*The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. e0196322

Page 8 of 10

Owner's Well Number MW-1

Date Work Began 12/16/2013 Date Work Ended 12/20/2013

Local Permit Agency Monterey County Health Department

Permit Number 13-12301 Permit Date 10/29/2013

DWR Use Only – Do Not Fill In

State Well Number/Site Number

N Latitude W Longitude

APN/TRS/Other

Geologic Log

Orientation ○ Vertical ○ Horizontal ○ Angle Specify

Drilling Method Drilling Fluid

Depth from Surface Feet	to Feet	Description Describe material, grain size, color, etc
362		(SP) 10YR 6/6 Yellowish brown medium coarse
		to coarse sand, dry
367		(SP) 10YR 6/6 Yellowish brown very fine sand, dry
369.5		(SP) 10YR 6/6 Yellowish brown very fine sand with
		trace medium coarse sand, dry
372		(SP) 10YR 6/6 Yellowish brown very fine sand, dry
389.5		(Sp) 10YR 6/6 Yellowish brown very fine silty sand
		(15/85), dry
391		(SM) 10YR 6/6 Yellowish brown very fine silty sand
		(30/70), dry
		(BOTTOM OF AROMAS SAND FORMATION)
392.5		(TOP OF PASO ROBLES FORMATION)
		(ML) 10YR 3/1 Very dark gray clayey silt, very
		dense, dry
393.5		(ML) 10YR 3/1 Very dark gray clayey silt, very
		dense, dry
407.5		(CL) 10YR 3/1 Very dark gray silty clay (50/50),
		very dense, dry
414		(ML) 10YR 4/3 Brown clayey silt, dry
415		(ML) 10YR 4/3 Brown fine to medium coarse sandy
		silt (30/70), dry
417.5		(ML) 10YR 4/3 Brown fine to medium coarse
		sandy silt (40/60), dry
420		(ML) 10YR 4/3 Brown fine to medium coarse
		sandy silt (30/70), dry
420.5		ML 10YR 4/3 Brown clayey fine sandy silt
		(20/20/60), dense, moist
422		(SM) 10YR 4/3 brown silty fine sand, loose, moist
423		(SP) 10YR 4/4 Dark yellowish brown silty fine
		sand, loose, moist

Total Depth of Boring 535 Feet

Total Depth of Completed Well 521 Feet

Well Owner

Name Monterey Regional Water Pollution Control Agency

Mailing Address 5 Harris Court, Building D

City Monterey State CA Zip 93940

Well Location

Address Eucalyptus Road (1,800' east of Gen. Jim Moore Blvd)

City Seaside County Monterey

Latitude 36 Deg. 37 Min. 22 Sec. N Longitude 121 Deg. 48 Min. 43 Sec. W

Datum NAD83 Dec. Lat. 36.62269 Dec. Long. 121.8119

APN Book 031 Page 151 Parcel 048000

Township 15S Range 1E Section

Location Sketch

(Sketch must be drawn by hand after form is printed.)

North

West East

South

Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. **Please be accurate and complete.**

Activity

- ◉ New Well
- ○ Modification/Repair
  - ○ Deepen
  - ○ Other
- ○ Destroy

Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

- ○ Water Supply
  - ☐ Domestic ☐ Public
  - ☐ Irrigation ☐ Industrial
- ○ Cathodic Protection
- ○ Dewatering
- ○ Heat Exchange
- ○ Injection
- ◉ Monitoring
- ○ Remediation
- ○ Sparging
- ○ Test Well
- ○ Vapor Extraction
- ○ Other

Water Level and Yield of Completed Well

Depth to first water 405 (Feet below surface)

Depth to Static Water Level (Feet) Date Measured

Estimated Yield * (GPM) Test Type

Test Length (Hours) Total Drawdown (Feet)

*May not be representative of a well's long term yield.

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)

Annular Material

Depth from Surface Feet	to Feet	Fill	Description

Attachments

- ☐ Geologic Log
- ☐ Well Construction Diagram
- ☐ Geophysical Log(s)
- ☐ Soil/Water Chemical Analyses
- ☐ Other

Attach additional information, if it exists.

Certification Statement

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name Edwin Lin, Todd Engineers

Person, Firm or Corporation

2490 Mariner Sq Loop, Ste, 215 Alameda CA 94501

Address City State Zip

Signed

C-57 Licensed Water Well Contractor Date Signed C-57 License Number 988110

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

CA Water Code § 13751

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State of California

Well Completion Report

Refer to Instruction Pamphlet

No. e0196323

Page 9 of 10

Owner's Well Number MW-1

Date Work Began 12/16/2013 Date Work Ended 12/20/2013

Local Permit Agency Monterey County Health Department

Permit Number 13-12301 Permit Date 10/29/2013

DWR Use Only – Do Not Fill In

State Well Number/Site Number

N Latitude W Longitude

APN/TRS/Other

Geologic Log

Orientation ○ Vertical ○ Horizontal ○ Angle Specify

Drilling Method Drilling Fluid

Depth from Surface Feet	to Feet	Description Describe material, grain size, color, etc
425.5		(SP) 10YR 4/4 Dark yellowish brown fine sand,
		loose, moist
433		(SP) 10YR 4/4 Dark yellowish brown silty fine
		sand, moist
435		(ML) 2.5YR 6/4 Light yellowish brown clayey silt,
		very dense
442.5		(SP) 10YR 5/4 Yellowish brown silty fine sand,
		moist
445		(ML) 5YR 5/2 Olive gray clayey silt, very dense
462.5		(ML) 5YR 5/2 Olive gray clayey silt, wet
464		(SM-SC) 5YR 5/3 Olive silty, clayey fine to medium
		coarse sand (30/10/60), wet
474		(SM) 5YR 5/3 Olive silty fine sand (40/60), wet
477		(SM-SC) 10YR 5/4 Yellowish brown silty, clayey
		fine sand (30/15/55)
478.5		(SM-SC) 10YR 5/4 Yellowish brown silty, clayey
		fine sand (20/20/60)
481		(SM-SC) 10YR 5/4 Yellowish brown silty, clayey
		fine to medium coarse sand (30/10/60), wet
482		(SM) 10YR 5/4 Yellowish brown silty fine to
		medium coarse sand (30/70), wet
488		(SM-SP) 10YR 5/4 Yellowish brown silty fine to
		medium coarse sand (20/80) with well-rounded
		chert cobbles up to 2 inches in diameter, wet
492		(SP) 10YR 5/4 Yellowish brown fine to medium
		coarse sand with trace silt
495.5		(SC) 10YR 5/4 Yellowish brown silty, clayey, fine
		to medium coarse sand (30/30/40)
497		(ML) 10YR 5/4 Yellowish brown fine sandy, clayey
		silt (20/20/60) with 3-5% rounded pebbles

Total Depth of Boring 535 Feet

Total Depth of Completed Well 521 Feet

Well Owner

Name Monterey Regional Water Pollution Control Agency

Mailing Address 5 Harris Court, Building D

City Monterey State CA Zip 93940

Well Location

Address Eucalyptus Road (1,800' east of Gen. Jim Moore Blvd)

City Seaside County Monterey

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APN Book 031 Page 151 Parcel 048000

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West East

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Activity

- ◉ New Well
- ○ Modification/Repair
  - ○ Deepen
  - ○ Other
- ○ Destroy

Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

- ○ Water Supply
  - ☐ Domestic ☐ Public
  - ☐ Irrigation ☐ Industrial
- ○ Cathodic Protection
- ○ Dewatering
- ○ Heat Exchange
- ○ Injection
- ◉ Monitoring
- ○ Remediation
- ○ Sparging
- ○ Test Well
- ○ Vapor Extraction
- ○ Other

Water Level and Yield of Completed Well

Depth to first water 405 (Feet below surface)

Depth to Static Water Level (Feet) Date Measured

Estimated Yield * (GPM) Test Type

Test Length (Hours) Total Drawdown (Feet)

*May not be representative of a well's long term yield.

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)

Annular Material

Depth from Surface Feet	to Feet	Fill	Description

Attachments

- ☐ Geologic Log
- ☐ Well Construction Diagram
- ☐ Geophysical Log(s)
- ☐ Soil/Water Chemical Analyses
- ☐ Other

Attach additional information, if it exists.

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Signed

C-57 Licensed Water Well Contractor

Date Signed

988110

C-57 License Number

DWR 188 REV. 1/2006

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Well Completion Report

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No. e0196324

Page 10 of 10

Owner's Well Number MW-1

Date Work Began 12/16/2013 Date Work Ended 12/20/2013

Local Permit Agency Monterey County Health Department

Permit Number 13-12301 Permit Date 10/29/2013

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State Well Number/Site Number

N Latitude W Longitude

APN/TRS/Other

Geologic Log

Orientation ○ Vertical ○ Horizontal ○ Angle Specify

Drilling Method Drilling Fluid

Depth from Surface Feet	to Feet	Description Describe material, grain size, color, etc
497.5		(ML) 10YR 5/4 Yellowish brown fine sandy,
		clayey silt (40/10/50), dense
498.5		(ML) 10YR 5/4 Yellowish brown fine sandy, clayey
		silt (30/20/50), dense
501		(ML) 10YR 5/4 Yellowish brown clayey silt
		(30/20/50), dense
506		(SP) 10YR 5/4 Yellowish brown fine to medium
		coarse sand with trace silt
507		(SW)10YR5/4 Yellowish brown fine to coarse sand
		with well-rounded chert pebbles up to 0.5 inch dia.
509.5		(SW) 10YR 5/4 Yellowish brown fine to coarse
		sand with well-rounded chert pebbles up to 2 inch
		diameter
512		(SW) 10YR 5/4 Yellowish brown fine to coarse
		sand
516		(SP) 10YR 5/4 Yellowish brown fine to medium
		coarse sand (30/10/60), wet
517		(ML) 5YR 6/2 Light olive gray silt/siltstone, very
		dense, semi-consolidated to consolidated
518.5		(CL) 5YR 6/2 Light olive gray sandy, silty clay
		(30/30/40)
519		(CL) 5YR 6/2 Light olive gray sandy, silty clay
		(30/30/40) with grayish white deposits of volcanic
		ash (reactive to acid, indicating calcium carbonate)
519.5		(ML) 5YR 5/2 Olive gray fine sandy siltstone,
		semi-consolidated to consolidated
522	535	(ML) 5YR 5/2 Olive gray sandy, silty clay
		(30/30/40) with grayish white deposits of volcanic
		ash (reactive to acid,indicating calcium carbonate);
		fragments are large as 6-inch diameter (530-531.5)

Total Depth of Boring 535 Feet

Total Depth of Completed Well 521 Feet

Well Owner

Name Monterey Regional Water Pollution Control Agency

Mailing Address 5 Harris Court, Building D

City Monterey State CA Zip 93940

Well Location

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- ◉ New Well
- ○ Modification/Repair
  - ○ Deepen
  - ○ Other
- ○ Destroy

Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

- ○ Water Supply
  - ☐ Domestic ☐ Public
  - ☐ Irrigation ☐ Industrial
- ○ Cathodic Protection
- ○ Dewatering
- ○ Heat Exchange
- ○ Injection
- ◉ Monitoring
- ○ Remediation
- ○ Sparging
- ○ Test Well
- ○ Vapor Extraction
- ○ Other

Water Level and Yield of Completed Well

Depth to first water 405 (Feet below surface)

Depth to Static Water Level (Feet) Date Measured

Estimated Yield * (GPM) Test Type

Test Length (Hours) Total Drawdown (Feet)

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Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)

Annular Material

Depth from Surface Feet	to Feet	Fill	Description

Attachments

- ☐ Geologic Log
- ☐ Well Construction Diagram
- ☐ Geophysical Log(s)
- ☐ Soil/Water Chemical Analyses
- ☐ Other

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DWR 188 REV. 1/2006

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© CA Water Code § 13752

APPENDIX D

Cooper Testing Laboratory Reports and Chain-of-Custody Form

(Soil Hydraulic Analysis)

Total and Effective Porosity Report
(API RP40 and ASTM D6836m)

Job No: 148-012a **Project No.:** 60408
Client: Todd Engineers **Date:** 1/6/14
Project Name: Monterey Regional WPCA Monitoring Well **By:** PJ

Boring:	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1
Sample:								
Depth, ft:	27.5-30.0	58.0-60.5	98.5-101.0	124.5-127.0	139.5-142.0	174.5-177.0	197.0-200.0	223.0-225.5
Visual Description:	Yellow SAND, trace Silt	Yellow SAND w/ Silt	Yellow SAND w/ Silt	Yellow SAND w/ Silt	Yellow SAND w/ Silt	Yellow SAND w/ Silt	Yellow SAND w/ Silt	Yellow SAND w/ Silt
Total Porosity, %	46.3	47.0	46.0	44.6	42.6	46.2	44.3	44.7
Effective Porosity, %	39.8	36.7	39.9	37.5	29.5	40.3	36.4	31.1
Air-filled Porosity, %	37.9	39.3	39.1	37.6	33.4	40.8	40.4	39.7
Water-filled Porosity, %	8.3	7.7	6.9	7.0	9.2	5.4	3.9	5.0
Specific Gravity	2.64	2.65	2.64	2.65	2.64	2.64	2.64	2.67
Saturation, %	18.0	16.3	14.9	15.6	21.7	11.6	8.8	11.1
Moisture, %	5.9	5.5	4.8	4.7	6.1	3.8	2.6	3.4
Wet Unit wt, pcf	93.8	92.4	93.2	96.1	100.5	92.2	94.4	95.4
Dry Unit wt, pcf	88.6	87.6	89.0	91.8	94.8	88.9	91.9	92.3
Dry Unit wt, g/c	1.42	1.40	1.42	1.47	1.52	1.42	1.47	1.48
Series	1	2	3	4	5	6	7	8

Note: All reported values above are for the "as received" condition except for the effective porosity which is measured at a tension of 1/3 Bar.

The Zero Air-Voids curves represent the dry density at 100% saturation for each value of specific gravity

COOPER TESTING LABORATORY

Total and Effective Porosity Report
(API RP40 and ASTM D6836m)

Job No: 148-012b **Project No.:** 60408
Client: Todd Engineers **Date:** 1/15/14
Project Name: Monterey Regional WPCA Monitoring Well **By:** PJ

Boring:	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	
Sample:								
Depth, ft:	259.5-262.0	274.5-277.0	298.5-301.0	324.5-327.0	349.5-352.0	357.0-359.5	377.0-379.5	
Visual Description:	Yellow SAND w/ Silt	Yellow SAND w/ Silt	Light Gray Clayey SAND	Light Yellowish Brown Clayey SAND	Yellow SAND w/ Clay	Very Pale Brown SAND, trace Silt	Very Pale Brown Silty SAND	
Total Porosity, %	47.5	46.0	44.0	33.7	41.5	39.8	49.5	
Effective Porosity, %	35.3	34.6	4.1	13.1	26.0	27.7	24.3	
Air-filled Porosity, %	38.9	38.2	3.9	12.7	26.3	29.1	40.8	
Water-filled Porosity, %	8.6	7.7	40.2	21.1	15.2	10.7	8.7	
Specific Gravity	2.65	2.65	2.65	2.68	2.64	2.64	2.68	
Saturation, %	18.1	16.8	91.2	62.5	36.6	26.9	17.6	
Moisture, %	6.2	5.4	27.1	11.9	9.8	6.7	6.4	
Wet Unit wt, pcf	92.3	94.1	117.7	123.9	106.0	106.1	90.2	
Dry Unit wt, pcf	86.9	89.3	92.6	110.7	96.5	99.4	84.7	
Dry Unit wt, g/c	1.39	1.43	1.48	1.77	1.54	1.59	1.36	
Series	1	2	3	4	5	6	7	8

Note: All reported values above are for the "as received" condition except for the effective porosity which is measured at a tension of 1/3 Bar.

The Zero Air-Voids curves represent the dry density at 100% saturation for each value of specific gravity

Specific Gravity by Pycnometer
ASTM D 854

CTL Job#:	148-012a	**Project Name:**	Monterey Reginal Water Pollution Control	**Date:**	01/02/14
Client:	Todd Engineers	**Project No.:**	60408	**Run By:**	MD
				Checked	DC

Boring:	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1
Sample:								
Depth, ft.:	27.5-30.0	58.0-60.5	98.5-101.0	124.5-127.0	139.5-142.0	174.5-177.0	197.0-200.0	223.0-225.5
Pan No.:								
Soil Description (visual)	Yellow SAND, trace Silt	Yellow SAND w/ Silt	Yellow SAND w/ Silt	Yellow SAND w/ Silt	Yellow SAND w/ Silt	Yellow SAND w/ Silt	Yellow SAND w/ Silt	Yellow SAND w/ Silt
Pycnometer ID:	3	6	E	F	3	6	E	F
Mass of Clean, Dry Pycnometer (g):	166.26	164.22	171.63	173.67	166.25	164.22	171.63	173.67
Mass of Pycnometer, Soil, and Water (g):	746.78	740.94	742.94	765.38	750.56	793.53	768.08	753.83
Temperature of Slurry (°C):	20.1	20.1	20.1	20.1	20.9	20.9	20.9	20.9
Tare ID:								
Mass of Tare (g):	227.80	232.53	229.26	229.62	229.40	227.86	232.65	229.66
Mass of Dry Soil and Tare (g):	359.73	358.03	346.34	379.33	367.40	438.14	390.07	360.40
Mass of Dry Soil (g):	131.93	125.50	117.08	149.71	138.00	210.28	157.42	130.74
Mass of Pycnometer and Water at Test Temp (g):	664.86	662.89	670.28	672.14	664.77	662.80	670.19	672.05
Specific Gravity @ Test Temp:	2.638	2.645	2.636	2.651	2.643	2.643	2.644	2.670
Specific Gravity @ 20 °C:	**2.638**	**2.645**	**2.636**	**2.651**	**2.643**	**2.643**	**2.644**	**2.670**

Specific Gravity by Pycnometer
ASTM D 854

CTL Job#:	148-012b			**Project Name:**	Monterey Regional WPCA Monitoring Well		**Date:**	01/10/14
Client:	Todd Engineers			**Project No.:**	60408		**Run By:**	MD
							Checked	DC
Boring:	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	
Sample:								
Depth, ft.:	259.5-262.0	274.5-277.0	298.5-301.0	324.5-327.0	349.5-352.0	357.0-359.5	377.0-379.5	
Pan No.:								
Soil Description (visual)	Yellow SAND w/ Silt	Yellow SAND w/ Silt	Light Gray Clayey SAND	Light Yellowish Brown Clayey SAND	Yellow SAND w/ Clay	Very Pale Brown SAND, trace Silt	Very Pale Brown Silty SAND	
Pycnometer ID:	3	6	E	F	3	6	E	
Mass of Clean, Dry Pycnometer (g):	166.25	164.22	171.63	173.67	166.25	164.22	171.63	
Mass of Pycnometer, Soil, and Water (g):	761.03	741.28	735.79	770.73	757.92	746.50	743.28	
Temperature of Slurry (°C):	21.5	21.5	21.5	21.5	21.2	21.2	21.2	
Tare ID:								
Mass of Tare (g):	224.07	225.38	232.67	227.89	224.03	232.65	225.32	
Mass of Dry Soil and Tare (g):	378.78	351.62	338.16	385.54	374.03	367.36	341.85	
Mass of Dry Soil (g):	154.71	126.24	105.49	157.65	150.00	134.71	116.53	
Mass of Pycnometer and Water at Test Temp (g):	664.71	662.74	670.13	671.99	664.74	662.77	670.16	
Specific Gravity @ Test Temp:	2.650	2.647	2.649	2.676	2.640	2.643	2.685	
Specific Gravity @ 20 °C:	**2.649**	**2.646**	**2.648**	**2.675**	**2.639**	**2.642**	**2.684**	

Constant Head Permeability Test
ASTM D 2434

CTL Job No:	148-012	**Boring:**	MW-1	**Date:**	1/21/2014
Client:	Todd Engineers	**Sample:**	27.5-30	**By:**	PJ
Project Name:	Monterey Reginal WPCA	**Depth, ft:**			
Project No.:	60408				

Soil Description: Yellow SAND, trace Silt

Remolding Data: Undisturbed

		Constant Head Calculation, K=QL/thA				
Test #	**Elapsed Time t, (sec)**	**Volume Q, (cc)**	**Head Loss h (cm)**	**Water Temp (°C)**	**Hydraulic Gradient**	**Coef. Of Permeability K, (cm/sec)**
1	250	38	1.1	19.7	0.14	0.0364
2	300	45	1.1	19.7	0.14	0.0359
3	300	46	1.1	19.7	0.14	0.0367
4	185	28	1.1	19.7	0.14	0.0362
5	120	28	1.6	19.7	0.21	0.0384

Average Permeability (cm/sec):	**4.E-02**
Average Permeability (in/hr):	**52**

Sample Data:		**Initial**	**Final**
Height, (L)	**in.:**	5.00	4.74
Diameter,	**in.:**	2.40	2.40
Area, (A)	**in^2:**	4.52	4.52
Volume,	**in^3:**	22.62	21.44
Total Volume.	**cc:**	371	351
Vol. of Solids,	**cc:**	209	209
Vol. of Voids,	**cc:**	162	143
Void Ratio	**e:**	0.77	0.68
Porosity,	**%:**	43.6	40.6
Saturation,	**%:**	25.6	100.0
Sp. Gravity:		2.64	2.64
Wet Weight,	**gm:**	592.4	693.6
Dry Weight	**gm:**	551.1	551.1
Moisture,	**%:**	7.5	25.9
Density,	**pcf:**	92.8	97.9

Remarks: A significant amount of fines migrated out of the sample during the saturation and testing phases. The migration of fines can have a significant impact on the permeability.

Constant Head Permeability Test
ASTM D 2434

CTL Job No:	148-012	**Boring:**	MW-1	**Date:**	1/21/2014
Client:	Todd Engineers	**Sample:**		**By:**	PJ
Project Name:	Monterey Regional WPCA	**Depth, ft:**	58-60.5		
Project No.:	60408				

Soil Description: Yellow SAND w/ Silt

Remolding Data: Undisturbed

		Constant Head Calculation, K=QL/thA				
Test #	**Elapsed Time t, (sec)**	**Volume Q, (cc)**	**Head Loss h (cm)**	**Water Temp (°C)**	**Hydraulic Gradient**	**Coef. Of Permeability K, (cm/sec)**
1	190	9	0.9	20.2	0.12	0.0131
2	190	9	0.9	20.2	0.12	0.0134
3	270	12	0.8	20.2	0.10	0.0144
4	190	9	0.8	20.2	0.10	0.0152
5	195	9	0.8	20.2	0.10	0.0157
6	1260	80	1.1	20.2	0.14	0.0150
				Average Permeability (cm/sec):		**1.E-02**
				Average Permeability (in/hr):		**20**

Sample Data:		**Initial**	**Final**
Height, (L)	**in.:**	4.86	4.28
Diameter,	**in.:**	2.40	2.40
Area, (A)	**in^2:**	4.52	4.52
Volume,	**in^3:**	21.96	19.38
Total Volume.	**cc:**	360	318
Vol. of Solids,	**cc:**	181	181
Vol. of Voids,	**cc:**	178	136
Void Ratio	**e:**	0.98	0.75
Porosity,	**%:**	49.6	42.9
Saturation,	**%:**	24.1	100.0
Sp. Gravity:		2.65	2.65
Wet Weight,	**gm:**	523.0	616.0
Dry Weight	**gm:**	479.9	479.9
Moisture,	**%:**	9.0	28.4
Density,	**pcf:**	83.2	94.3

Remarks: A significant amount of fines migrated out of the sample during the saturation and testing phases. The migration of fines can have a significant impact on the permeability.

Constant Head Permeability Test
ASTM D 2434

CTL Job No:	148-012	**Boring:**	MW-1	**Date:**	1/21/2014
Client:	Todd Engineers	**Sample:**		**By:**	PJ
Project Name:	Monterey Regional WPCA	**Depth, ft:**	98.5-101.0		
Project No.:	60408				

Soil Description: Yellow SAND w/ Silt

Remolding Data: Undisturbed

		Constant Head Calculation, K=QL/thA				
Test #	**Elapsed Time t, (sec)**	**Volume Q, (cc)**	**Head Loss h (cm)**	**Water Temp (°C)**	**Hydraulic Gradient**	**Coef. Of Permeability K, (cm/sec)**
1	330	29	1.1	20.1	0.14	0.0146
2	320	35	1.1	20.1	0.14	0.0181
3	310	30	0.9	20.1	0.12	0.0186
4	640	66	0.9	19.9	0.12	0.0199
5	500	55	1.0	19.8	0.13	0.0202
6	1260	72	0.5	19.7	0.07	0.0210
				Average Permeability (cm/sec):		**2.E-02**
				Average Permeability (in/hr):		**27**

Sample Data:		**Initial**	**Final**
Height, (L)	**in.:**	4.63	4.10
Diameter,	**in.:**	2.87	2.87
Area, (A)	**in^2:**	6.47	6.47
Volume,	**in^3:**	29.92	26.52
Total Volume.	**cc:**	490	435
Vol. of Solids,	**cc:**	177	177
Vol. of Voids,	**cc:**	313	258
Void Ratio	**e:**	1.77	1.45
Porosity,	**%:**	63.9	59.3
Saturation,	**%:**	9.4	54.8
Sp. Gravity:		2.64	2.64
Wet Weight,	**gm:**	496.2	608.0
Dry Weight	**gm:**	466.9	466.9
Moisture,	**%:**	6.3	30.2
Density,	**pcf:**	59.4	67.0

Remarks: A significant amount of fines migrated out of the sample during the saturation and testing phases. The migration of fines can have a significant impact on the permeability.

Constant Head Permeability Test
ASTM D 2434

CTL Job No:	148-012	**Boring:**	MW-1	**Date:**	1/21/2014
Client:	Todd Engineers	**Sample:**		**By:**	PJ
Project Name:	Monterey Regional WPCA	**Depth, ft:**	124.5-127		
Project No.:	60408				

Soil Description: Yellow SAND w/ Silt

Remolding Data: Undisturbed

		Constant Head Calculation, K=QL/thA				
Test #	**Elapsed Time t, (sec)**	**Volume Q, (cc)**	**Head Loss h (cm)**	**Water Temp (^oC)**	**Hydraulic Gradient**	**Coef. Of Permeability K, (cm/sec)**
1	361	57	1.2	21.3	0.19	0.0277
2	270	43	1.2	21.3	0.19	0.0280
3	400	63	1.2	21.3	0.19	0.0277
4	160	25	1.2	21.3	0.19	0.0275
				Average Permeability (cm/sec):		**3.E-02**
				Average Permeability (in/hr):		**39**

Sample Data:		**Initial**	**Final**
Height, (L)	**in.:**	5.35	5.09
Diameter,	**in.:**	2.40	2.40
Area, (A)	**in^2:**	4.52	4.52
Volume,	**in^3:**	24.20	23.03
Total Volume.	**cc:**	397	377
Vol. of Solids,	**cc:**	211	211
Vol. of Voids,	**cc:**	186	166
Void Ratio	**e:**	0.88	0.79
Porosity,	**%:**	46.8	44.1
Saturation,	**%:**	13.6	100.0
Sp. Gravity:		2.65	2.65
Wet Weight,	**gm:**	584.3	725.4
Dry Weight	**gm:**	559.0	559.0
Moisture,	**%:**	4.5	29.8
Density,	**pcf:**	87.9	92.4

Remarks: A significant amount of fines migrated out of the sample during the saturation and testing phases. The migration of fines can have a significant impact on the permeability.

Constant Head Permeability Test
ASTM D 2434

CTL Job No:	148-012	**Boring:**	MW-1	**Date:**	1/21/2014
Client:	Todd Engineers	**Sample:**		**By:**	PJ
Project Name:	Monterey Regional WPCA	**Depth, ft:**	139.5-142.0		
Project No.:	60408				

Soil Description: Yellow SAND w/ Silt

Remolding Data: Undisturbed

		Constant Head Calculation, K=QL/thA				
Test #	**Elapsed Time t, (sec)**	**Volume Q, (cc)**	**Head Loss h (cm)**	**Water Temp (°C)**	**Hydraulic Gradient**	**Coef. Of Permeability K, (cm/sec)**
1	125	7	1.2	19.8	0.19	0.0108
2	125	8	1.2	19.8	0.19	0.0115
3	140	9	1.2	19.8	0.19	0.0117
4	126	8	1.2	19.8	0.19	0.0122
5	144	10	1.2	19.8	0.19	0.0127
6	156	11	1.2	19.8	0.19	0.0134
				Average Permeability (cm/sec):		**1.E-02**
				Average Permeability (in/hr):		**17**

Sample Data:		**Initial**	**Final**
Height, (L)	**in.:**	5.40	4.98
Diameter,	**in.:**	2.40	2.40
Area, (A)	**in^2:**	4.51	4.51
Volume,	**in^3:**	24.37	22.47
Total Volume.	**cc:**	399	368
Vol. of Solids,	**cc:**	217	217
Vol. of Voids,	**cc:**	182	151
Void Ratio	**e:**	0.84	0.69
Porosity,	**%:**	45.5	41.0
Saturation,	**%:**	18.9	100.0
Sp. Gravity:		2.64	2.64
Wet Weight,	**gm:**	609.1	725.5
Dry Weight	**gm:**	574.7	574.7
Moisture,	**%:**	6.0	26.2
Density,	**pcf:**	89.8	97.4

Remarks: A significant amount of fines migrated out of the sample during the saturation and testing phases. The migration of fines can have a significant impact on the permeability.

Constant Head Permeability Test
ASTM D 2434

CTL Job No:	148-012	**Boring:**	MW-1	**Date:**	1/21/2014
Client:	Todd Engineers	**Sample:**		**By:**	PJ
Project Name:	Monterey Regional WPCA	**Depth, ft:**	174.5-177.0		
Project No.:	60408				

Soil Description: Yellow SAND w/ Silt

Remolding Data: Undisturbed

		Constant Head Calculation, K=QL/thA				
Test #	**Elapsed Time t, (sec)**	**Volume Q, (cc)**	**Head Loss h (cm)**	**Water Temp (^oC)**	**Hydraulic Gradient**	**Coef. Of Permeability K, (cm/sec)**
1	90	4	0.4	20.3	0.06	0.0217
2	125	8	0.8	20.3	0.12	0.0176
3	120	7	0.7	20.3	0.11	0.0180
4	155	9	0.7	20.3	0.11	0.0184
5	155	9	0.7	20.3	0.11	0.0184
6	75	9	1.7	20.3	0.27	0.0160
				Average Permeability (cm/sec):		**2.E-02**
				Average Permeability (in/hr):		**26**

Sample Data:		**Initial**	**Final**
Height, (L)	**in.:**	5.17	4.85
Diameter,	**in.:**	2.40	2.40
Area, (A)	**in^2:**	4.51	4.51
Volume,	**in^3:**	23.33	21.88
Total Volume.	**cc:**	382	358
Vol. of Solids,	**cc:**	204	204
Vol. of Voids,	**cc:**	178	154
Void Ratio	**e:**	0.87	0.75
Porosity,	**%:**	46.6	43.0
Saturation,	**%:**	10.7	100.0
Sp. Gravity:		2.64	2.64
Wet Weight,	**gm:**	559.1	694.2
Dry Weight	**gm:**	540.0	540.0
Moisture,	**%:**	3.5	28.6
Density,	**pcf:**	88.1	94.0

Remarks: A significant amount of fines migrated out of the sample during the saturation and testing phases. The migration of fines can have a significant impact on the permeability.

Constant Head Permeability Test
ASTM D 2434

CTL Job No:	148-012	**Boring:**		**Date:**	1/21/2014
Client:	Todd Engineers	**Sample:**	MW-1	**By:**	PJ
Project Name:	Monterey Regional WPCA	**Depth, ft:**	197.0-200.0		
Project No.:	60408				

Soil Description: Yellow SAND w/ Silt

Remolding Data: Undisturbed

		Constant Head Calculation, K=QL/thA				
Test #	**Elapsed Time t, (sec)**	**Volume Q, (cc)**	**Head Loss h (cm)**	**Water Temp (°C)**	**Hydraulic Gradient**	**Coef. Of Permeability K, (cm/sec)**
1	200	36	0.8	18.7	0.13	0.0507
2	470	86	0.7	18.7	0.11	0.0589
3	440	81	0.7	18.7	0.11	0.0592
4	375	69	0.7	18.7	0.11	0.0592
5	585	107	0.7	18.7	0.11	0.0589
		Average Permeability (cm/sec):				**6.E-02**
		Average Permeability (in/hr):				**81**

Sample Data:		**Initial**	**Final**
Height, (L)	**in.:**	5.20	4.99
Diameter,	**in.:**	2.40	2.40
Area, (A)	**in^2:**	4.51	4.51
Volume,	**in^3:**	23.47	22.51
Total Volume.	**cc:**	385	369
Vol. of Solids,	**cc:**	210	210
Vol. of Voids,	**cc:**	175	159
Void Ratio	**e:**	0.84	0.76
Porosity,	**%:**	45.5	43.2
Saturation,	**%:**	6.5	100.0
Sp. Gravity:		2.64	2.64
Wet Weight,	**gm:**	565.4	713.4
Dry Weight	**gm:**	554.0	554.0
Moisture,	**%:**	2.1	28.8
Density,	**pcf:**	89.9	93.7

Remarks: A significant amount of fines migrated out of the sample during the saturation and testing phases. The migration of fines can have a significant impact on the permeability.

Constant Head Permeability Test
ASTM D 2434

CTL Job No:	148-012	**Boring:**		**Date:**	1/21/2014
Client:	Todd Engineers	**Sample:**	MW-1	**By:**	PJ
Project Name:	Monterey Regional WPCA	**Depth, ft:**	223.0-225.5		
Project No.:	60408				

Soil Description: Yellow SAND W/ Silt

Remolding Data: Undisturbed

		Constant Head Calculation, K=QL/thA				
Test #	**Elapsed Time t, (sec)**	**Volume Q, (cc)**	**Head Loss h (cm)**	**Water Temp (°C)**	**Hydraulic Gradient**	**Coef. Of Permeability K, (cm/sec)**
1	290	48	0.8	20.3	0.13	0.0448
2	90	15	0.9	20.3	0.14	0.0401
3	105	18	0.9	20.3	0.15	0.0391
4	160	26	0.9	20.3	0.14	0.0391
5	515	84	0.9	20.3	0.14	0.0393
6	90	15	0.9	20.3	0.14	0.0401
7	60	11	1.1	20.3	0.17	0.0361
8	60	11	1.2	20.3	0.19	0.0331
9	60	14	1.5	20.3	0.24	0.0337
		Average Permeability (cm/sec):				**4.E-02**
		Average Permeability (in/hr):				**54**

Sample Data:		**Initial**	**Final**
Height, (L)	**in.:**	5.29	5.17
Diameter,	**in.:**	2.40	2.40
Area, (A)	**in^2:**	4.51	4.51
Volume,	**in^3:**	23.89	23.33
Total Volume.	**cc:**	391	382
Vol. of Solids,	**cc:**	214	214
Vol. of Voids,	**cc:**	178	169
Void Ratio	**e:**	0.83	0.79
Porosity,	**%:**	45.4	44.1
Saturation,	**%:**	9.8	100.0
Sp. Gravity:		2.67	2.67
Wet Weight,	**gm:**	588.3	739.4
Dry Weight	**gm:**	570.9	570.9
Moisture,	**%:**	3.1	29.5
Density,	**pcf:**	91.0	93.2

Remarks: A significant amount of fines migrated out of the sample during the saturation and testing phases. The migration of fines can have a significant impact on the permeability.

Constant Head Permeability Test
ASTM D 2434

CTL Job No:	148-012	**Boring:**	MW-1	**Date:**	1/21/2014
Client:	Todd Engineers	**Sample:**		**By:**	PJ
Project Name:	Monterey Regional WPCA	**Depth, ft:**	259.5-262.0		
Project No.:	60408				

Soil Description: Yellow SAND w/ Silt

Remolding Data: Undisturbed

		Constant Head Calculation, K=QL/thA				
Test #	**Elapsed Time t, (sec)**	**Volume Q, (cc)**	**Head Loss h (cm)**	**Water Temp (^oC)**	**Hydraulic Gradient**	**Coef. Of Permeability K, (cm/sec)**
1	120	6	1.3	20.4	0.20	0.0080
2	120	6	1.2	20.4	0.19	0.0093
3	130	7	1.2	20.4	0.19	0.0098
4	130	7	1.2	20.4	0.19	0.0102
5	70	5	1.2	20.3	0.19	0.0124
6	65	7	1.8	20.3	0.28	0.0126
7	90	8	1.8	20.3	0.28	0.0104
8	80	7	1.8	20.3	0.28	0.0108
		Average Permeability (cm/sec):				**1.E-02**
		Average Permeability (in/hr):				**15**

Sample Data:		**Initial**	**Final**
Height, (L)	**in.:**	5.27	4.98
Diameter,	**in.:**	2.40	2.40
Area, (A)	**in^2:**	4.51	4.51
Volume,	**in^3:**	23.76	22.48
Total Volume.	**cc:**	389	368
Vol. of Solids,	**cc:**	212	212
Vol. of Voids,	**cc:**	178	157
Void Ratio	**e:**	0.84	0.74
Porosity,	**%:**	45.6	42.5
Saturation,	**%:**	18.4	100.0
Sp. Gravity:		2.65	2.65
Wet Weight,	**gm:**	593.4	717.5
Dry Weight	**gm:**	560.8	560.8
Moisture,	**%:**	5.8	27.9
Density,	**pcf:**	89.9	95.0

Remarks: A significant amount of fines migrated out of the sample during the saturation and testing phases. The migration of fines can have a significant impact on the permeability.

Constant Head Permeability Test
ASTM D 2434

CTL Job No:	148-012	**Boring:**	MW-1	**Date:**	1/21/2014
Client:	Todd Engineers	**Sample:**		**By:**	PJ
Project Name:	Monterey Regional WPCA	**Depth, ft:**	274.5-277		
Project No.:	60408				

Soil Description: Yellow SAND w/ Silt

Remolding Data: Undisturbed

		Constant Head Calculation, K=QL/thA				
Test #	**Elapsed Time t, (sec)**	**Volume Q, (cc)**	**Head Loss h (cm)**	**Water Temp (^oC)**	**Hydraulic Gradient**	**Coef. Of Permeability K, (cm/sec)**
1	120	9	1.2	19.7	0.19	0.0140
2	120	9	1.2	19.7	0.19	0.0140
3	125	10	1.2	19.7	0.19	0.0141
4	80	6	1.2	19.7	0.19	0.0147
				Average Permeability (cm/sec):		**1.E-02**
				Average Permeability (in/hr):		**20**

Sample Data:		**Initial**	**Final**
Height, (L)	**in.:**	5.07	4.45
Diameter,	**in.:**	2.40	2.40
Area, (A)	**in^2:**	4.51	4.51
Volume,	**in^3:**	22.87	20.09
Total Volume.	**cc:**	375	329
Vol. of Solids,	**cc:**	201	201
Vol. of Voids,	**cc:**	174	128
Void Ratio	**e:**	0.86	0.64
Porosity,	**%:**	46.4	38.9
Saturation,	**%:**	16.9	100.0
Sp. Gravity:		2.65	2.65
Wet Weight,	**gm:**	561.3	660.0
Dry Weight	**gm:**	531.9	531.9
Moisture,	**%:**	5.5	24.1
Density,	**pcf:**	88.6	100.8

Remarks: A significant amount of fines migrated out of the sample during the saturation and testing phases. The migration of fines can have a significant impact on the permeability.

Hydraulic Conductivity
ASTM D 5084
Method C: Falling Head Rising Tailwater

Job No:	148-012	**Boring:**	MW-1	**Date:**	01/21/14
Client:	Todd Engineers	**Sample:**		**By:**	MD/PJ
Project:	60408	**Depth, ft.:**	297-298.5	**Remolded:**	

Visual Classification: Pale Yellow Sandy CLAY/ Clayey SAND

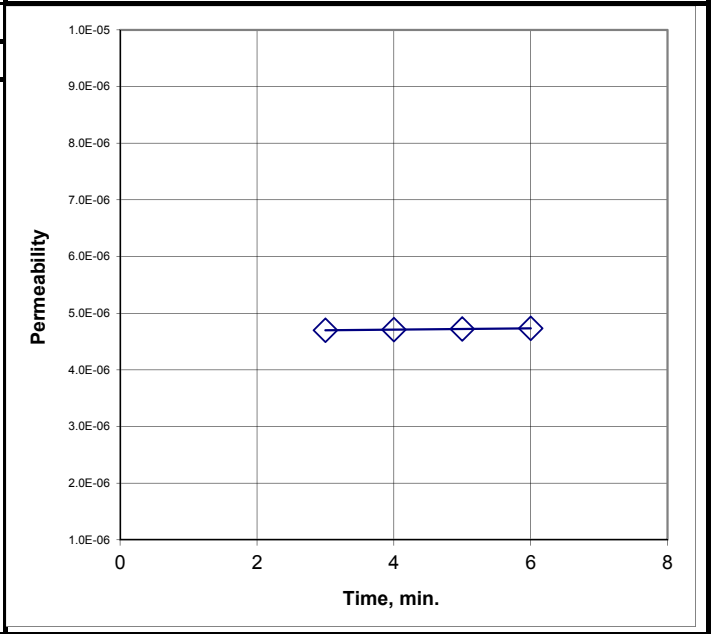
Max Sample Pressures, psi:

Cell:	Bottom	Top	Avg. Sigma3
64	59.5	58.5	5

B: = >0.95 **("B" is an indication of saturation)**

Max Hydraulic Gradient: = 21

Date	Minutes	Head, (in)	K,cm/sec
1/16/2014	0.00	42.69	**Start of Test**
1/16/2014	3.00	42.09	4.7E-06
1/16/2014	4.00	41.89	4.7E-06
1/16/2014	5.00	41.69	4.7E-06
1/16/2014	6.00	41.49	4.7E-06



Average Hydraulic Conductivity: 5.E-06 cm/sec

Sample Data:	Initial (As-Received)		Final (At-Test)
Height, in	2.00		2.01
Diameter, in	2.41		2.41
Area, in2	4.55		4.56
Volume in3	9.11		9.17
Total Volume, cc	149.3		150.3
Volume Solids, cc	59.7		59.7
Volume Voids, cc	89.6		90.6
Void Ratio	1.5		1.5
Total Porosity, %	60.0		60.3
Air-Filled Porosity (θa),%	17.3		2.6
Water-Filled Porosity (θw),%	42.8		57.7
Saturation, %	71.2		95.6
Specific Gravity	2.70	Assumed	2.70
Wet Weight, gm	224.9		247.7
Dry Weight, gm	161.1		161.1
Tare, gm	0.00		0.00
Moisture, %	39.6		53.8
Wet Bulk Density, pcf	94.0		102.9
Dry Bulk Density, pcf	67.3		66.9
Wet Bulk Dens.ρb, (g/cm^3)	1.51		1.65
Dry Bulk Dens.ρb, (g/cm^3)	1.08		1.07

Remarks: Moderate patching required during sample preparation. Fines apparently migrated within the sample during testing and were being trapped in the filter paper causing the measured permability to continue dropping. The data reported reflect the best estimate of this sample's permeability.

Hydraulic Conductivity
ASTM D 5084
Method C: Falling Head Rising Tailwater

Job No:	148-012	**Boring:**	MW-1	**Date:**	01/21/14
Client:	Todd Engineers	**Sample:**		**By:**	MD/PJ
Project:	60408	**Depth, ft.:**	298.5-301	**Remolded:**	

Visual Classification: Light Gray Clayey SAND

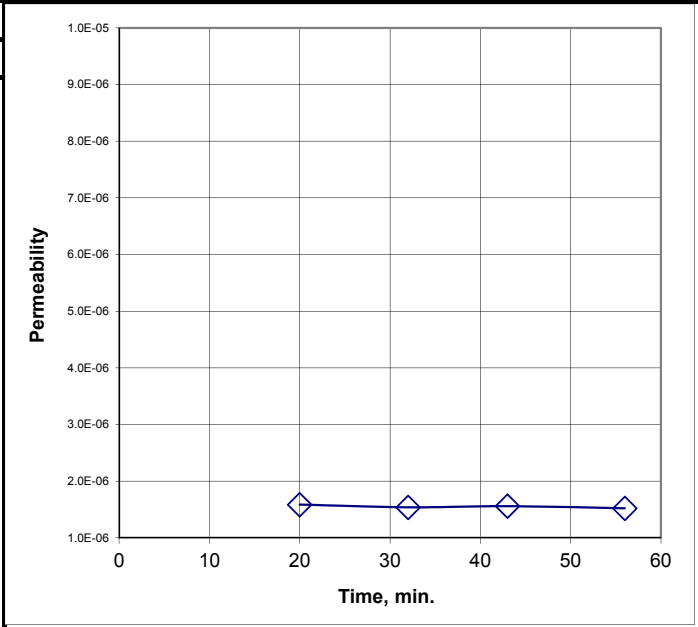
Max Sample Pressures, psi:

Cell:	Bottom	Top	Avg. Sigma3
64	59.5	58.5	5

B: = >0.95 **("B" is an indication of saturation)**

Max Hydraulic Gradient: = 21

Date	Minutes	Head, (in)	K,cm/sec
1/16/2014	0.00	42.69	**Start of Test**
1/16/2014	20.00	41.39	1.6E-06
1/16/2014	32.00	40.69	1.5E-06
1/16/2014	43.00	39.99	1.6E-06
1/16/2014	56.00	39.29	1.5E-06



Average Hydraulic Conductivity: 2.E-06 cm/sec

Sample Data:	Initial (As-Received)	Final (At-Test)
Height, in	2.00	2.01
Diameter, in	2.37	2.38
Area, in2	4.41	4.43
Volume in3	8.83	8.90
Total Volume, cc	144.7	145.9
Volume Solids, cc	77.7	77.7
Volume Voids, cc	67.1	68.3
Void Ratio	0.9	0.9
Total Porosity, %	46.3	46.8
Air-Filled Porosity (θa),%	5.6	1.9
Water-Filled Porosity (θw),%	40.7	44.9
Saturation, %	87.9	95.9
Specific Gravity	2.65	2.65
Wet Weight, gm	264.6	271.1
Dry Weight, gm	205.7	205.7
Tare, gm	0.00	0.00
Moisture, %	28.7	31.8
Wet Bulk Density, pcf	114.1	115.9
Dry Bulk Density, pcf	88.7	87.9
Wet Bulk Dens.ρb, (g/cm^3)	1.83	1.86
Dry Bulk Dens.ρb, (g/cm^3)	1.42	1.41

Remarks: Moderate patching required during sample preparation.

Hydraulic Conductivity
ASTM D 5084
Method C: Falling Head Rising Tailwater

Job No:	148-012	**Boring:**	MW-1	**Date:**	01/21/14
Client:	Todd Engineers	**Sample:**		**By:**	MD/PJ
Project:	60408	**Depth, ft.:**	324.5-327	**Remolded:**	

Visual Classification: Light Yellowish Brown Clayey SAND

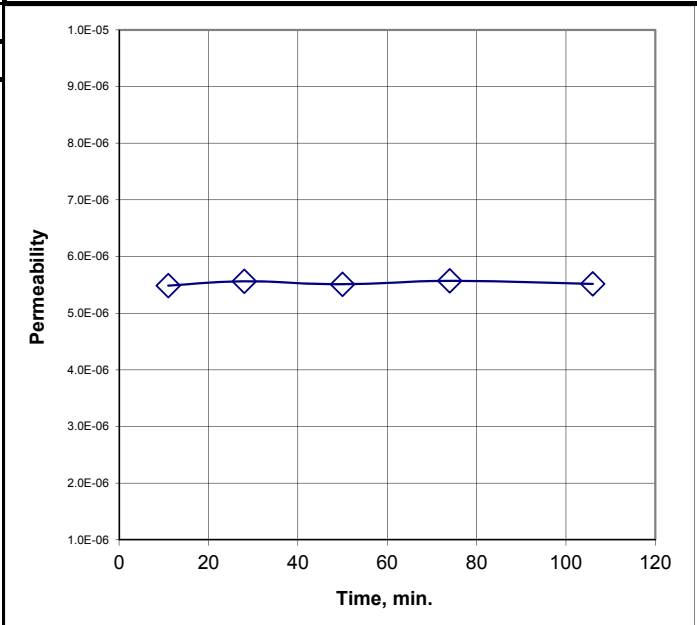
Max Sample Pressures, psi:

Cell:	Bottom	Top	Avg. Sigma3
73.5	68.5	68.5	5

B: = >0.95 **("B" is an indication of saturation)**

Max Hydraulic Gradient: = 5

Date	Minutes	Head, (in)	K,cm/sec
1/1/2014	0.00	15.00	**Start of Test**
1/1/2014	11.00	14.40	5.5E-06
1/1/2014	28.00	13.50	5.6E-06
1/1/2014	50.00	12.45	5.5E-06
1/1/2014	74.00	11.35	5.6E-06
1/1/2014	106.00	10.10	5.5E-06



Average Hydraulic Conductivity: 6.E-06 cm/sec

Sample Data:	Initial (As-Received)	Final (At-Test)
Height, in	2.84	2.78
Diameter, in	2.42	2.38
Area, in2	4.59	4.46
Volume in3	13.03	12.41
Total Volume, cc	213.5	203.4
Volume Solids, cc	132.7	132.7
Volume Voids, cc	80.7	70.6
Void Ratio	0.6	0.5
Total Porosity, %	37.8	34.7
Air-Filled Porosity (θa),%	15.0	0.9
Water-Filled Porosity (θw),%	22.8	33.8
Saturation, %	60.2	97.3
Specific Gravity	2.68	2.68
Wet Weight, gm	403.7	423.8
Dry Weight, gm	355.1	355.1
Tare, gm	0.00	0.00
Moisture, %	13.7	19.4
Wet Bulk Density, pcf	118.0	130.0
Dry Bulk Density, pcf	103.8	109.0
Wet Bulk Dens.ρb, (g/cm^3)	1.89	2.08
Dry Bulk Dens.ρb, (g/cm^3)	1.66	1.75

Remarks:

Hydraulic Conductivity
ASTM D 5084
Method C: Falling Head Rising Tailwater

Job No:	148-012	**Boring:**	MW-1	**Date:**	01/21/14
Client:	Todd Engineers	**Sample:**		**By:**	MD/PJ
Project:	60408	**Depth, ft.:**	337-339	**Remolded:**	

Visual Classification: Yellowish Brown Clayey SAND/ Sandy CLAY

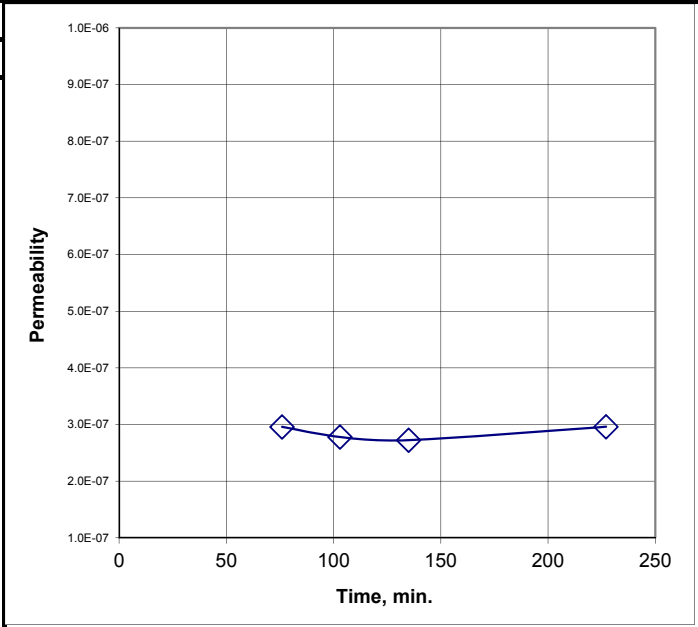
Max Sample Pressures, psi:

Cell:	Bottom	Top	Avg. Sigma3
73.5	69	68	5

B: = >0.95 **("B" is an indication of saturation)**

Max Hydraulic Gradient: = 26

Date	Minutes	Head, (in)	K,cm/sec
1/2/2014	0.00	51.69	**Start of Test**
1/2/2014	76.00	50.59	3.0E-07
1/2/2014	103.00	50.29	2.8E-07
1/2/2014	135.00	49.89	2.7E-07
1/2/2014	227.00	48.44	3.0E-07



Average Hydraulic Conductivity: 3.E-07 cm/sec

Sample Data:	Initial (As-Received)		Final (At-Test)
Height, in	2.00		2.02
Diameter, in	2.41		2.41
Area, in2	4.56		4.56
Volume in3	9.12		9.21
Total Volume, cc	149.5		150.8
Volume Solids, cc	99.1		99.1
Volume Voids, cc	50.5		51.8
Void Ratio	0.5		0.5
Total Porosity, %	33.7		34.3
Air-Filled Porosity (θa),%	11.0		0.5
Water-Filled Porosity (θw),%	22.7		33.8
Saturation, %	67.3		98.6
Specific Gravity	2.70	Assumed	2.70
Wet Weight, gm	301.4		318.5
Dry Weight, gm	267.4		267.4
Tare, gm	0.00		0.00
Moisture, %	12.7		19.1
Wet Bulk Density, pcf	125.8		131.7
Dry Bulk Density, pcf	111.6		110.6
Wet Bulk Dens.ρb, (g/cm^3)	2.02		2.11
Dry Bulk Dens.ρb, (g/cm^3)	1.79		1.77

Remarks:

Constant Head Permeability Test
ASTM D 2434

CTL Job No:	148-012	**Boring:**	MW-1	**Date:**	1/21/2014
Client:	Todd Engineers	**Sample:**		**By:**	PJ
Project Name:	Monterey Regional WPCA	**Depth, ft:**	349.5-352		
Project No.:	60408				

Soil Description: Yellow SAND w/ Clay

Remolding Data: Undisturbed

		Constant Head Calculation, K=QL/thA				
Test #	**Elapsed Time t, (sec)**	**Volume Q, (cc)**	**Head Loss h (cm)**	**Water Temp (°C)**	**Hydraulic Gradient**	**Coef. Of Permeability K, (cm/sec)**
1	80	28	0.6	19.5	0.09	0.1288
2	90	30	0.6	19.5	0.09	0.1227
3	95	26	0.5	19.5	0.08	0.1209
4	90	25	0.5	19.5	0.08	0.1227

Average Permeability (cm/sec):	**1.E-01**
Average Permeability (in/hr):	**175**

Sample Data:		**Initial**	**Final**
Height, (L)	**in.:**	5.54	5.26
Diameter,	**in.:**	2.40	2.40
Area, (A)	**in^2:**	4.51	4.51
Volume,	**in^3:**	25.00	23.71
Total Volume.	**cc:**	410	389
Vol. of Solids,	**cc:**	236	236
Vol. of Voids,	**cc:**	174	153
Void Ratio	**e:**	0.74	0.65
Porosity,	**%:**	42.4	39.3
Saturation,	**%:**	37.8	100.0
Sp. Gravity:		2.64	2.64
Wet Weight,	**gm:**	688.2	775.2
Dry Weight	**gm:**	622.5	622.5
Moisture,	**%:**	10.6	24.5
Density,	**pcf:**	94.8	100.0

Remarks: A significant amount of fines migrated out of the sample during the saturation and testing phases. The migration of fines can have a significant impact on the permeability.

Constant Head Permeability Test
ASTM D 2434

CTL Job No:	148-012	**Boring:**	MW-1	**Date:**	1/21/2014
Client:	Todd Engineers	**Sample:**		**By:**	PJ
Project Name:	Monterey Regional WPCA	**Depth, ft:**	357-359.5		
Project No.:	60408				

Soil Description: Very Pale Brown Silty SAND

Remolding Data: Undisturbed

		Constant Head Calculation, K=QL/thA				
Test #	**Elapsed Time t, (sec)**	**Volume Q, (cc)**	**Head Loss h (cm)**	**Water Temp (°C)**	**Hydraulic Gradient**	**Coef. Of Permeability K, (cm/sec)**
1	121	23	0.6	20.9	0.09	0.0676
2	210	40	0.6	20.9	0.09	0.0678
3	140	26	0.6	20.9	0.09	0.0661
4	120	23	0.6	20.9	0.09	0.0682
5	90	23	0.8	20.9	0.13	0.0682
					Average Permeability (cm/sec):	**7.E-02**
					Average Permeability (in/hr):	**96**

Sample Data:		**Initial**	**Final**
Height, (L)	**in.:**	5.36	5.23
Diameter,	**in.:**	2.40	2.40
Area, (A)	**in^2:**	4.51	4.51
Volume,	**in^3:**	24.20	23.59
Total Volume.	**cc:**	397	387
Vol. of Solids,	**cc:**	236	236
Vol. of Voids,	**cc:**	160	150
Void Ratio	**e:**	0.68	0.64
Porosity,	**%:**	40.4	38.9
Saturation,	**%:**	25.7	100.0
Sp. Gravity:		2.64	2.64
Wet Weight,	**gm:**	665.5	774.5
Dry Weight	**gm:**	624.2	624.2
Moisture,	**%:**	6.6	24.1
Density,	**pcf:**	98.2	100.8

Remarks: A significant amount of fines migrated out of the sample during the saturation and testing phases. The migration of fines can have a significant impact on the permeability.

Constant Head Permeability Test
ASTM D 2434

CTL Job No:	148-012	**Boring:**	MW-1	**Date:**	1/21/2014
Client:	Todd Engineers	**Sample:**		**By:**	PJ
Project Name:	Monterey Regional WPCA	**Depth, ft:**	377-379.5		
Project No.:	60408				

Soil Description: Very Pale Brown Silty SAND

Remolding Data: Undisturbed

		Constant Head Calculation, K=QL/thA				
Test #	**Elapsed Time t, (sec)**	**Volume Q, (cc)**	**Head Loss h (cm)**	**Water Temp (°C)**	**Hydraulic Gradient**	**Coef. Of Permeability K, (cm/sec)**
1	240	9	1.1	21.6	0.17	0.0070
2	240	9	1.1	21.6	0.17	0.0070
3	180	6	1.2	21.6	0.19	0.0062
4	180	6	1.2	21.6	0.19	0.0062
5	210	7	1.2	21.6	0.19	0.0056
6	90	6	2.6	21.6	0.41	0.0057
				Average Permeability (cm/sec):		**6.E-03**
				Average Permeability (in/hr):		**9**

Sample Data:		**Initial**	**Final**
Height, (L)	**in.:**	5.47	5.32
Diameter,	**in.:**	2.40	2.40
Area, (A)	**in^2:**	4.51	4.51
Volume,	**in^3:**	24.67	23.99
Total Volume.	**cc:**	404	393
Vol. of Solids,	**cc:**	201	201
Vol. of Voids,	**cc:**	203	192
Void Ratio	**e:**	1.01	0.95
Porosity,	**%:**	50.2	48.8
Saturation,	**%:**	21.3	100.0
Sp. Gravity:		2.68	2.68
Wet Weight,	**gm:**	583.3	731.9
Dry Weight	**gm:**	540.0	540.0
Moisture,	**%:**	8.0	35.5
Density,	**pcf:**	83.3	85.7

Remarks: A significant amount of fines migrated out of the sample during the saturation and testing phases. The migration of fines can have a significant impact on the permeability.

Hydraulic Conductivity
ASTM D 5084
Method C: Falling Head Rising Tailwater

Job No:	148-012	**Boring:**	MW-1	**Date:**	01/08/14
Client:	Todd Engineers	**Sample:**		**By:**	MD/PJ
Project:	60408	**Depth, ft.:**	405.0-407.5	**Remolded:**	

Visual Classification: Dark Gray Sandy SILT (slightly plastic)

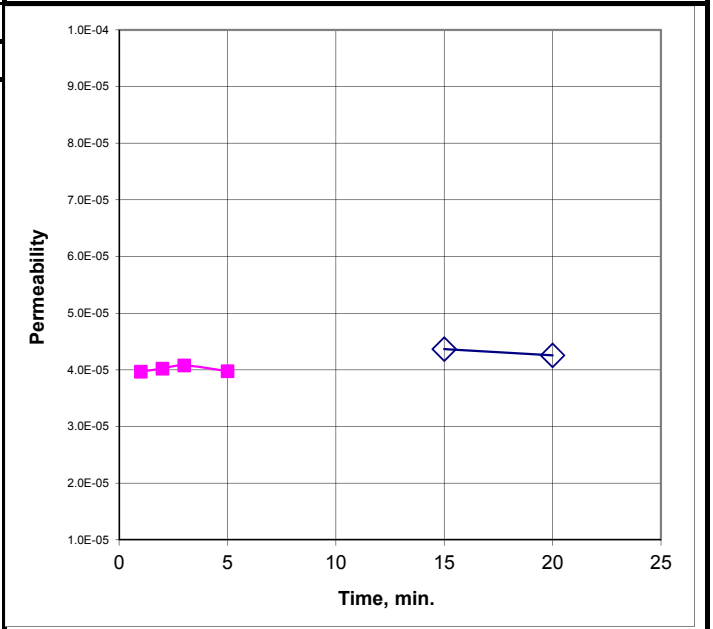
Max Sample Pressures, psi:

Cell:	Bottom	Top	Avg. Sigma3
73.5	68.5	68.5	5

B: = >0.95 **("B" is an indication of saturation)**

Max Hydraulic Gradient: = 5

Date	Minutes	Head, (in)	K,cm/sec
1/1/2014	0.00	15.00	**Start of Test**
1/1/2014	15.00	9.60	4.4E-05
1/1/2014	20.00	8.40	4.3E-05
1/1/2014	1.00	14.60	4.0E-05
1/1/2014	2.00	14.20	4.0E-05
1/1/2014	3.00	13.80	4.1E-05
1/1/2014	5.00	13.10	4.0E-05



Average Hydraulic Conductivity: 4.E-05 cm/sec

Sample Data:	Initial (As-Received)		Final (At-Test)
Height, in	2.84		2.82
Diameter, in	2.40		2.41
Area, in2	4.52		4.56
Volume in3	12.83		12.86
Total Volume, cc	210.2		210.8
Volume Solids, cc	99.4		99.4
Volume Voids, cc	110.8		111.4
Void Ratio	1.1		1.1
Total Porosity, %	52.7		52.8
Air-Filled Porosity (θa),%	9.0		0.2
Water-Filled Porosity (θw),%	43.7		52.7
Saturation, %	83.0		99.7
Specific Gravity	2.70	Assumed	2.70
Wet Weight, gm	360.3		379.4
Dry Weight, gm	268.4		268.4
Tare, gm	0.00		0.00
Moisture, %	34.2		41.4
Wet Bulk Density, pcf	107.0		112.3
Dry Bulk Density, pcf	79.7		79.4
Wet Bulk Dens.ρb, (g/cm^3)	1.71		1.80
Dry Bulk Dens.ρb, (g/cm^3)	1.28		1.27

Remarks:

Hydraulic Conductivity
ASTM D 5084
Method C: Falling Head Rising Tailwater

Job No:	148-012	**Boring:**	MW-1	**Date:**	01/17/14
Client:	Todd Engineers	**Sample:**		**By:**	MD/PJ
Project:	60408	**Depth, ft.:**	417.5-420	**Remolded:**	

Visual Classification: Light Gray Silty SAND near Sandy SILT

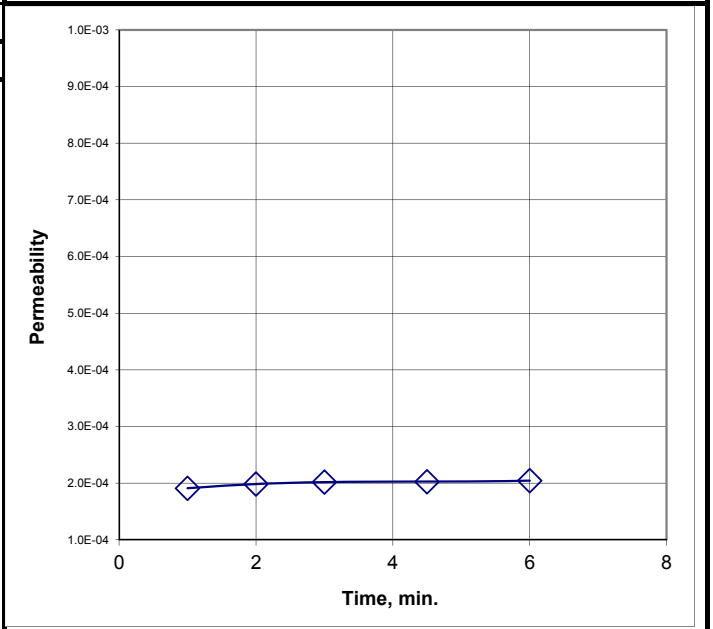
Max Sample Pressures, psi:

Cell:	Bottom	Top	Avg. Sigma3
53.5	48.5	48.5	5

B: = >0.95 **("B" is an indication of saturation)**

Max Hydraulic Gradient: = 5

Date	Minutes	Head, (in)	K,cm/sec
1/1/2014	0.00	15.00	**Start of Test**
1/1/2014	1.00	13.20	1.9E-04
1/1/2014	2.00	11.50	2.0E-04
1/1/2014	3.00	10.00	2.0E-04
1/1/2014	4.50	8.15	2.0E-04
1/1/2014	6.00	6.60	2.0E-04



Average Hydraulic Conductivity: 2.E-04 cm/sec

Sample Data:	Initial (As-Received)		Final (At-Test)
Height, in	2.84		2.80
Diameter, in	2.43		2.38
Area, in2	4.62		4.46
Volume in3	13.09		12.50
Total Volume, cc	214.6		204.8
Volume Solids, cc	106.8		106.8
Volume Voids, cc	107.8		98.0
Void Ratio	1.0		0.9
Total Porosity, %	50.2		47.8
Air-Filled Porosity (θa),%	13.7		0.0
Water-Filled Porosity (θw),%	36.5		47.8
Saturation, %	72.7		100.0
Specific Gravity	2.70	Assumed	2.70
Wet Weight, gm	366.7		386.3
Dry Weight, gm	288.4		288.4
Tare, gm	0.00		0.00
Moisture, %	27.2		34.0
Wet Bulk Density, pcf	106.6		117.7
Dry Bulk Density, pcf	83.9		87.9
Wet Bulk Dens.ρb, (g/cm^3)	1.71		1.89
Dry Bulk Dens.ρb, (g/cm^3)	1.34		1.41

Remarks:

APPENDIX E

McCampbell Analytical Laboratory Reports and Chain-of-Custody Form

(Core Mineralogical / Leaching Test Analyses)

and

Trussell Technologies Pilot Water Stabilization TM and Chain-of-Custody Form

MINERALOGY, INC.

Final Test Report

Client:	McCampbell Analytical, Inc.	MI#:	14122
Project:	1312545 (Follow-Up to MI# 14031)	Sample Type:	Sediments
Location:	N/A	Date:	May 5, 2014

Contact	Rosa Venegas
Address	McCampbell Analytical, Inc.
	1534 Willow Pass Road
	Plttsburg, CA 94565
E-mail	rosa@mccampbell.com
Phone	925.252.9262
Project ID:	1312545 (Follow-Up to MI# 14031)
Test Methods	EDX & TSD (x7)
Calibration Date	
MI Lab Supervisor	
	Timothy B. Murphy

CONDITIONS AND QUALIFICATIONS

Mineralogy, Inc. will endeavor to provide accurate and reliable laboratory measurements of the samples provided by the client. The results of any x-ray diffraction, petrographic or core analysis test are necessarily influenced by the condition and selection of the samples to be analyzed. It should be recognized that geological samples are commonly heterogeneous and lack uniform properties. Mineralogical, geochemical and/or petrographic data obtained for a specific sample provides compositional data pertinent to that specific sampling location. Such "site-specific data" may fail to provide adequate characterization of the range of compositional variability possible within a given project area, thus the "projection" of these laboratory findings and values to adjoining, "untested" areas of the formation or project area is inherently risky, and exceeds the scope of the laboratory work request. Hence, Mineralogy, Inc. shall not assume any liability risk or responsibility for any loss or potential failure associated with the application of "site or sample-specific laboratory data" to "untested" areas of the formation or project area. Unless otherwise directed, the samples selected for analysis will be chosen to reflect a visually representative portion of the bulk sample submitted for analysis. Where provided, the interpretation of x-ray diffraction, petrographic or core analysis results constitutes the best geological judgment of Mineralogy, Inc., and is subject to the sampling limitations described above, and the detection limits inherent to semi-quantitative and/or qualitative mineralogical and microscopic analysis. Mineralogy, Inc. assumes no responsibility nor offers any guarantee of the productivity, suitability or performance of any oil or gas well, hydrocarbon recovery process, dimension stone, and/or ore material based upon the data or conclusions presented in this report.

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545
Sample ID: 1312545-001B
Mineralogy, Inc. Job No.: 14122-01

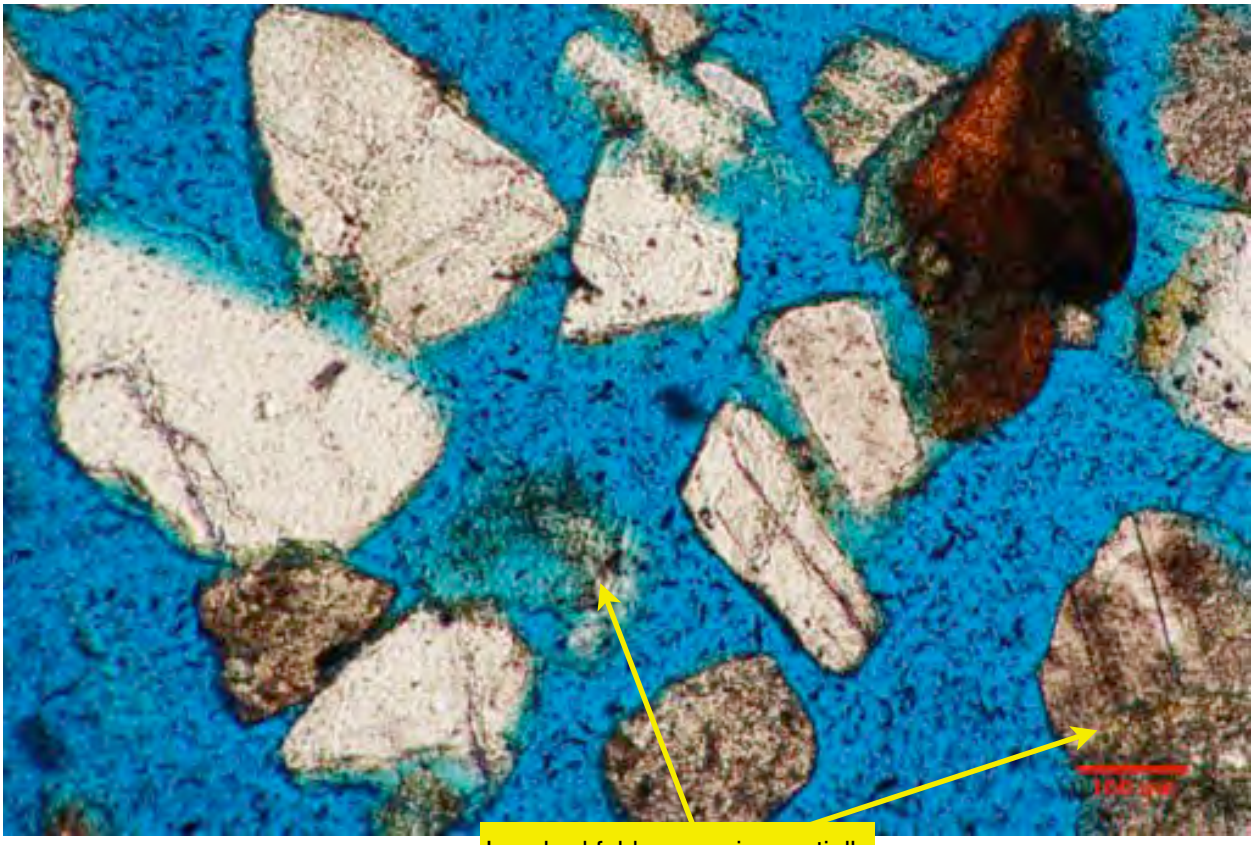
Lithologic Classification	Unconsolidated, Lithic Arkosic Sand
Textural Properties	Fine grained (fU), moderately sorted, and subangular.
Mean Grain Diameter	0.23 mm
Max Grain Diameter	1.14 mm
Fabric	Unconsolidated and disaggregated grain mount thin section
Detrital Mineralogy	Detrital grain constituents are listed in descending order of relative abundance and include: 1) quartz (monocrystalline and polycrystalline quartz varieties), 2) feldspar (plagioclase > k-feldspar), 3) igneous RFs (predominately fine to medium crystalline granodiorite and granite RFs), 4) chert RFs, 5) silty shale RFs, and trace amounts of augite, hornblende, biotite mica, carbonate apatite, spinel, zircon and epidote.
Cements & Matrix Constituents	Cement constituents include traces of authigenic quartz overgrowths, authigenic feldspar overgrowths, siderite, and traces of iron oxide cement. The quartz and feldspar cements occur as syntaxial rims of overgrowth cement flanking host quartz and feldspar grains. Clay matrix constituents include grain replacement and pore filling clay which likely include illite, mixed layered chlorite smectite, and chlorite. X-ray diffraction analysis will be required to precisely define the clay mineralogy if desired.

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545
Sample ID: 1312545-001B
Mineralogy, Inc. Job No.: 14122-01

Weathering Properties	Authigenic grain replacement clay is associated with leached and altered feldspar grains.
Pore System	NA

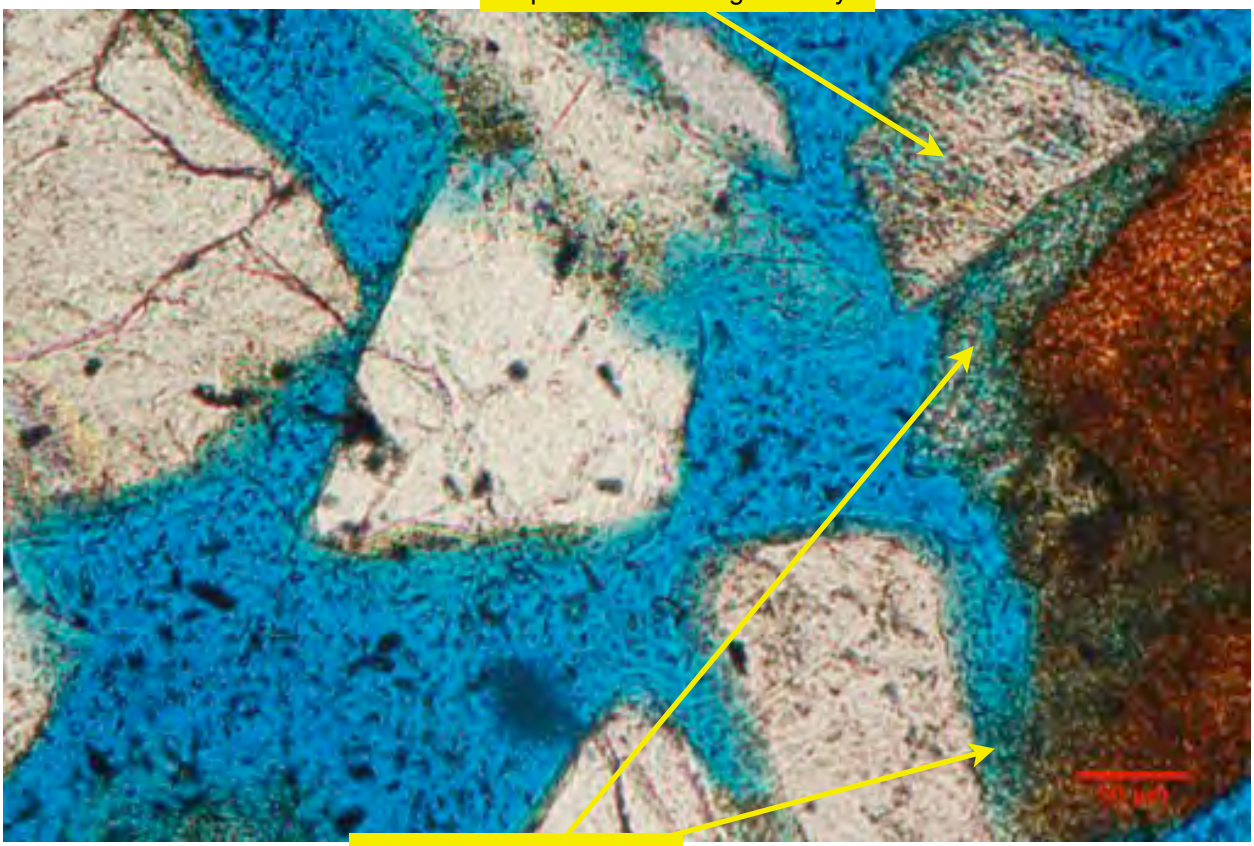
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545; Sample ID: 1312545-001B
Mineralogy, Inc. Job No.: 14122-01

14122-01A



Leached feldspar grains partially replaced with authigenic clay

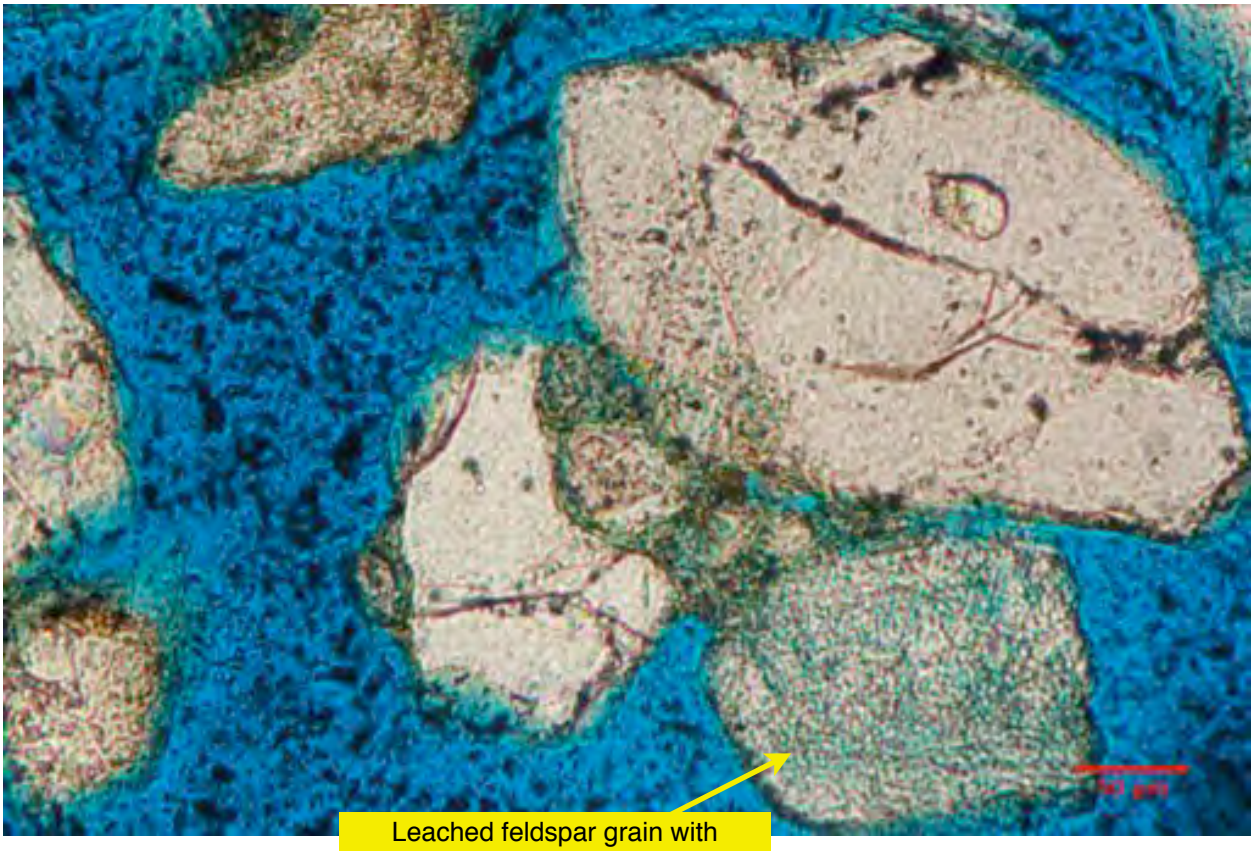
14122-01B



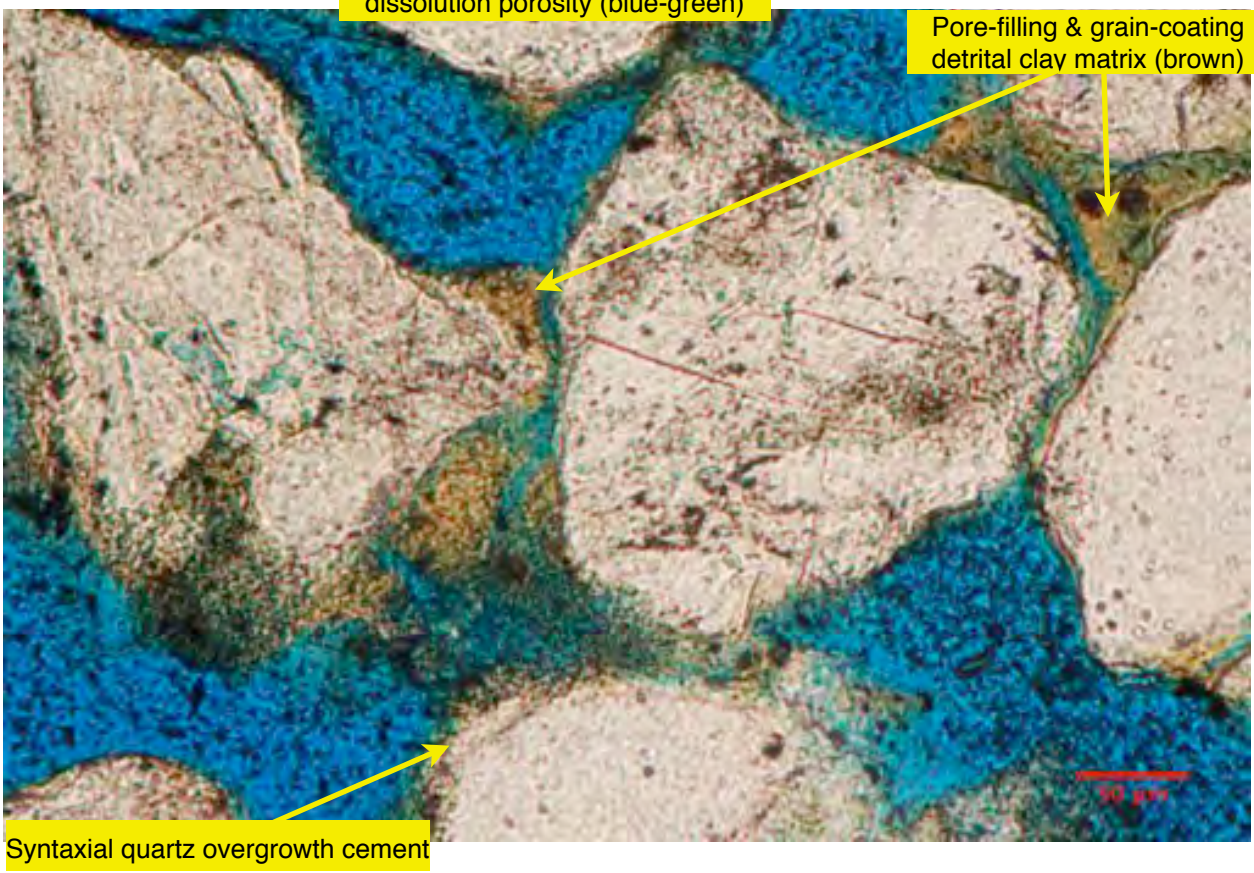
Microporous grain-coating clay matrix (green)

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545; Sample ID: 1312545-001B
Mineralogy, Inc. Job No.: 14122-01

14122-01C



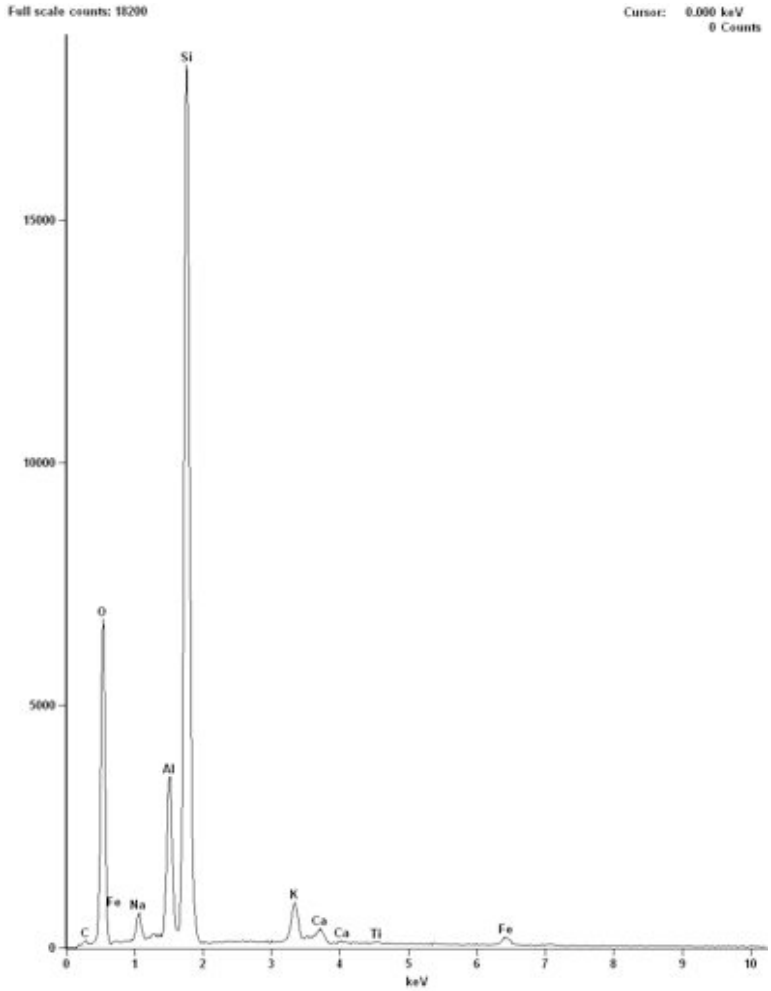
14122-01D



MINERALOGY, INC.

Figure I.
Energy Dispersive X-Ray Analysis

Client:	McCampbell Analytical, Inc.	MI#:	14122-01
Project:	1312545 (Follow-Up to MI#14031)	Location:	N/A



Energy Dispersive X-Ray Results

14122-01	1312545-001B			
Element Line	Element Wt.%	Wt.% Error	Compound Formula	Compound Wt%
C K	3.9	+/-0.35	CO2	14.29
O K	53.24S	---		---
Na K	1.92	+/-0.07	Na2O	2.58
Al K	5.29	+/-0.06	Al2O3	9.99
Si K	31.84	+/-0.12	SiO2	68.12
K K	1.99	+/-0.05	K2O	2.39
Ca K	0.68	+/-0.05	CaO	0.95
Ti K	0.12	+/-0.02	TiO2	0.2
Fe K	1.03	+/-0.04	Fe2O3	1.47
	----------			----------
Total	100			100

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545
Sample ID: 1312545-002B
Mineralogy, Inc. Job No.: 14122-02

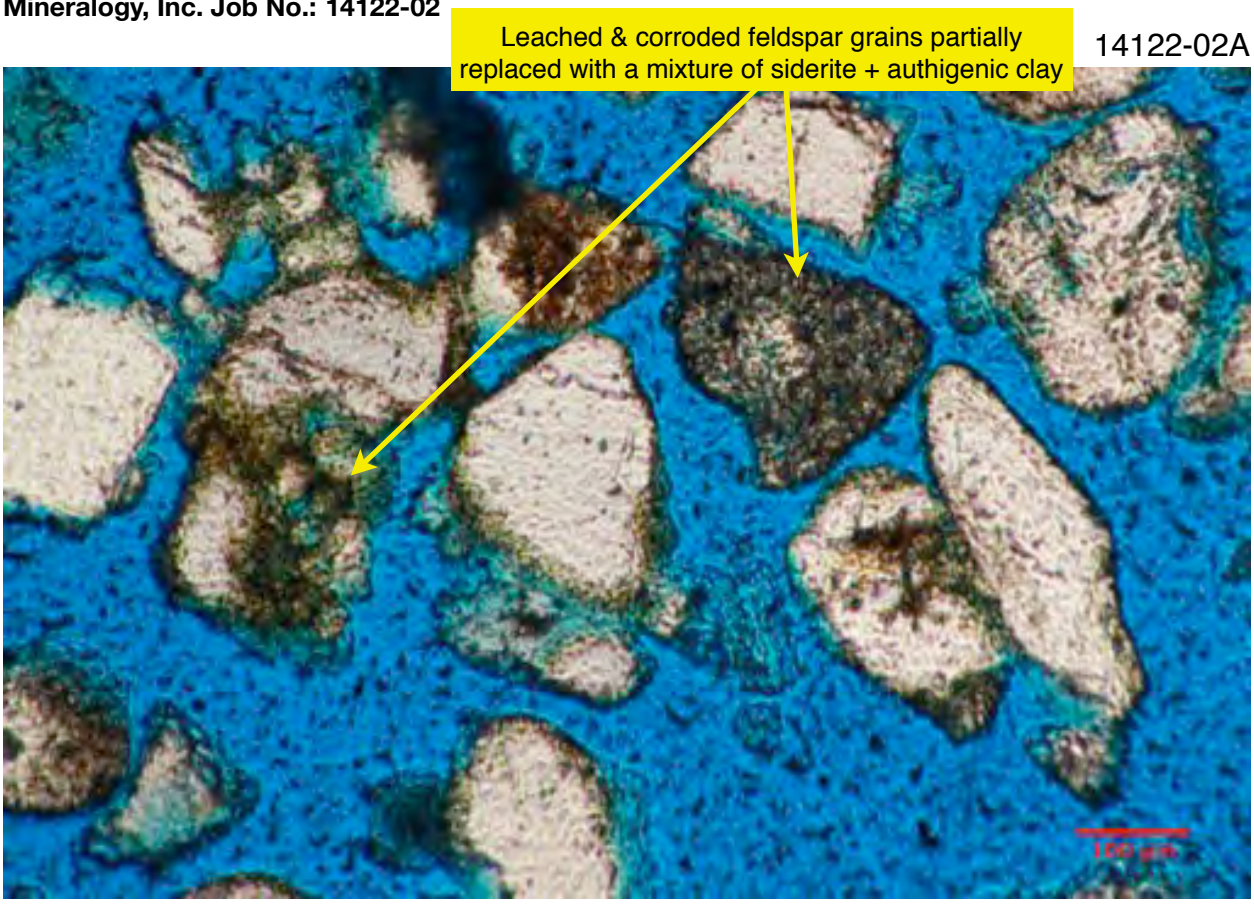
Lithologic Classification	Unconsolidated, Lithic Arkosic Sand
Textural Properties	Fine grained (fU), well sorted, and subangular. The thin section represents a grain mount of unconsolidated and disaggregated sand material.
Mean Grain Diameter	0.20 mm
Max Grain Diameter	1.51 mm
Fabric	Unconsolidated and disaggregated grain mount thin section
Detrital Mineralogy	Detrital grain constituents are listed in descending order of relative abundance and include: 1) quartz (monocrystalline and polycrystalline quartz varieties), 2) feldspar (plagioclase > k-feldspar), 3) igneous RFs (granodiorite, granite, and rhyolite RFs), 4) chert RFs, 5) biotite mica, 6) silty shale RFs with traces of hornblende, apatite, and zircon present as accessory phases.

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545
Sample ID: 1312545-002B
Mineralogy, Inc. Job No.: 14122-02

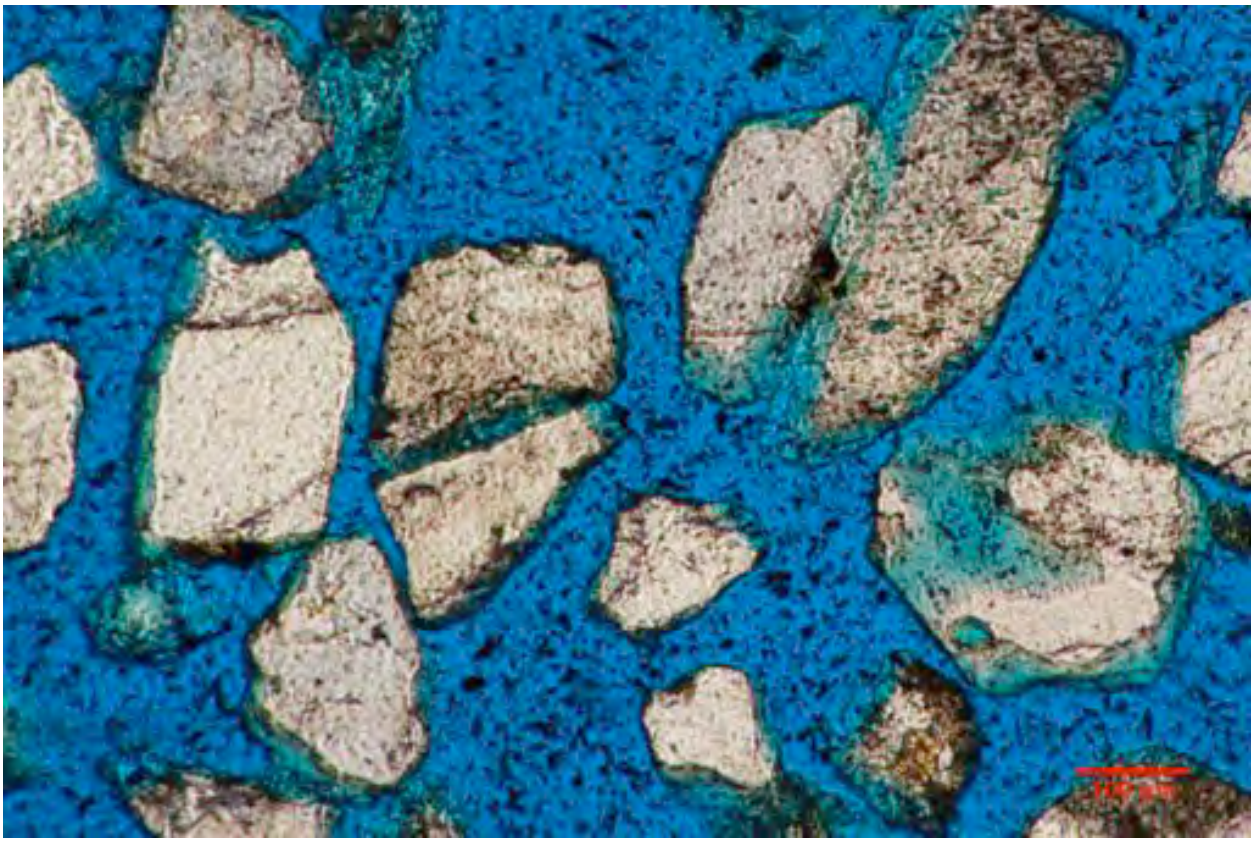
Cements & Matrix Constituents	Traces of quartz and feldspar cement are present as syntaxial overgrowths nucleated on the detrital quartz and feldspar grains. Traces of siderite cement are also locally present as a grain coating authigenic cement phase. Several of the clusters of clay matrix minerals encrusting the grain surfaces contain microcrystalline iron oxide +/- pyrite cement. Matrix constituents present within this sand sample are tentatively identified to include illite, chlorite, and mixed layered chlorite smectite. Detailed mineralogical analysis of the clay fraction will require x-ray diffraction analysis for this interval.
Weathering Properties	A significant percentage of the detrital feldspar population exhibits evidence of intraparticle corrosion and replacement with authigenic clay +/- iron oxide cement.
Pore System	This grain mount thin section is comprised of disaggregated and unconsolidated sand that exhibits small to minor amounts of intragranular dissolution porosity in association with the leached feldspar grains.

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545; Sample ID: 1312545-002B
Mineralogy, Inc. Job No.: 14122-02

14122-02A

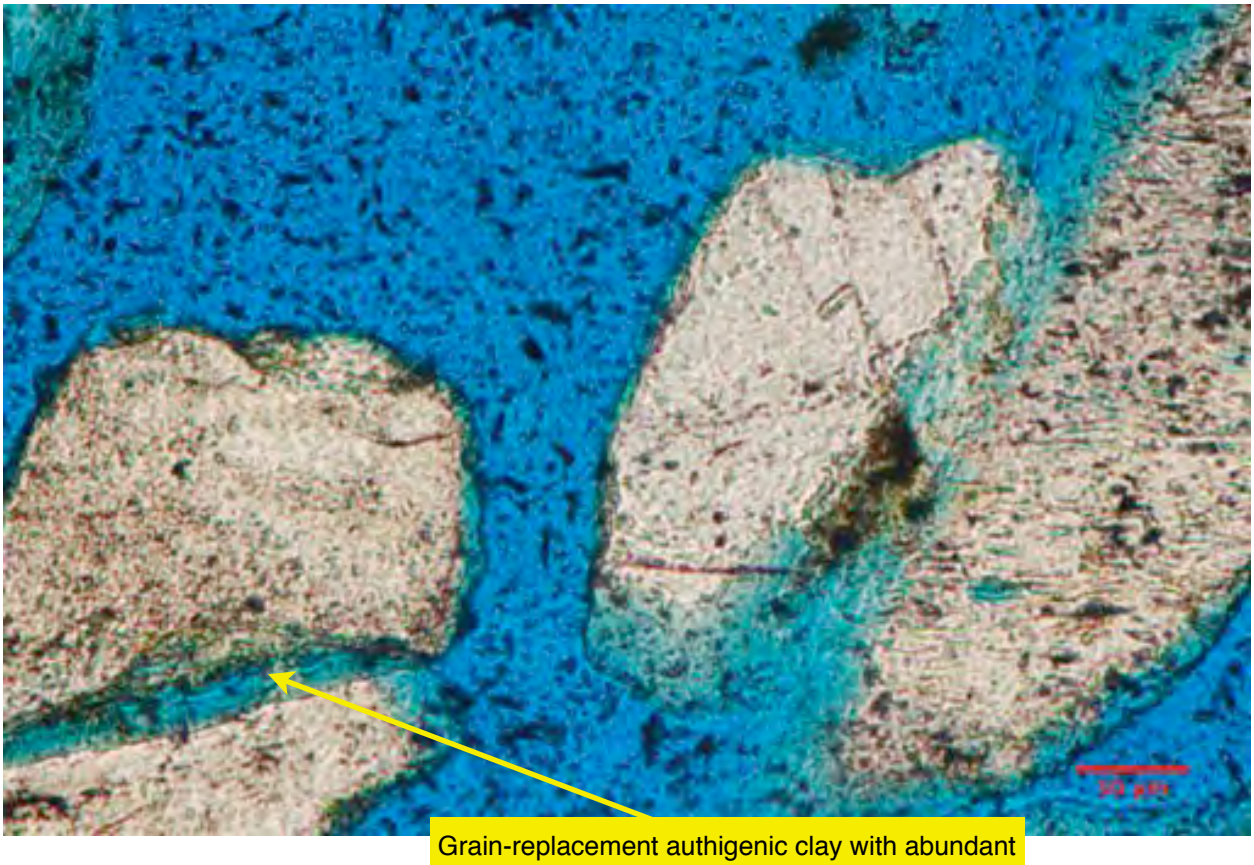


14122-02B



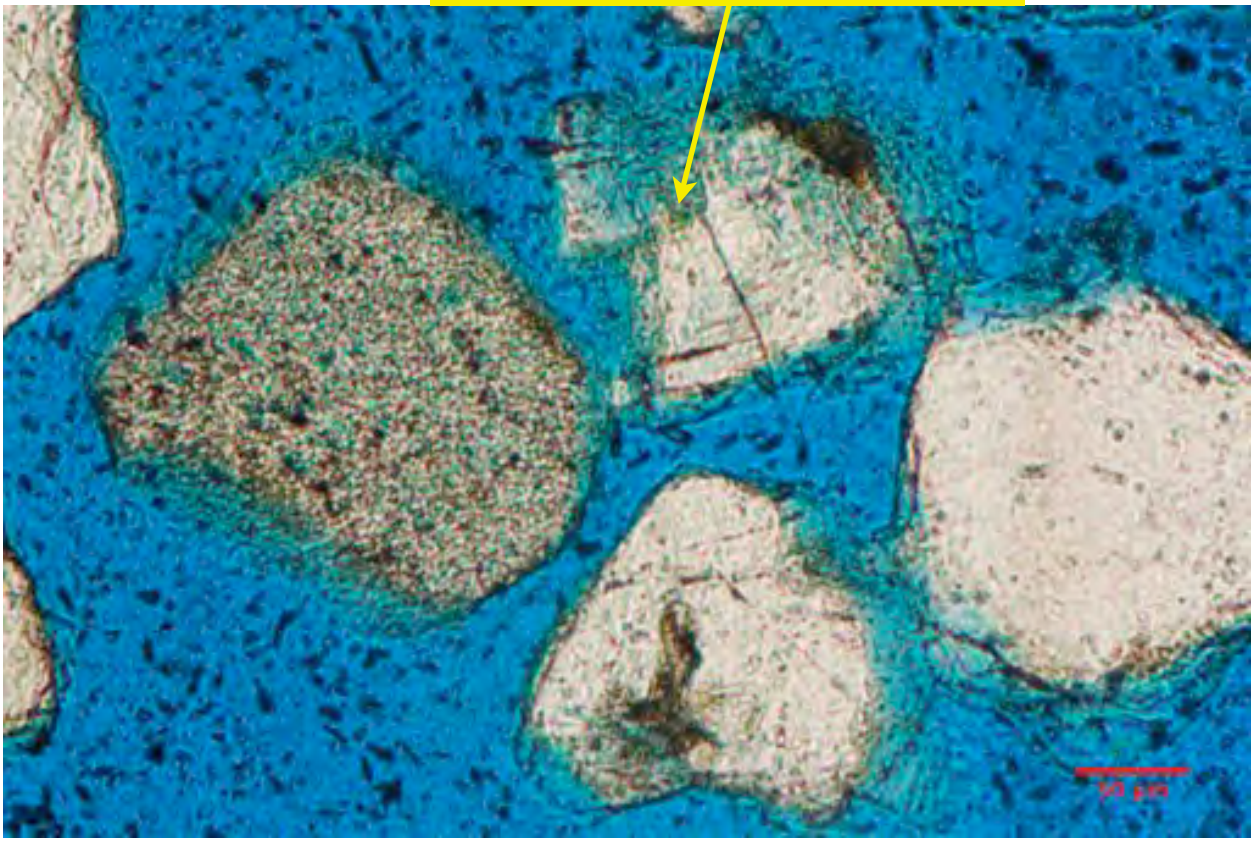
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545; Sample ID: 1312545-002B
Mineralogy, Inc. Job No.: 14122-02

14122-02C



Grain-replacement authigenic clay with abundant intercrystalline microporosity (blue-green)

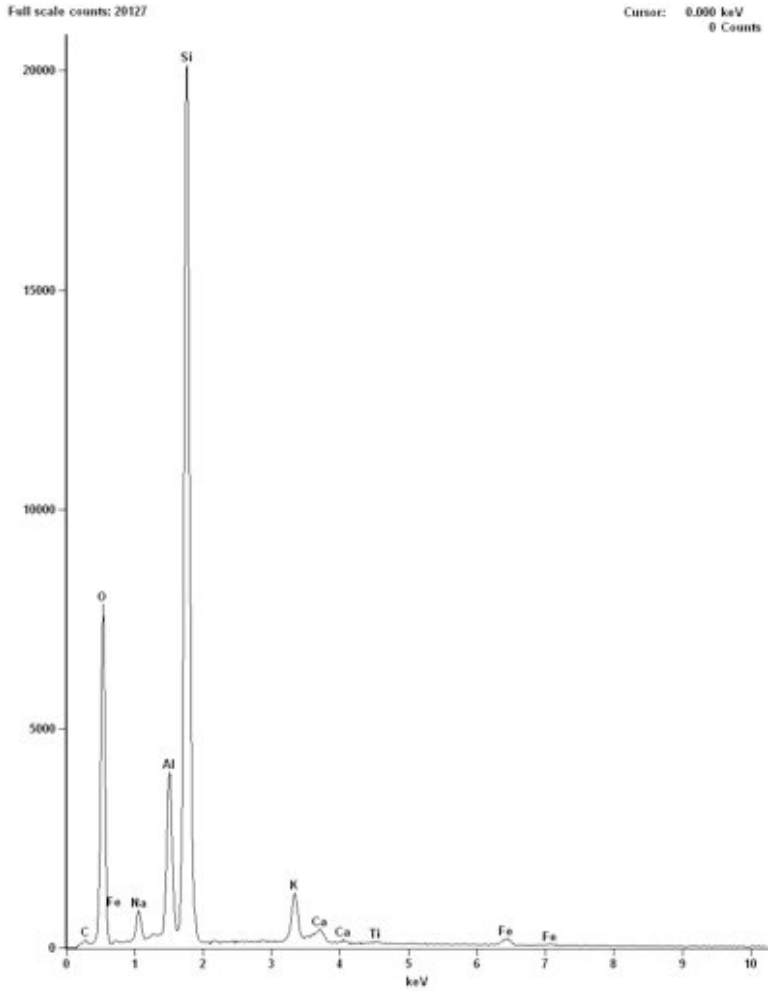
14122-02D



MINERALOGY, INC.

Figure II.
Energy Dispersive X-Ray Analysis

Client:	McCampbell Analytical, Inc.	MI#:	14122-02
Project:	1312545 (Follow-Up to MI#14031)	Location:	N/A



Energy Dispersive X-Ray Results

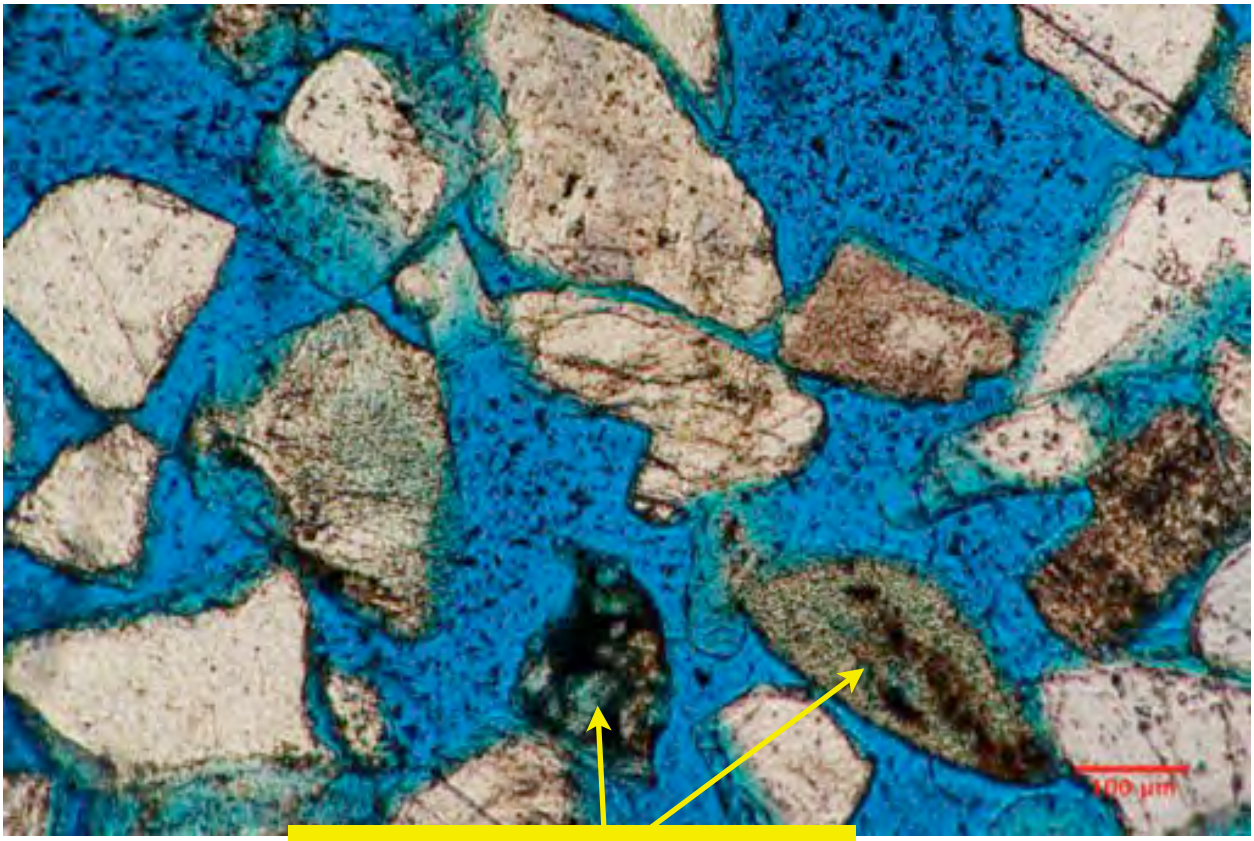
14122-02	1312545-002B			
Element Line	Element Wt.%	Wt.% Error	Compound Formula	Compound Wt%
C K	3.91	+/-0.24	CO2	14.32
O K	53.08S	---		---
Na K	2.18	+/-0.07	Na2O	2.93
Al K	5.42	+/-0.06	Al2O3	10.24
Si K	31.54	+/-0.12	SiO2	67.47
K K	2.32	+/-0.05	K2O	2.8
Ca K	0.66	+/-0.05	CaO	0.92
Ti K	0.1	+/-0.02	TiO2	0.17
Fe K	0.8	+/-0.04	Fe2O3	1.15
	----------			----------
Total	100			100

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545
Sample ID: 1312545-003B
Mineralogy, Inc. Job No.: 14122-03

Lithologic Classification	Unconsolidated, Lithic Arkosic Sand
Textural Properties	Fine grained (fU), well sorted, and subangular to subrounded.
Mean Grain Diameter	~0.22 mm
Max Grain Diameter	0.75 mm
Fabric	Unconsolidated and disaggregated grain mount thin section
Detrital Mineralogy	Detrital grain constituents are listed in descending order of relative abundance and include: 1) quartz (monocrystalline and polycrystalline quartz varieties), 2) feldspar (plagioclase > k-feldspar), 3) igneous RFs (granodiorite, granite, and rhyolite RFs), 4) chert RFs, 5) biotite mica, 6) silty shale RFs with traces of magnetite, hornblende, and augite.
Cements & Matrix Constituents	Traces of authigenic quartz and feldspar cement are locally present as syntaxial overgrowths nucleated on the detrital sand grains. Authigenic clay is common within this sample as a grain replacement associated with leached feldspar and igneous RF material. Minor amounts of poorly crystallized detrital clay matrix is locally present as a grain coating matrix material. The clay mineralogy is dominated by illite coupled with traces of mixed layered chlorite/smectite and chlorite.
Pore System	NA

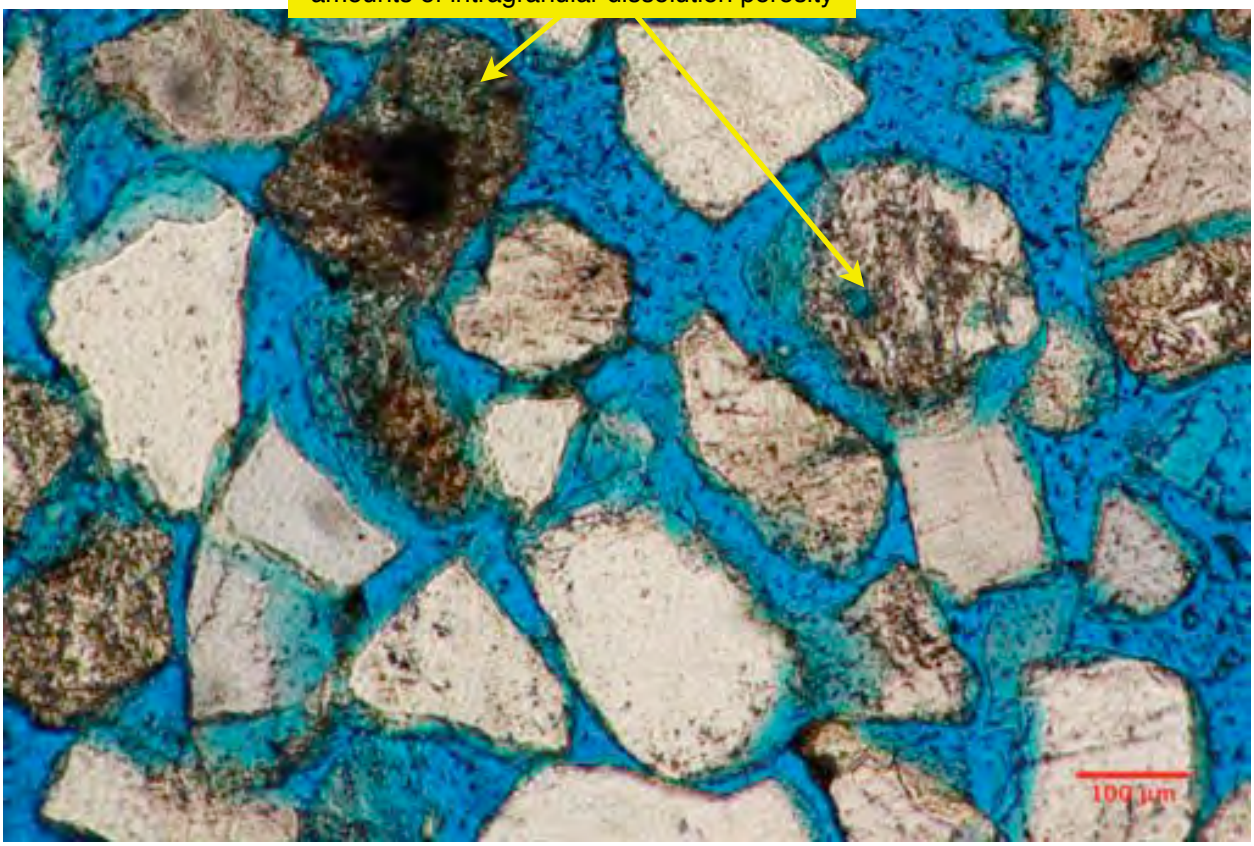
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545; Sample ID: 1312545-003B
Mineralogy, Inc. Job No.: 14122-03

14122-03A



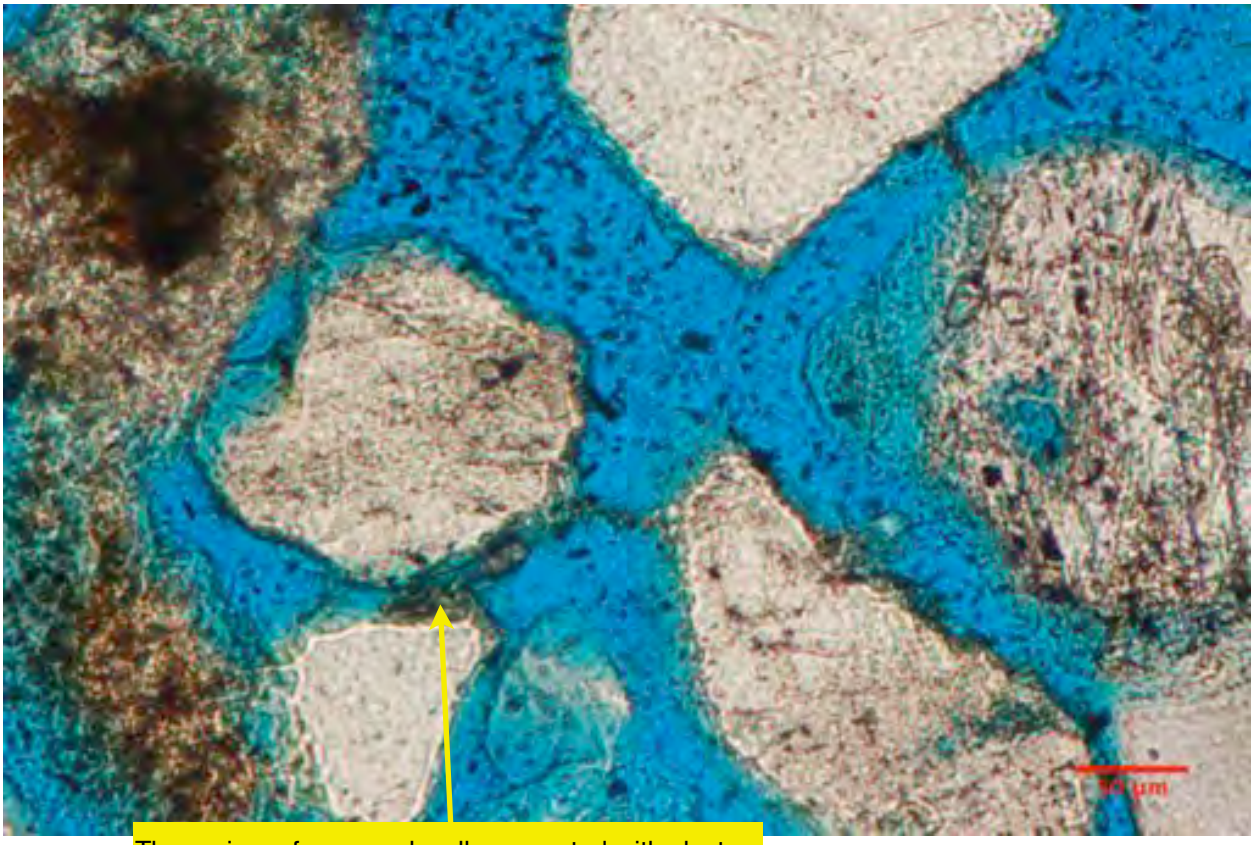
Leached feldspar grains with locally significant amounts of intragranular dissolution porosity

14122-03B



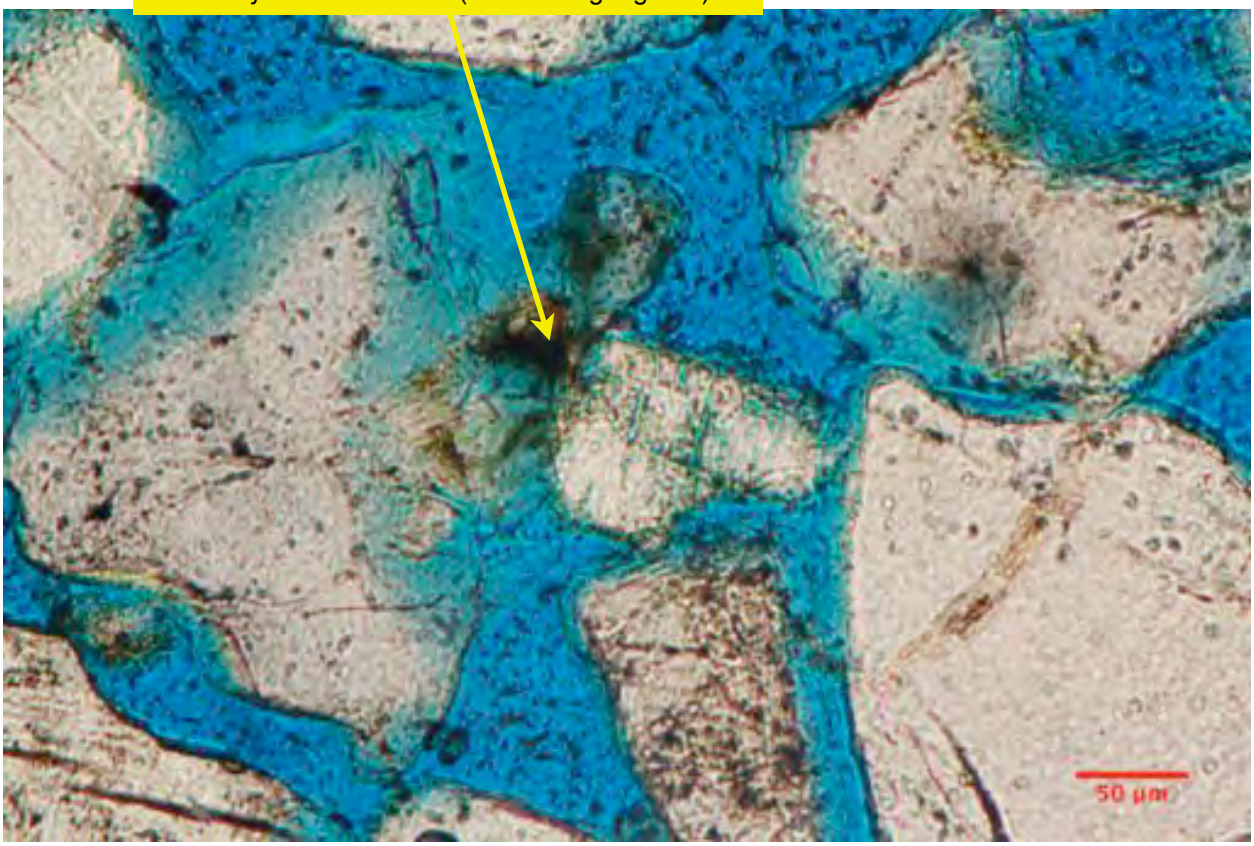
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545; Sample ID: 1312545-003B
Mineralogy, Inc. Job No.: 14122-03

14122-03C



The grain surfaces are locally encrusted with clusters of clay matrix minerals (brown to light green)

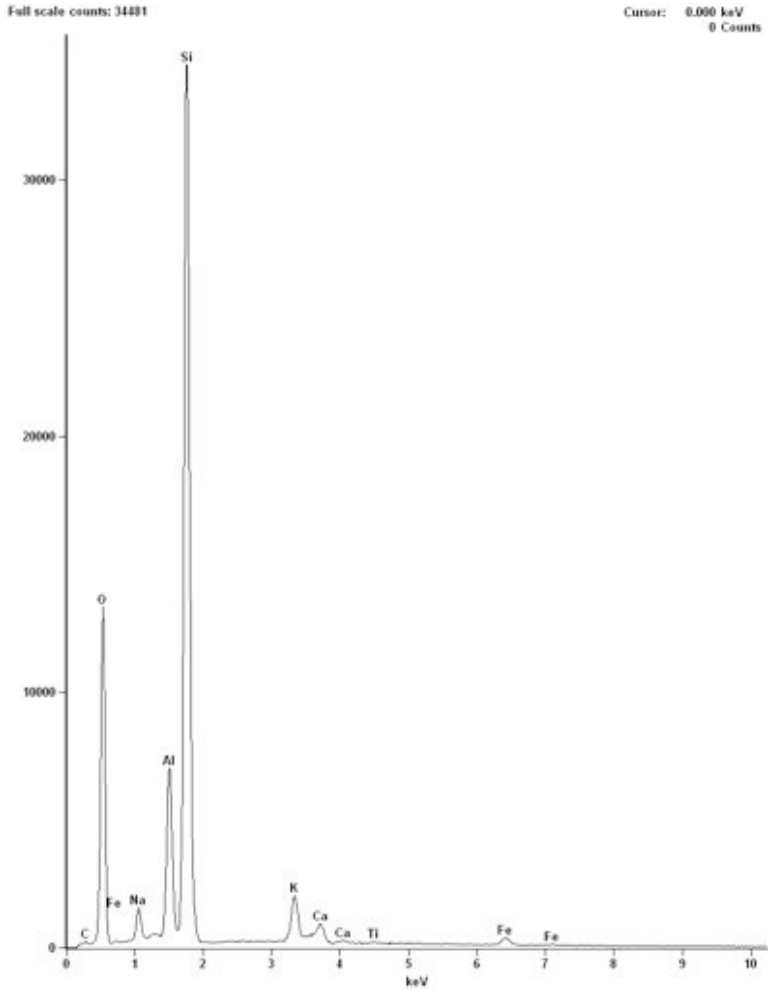
14122-03D



MINERALOGY, INC.

Figure III.
Energy Dispersive X-Ray Analysis

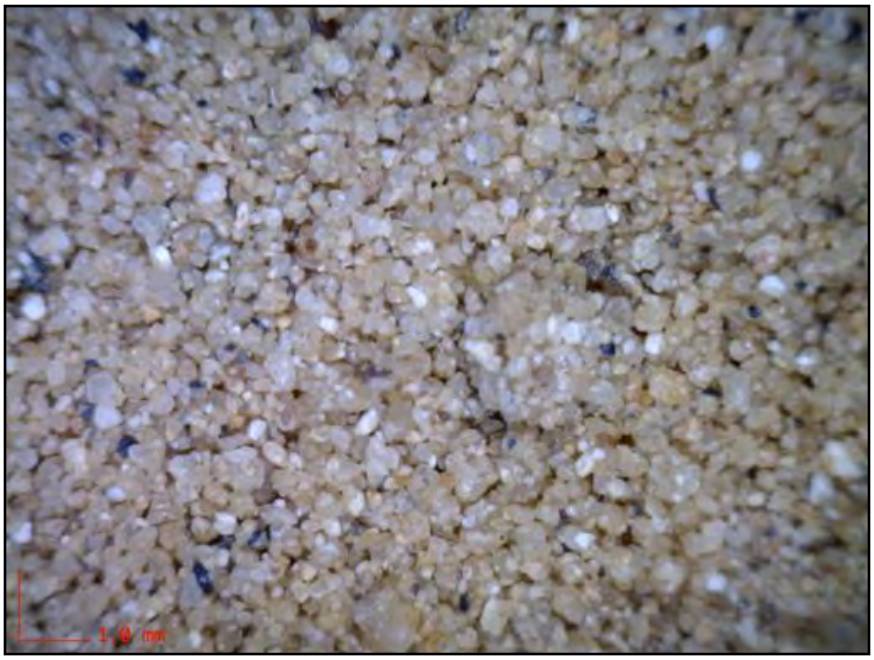
Client:	McCampbell Analytical, Inc.	MI#:	14122-03
Project:	1312545 (Follow-Up to MI#14031)	Location:	N/A



Energy Dispersive X-Ray Results

14122-03	1312545-003B			
Element Line	Element Wt.%	Wt.% Error	Compound Formula	Compound Wt%
C K	2.67	+/-0.26	CO2	9.77
O K	51.97S	---		---
Na K	2.24	+/-0.06	Na2O	3.02
Al K	5.78	+/-0.05	Al2O3	10.91
Si K	33.03	+/-0.10	SiO2	70.65
K K	2.35	+/-0.04	K2O	2.83
Ca K	0.99	+/-0.04	CaO	1.38
Ti K	0.07	+/-0.02	TiO2	0.11
Fe K	0.93	+/-0.05	Fe2O3	1.32
	----------			----------
Total	100			100

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545
Sample ID: 1312545-004B
Mineralogy, Inc. Job No.: 14122-04



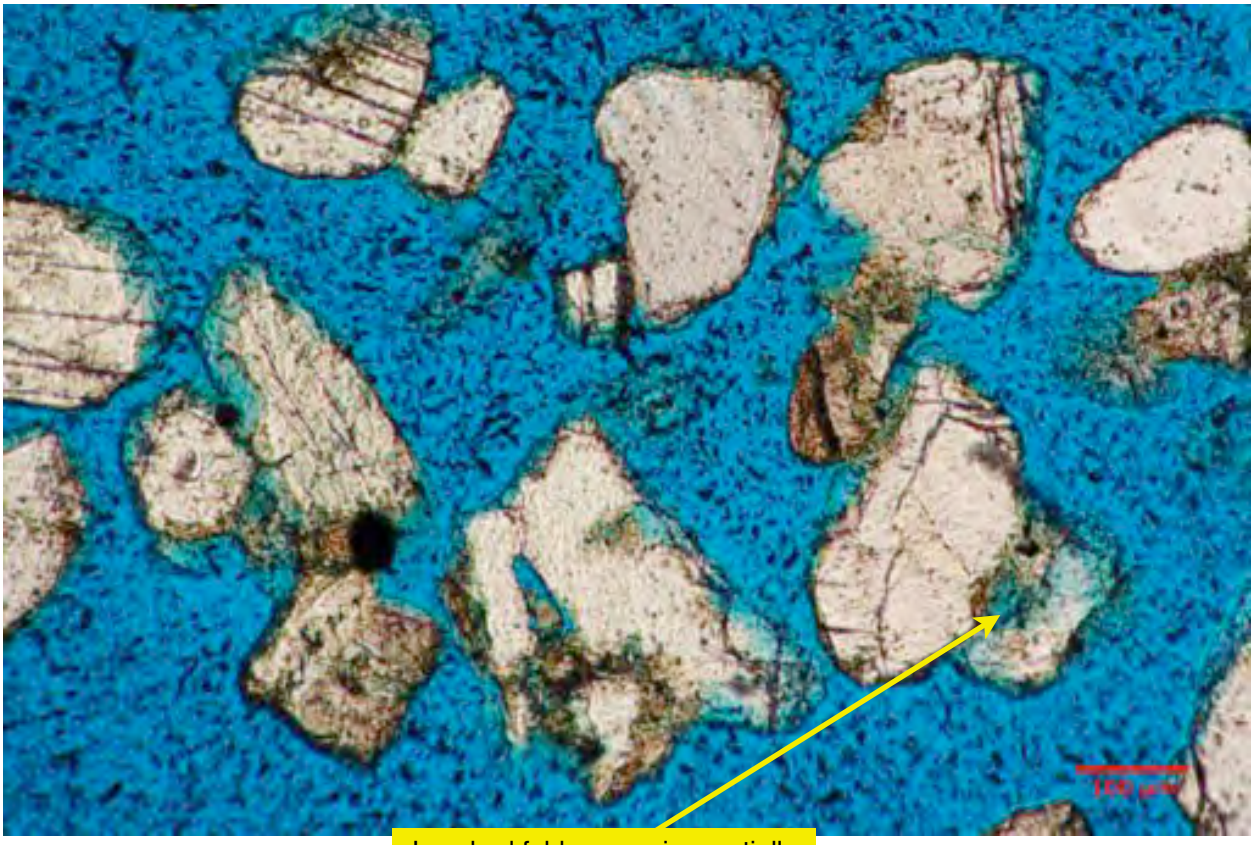
Lithologic Classification	Unconsolidated, Lithic Arkosic Sand
Textural Properties	Medium grained (mL), well sorted, and subangular to subrounded.
Mean Grain Diameter	~0.28 mm
Max Grain Diameter	1.11 mm
Fabric	Unconsolidated and disaggregated with scattered clusters of sand grains held together by weakly adhered grain coating clay matrix minerals.
Detrital Mineralogy	Detrital grain constituents are listed in descending order of relative abundance and include: 1) quartz (monocrystalline and polycrystalline quartz varieties), 2) feldspar (plagioclase > k-feldspar), 3) igneous RFs (granodiorite, granite, and rhyolite RFs), 4) chert RFs, 5) biotite mica, 6) silty shale RFs with traces of magnetite, hornblende, and augite.

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545
Sample ID: 1312545-004B
Mineralogy, Inc. Job No.: 14122-04

Cements & Matrix Constituents	Cement constituents are limited to traces of quartz and feldspar overgrowths as well as irregular clusters of grain coating iron oxide cement. Authigenic clay matrix is common as a grain replacement associated with leached feldspar grains and igneous RFs. Clay minerals contained in this sample are dominated by illite coupled with traces of chlorite and mixed layered illite/smectite (see Table I). Minor amounts of iron oxide hydroxide cement are commingled with the grain coating clay within this sample.
Weathering Properties	Detrital feldspar grains within this sample are extensively leached and commonly corroded and partially replaced with authigenic clay matrix minerals. Iron oxide hydroxide cement is commonly present in association with the grain coating and grain replacement clay.
Pore System	Minor amounts of intragranular dissolution porosity are locally present in association with the leached feldspar and igneous RFs.

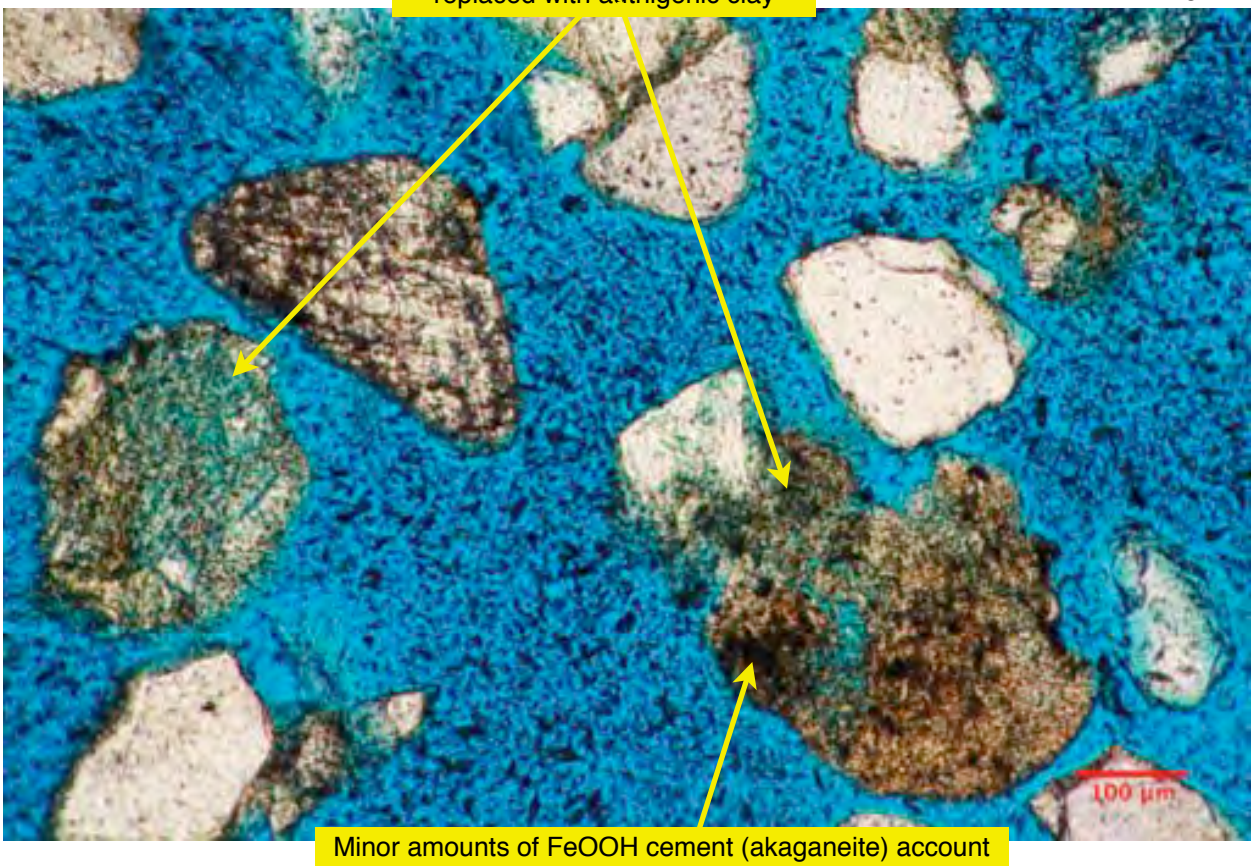
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545; Sample ID: 1312545-004B
Mineralogy, Inc. Job No.: 14122-04

14122-04A



Leached feldspar grains partially replaced with authigenic clay

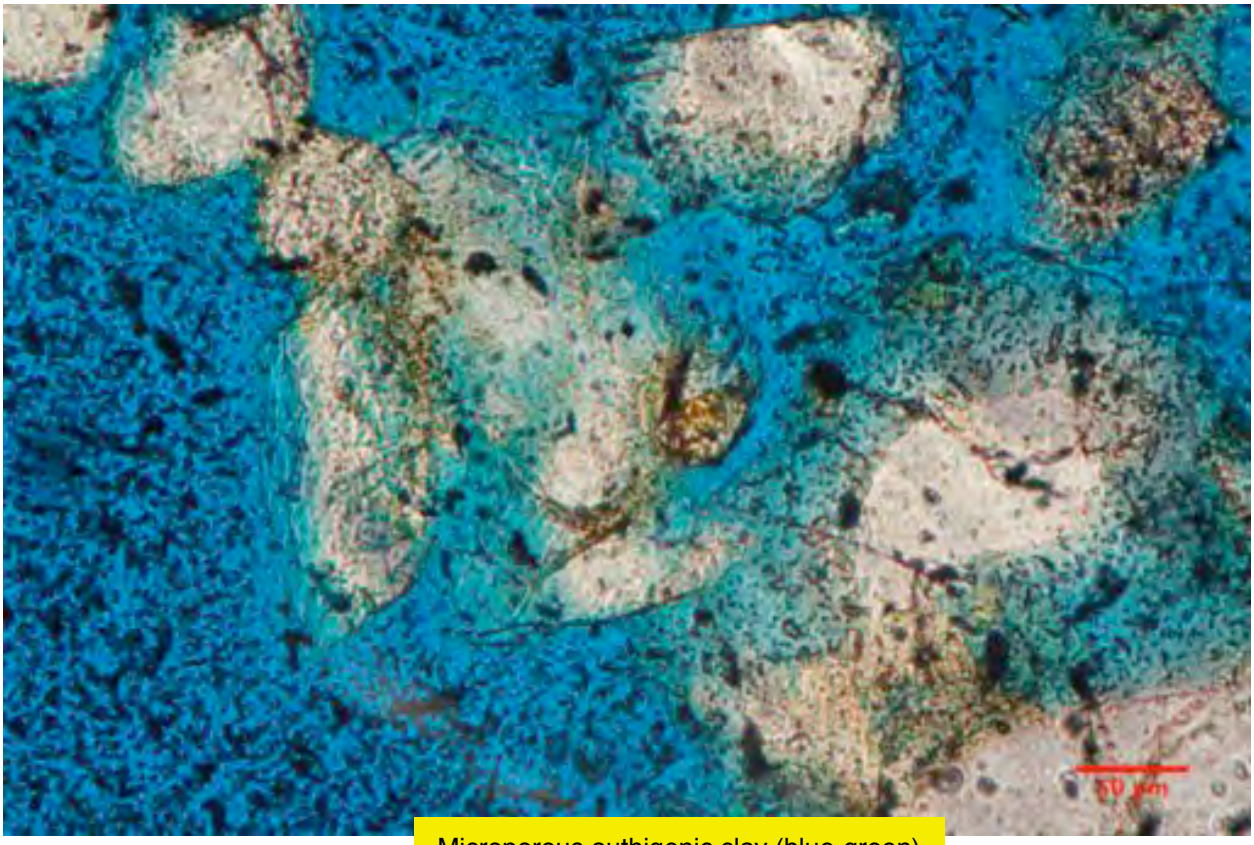
14122-04B



Minor amounts of FeOOH cement (akaganeite) account for the dark brown color of the weathered feldspar grains

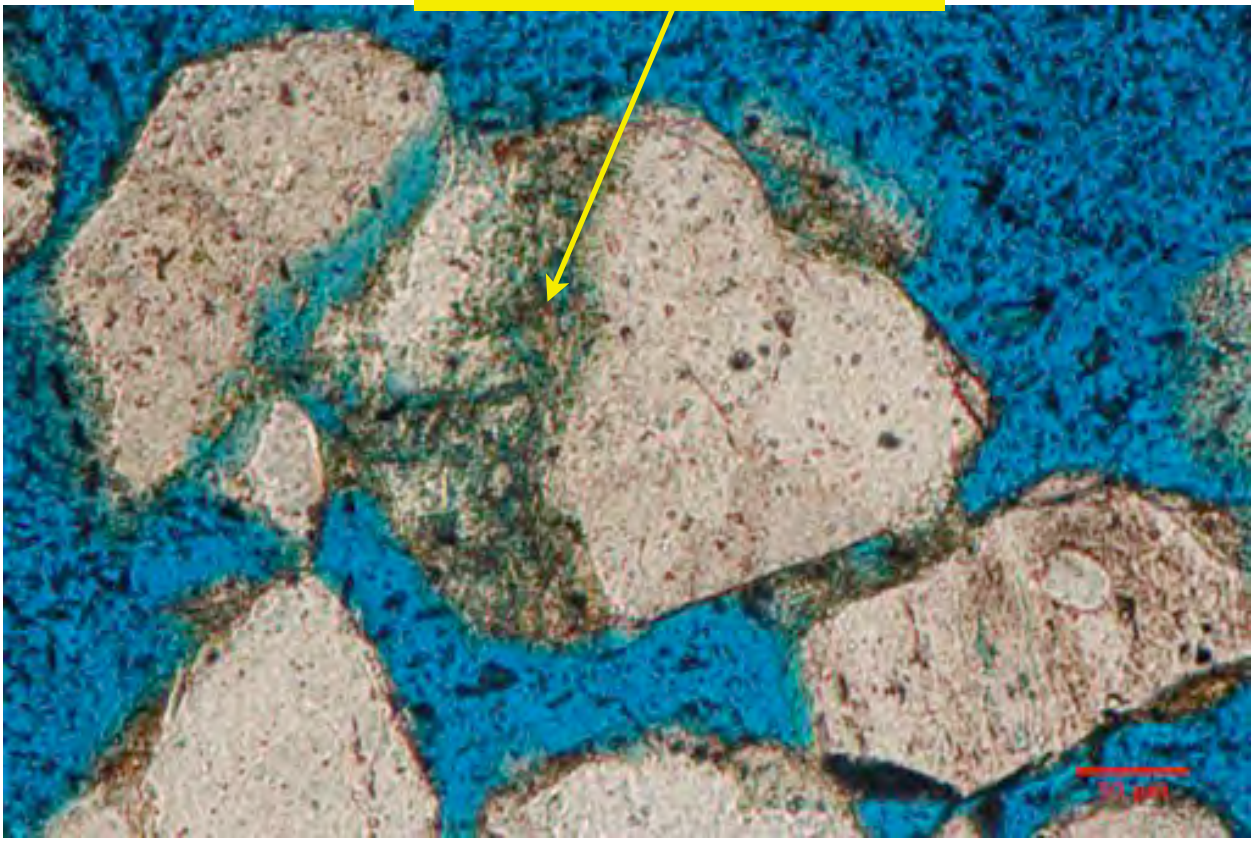
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545; Sample ID: 1312545-004B
Mineralogy, Inc. Job No.: 14122-04

14122-04C



Microporous authigenic clay (blue-green) partially replacing a leached feldspar grain

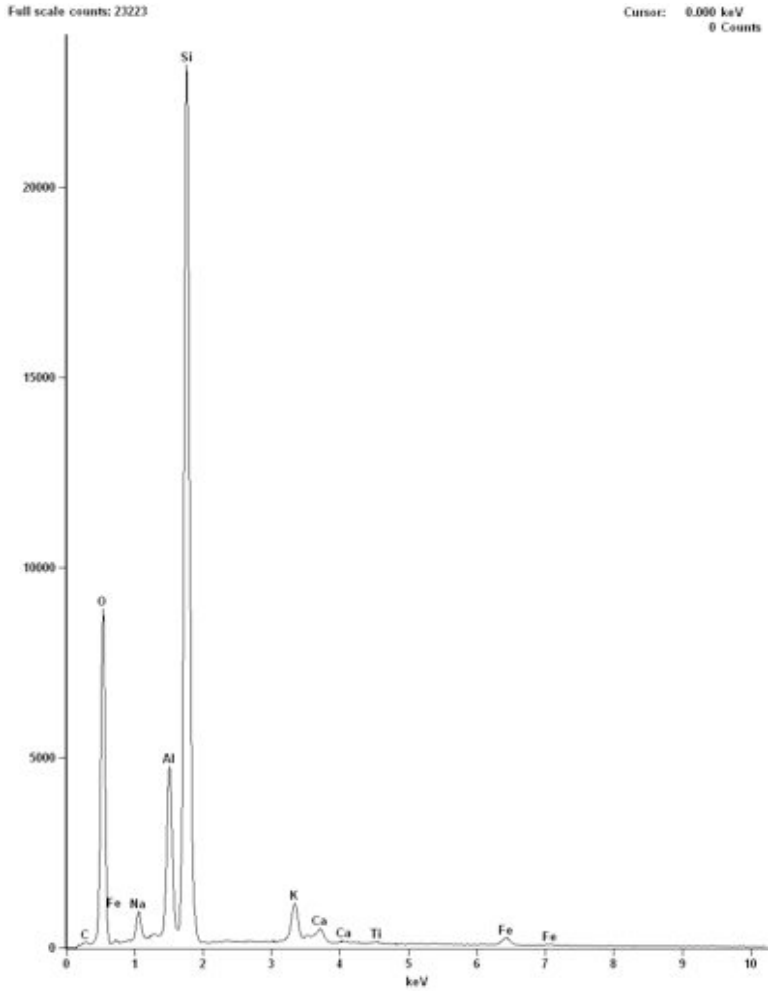
14122-04D



MINERALOGY, INC.

Figure IV.
Energy Dispersive X-Ray Analysis

Client:	McCampbell Analytical, Inc.	MI#:	14122-04
Project:	1312545 (Follow-Up to MI#14031)	Location:	N/A



Energy Dispersive X-Ray Results

14122-04	1312545-004B			
Element Line	Element Wt.%	Wt.% Error	Compound Formula	Compound Wt%
C K	3.05	+/-0.22	CO2	11.17
O K	52.56S	---		---
Na K	2.04	+/-0.07	Na2O	2.76
Al K	5.83	+/-0.06	Al2O3	11.02
Si K	32.82	+/-0.12	SiO2	70.22
K K	1.99	+/-0.05	K2O	2.39
Ca K	0.65	+/-0.05	CaO	0.91
Ti K	0.13	+/-0.02	TiO2	0.21
Fe K	0.94	+/-0.07	Fe2O3	1.34
	----------			----------
Total	100			100

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545
Sample ID: 1312545-005B
Mineralogy, Inc. Job No.: 14122-05

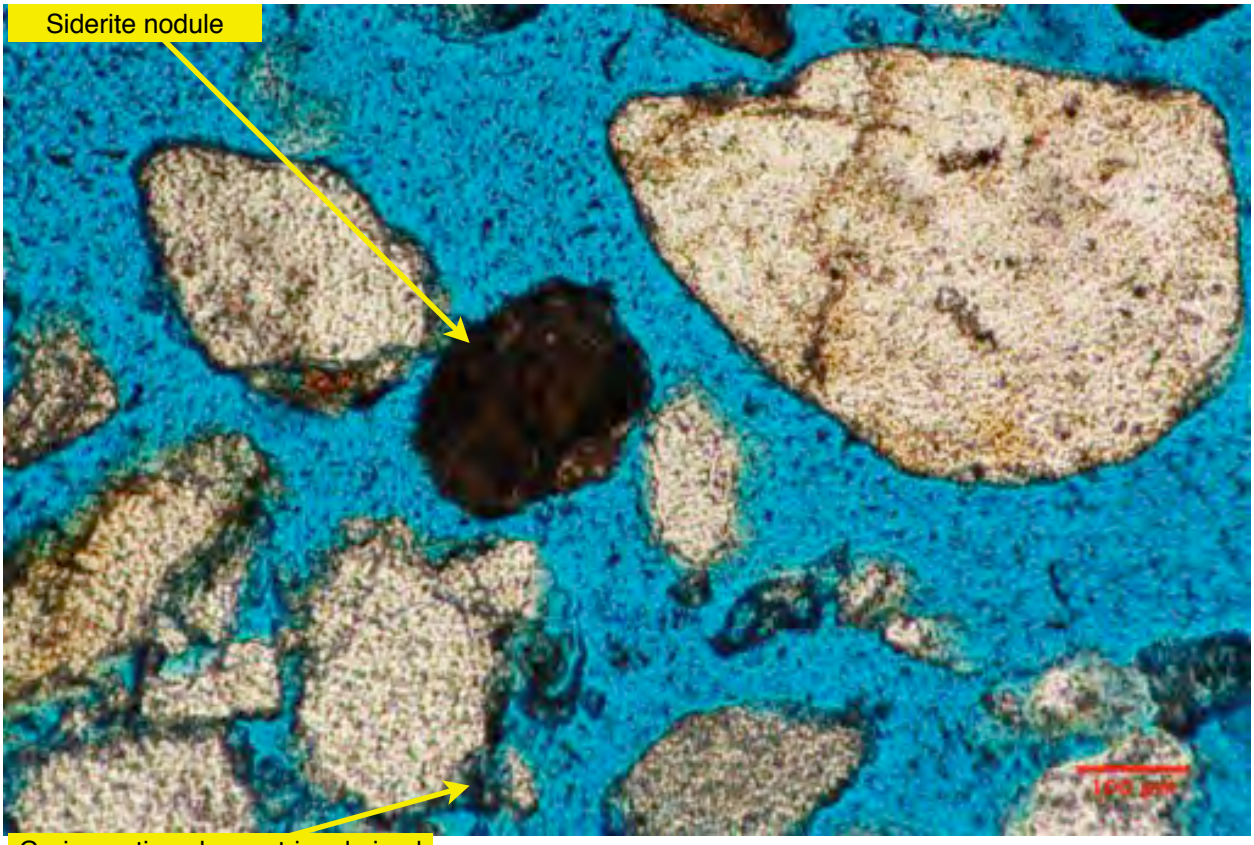
Lithologic Classification	Unconsolidated, Lithic Arkosic Sand
Textural Properties	Fine to medium grained (fU-mL), well sorted, and subangular to subrounded.
Mean Grain Diameter	~0.25 mm
Max Grain Diameter	1.14 mm
Fabric	Unconsolidated and disaggregated sand
Detrital Mineralogy	Detrital grain constituents are listed in descending order of relative abundance and include: 1) quartz (monocrystalline and polycrystalline quartz varieties), 2) feldspar (plagioclase > k-feldspar), 3) chert RFs, 4) igneous RFs (mostly granodiorite and rhyolite RFs), 5) biotite mica, and 6) shale RFs. Traces of magnetite, hornblende, and zircon occur as accessory detrital grain types.

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545
Sample ID: 1312545-005B
Mineralogy, Inc. Job No.: 14122-05

Cements & Matrix Constituents	Traces of quartz and feldspar cement occur as weakly developed, syntaxial overgrowths that are locally encrusted on detrital quartz and feldspar grains. Traces of siderite are also locally present as a weakly developed intergranular cement coating selected sand grains. Clay matrix minerals are common within this sand sample, occurring as grain replacements associated with leached feldspar grains, and as irregular clusters of grain coating clay. The x-ray diffraction analysis for this sample indicates the clay composition is dominated by illite coupled with mixed layered illite/smectite, and traces of chlorite and mixed layered chlorite smectite.
Weathering Properties	Feldspar grains contained within this sample are locally corroded and replaced with authigenic clay matrix minerals. Grain coating detrital clay is locally encrusted on the sand surfaces and is frequently commingled with traces of amorphous iron oxide cement.
Pore System	Minor amounts of intragranular dissolution porosity are present in association with the leached feldspar grains contained in this sample.

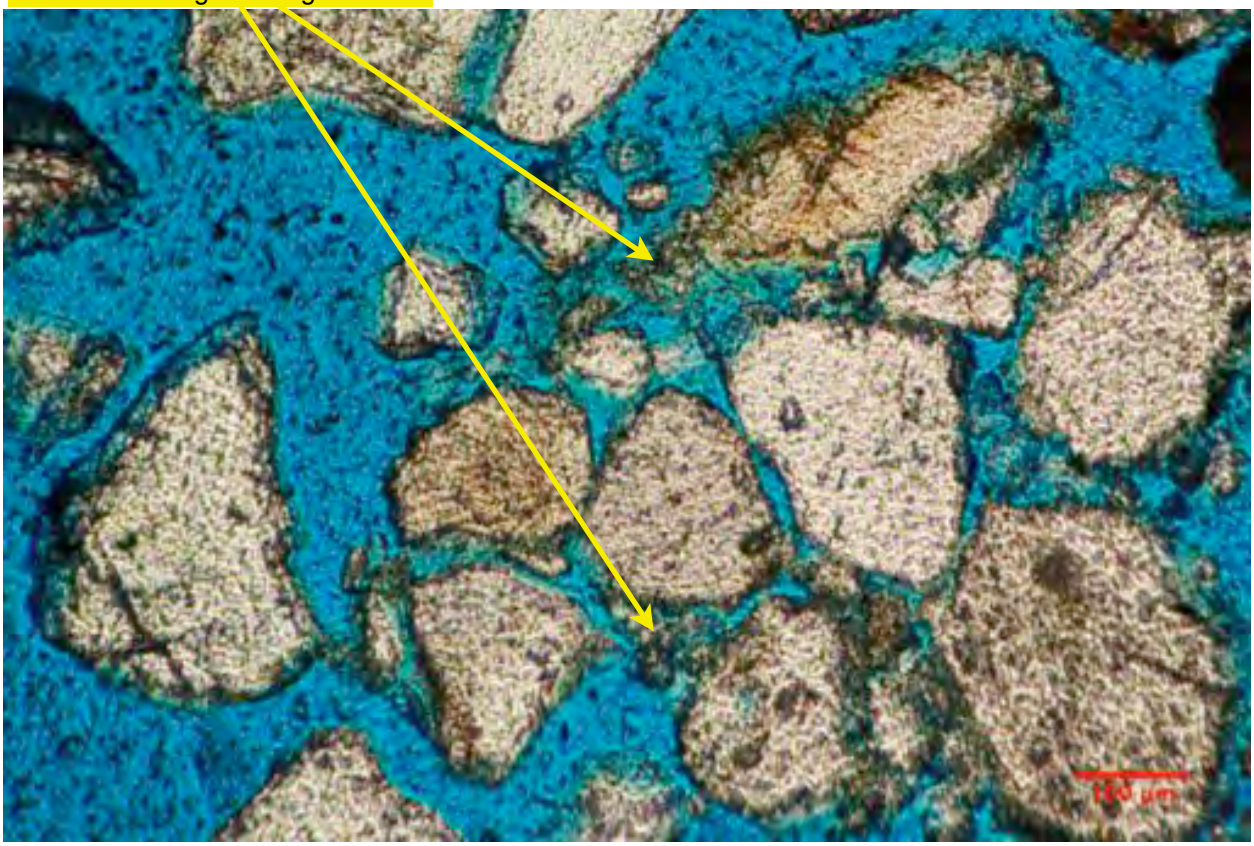
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545; Sample ID: 1312545-005B
Mineralogy, Inc. Job No.: 14122-05

14122-05A



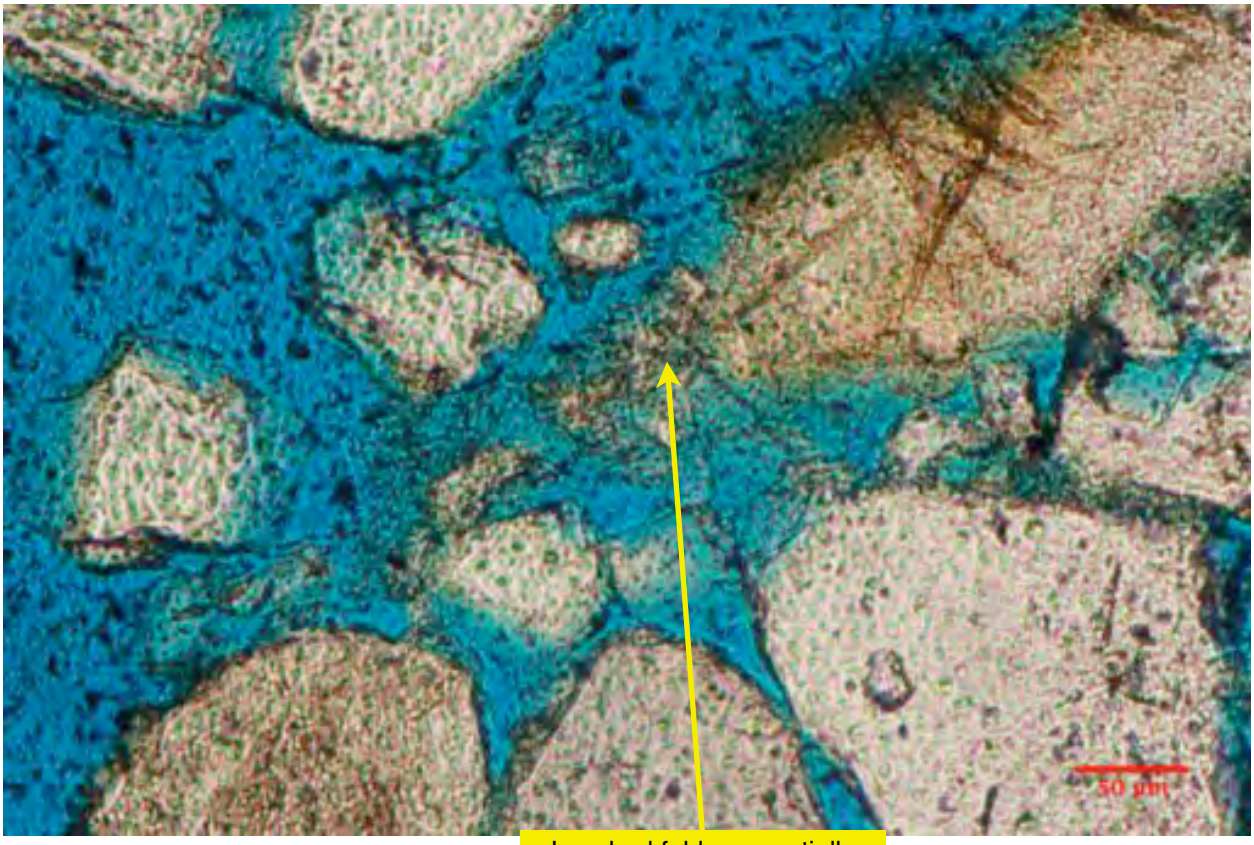
Grain-coating clay matrix admixed with subangular silt grains

14122-05B



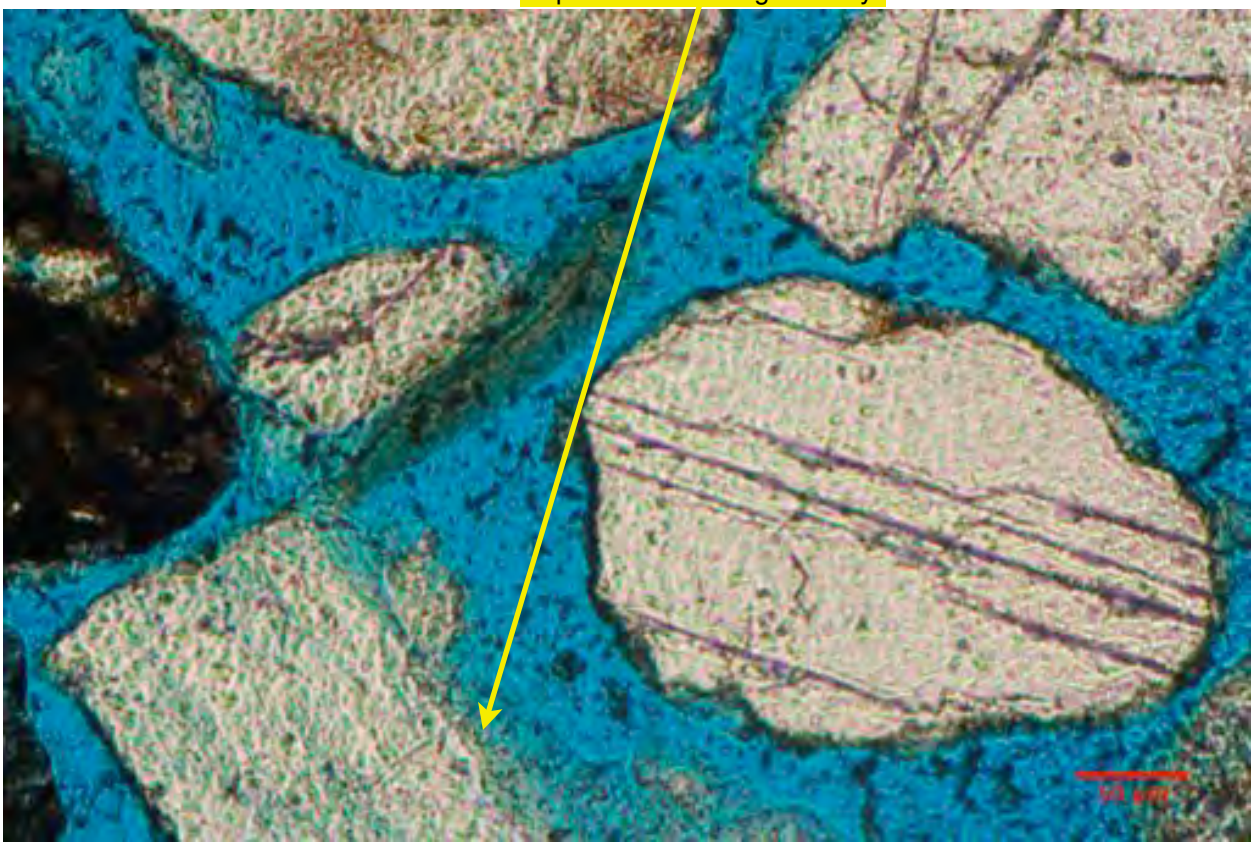
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545; Sample ID: 1312545-005B
Mineralogy, Inc. Job No.: 14122-05

14122-05C



Leached feldspar partially replaced with authigenic clay

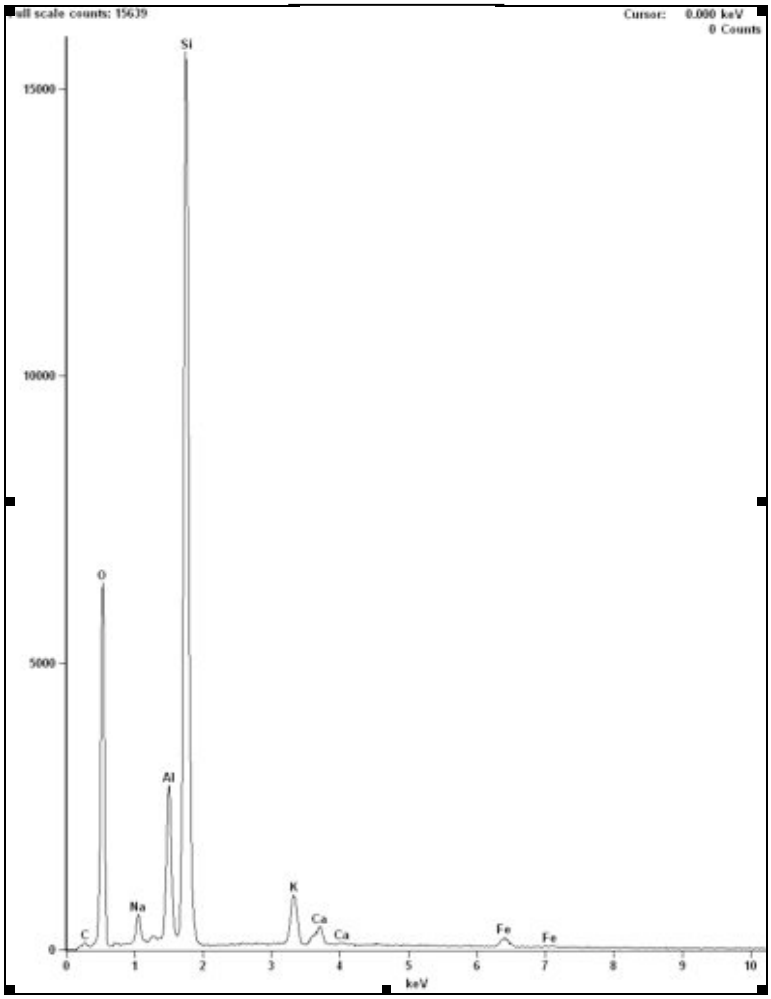
14122-05D



MINERALOGY, INC.

Figure V.
Energy Dispersive X-Ray Analysis

Client:	McCampbell Analytical, Inc.	MI#:	14122-05
Project:	1312545 (Follow-Up to MI#14031)	Location:	N/A



Energy Dispersive X-Ray Results

14122-05	1312545-005B			
Element Line	Element Wt.%	Wt.% Error	Compound Formula	Compound Wt%
C K	3	+/-0.24	CO2	10.99
O K	51.88S	---		---
Na K	2.19	+/-0.08	Na2O	2.95
Al K	4.94	+/-0.08	Al2O3	9.34
Si K	32.58	+/-0.14	SiO2	69.69
K K	3.03	+/-0.06	K2O	3.65
Ca K	1.06	+/-0.06	CaO	1.49
Fe K	1.33	+/-0.10	Fe2O3	1.9
	----------			----------
Total	100			100

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545
Sample ID: 1312545-006B
Mineralogy, Inc. Job No.: 14122-06

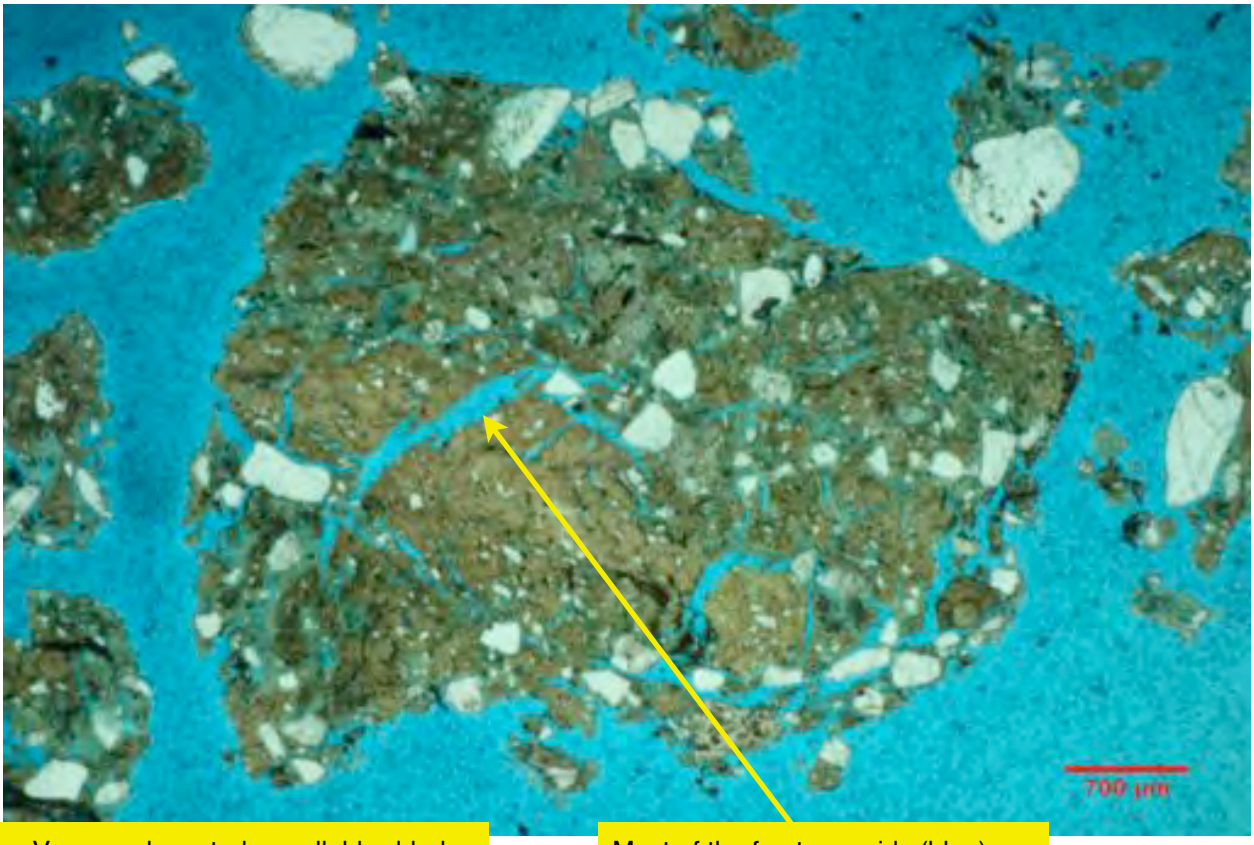
Lithologic Classification	Arkosic Silty and Sandy Shale
Textural Properties	Detrital grains are coarse silt-sized, very poorly sorted, subangular to subrounded, and bi-modally distributed. The clay-rich groundmass materials are microcrystalline and densely interlocked.
Mean Grain Diameter	~0.05 mm
Max Grain Diameter	1.30 mm
Fabric	Parallel bedded and matrix-supported with widely scattered quartz and feldspar-rich silt and sand grains irregularly distributed within the shale groundmass.
Detrital Mineralogy	Detrital grain constituents are listed in descending order of relative abundance and include: 1) quartz (monocrystalline and minor polycrystalline quartz varieties), 2) feldspar (plagioclase > k-feldspar), 3) chert RFs, 4) organic matter particles, 5) igneous RFs, 6) biotite mica. Accessory components include traces of hornblende, epidote, and sphene.

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545
Sample ID: 1312545-006B
Mineralogy, Inc. Job No.: 14122-06

Cements & Matrix Constituents	The shale mineralogy is dominated by detrital clay matrix. X-ray diffraction mineralogical analysis of this sample indicates a mineralogy dominated by mixed layered illite/smectite coupled with subordinate amounts of illite and traces of chlorite. The mixed layered illite fraction is a hybrid clay that exhibits a predominance of randomly stacked layers of illite and montmorillonite, with montmorillonite comprising ~70% of the hybrid structure.
Weathering Properties	Scattered detrital feldspar grains exhibit localized evidence of intraparticle leaching and replacement with authigenic clay matrix minerals.
Pore System	The void volume of this sediment material consists of intercrystalline microporosity coupled with scattered interparticle macropores associated with localized clusters of detrital silt and sand grains. The interval exhibits significant amounts of fracture porosity; however, the fractures are regarded as artifacts of sample collection and preparation. Intercrystalline microporosity locally accounts for as much as 7-10% of the bulk volume within selected shale particles.

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545; Sample ID: 1312545-006B
Mineralogy, Inc. Job No.: 14122-06

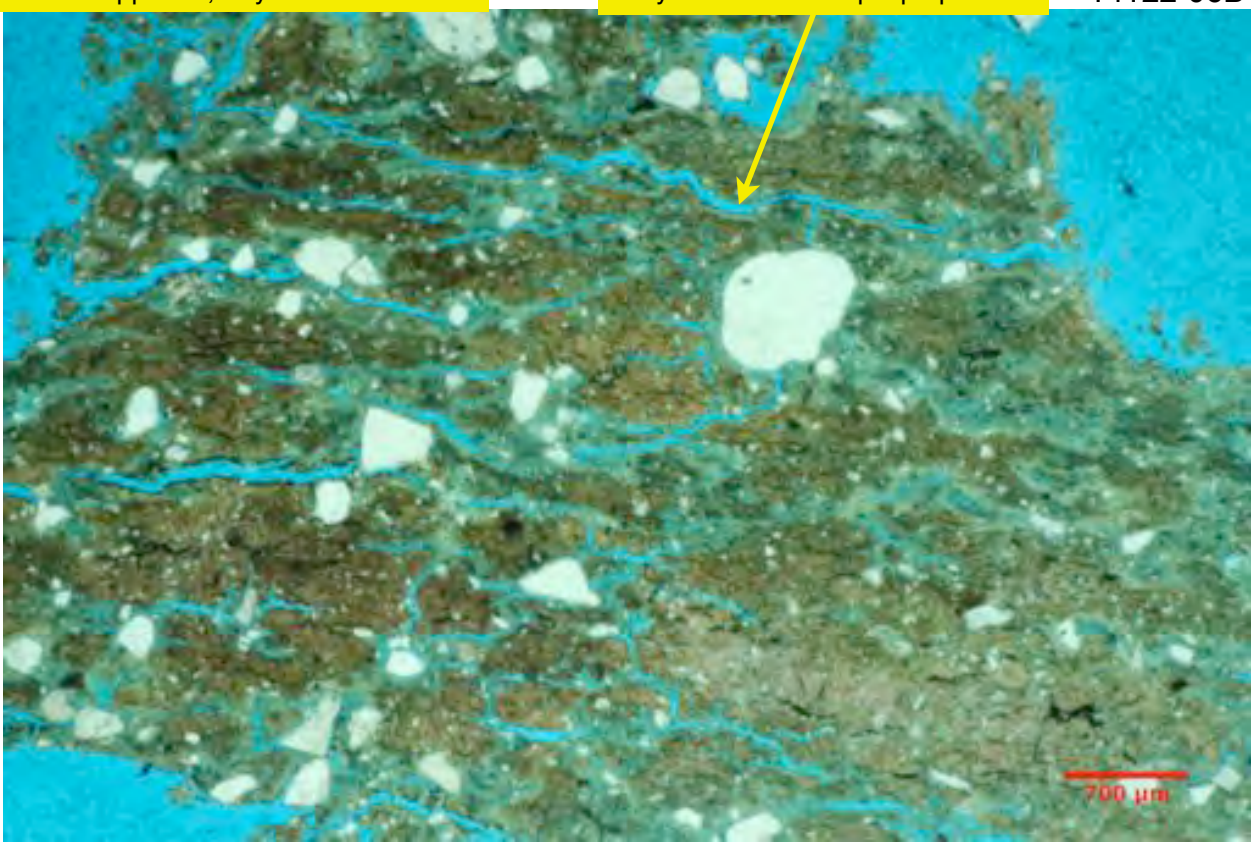
14122-06A



Very poorly sorted, parallel-bedded, matrix-supported, silty shale / mudstone

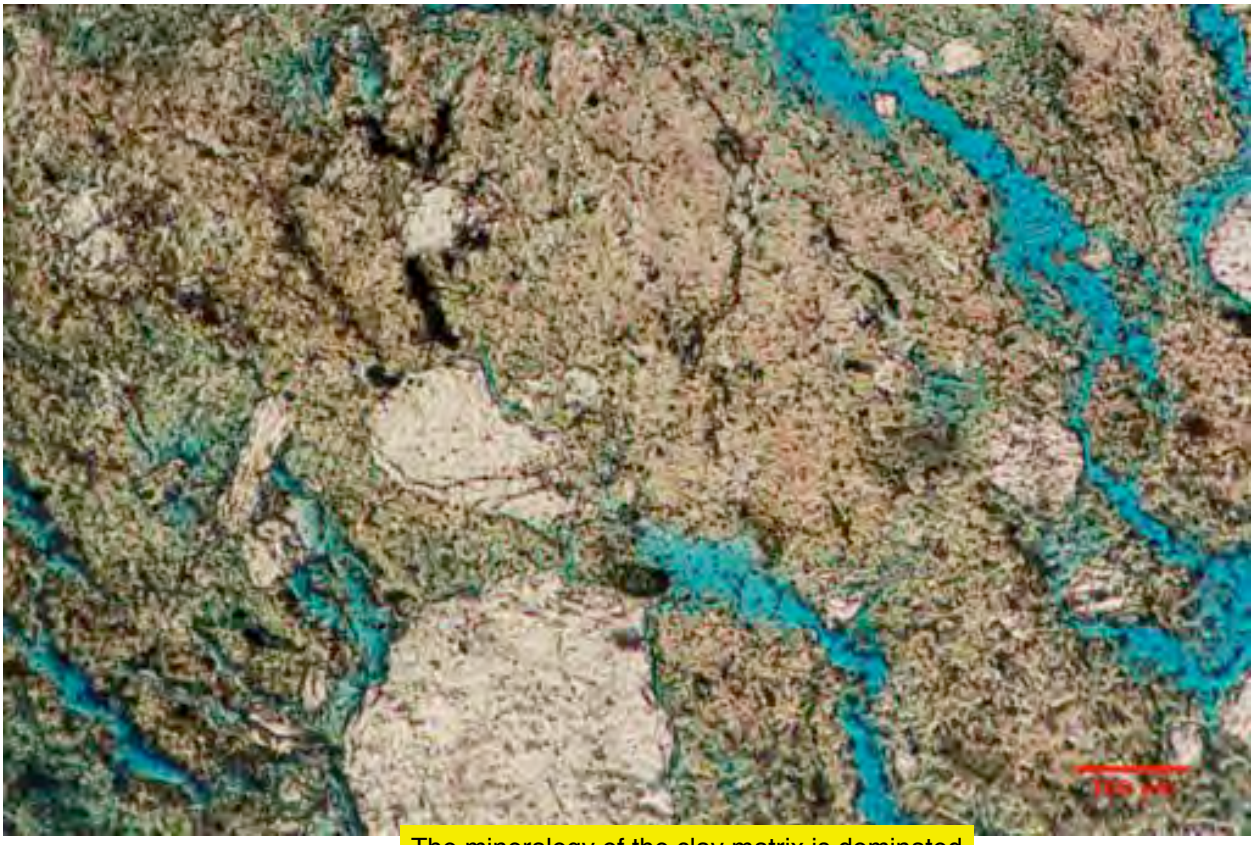
Most of the fracture voids (blue) are likely artifacts of sample preparation

14122-06B



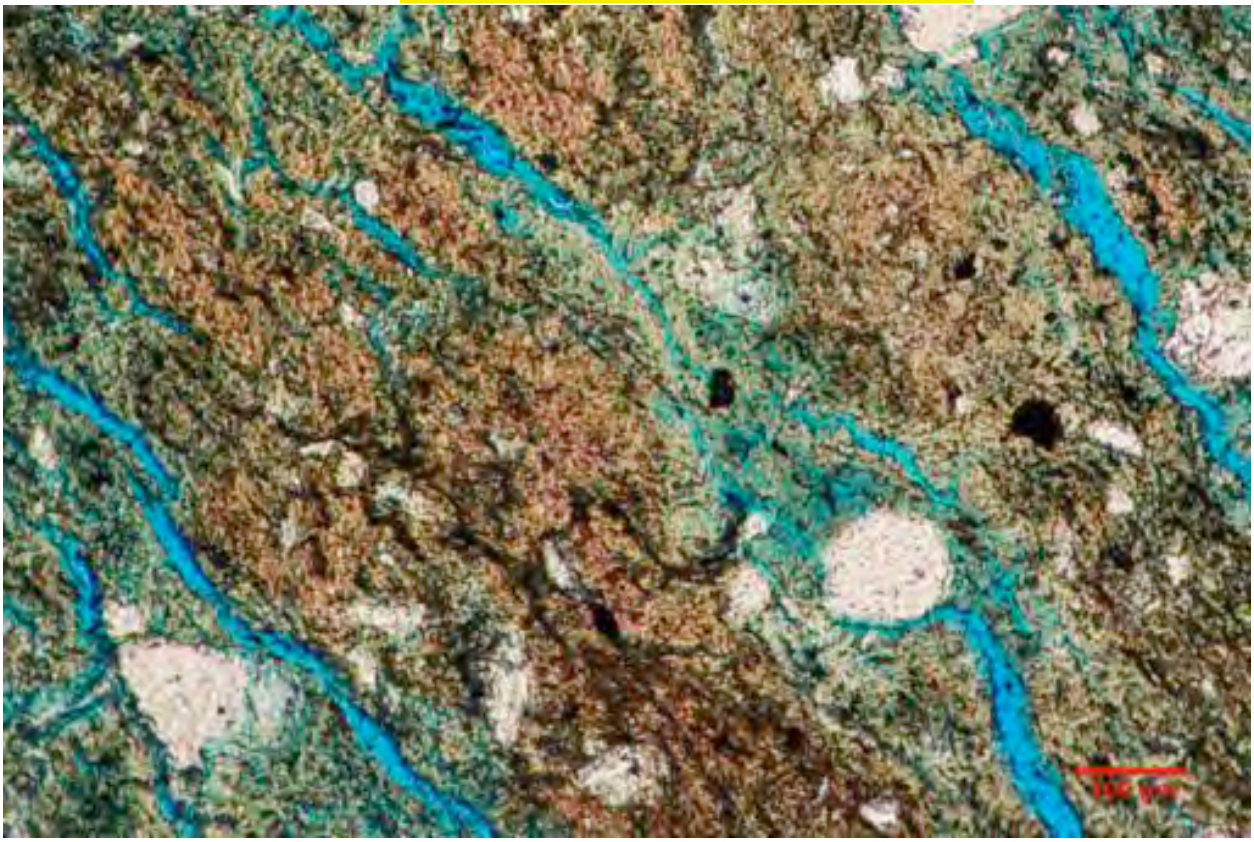
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545; Sample ID: 1312545-006B
Mineralogy, Inc. Job No.: 14122-06

14122-06C



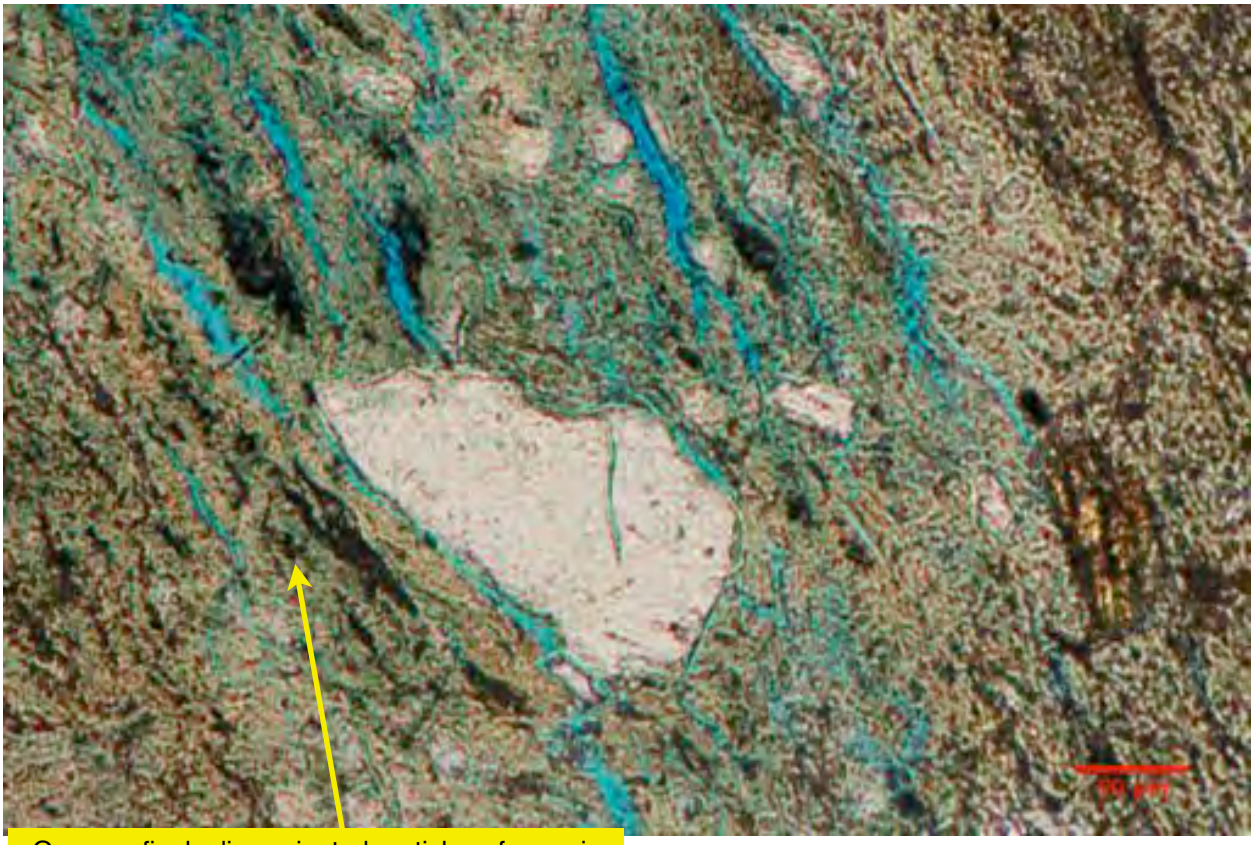
The mineralogy of the clay matrix is dominated by mixed-layered illite/smectite + illite

14122-06D



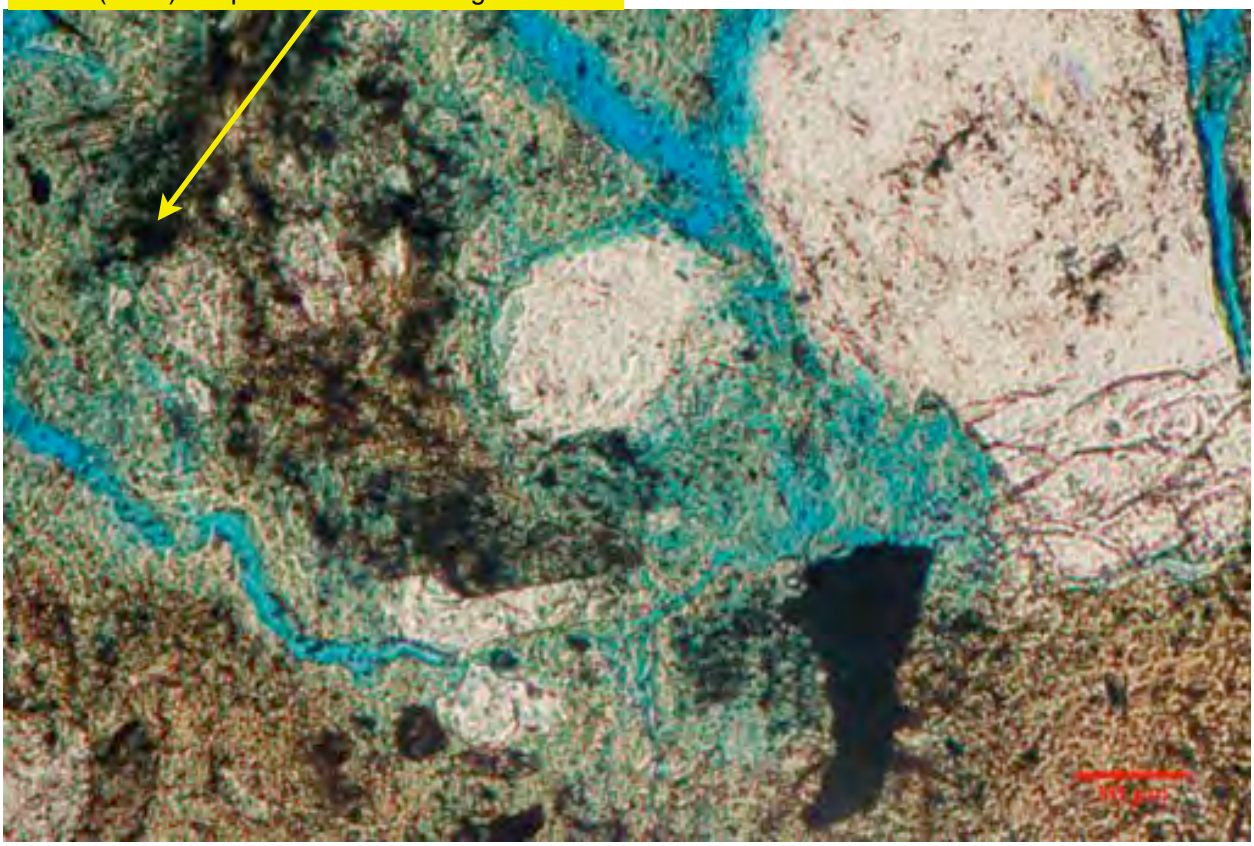
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545; Sample ID: 1312545-006B
Mineralogy, Inc. Job No.: 14122-06

14122-06E



Opaque, finely disseminated particles of organic matter (black) are present in the shale groundmass

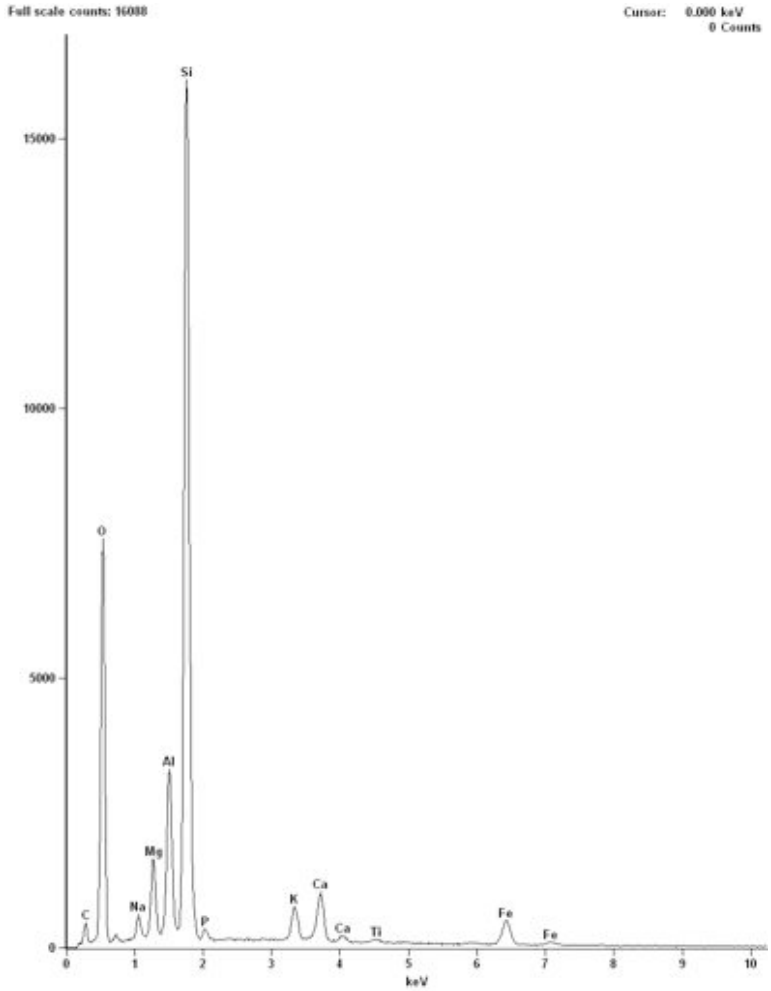
14122-06F



MINERALOGY, INC.

Figure VI.
Energy Dispersive X-Ray Analysis

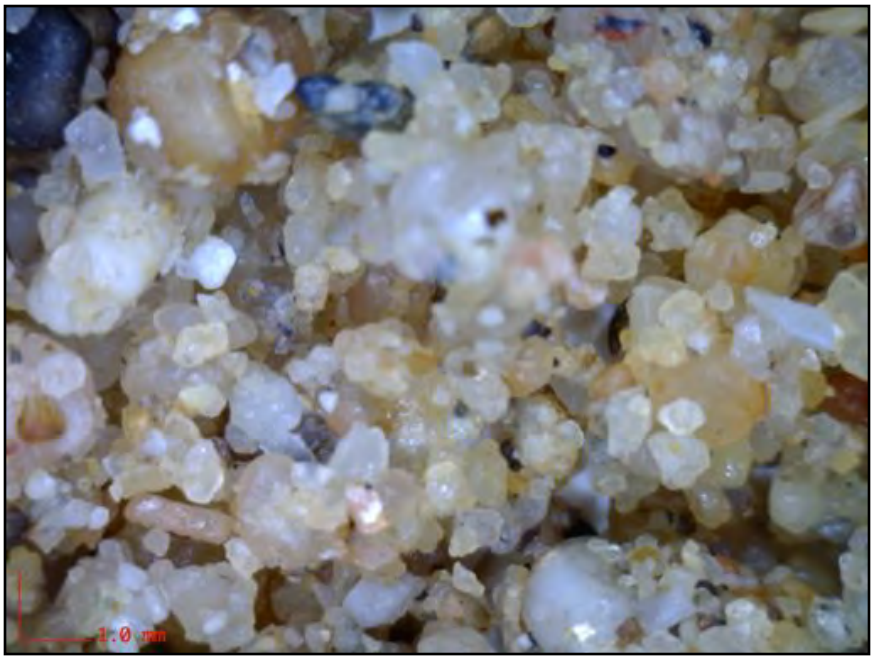
Client:	McCampbell Analytical, Inc.	MI#:	14122-06
Project:	1312545 (Follow-Up to MI#14031)	Location:	N/A



Energy Dispersive X-Ray Results

14122-06	1312545-006B			
Element Line	Element Wt.%	Wt.% Error	Compound Formula	Compound Wt%
C K	8.67	+/-0.31	CO2	31.78
O K	56.18S	---		---
Na K	0.84	+/-0.08	Na2O	1.13
Mg K	2.18	+/-0.06	MgO	3.61
Al K	4.34	+/-0.07	Al2O3	8.19
Si K	21.57	+/-0.10	SiO2	46.14
P K	0.58	+/-0.05	P2O5	1.34
K K	1.16	+/-0.04	K2O	1.39
Ca K	1.93	+/-0.05	CaO	2.7
Ti K	0.23	+/-0.03	TiO2	0.38
Fe K	2.33	+/-0.07	Fe2O3	3.33
	----------			----------
Total	100			100

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545
Sample ID: 1312545-007B
Mineralogy, Inc. Job No.: 14122-07



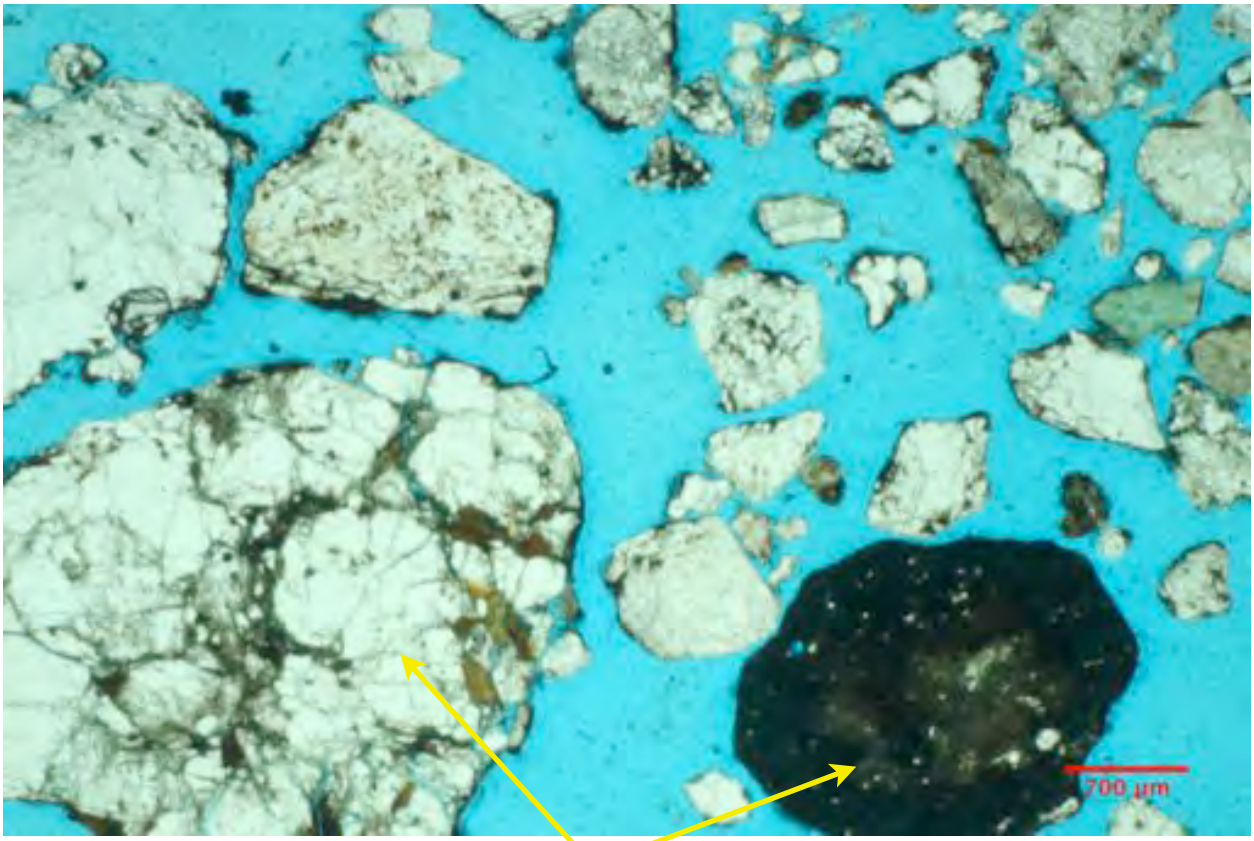
Lithologic Classification	Unconsolidated Lithic Arkosic Sand
Textural Properties	Medium grained (mU), moderately sorted, and subangular to subrounded.
Mean Grain Diameter	~0.46 mm
Max Grain Diameter	4.13 mm
Fabric	Unconsolidated and disaggregated
Detrital Mineralogy	Detrital grain constituents are listed in descending order of relative abundance and include: 1) quartz (monocrystalline and polycrystalline quartz varieties), 2) feldspar (plagioclase > k-feldspar), 3) igneous RFs (including granite and granodiorite RFs), 4) silty mudstone RFs, and 5) apatite.
Cements & Matrix Constituents	This unconsolidated sand sample exhibits evidence of common grain coating detrital clay matrix minerals (probably chloride-rich), + minor amounts of grain replacement authigenic clay associated with leached and partially replaced feldspar grains and igneous RFs. Localized concentrations of iron oxide cement are also present as a late stage cement phase associated with a few of the rock fragment particles in this interval.

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545
Sample ID: 1312545-007B
Mineralogy, Inc. Job No.: 14122-07

Pore System	Traces of intraparticle dissolution porosity are also present in association with a few of the leached feldspar grains.

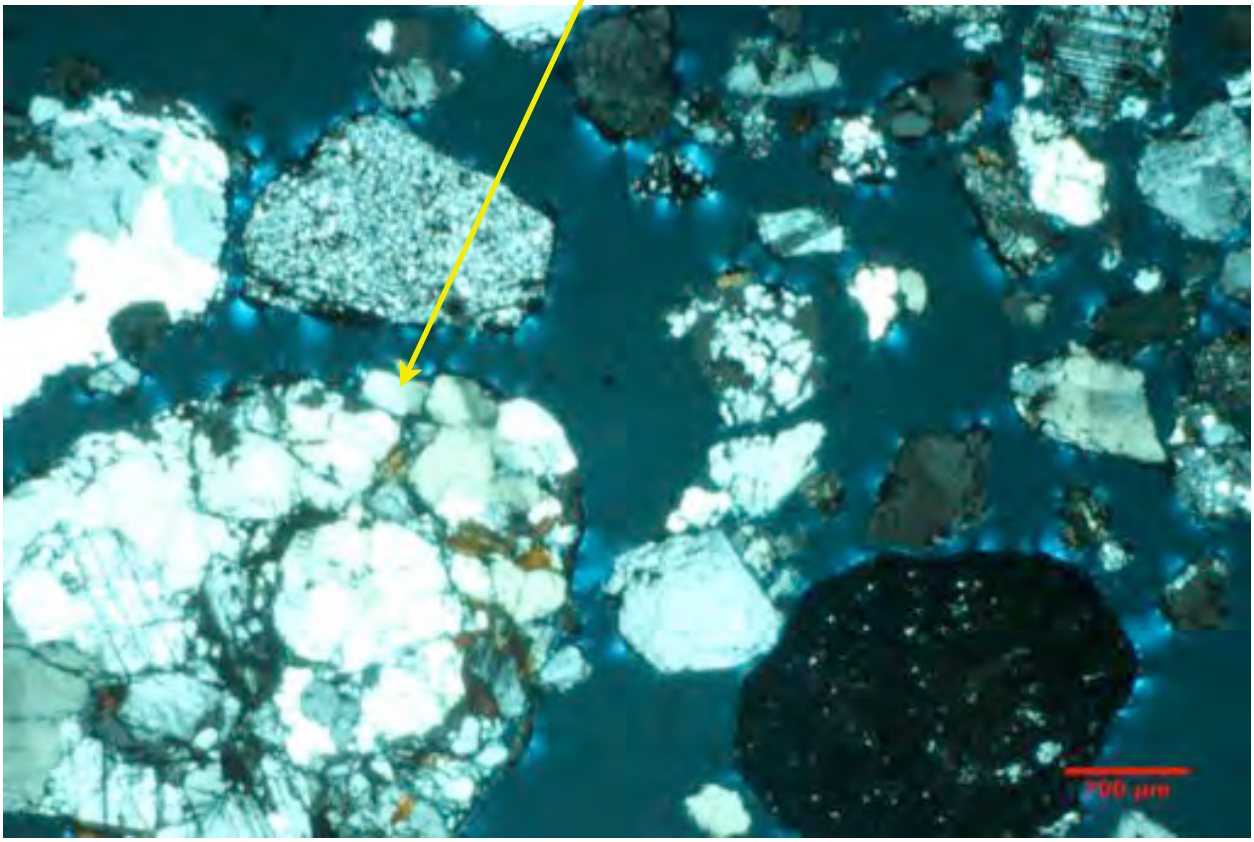
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545; Sample ID: 1312545-007B
Mineralogy, Inc. Job No.: 14122-07

14122-07A



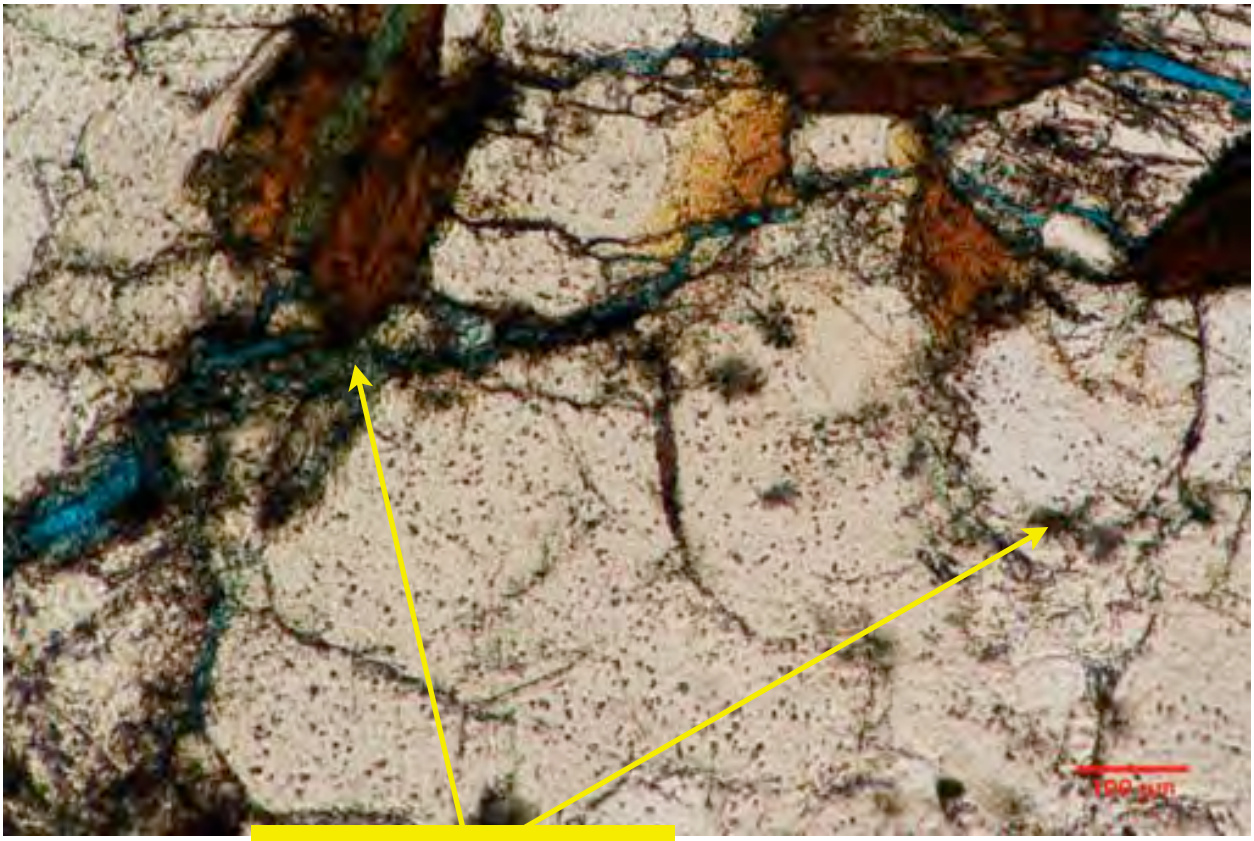
Igneous rock fragments (RFs)

14122-07B



Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545; Sample ID: 1312545-007B
Mineralogy, Inc. Job No.: 14122-07

14122-07C

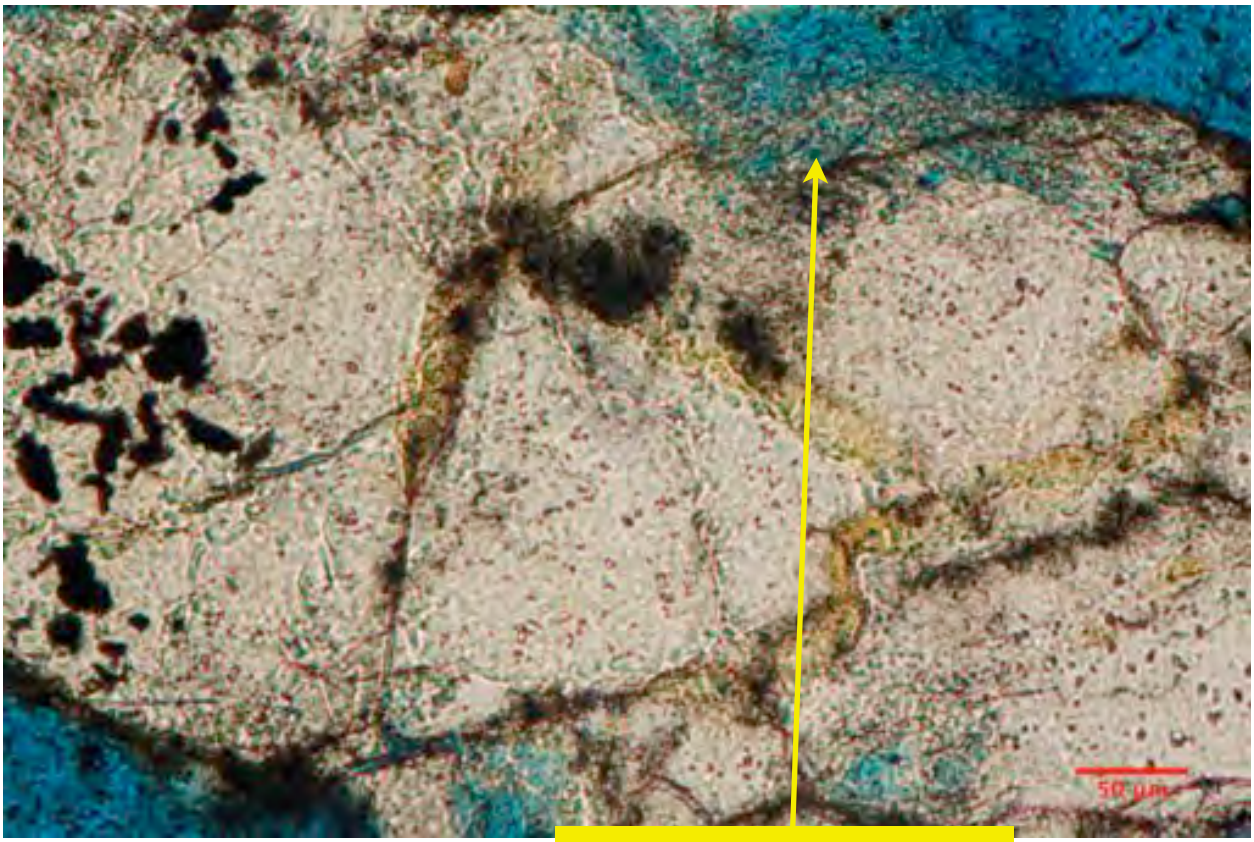


Authigenic grain-replacement clay within a leached granite RF

14122-07D

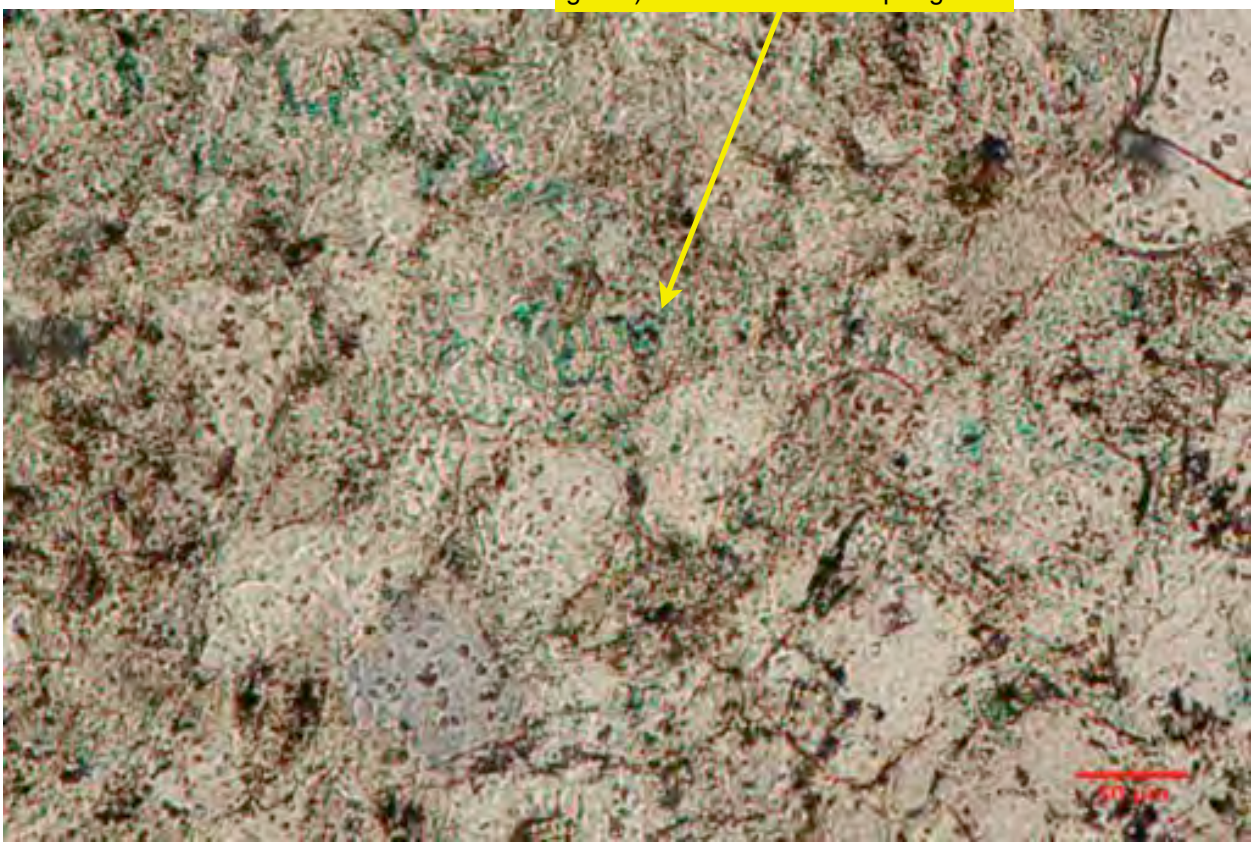
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312545; Sample ID: 1312545-007B
Mineralogy, Inc. Job No.: 14122-07

14122-07E



Cleavage plane dissolution (blue-green) within leached feldspar grains

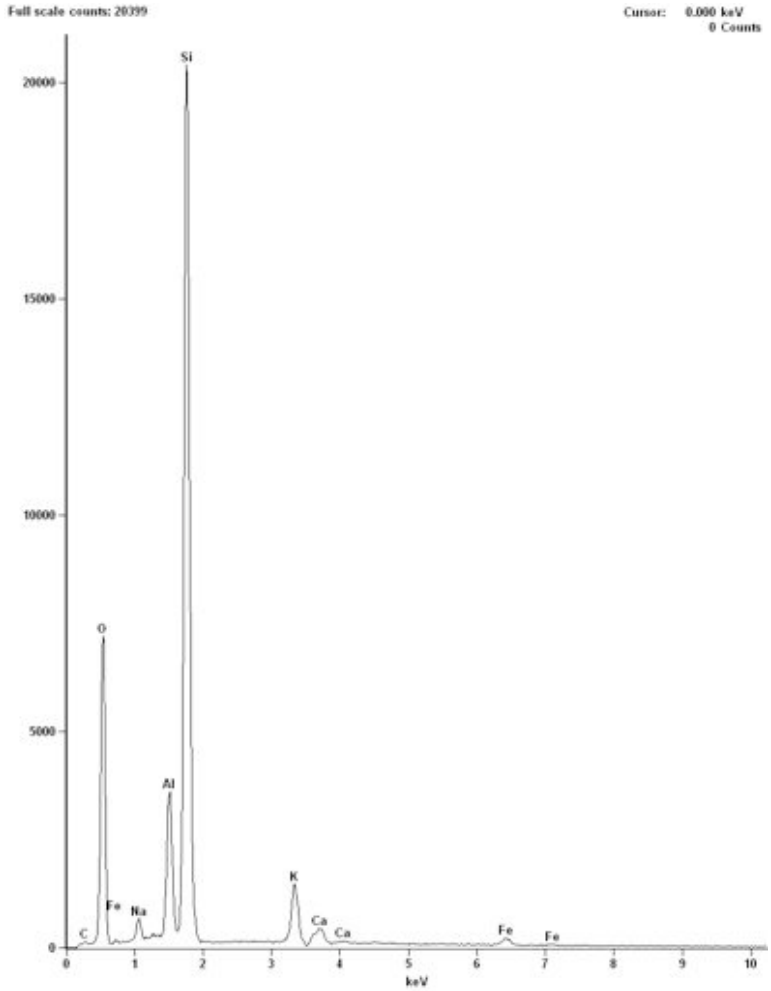
14122-07F



MINERALOGY, INC.

Figure VII.
Energy Dispersive X-Ray Analysis

Client:	McCampbell Analytical, Inc.	MI#:	14122-07
Project:	1312545 (Follow-Up to MI#14031)	Location:	N/A



Energy Dispersive X-Ray Results

14122-07	1312545-007B			
Element Line	Element Wt.%	Wt.% Error	Compound Formula	Compound Wt%
C K	2.49	+/-0.26	CO2	9.13
O K	51.60S	---		---
Na K	1.57	+/-0.07	Na2O	2.11
Al K	5.2	+/-0.06	Al2O3	9.82
Si K	33.54	+/-0.13	SiO2	71.75
K K	3.56	+/-0.05	K2O	4.29
Ca K	1.09	+/-0.05	CaO	1.53
Fe K	0.96	+/-0.07	Fe2O3	1.37
	----------			----------
Total	100			100

MINERALOGY, INC.

Final Test Report

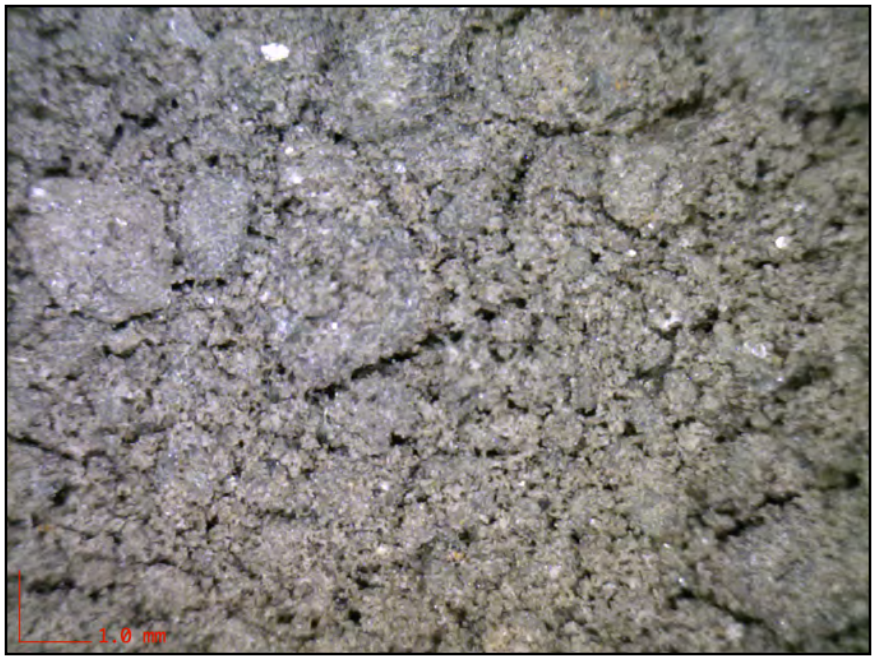
Client:	McCampbell Analytical, Inc.	MI#:	14123
Project:	1312650 (Follow-Up to MI# 14032)	Sample Type:	Sediments
Location:	N/A	Date:	05.05.14

Contact	Alan Santistevan
Address	McCampbell Analytical, Inc.
	1534 Willow Pass Road
	Plttsburg, CA 94565
E-mail	alan.santistevan@mccampbell.com
Phone	925.252.9262
Project ID:	1312650 (Follow-Up to MI# 14032)
Test Methods	EDX & TSD (x3)
Calibration Date	05.05.14
MI Lab Supervisor	
	Timothy B. Murphy

CONDITIONS AND QUALIFICATIONS

Mineralogy, Inc. will endeavor to provide accurate and reliable laboratory measurements of the samples provided by the client. The results of any x-ray diffraction, petrographic or core analysis test are necessarily influenced by the condition and selection of the samples to be analyzed. It should be recognized that geological samples are commonly heterogeneous and lack uniform properties. Mineralogical, geochemical and/or petrographic data obtained for a specific sample provides compositional data pertinent to that specific sampling location. Such "site-specific data" may fail to provide adequate characterization of the range of compositional variability possible within a given project area, thus the "projection" of these laboratory findings and values to adjoining, "untested" areas of the formation or project area is inherently risky, and exceeds the scope of the laboratory work request. Hence, Mineralogy, Inc. shall not assume any liability risk or responsibility for any loss or potential failure associated with the application of "site or sample-specific laboratory data" to "untested" areas of the formation or project area. Unless otherwise directed, the samples selected for analysis will be chosen to reflect a visually representative portion of the bulk sample submitted for analysis. Where provided, the interpretation of x-ray diffraction, petrographic or core analysis results constitutes the best geological judgment of Mineralogy, Inc., and is subject to the sampling limitations described above, and the detection limits inherent to semi-quantitative and/or qualitative mineralogical and microscopic analysis. Mineralogy, Inc. assumes no responsibility nor offers any guarantee of the productivity, suitability or performance of any oil or gas well, hydrocarbon recovery process, dimension stone, and/or ore material based upon the data or conclusions presented in this report.

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312650
Sample ID: 1312650-001B
Mineralogy, Inc. Job No.: 14123-01



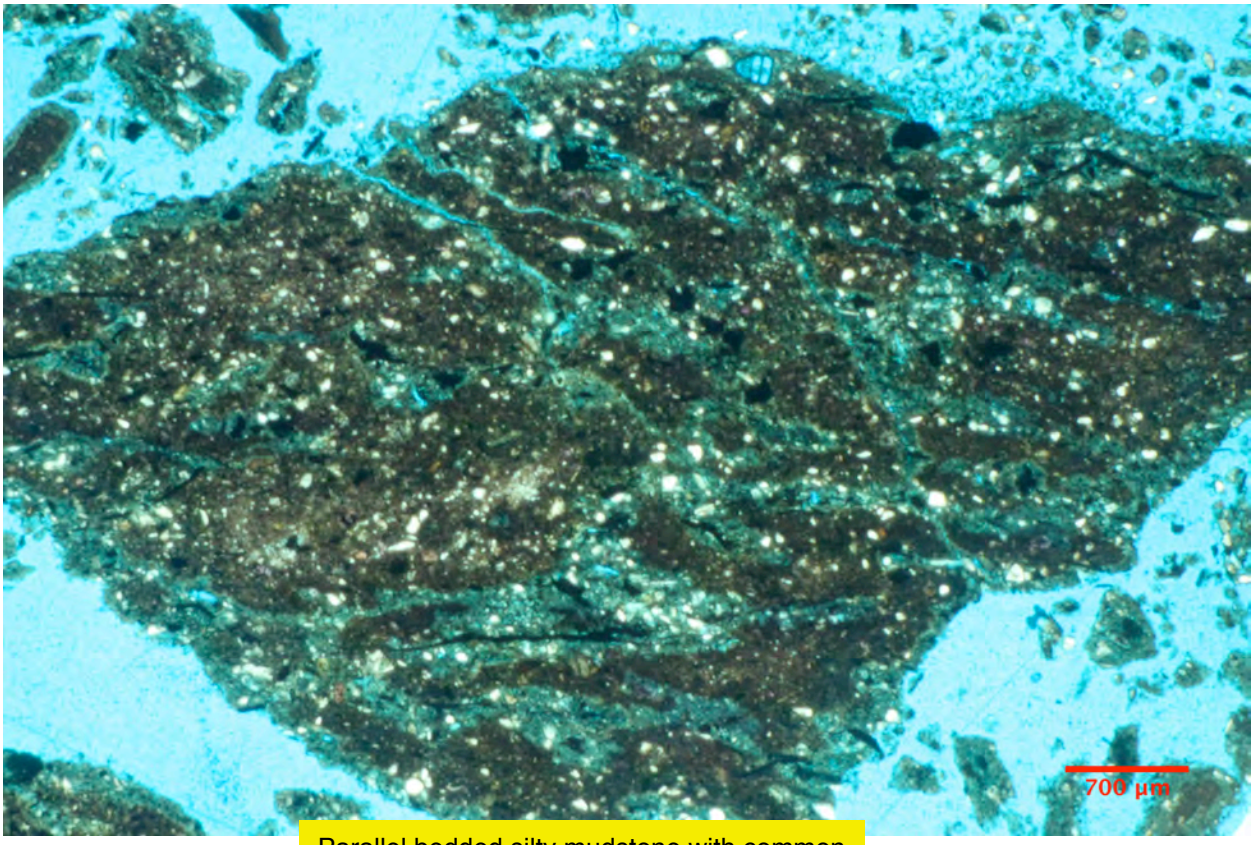
Lithologic Classification	Silty Mudstone
Textural Properties	Coarse silt-sized, very poorly sorted, and subangular. Scattered quartz-rich sand grains are also locally present within the fabric of the mudstone.
Mean Grain Diameter	~0.045 mm
Max Grain Diameter	0.33 mm
Fabric	The mudstone sample is matrix supported, massively to parallel bedded, and partially disaggregated. Individual fragments of silty mudstone exhibit evidence of fracture strain attributed to desiccation of the clay matrix during sample preparation. The detrital silt and sand grains are irregularly distributed within the groundmass.
Detrital Mineralogy	Detrital grain constituents are listed in descending order of relative abundance and include: 1) quartz (monocrystalline and minor polycrystalline quartz varieties), 2) irregular particles of organic matter, 3) feldspar (plagioclase > k-feldspar), 4) mudstone and shale RFs, 5) chert RFs, and 6) mica laths.

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312650
Sample ID: 1312650-001B
Mineralogy, Inc. Job No.: 14123-01

Cements & Matrix Constituents	The groundmass is clay-rich & dominated by mixed layered illite/smectite coupled with subordinate amounts of illite, chlorite, and kaolinite. The mixed layered clay is a randomly ordered clay hybrid with sub-equal amounts of montmorillonite and illite. Pyrite is common as a replacement associated with altered particles of organic matter contained in this sediment.
Weathering Properties	A few of the feldspar grains exhibit evidence of intraparticle dissolution and clay replacement. Pyrite cement is common as a replacement associated with organic particles.
Pore System	The void volume of this mudstone interval is dominated by intercrystalline microporosity coupled with minor amounts of sheltered intergranular porosity and intraparticle dissolution void space. Most of the sheltered void space is associated with clusters of silt and/or sand grains incorporated within the mudstone fabric. The total void volume is visually estimated to range from ~8-11% of the bulk volume.

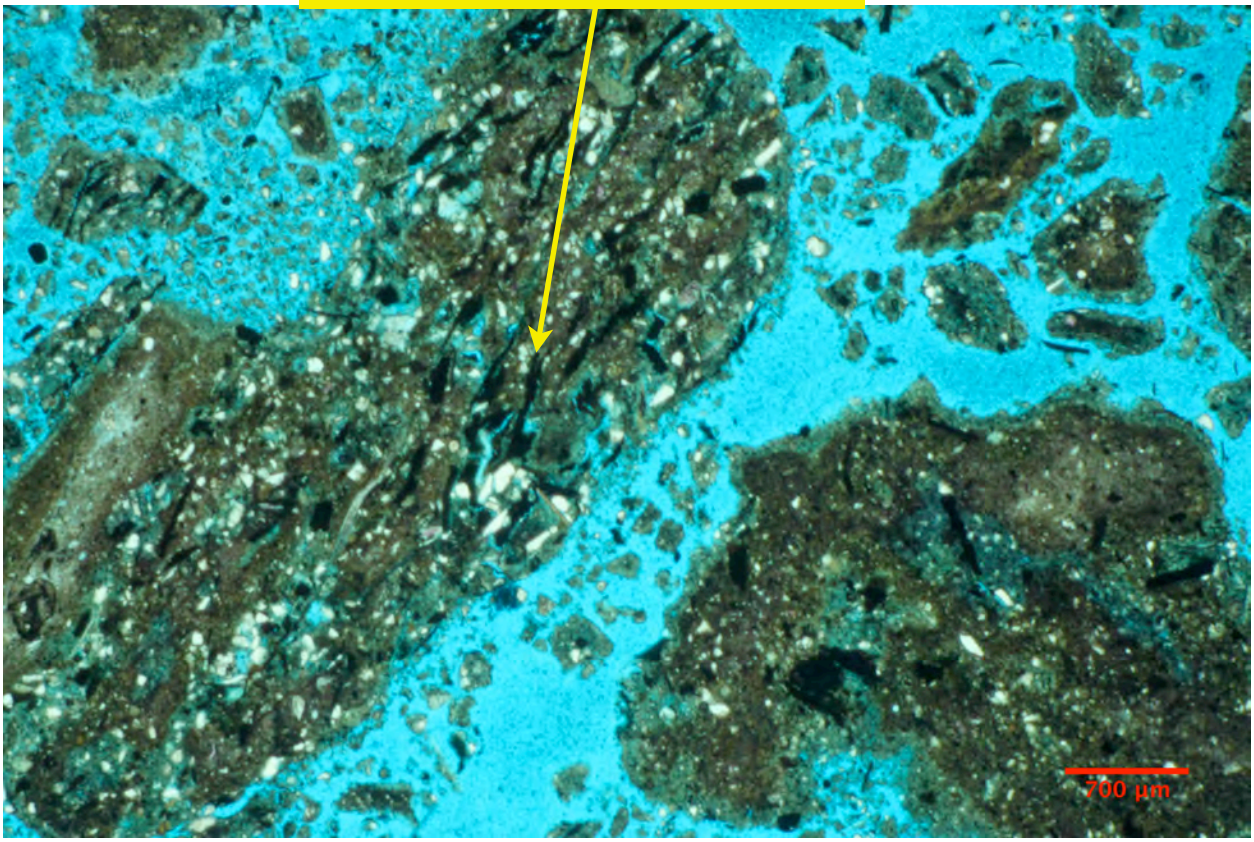
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312650; Sample ID: 1312650-001B
Mineralogy, Inc. Job No.: 14123-01

14123-01A



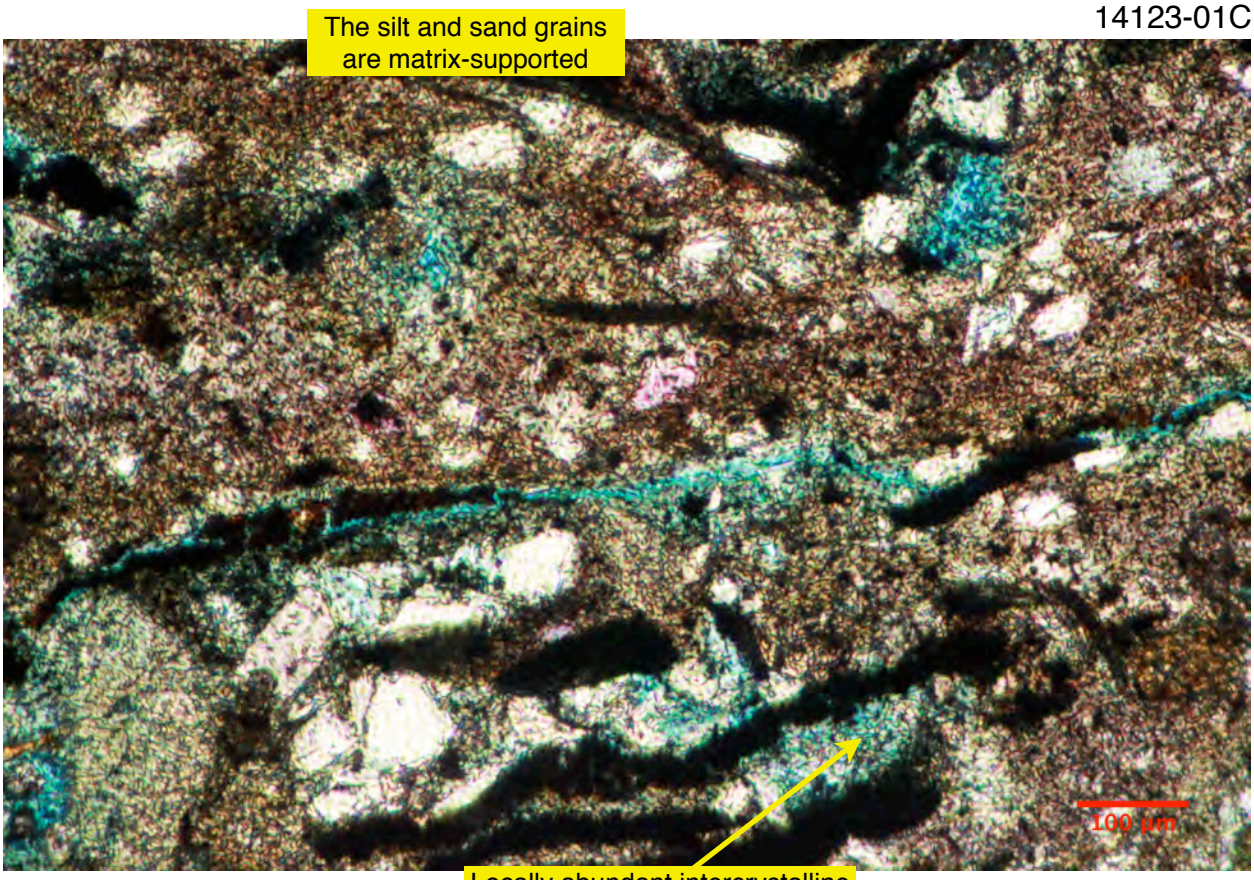
Parallel bedded silty mudstone with common lens-shaped particles of organic matter (black)

14123-01B

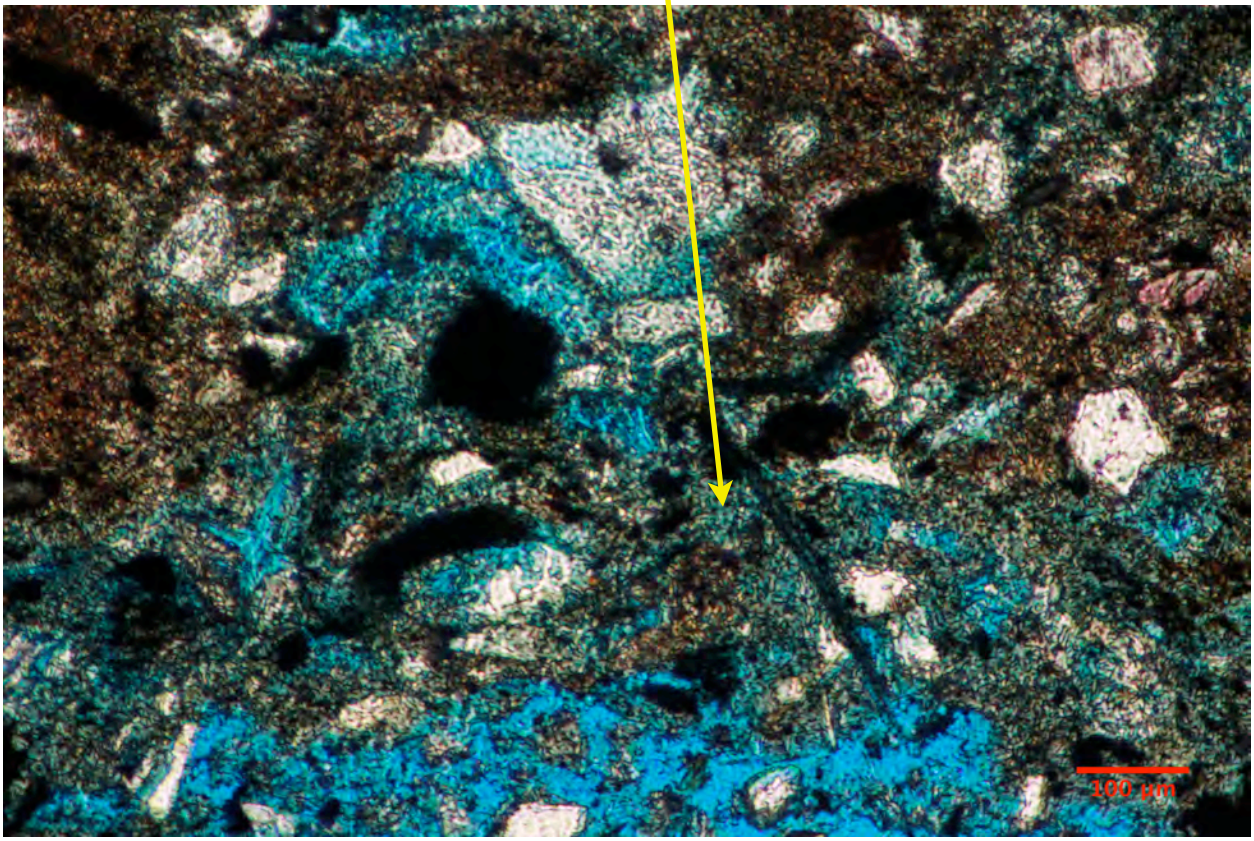


Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312650; Sample ID: 1312650-001B
Mineralogy, Inc. Job No.: 14123-01

14123-01C

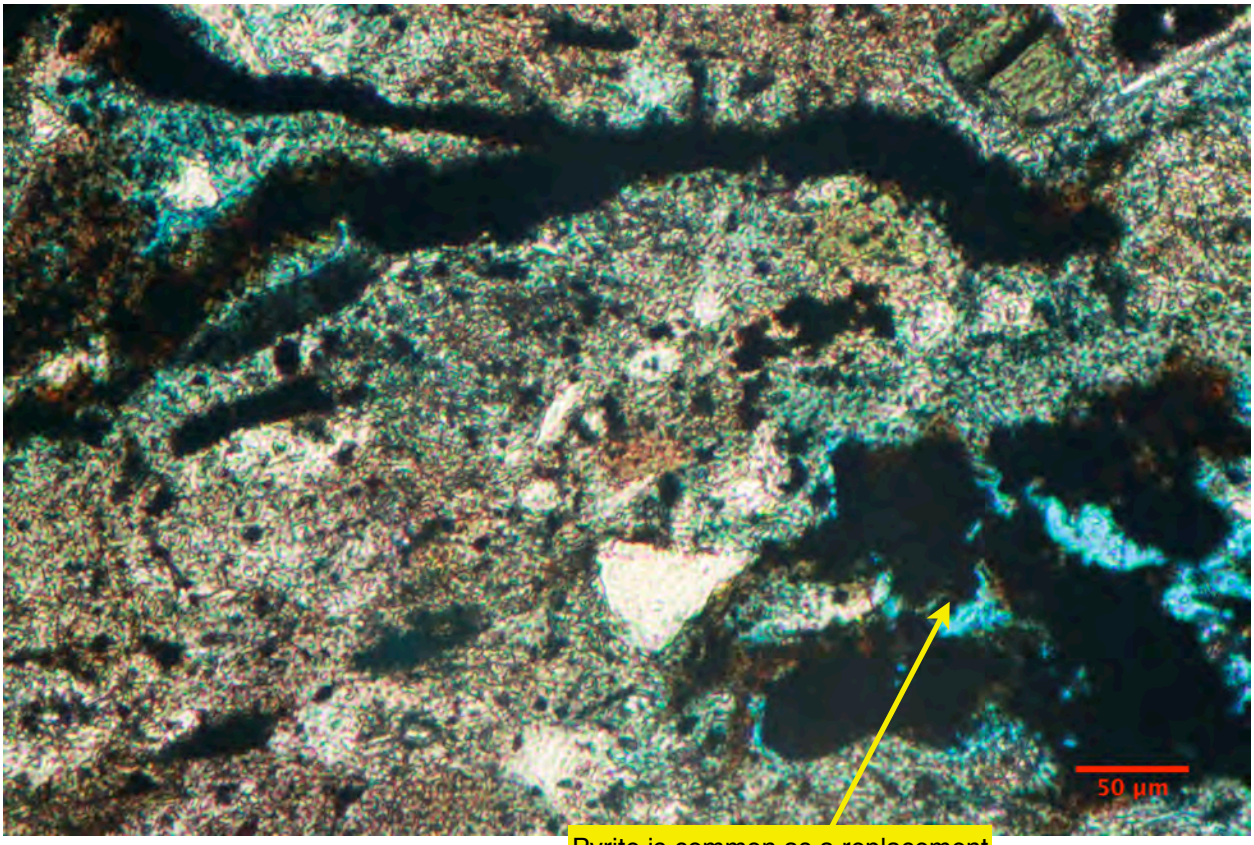


14123-01D



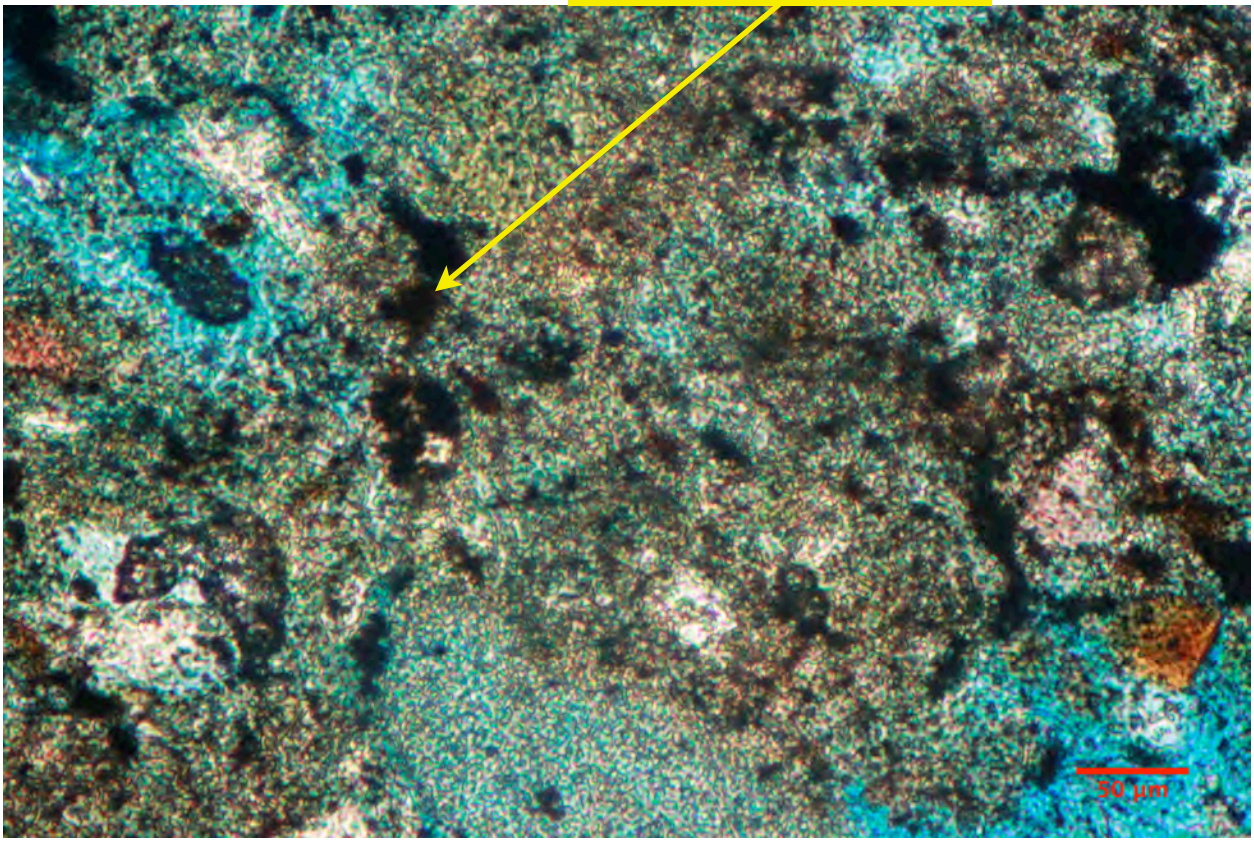
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312650; Sample ID: 1312650-001B
Mineralogy, Inc. Job No.: 14123-01

14123-01E



Pyrite is common as a replacement for organic matter particles

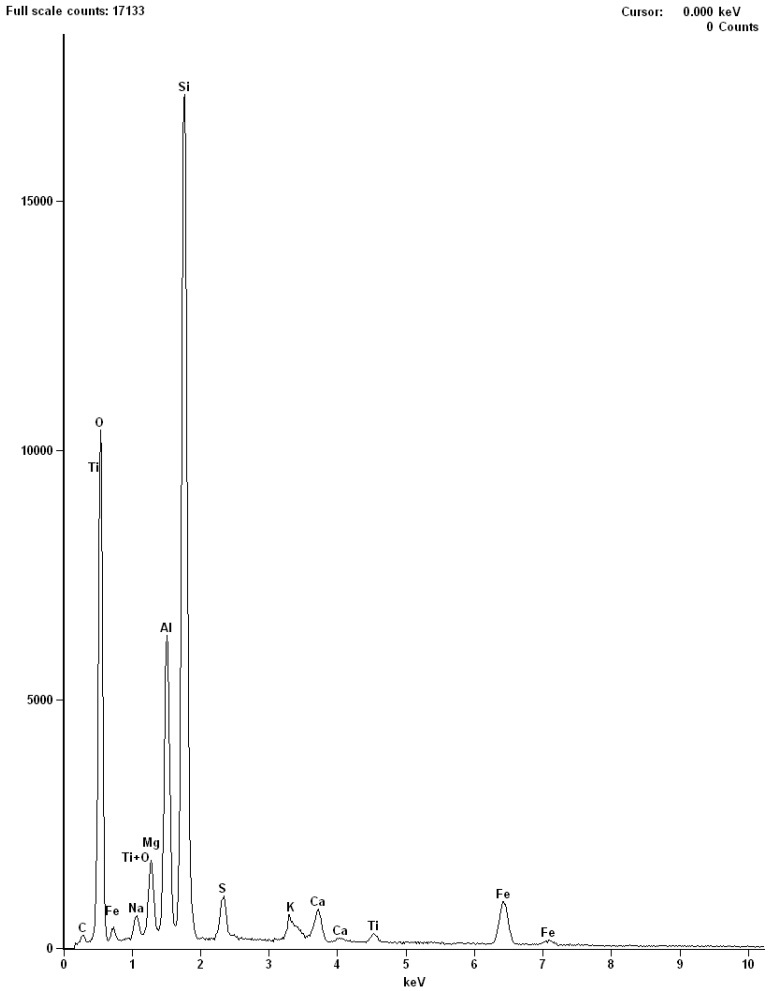
14123-01F



MINERALOGY, INC.

Figure I.
Energy Dispersive X-Ray Analysis

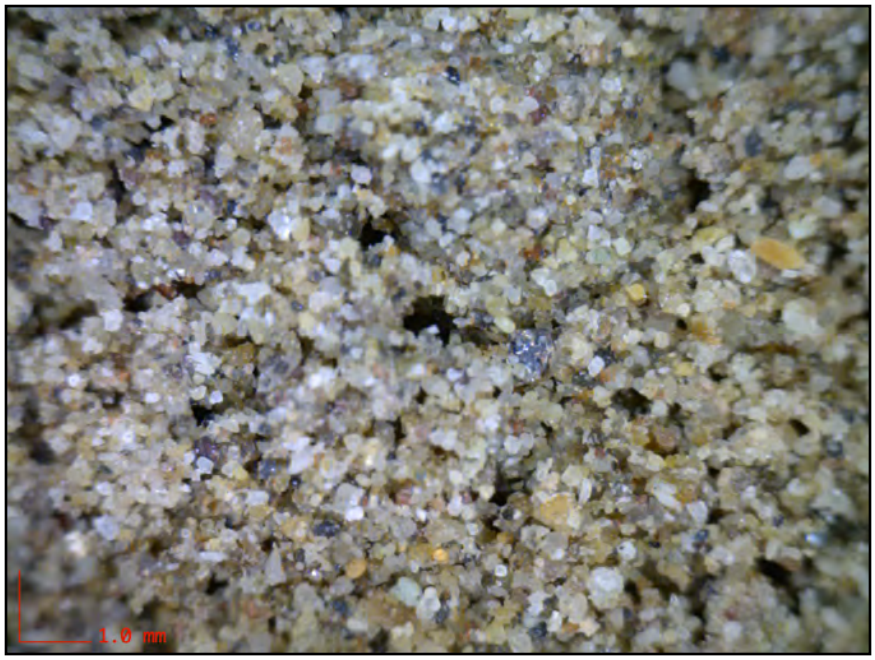
Client:	McCampbell Analytical, Inc.	MI#:	14123-01
Project:	1312650 (Follow-Up to MI# 14032)	Location:	N/A



Energy Dispersive X-Ray Results

14123-01	1312650-001B			
Element Line	Element Wt.%	Wt.% Error	Compound Formula	Compound Wt%
C K	4.62	+/-0.31	CO2	16.93
O K	52.78S	---		---
Na K	0.92	+/-0.08	Na2O	1.24
Mg K	2.23	+/-0.06	MgO	3.7
Al K	8.03	+/-0.08	Al2O3	15.16
Si K	23.14	+/-0.10	SiO2	49.49
S K	1.64	+/-0.04	SO3	4.09
K K	0.88	+/-0.04	K2O	1.07
Ca K	1.15	+/-0.04	CaO	1.61
Ti K	0.44	+/-0.04	TiO2	0.74
Fe K	4.17	+/-0.08	Fe2O3	5.96
	----------			----------
Total	100			100

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312650
Sample ID: 1312650-002B
Mineralogy, Inc. Job No.: 14123-02



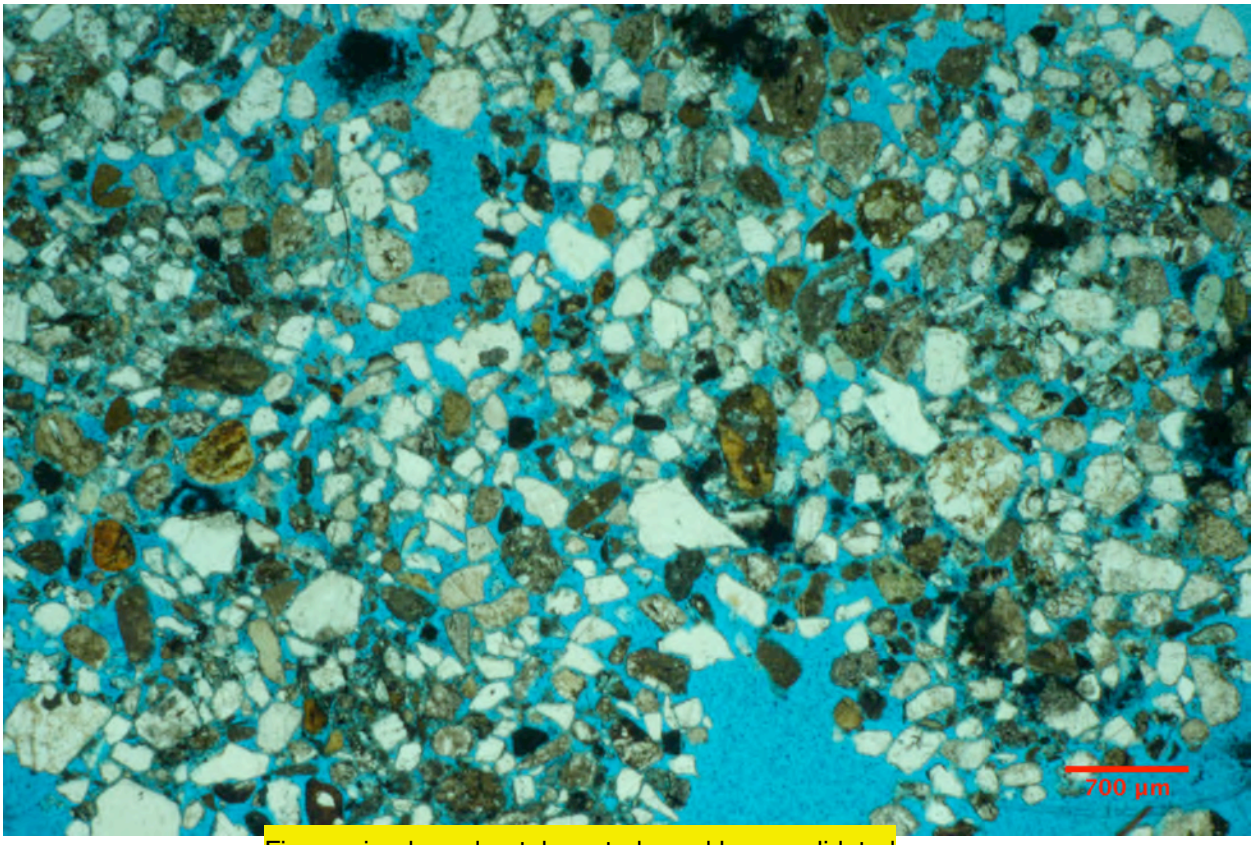
Lithologic Classification	Lithic Arkosic Sandstone
Textural Properties	Fine grained (fL-fU), moderately sorted, and subangular. Locally significant amounts of microcrystalline pore filling and grain coating clay are locally present throughout the pore system of this sand specimen.
Mean Grain Diameter	~0.16 mm
Max Grain Diameter	0.85 mm
Fabric	This sandstone sample is characterized as massively bedded, mildly compacted, and weakly consolidated. The sandstone is grain supported and exhibits common point-to-point and elongated intergranular contacts as well as trace indications of plastically deformed shale and mudstone RFs which locally grade into pseudomatrix.
Detrital Mineralogy	Detrital grain constituents are listed in descending order of relative abundance and include: 1) quartz (monocrystalline and polycrystalline quartz varieties), 2) silty shale and mudstone RFs, 3) igneous RFs (including common rhyolite RFs), 4) chert RFs, 5) feldspar (plagioclase > k-feldspar), 6) hornblende, 7) organic matter particles, 8) biotite mica, and 9) augite.

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312650
Sample ID: 1312650-002B
Mineralogy, Inc. Job No.: 14123-02

Cements & Matrix Constituents	Detrital clay matrix is common within this sand specimen occurring as microporous clusters of pore filling and grain coating matrix which are loosely adhered to the grain surfaces. The clay matrix exhibits a mineralogy that is dominated by mixed layered illite/smectite coupled with subordinate amounts of illite and chlorite. Minor amounts of authigenic clay are locally present as replacements associated with leached feldspar grains and RFs. Traces of pyrite cement are present as a common replacement associated with particles of organic matter.
Pore System	Void types contained within this specimen include common intergranular macropores, intercrystalline macroporosity, and minor amounts of intraparticle dissolution void space. The total void volume is visually estimated to range between ~19-21% of the bulk volume within the consolidated sandstone fragments from this interval.

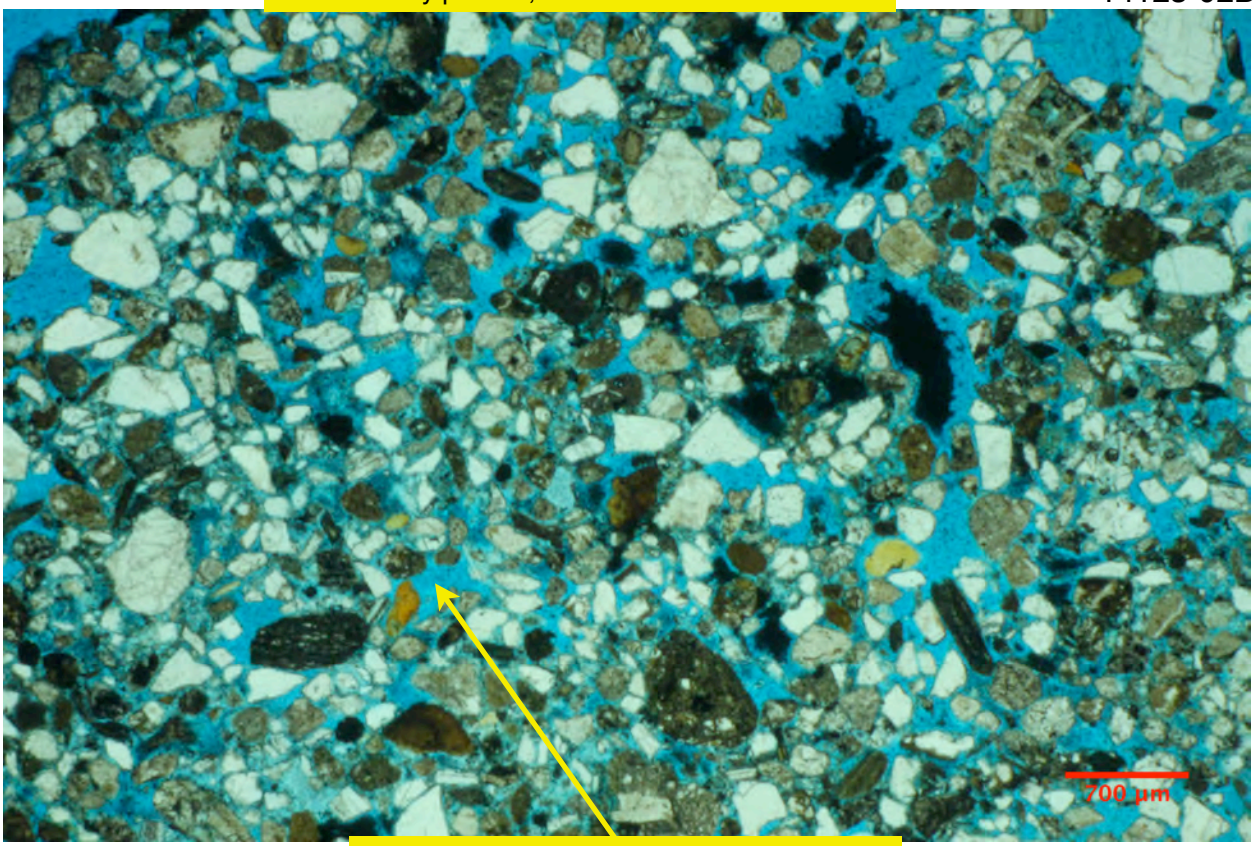
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312650; Sample ID: 1312650-002B
Mineralogy, Inc. Job No.: 14123-02

14123-02A



Fine-grained, moderately sorted, weakly consolidated
& mildly packed, lithic arkosic sandstone

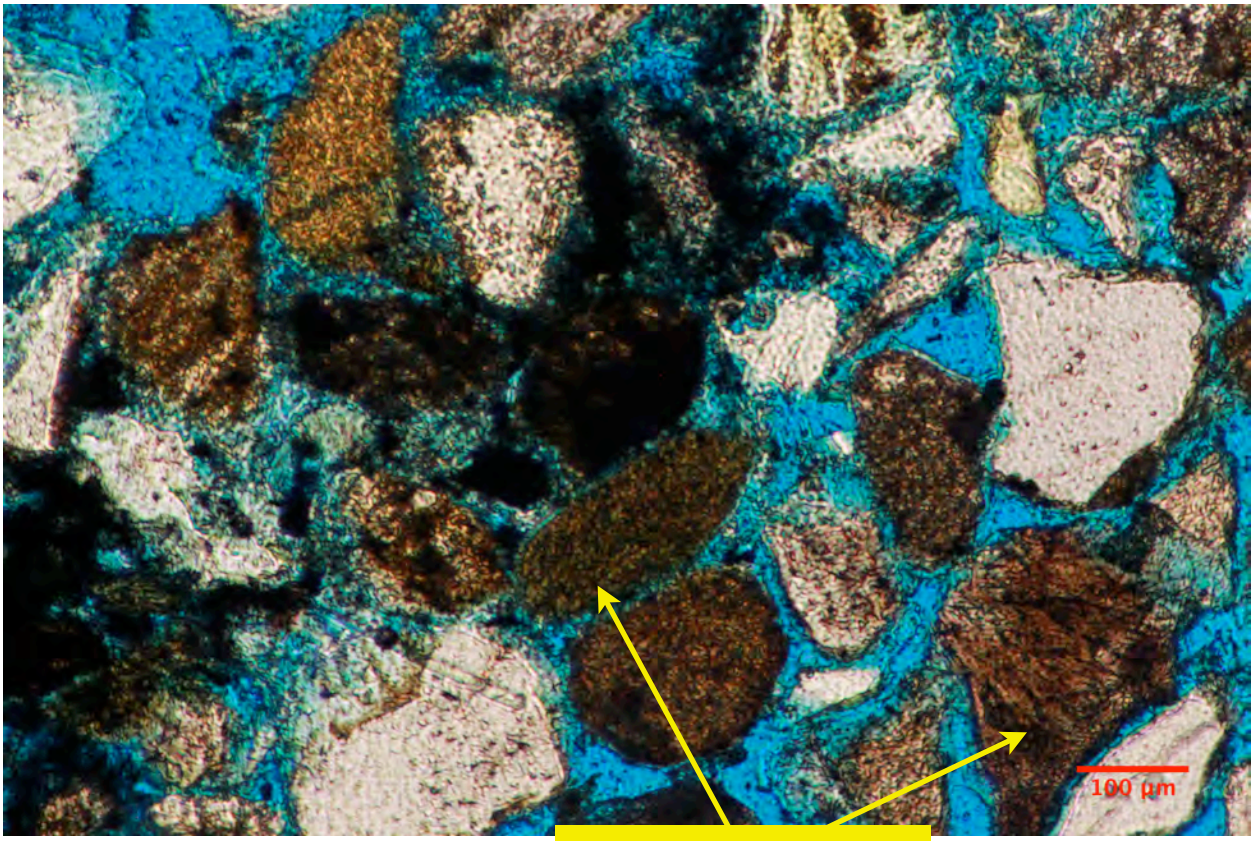
14123-02B



Abundant intergranular macroporosity (blue)

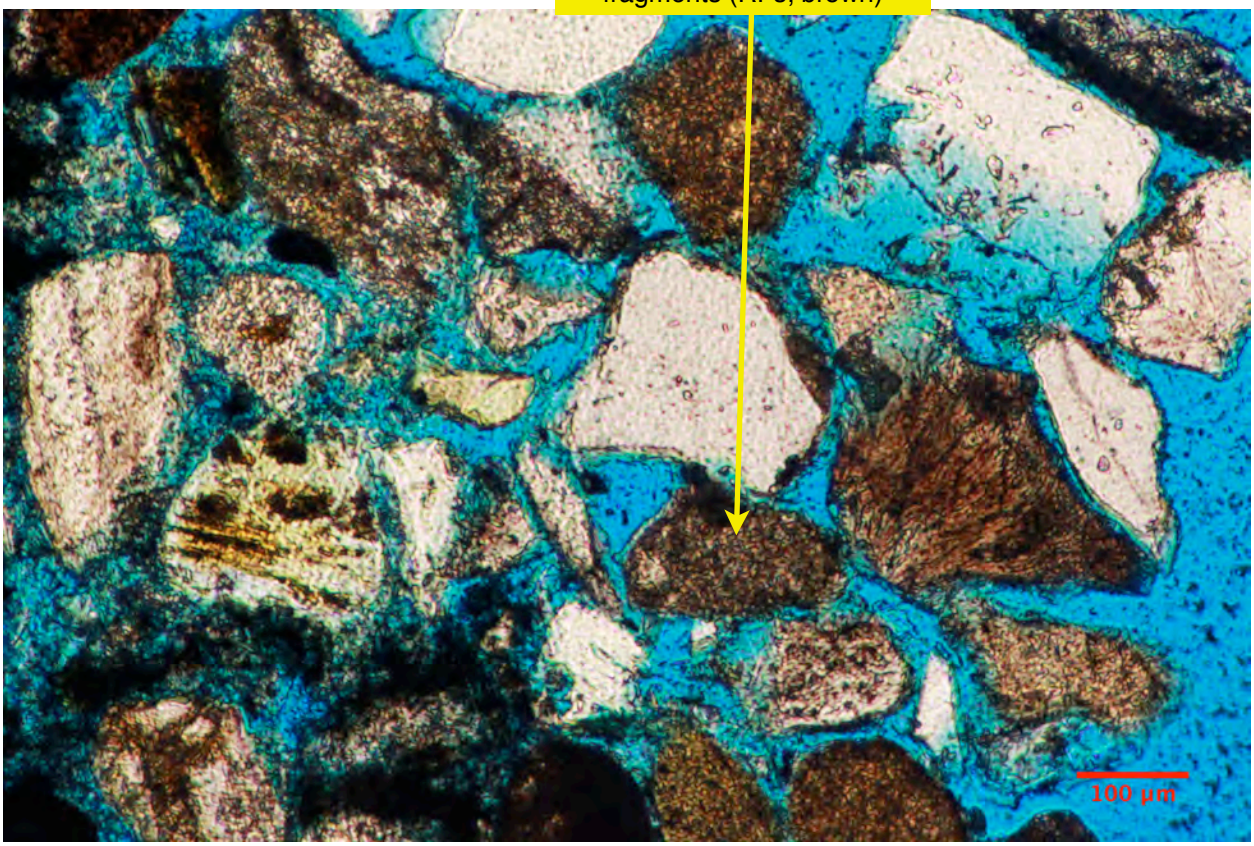
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312650; Sample ID: 1312650-002B
Mineralogy, Inc. Job No.: 14123-02

14123-02C



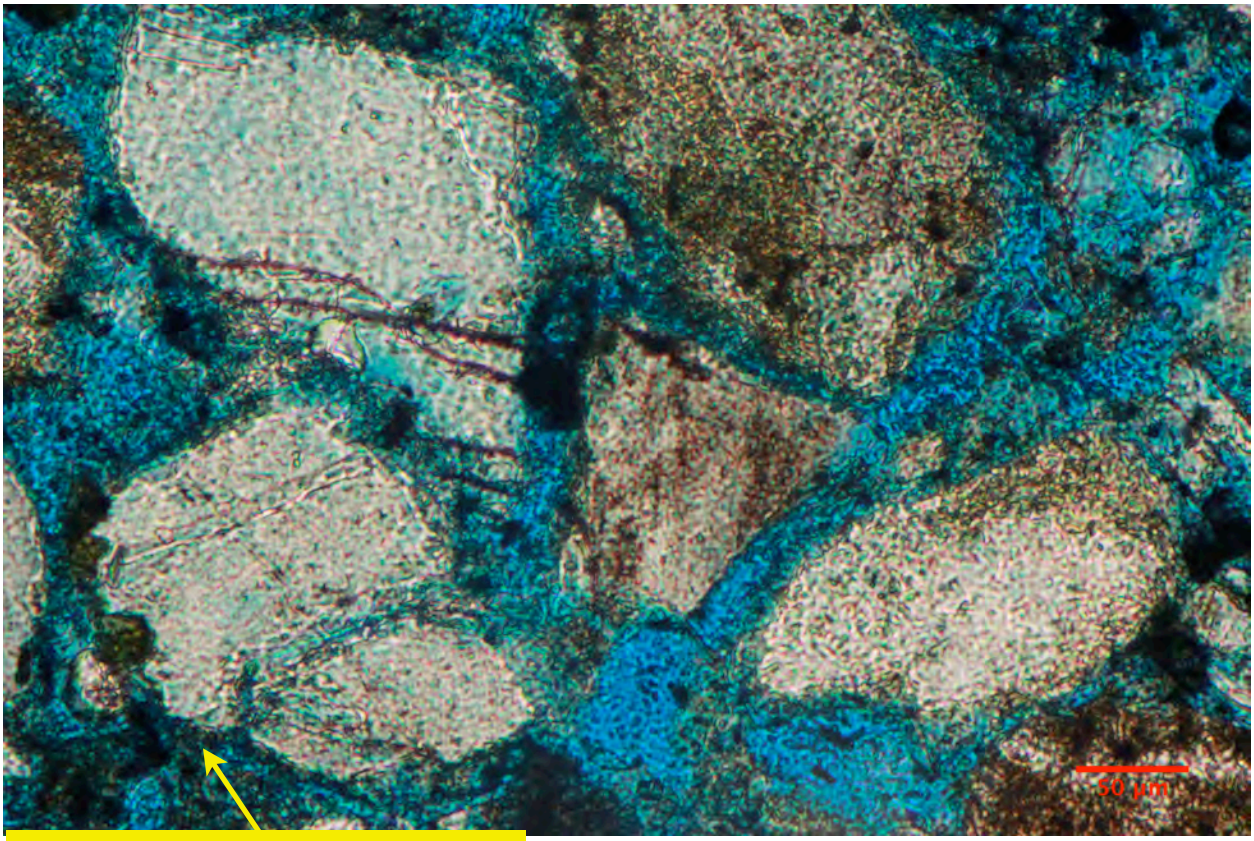
Silty shale and mudstone rock fragments (RFs; brown)

14123-02D



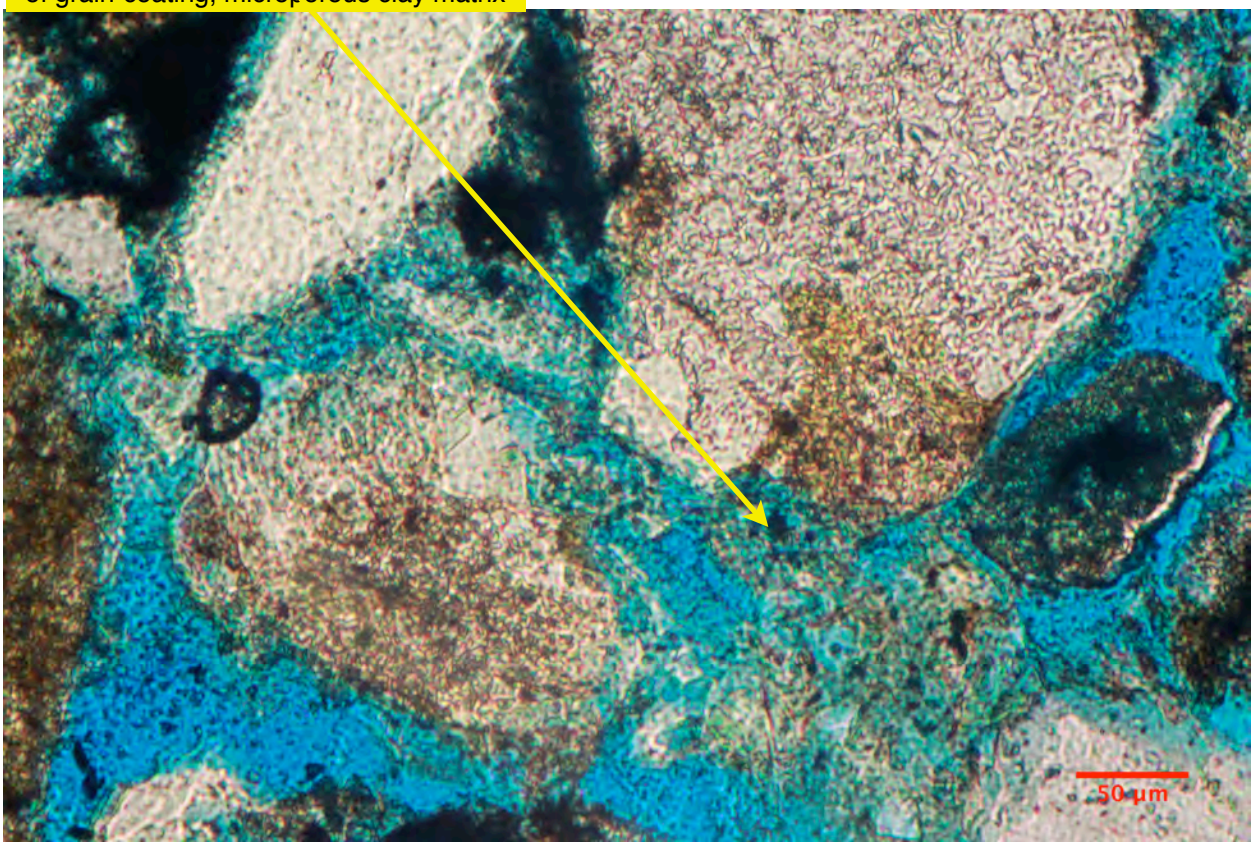
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312650; Sample ID: 1312650-002B
Mineralogy, Inc. Job No.: 14123-02

14123-02E



The sandstone contains significant amounts of grain-coating, microporous clay matrix

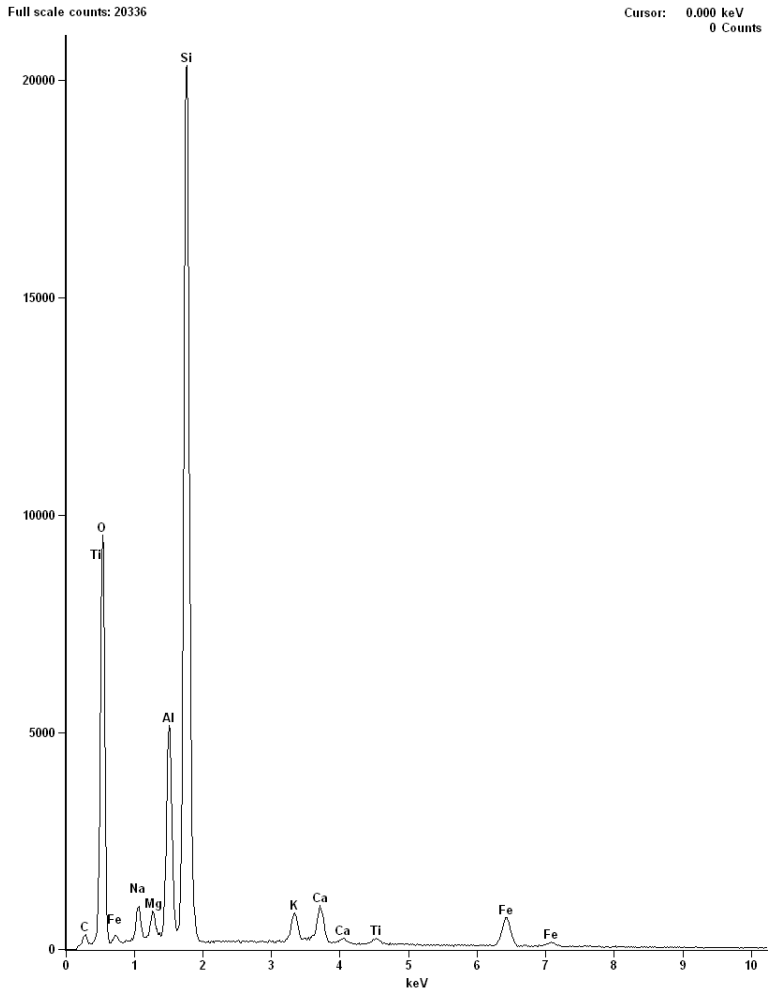
14123-02F



MINERALOGY, INC.

Figure II.
Energy Dispersive X-Ray Analysis

Client:	McCampbell Analytical, Inc.	MI#:	14123-02
Project:	1312650 (Follow-Up to MI# 14032)	Location:	N/A



Energy Dispersive X-Ray Results

14123-02	1312650-002B			
Element Line	Element Wt.%	Wt.% Error	Compound Formula	Compound Wt%
C K	5.92	+/-0.29	CO2	21.69
O K	53.85S	---		---
Na K	1.86	+/-0.08	Na2O	2.51
Mg K	0.79	+/-0.05	MgO	1.31
Al K	6.09	+/-0.07	Al2O3	11.5
Si K	25.6	+/-0.10	SiO2	54.76
K K	1.06	+/-0.04	K2O	1.28
Ca K	1.47	+/-0.04	CaO	2.06
Ti K	0.37	+/-0.03	TiO2	0.62
Fe K	2.99	+/-0.07	Fe2O3	4.28
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Total	100			100

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312650
Sample ID: 1312650-003B
Mineralogy, Inc. Job No.: 14123-03

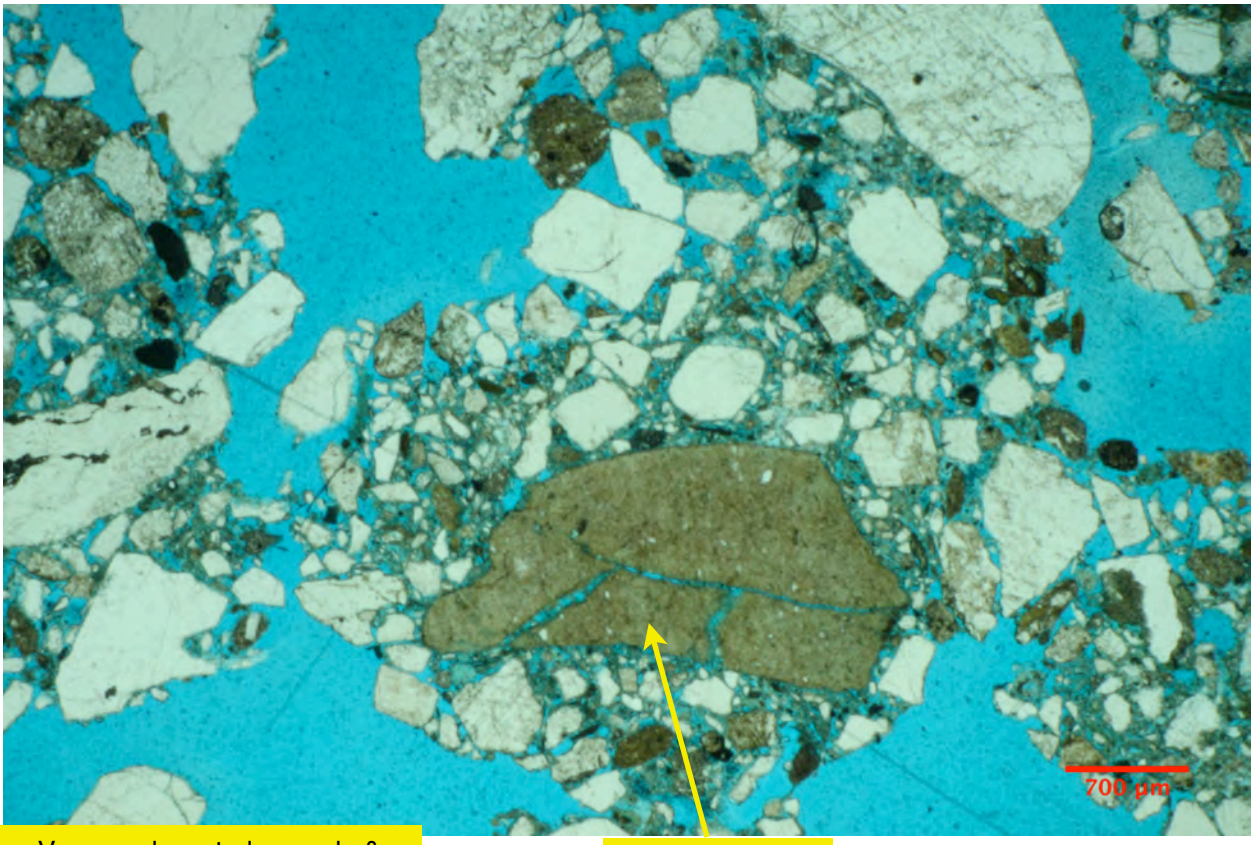
Lithologic Classification	Lithic Arkosic Sandstone
Textural Properties	Coarse grained (cL), very poorly sorted, granule and pebble-rich, well-graded, and subangular.
Mean Grain Diameter	~0.53 mm
Max Grain Diameter	4.94 mm
Fabric	This sandstone sample is mildly to moderately packed and displays a massively bedded fabric with common point-to-point and elongated intergranular contacts. Silt grains and clusters of pore filling and grain coating detrital clay are commonly present within the interparticle spaces of this sandstone.
Detrital Mineralogy	Detrital grains constituents are listed in descending order of relative abundance and include: 1) quartz (monocrystalline and polycrystalline quartz varieties), 2) feldspar (plagioclase > k-felspar), 3) igneous RFs (mostly granite and granodiorite RFs), 4) silty shale and mudstone RFs, 5) chert RFs, 6) organic matter particles, 7) hornblende, 8) mica, and 9) magnetite.

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312650
Sample ID: 1312650-003B
Mineralogy, Inc. Job No.: 14123-03

Cements & Matrix Constituents	Detrital clay matrix components are common within the pore system of this sandstone sample with the clay tentatively identified to include a mixture of illite smectite and illite. Precise characterization of the clay mineralogy will require XRD analysis of the sediment. Traces of pyrite cement are locally present as a replacement associated with leached particles of organic matter. Traces of authigenic clay matrix are also present in association with leached feldspar grains and igneous RFs.
Pore System	The void volume of this sandstone sample is comprised of a mixture of interparticle void space coupled with subordinate amounts of intercrystalline microporosity and intraparticle dissolution void space. The total void volume of this sandstone sample is visually estimated to account for ~10-13% of the bulk volume.

Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312650; Sample ID: 1312650-003B
Mineralogy, Inc. Job No.: 14123-03

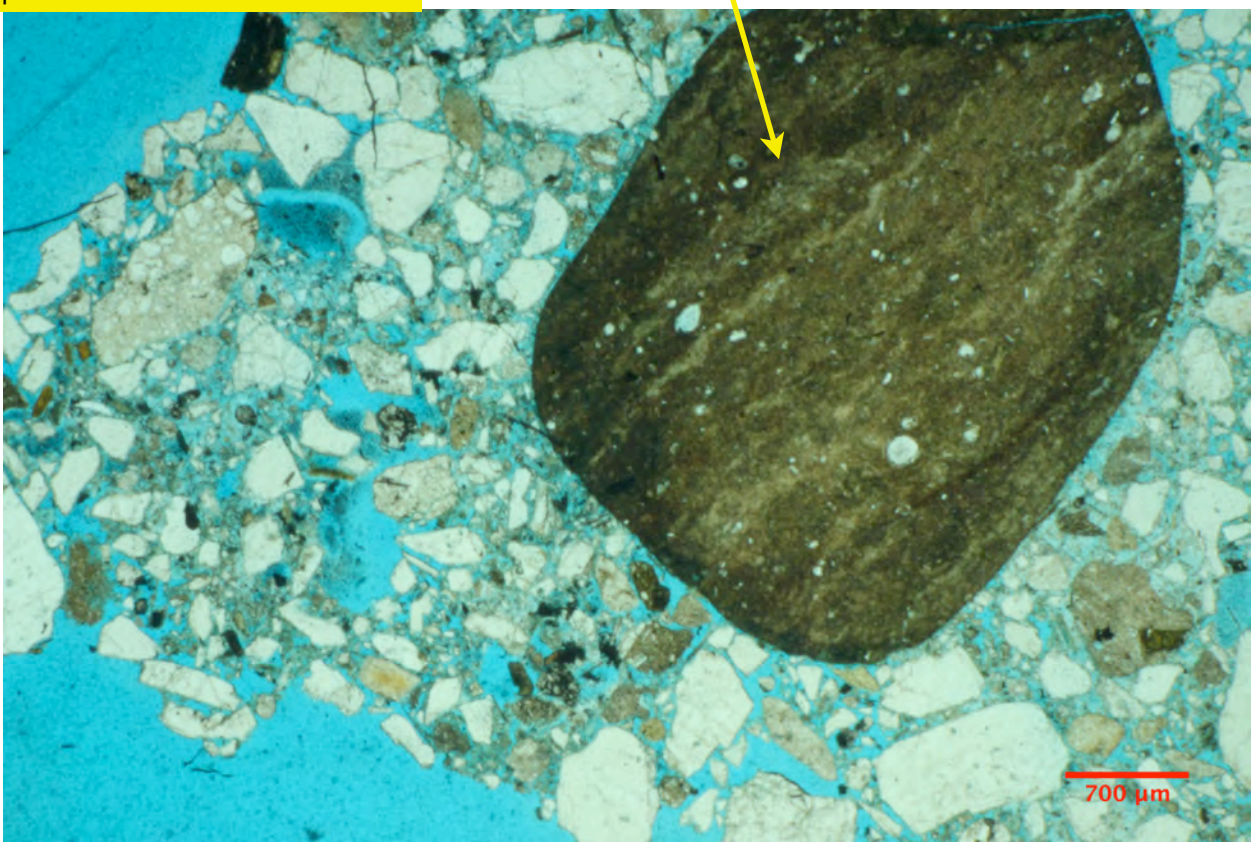
14123-03A



Very poorly sorted, granule & pebble-rich lithic arkosic sandstone

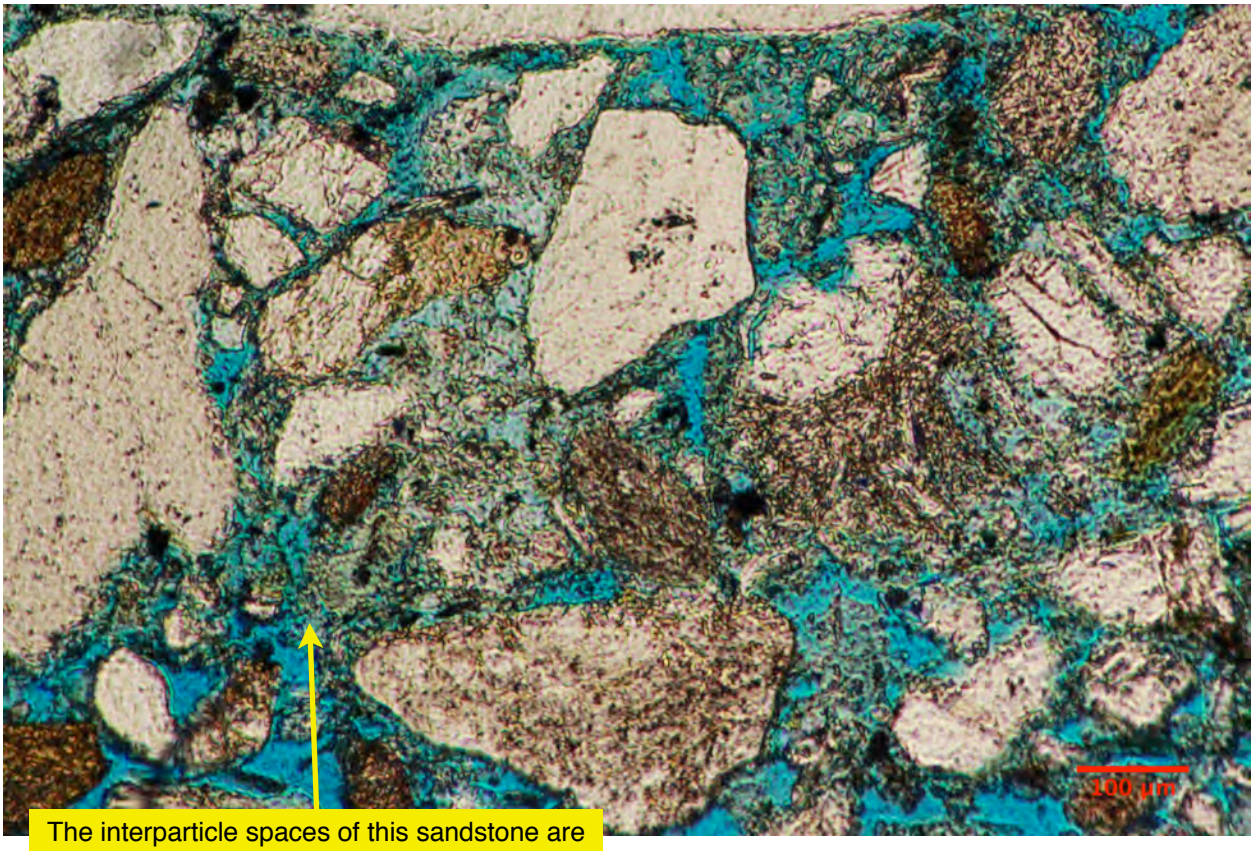
Silty shale RFs

14123-03B



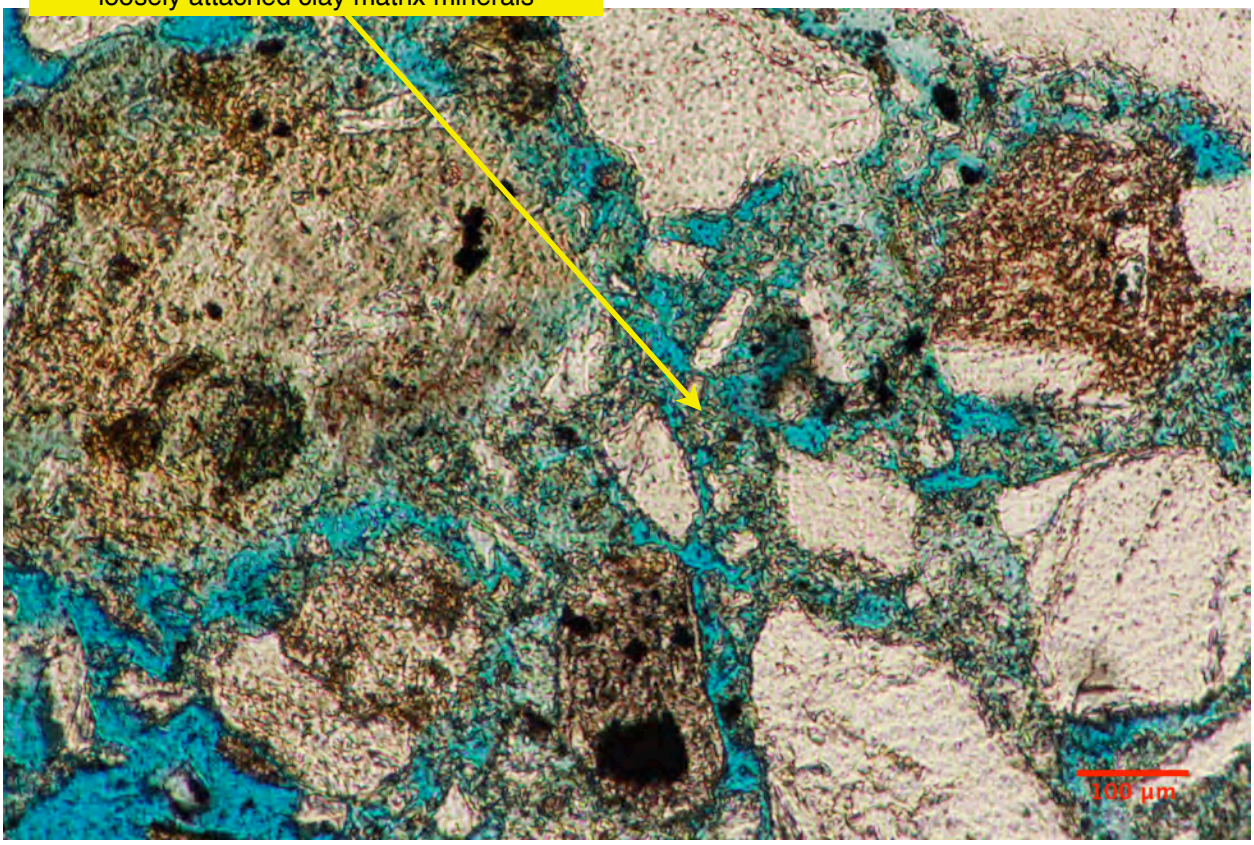
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312650; Sample ID: 1312650-003B
Mineralogy, Inc. Job No.: 14123-03

14123-03C



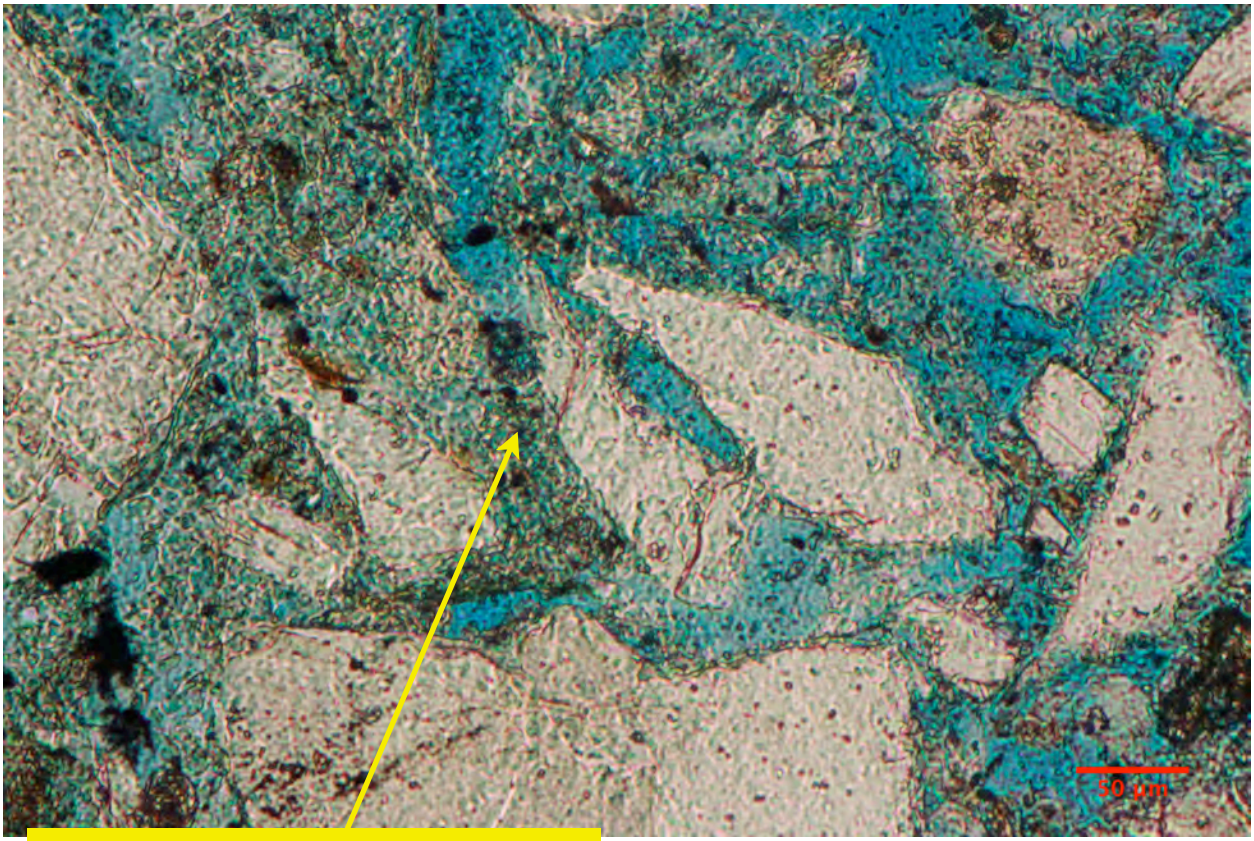
The interparticle spaces of this sandstone are commonly choked with clusters of microporous, loosely attached clay matrix minerals

14123-03D



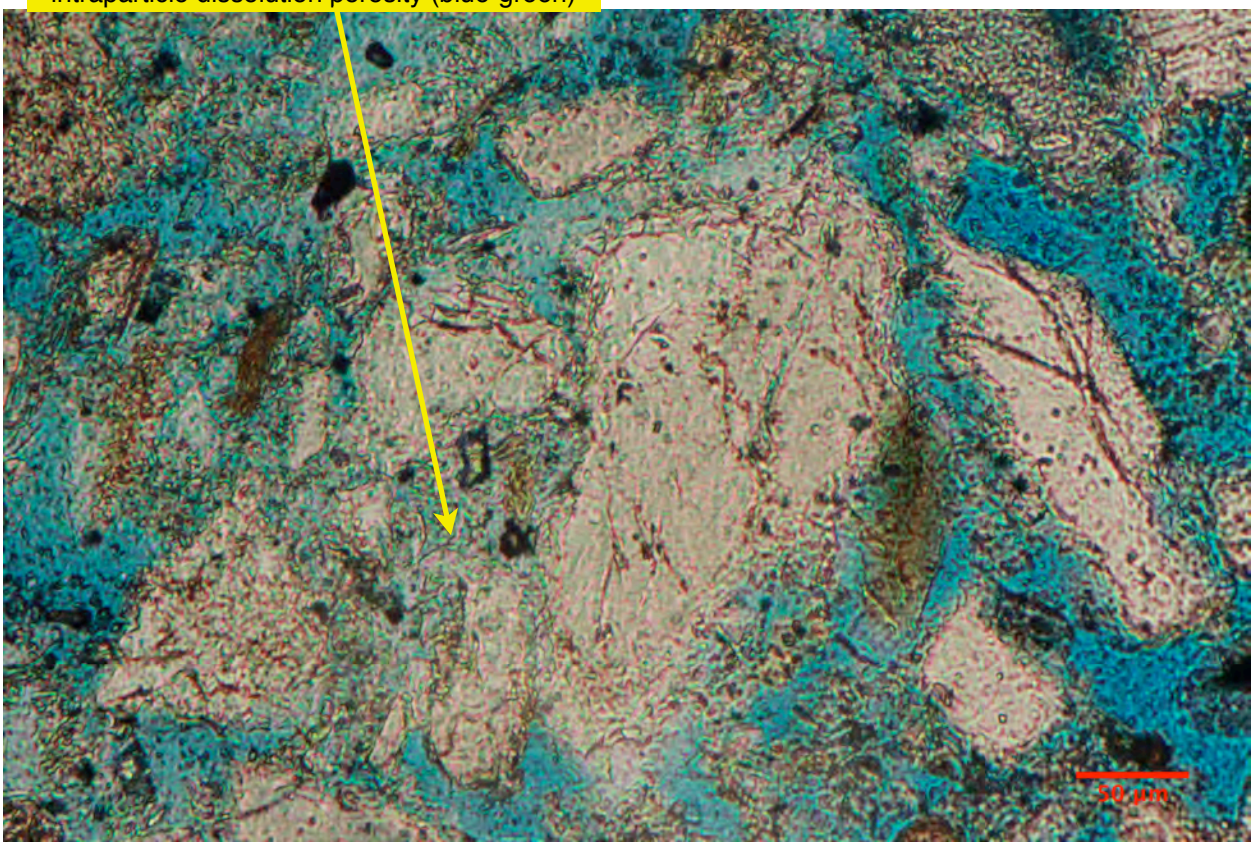
Thin Section Petrographic Analysis
McCampbell Analytical, Inc.
Project: 1312650; Sample ID: 1312650-003B
Mineralogy, Inc. Job No.: 14123-03

14123-03E



Leached feldspar grains with abundant intraparticle dissolution porosity (blue-green)

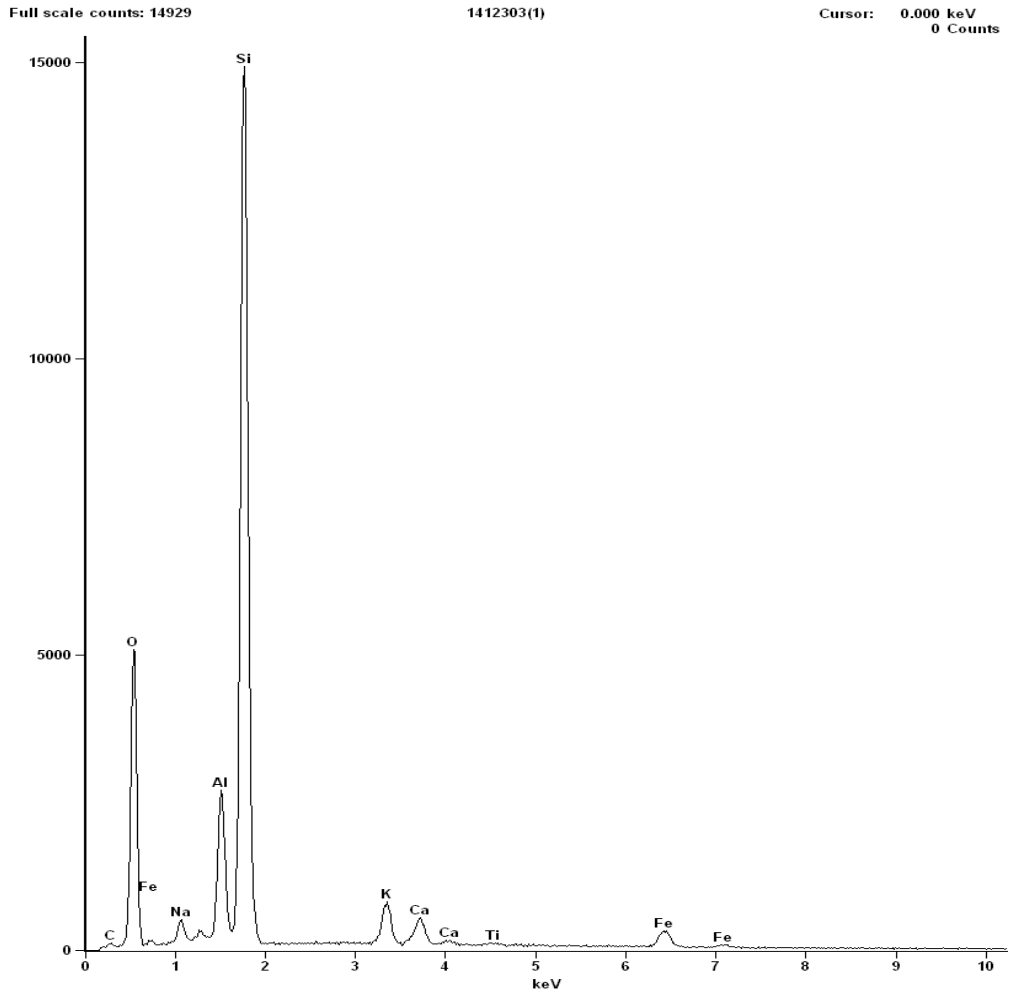
14123-03F



MINERALOGY, INC.

Figure III.
Energy Dispersive X-Ray Analysis

Client:	McCampbell Analytical, Inc.	MI#:	14123-03
Project:	1312650-003B (Follow-Up to MI# 14032)	Location:	N/A



Energy Dispersive X-Ray Results

14123-03	1312650-003B			
Element Line	Element Wt.%	Wt.% Error	Compound Formula	Compound Wt%
C K	4.2	+/-0.34	CO2	15.41
O K	52.94S	---		---
Na K	1.44	+/-0.08	Na2O	1.95
Al K	4.47	+/-0.04	Al2O3	8.45
Si K	30.84	+/-0.12	SiO2	65.98
K K	2.25	+/-0.05	K2O	2.71
Ca K	1.47	+/-0.03	CaO	2.06
Ti K	0.24	+/-0.05	TiO2	0.4
Fe K	2.13	+/-0.06	Fe2O3	3.05
	----------			----------
Total	100			100

McCampbell Analytical, Inc.

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Analytical Report

WorkOrder: 1312545

Report Created for: Todd Engineering
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501

Project Contact: Bill Motzer
Project P.O.:
Project Name: #60408; MRWPCA

Project Received: 12/18/2013

Analytical Report reviewed & approved for release on 05/16/2014 by:

Question about your data?

Click here to email McCampbell

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Glossary of Terms & Qualifier Definitions

Client: Todd Engineering
Project: #60408; MRWPCA
WorkOrder: 1312545

Glossary Abbreviation

95% Interval	95% Confident Interval
DF	Dilution Factor
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not detected at or above the indicated MDL or RL
NR	Matrix interferences, or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix; or sample diluted due to high matrix or analyte content.
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
TEQ	Toxicity Equivalence

Analytical Qualifier

B	analyte detected in the associated Method Blank
H	samples were analyzed out of holding time
S	spike recovery outside accepted recovery limits
a1	sample diluted due to matrix interference
a4	the reporting limits were raised due to the sample's matrix prohibiting a full volume extraction.
a7	reporting limit raised due to limited sample amount
a14	reporting limit raised due to the physical nature of the sample
c1	surrogate recovery outside of the control limits due to the dilution of the sample.
c2	low surrogate recovery caused by matrix interference.
c4	surrogate recovery outside of the control limits due to coelution with another peak(s) / cluttered chromatogram.
j1	see attached narrative

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Glossary of Terms & Qualifier Definitions

Client: Todd Engineering
Project: #60408; MRWPCA
WorkOrder: 1312545

Quality Control Qualifiers

F1	MS/MSD recovery and/or RPD was out of acceptance criteria; LCS validated the prep batch.
F2	LCS recovery for this compound is outside of acceptance limits.
F3	the surrogate standard recovery is outside of acceptance limits.

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	Methods for Geochemical Analysis
Date Received:	12/18/13 15:02	**Analytical Method:**	SW6020
Date Prepared:	5/16/14	**Unit:**	wt %

Major Elements as Oxides

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 27.5-30.0	**1312545-001B**	**Solid**	**12/16/2013 14:35**	**ICP-MS1**	**90512**

Analytes	Result	RL	DF	Date Analyzed
Al2O3	**8.7**	0.28	100	05/19/2014 17:24
BaO	**0.10**	0.056	10	05/19/2014 11:21
CaO	**0.99**	0.35	10	05/19/2014 11:21
FeO	**0.70**	0.019	10	05/19/2014 11:21
K2O	**2.8**	0.15	10	05/19/2014 11:21
MgO	**0.18**	0.025	10	05/19/2014 11:21
MnO	ND	0.026	10	05/19/2014 11:21
Na2O	**2.0**	0.20	10	05/19/2014 11:21
SrO	**0.028**	0.024	10	05/19/2014 11:21
TiO2	**0.099**	0.025	10	05/19/2014 11:21

Analytical Comments: a1

MW-1: 74.0-75.5	**1312545-002B**	**Solid**	**12/17/2013 11:40**	**ICP-MS1**	**90512**

Analytes	Result	RL	DF	Date Analyzed
Al2O3	**10**	0.28	100	05/19/2014 17:31
BaO	**0.10**	0.056	10	05/19/2014 11:27
CaO	**1.1**	0.35	10	05/19/2014 11:27
FeO	**0.62**	0.019	10	05/19/2014 11:27
K2O	**3.1**	0.15	10	05/19/2014 11:27
MgO	**0.17**	0.025	10	05/19/2014 11:27
MnO	ND	0.026	10	05/19/2014 11:27
Na2O	**2.2**	0.20	10	05/19/2014 11:27
SrO	**0.032**	0.024	10	05/19/2014 11:27
TiO2	**0.075**	0.025	10	05/19/2014 11:27

Analytical Comments: a1

(Cont.)

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	Methods for Geochemical Analysis
Date Received:	12/18/13 15:02	**Analytical Method:**	SW6020
Date Prepared:	5/16/14	**Unit:**	wt %

Major Elements as Oxides

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 98.5-101	**1312545-003B**	**Solid**	**12/18/2013 15:02**	**ICP-MS1**	**90512**

Analytes	Result	RL	DF	Date Analyzed
Al2O3	**10**	0.28	100	05/19/2014 17:37
BaO	**0.10**	0.056	10	05/19/2014 11:46
CaO	**1.1**	0.35	10	05/19/2014 11:46
FeO	**0.55**	0.019	10	05/19/2014 11:46
K2O	**3.0**	0.15	10	05/19/2014 11:46
MgO	**0.18**	0.025	10	05/19/2014 11:46
MnO	ND	0.026	10	05/19/2014 11:46
Na2O	**2.3**	0.20	10	05/19/2014 11:46
SrO	**0.032**	0.024	10	05/19/2014 11:46
TiO2	**0.068**	0.025	10	05/19/2014 11:46

Analytical Comments: a1

MW-1: 139.5-142.0	**1312545-004B**	**Solid**	**12/17/2013 12:00**	**ICP-MS1**	**90512**

Analytes	Result	RL	DF	Date Analyzed
Al2O3	**9.8**	0.28	100	05/19/2014 17:43
BaO	**0.10**	0.056	10	05/19/2014 11:52
CaO	**0.98**	0.35	10	05/19/2014 11:52
FeO	**0.72**	0.019	10	05/19/2014 11:52
K2O	**2.9**	0.15	10	05/19/2014 11:52
MgO	**0.20**	0.025	10	05/19/2014 11:52
MnO	ND	0.026	10	05/19/2014 11:52
Na2O	**2.0**	0.20	10	05/19/2014 11:52
SrO	**0.029**	0.024	10	05/19/2014 11:52
TiO2	**0.094**	0.025	10	05/19/2014 11:52

Analytical Comments: a1

(Cont.)

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	Methods for Geochemical Analysis
Date Received:	12/18/13 15:02	**Analytical Method:**	SW6020
Date Prepared:	5/16/14	**Unit:**	wt %

Major Elements as Oxides

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005B**	**Solid**	**12/17/2013 12:20**	**ICP-MS1**	**90512**

Analytes	Result	RL	DF	Date Analyzed
Al2O3	**10**	0.28	100	05/19/2014 17:50
BaO	**0.11**	0.056	10	05/19/2014 11:59
CaO	**1.3**	0.35	10	05/19/2014 11:59
FeO	**0.64**	0.019	10	05/19/2014 11:59
K2O	**3.2**	0.15	10	05/19/2014 11:59
MgO	**0.22**	0.025	10	05/19/2014 11:59
MnO	ND	0.026	10	05/19/2014 11:59
Na2O	**2.4**	0.20	10	05/19/2014 11:59
SrO	**0.034**	0.024	10	05/19/2014 11:59
TiO2	**0.083**	0.025	10	05/19/2014 11:59

Analytical Comments: a1

MW-1: 297-298.5	**1312545-006B**	**Solid**	**12/18/2013 08:20**	**ICP-MS1**	**90512**

Analytes	Result	RL	DF	Date Analyzed
Al2O3	**6.6**	0.28	100	05/19/2014 17:56
BaO	**0.062**	0.056	10	05/19/2014 12:05
CaO	**2.2**	0.35	10	05/19/2014 12:05
FeO	**1.8**	0.019	10	05/19/2014 12:05
K2O	**1.4**	0.15	10	05/19/2014 12:05
MgO	**2.3**	0.025	10	05/19/2014 12:05
MnO	**0.11**	0.026	10	05/19/2014 12:05
Na2O	**1.2**	0.20	10	05/19/2014 12:05
SrO	**0.030**	0.024	10	05/19/2014 12:05
TiO2	ND	0.25	100	05/19/2014 17:56

Analytical Comments: a1

(Cont.)

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	Methods for Geochemical Analysis
Date Received:	12/18/13 15:02	**Analytical Method:**	SW6020
Date Prepared:	5/16/14	**Unit:**	wt %

Major Elements as Oxides

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 364.5-367.0	**1312545-007B**	**Solid**	**12/18/2013 09:00**	**ICP-MS1**	**90512**

Analytes	Result	RL	DF	Date Analyzed
Al2O3	**14**	0.28	100	05/19/2014 18:15
BaO	**0.10**	0.056	10	05/19/2014 12:11
CaO	**1.2**	0.35	10	05/19/2014 12:11
FeO	**0.68**	0.019	10	05/19/2014 12:11
K2O	**2.8**	0.15	10	05/19/2014 12:11
MgO	**0.22**	0.025	10	05/19/2014 12:11
MnO	ND	0.026	10	05/19/2014 12:11
Na2O	**2.1**	0.20	10	05/19/2014 12:11
SrO	**0.032**	0.024	10	05/19/2014 12:11
TiO2	**0.080**	0.025	10	05/19/2014 12:11

Analytical Comments: a1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	Methods for Geochemical Analysis
Date Received:	12/18/13 15:02	**Analytical Method:**	SW6010B
Date Prepared:	12/19/14-12/20/14	**Unit:**	%

Major Elements as Oxides

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 27.5-30.0	**1312545-001B**	**Solid**	**12/16/2013 14:35**	**ICP-JY**	**90677**

Analytes	Result	RL	DF	Date Analyzed
P2O5	**0.020**	0.0035	1	05/06/2014 16:00
SiO2	**4.0**	0.032	10	05/20/2014 17:02

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002B**	**Solid**	**12/17/2013 11:40**	**ICP-JY**	**90677**

Analytes	Result	RL	DF	Date Analyzed
P2O5	**0.027**	0.0035	1	05/06/2014 16:02
SiO2	**1.1**	0.032	10	05/20/2014 17:04

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 98.5-101	**1312545-003B**	**Solid**	**12/18/2013 15:02**	**ICP-JY**	**90677**

Analytes	Result	RL	DF	Date Analyzed
P2O5	**0.026**	0.0035	1	05/06/2014 16:04
SiO2	**1.4**	0.032	10	05/20/2014 17:06

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 139.5-142.0	**1312545-004B**	**Solid**	**12/17/2013 12:00**	**ICP-JY**	**90677**

Analytes	Result	RL	DF	Date Analyzed
P2O5	**0.024**	0.0035	1	05/06/2014 16:06
SiO2	**1.1**	0.032	10	05/20/2014 17:08

(Cont.)

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	Methods for Geochemical Analysis
Date Received:	12/18/13 15:02	**Analytical Method:**	SW6010B
Date Prepared:	12/19/14-12/20/14	**Unit:**	%

Major Elements as Oxides

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005B**	**Solid**	**12/17/2013 12:20**	**ICP-JY**	**90677**

Analytes	Result	RL	DF	Date Analyzed
P2O5	**0.035**	0.0035	1	05/06/2014 16:08
SiO2	**1.6**	0.032	10	05/20/2014 17:11

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 297-298.5	**1312545-006B**	**Solid**	**12/18/2013 08:20**	**ICP-JY**	**90677**

Analytes	Result	RL	DF	Date Analyzed
P2O5	**0.93**	0.035	10	05/06/2014 16:52
SiO2	**1.4**	0.032	10	05/20/2014 17:17

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 364.5-367.0	**1312545-007B**	**Solid**	**12/18/2013 09:00**	**ICP-JY**	**90677**

Analytes	Result	RL	DF	Date Analyzed
P2O5	**0.066**	0.0035	1	05/06/2014 16:12
SiO2	**0.64**	0.032	10	05/20/2014 17:19

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	HH/TM-7
Date Received:	12/18/13 15:02	**Analytical Method:**	HH/TM-7
Date Prepared:	12/19/13	**Unit:**	mg/kg

Major Elements by Hydroxylamine-Hydrochloride

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005B**	**Solid/TOTAL**	**12/17/2013 12:20**	**ICP-MS1**	**90683**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	**2400**	50	1	05/20/2014 19:33
Arsenic	**1.8**	0.50	1	05/20/2014 19:33
Calcium	**810**	100	1	05/20/2014 19:33
Ferric Hydroxide as Iron	**3300**	20	1	05/20/2014 19:33
Hexachrome	ND	0.40	100	05/20/2014 19:33
Lead	**1.1**	0.50	1	05/20/2014 19:33
Magnesium	**770**	20	1	05/20/2014 19:33
Manganese	**37**	20	1	05/20/2014 19:33
Mercury	ND	0.050	1	05/20/2014 19:33
Selenium	ND	0.50	1	05/20/2014 19:33
Uranium	ND	0.50	1	05/20/2014 19:33

MW-1: 364.5-367.0	**1312545-007B**	**Solid/TOTAL**	**12/18/2013 09:00**	**ICP-MS1**	**90683**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	**1800**	50	1	05/20/2014 19:40
Arsenic	**0.72**	0.50	1	05/20/2014 19:40
Calcium	**820**	100	1	05/20/2014 19:40
Ferric Hydroxide as Iron	**2500**	20	1	05/20/2014 19:40
Hexachrome	ND	0.40	100	05/20/2014 19:40
Lead	**0.73**	0.50	1	05/20/2014 19:40
Magnesium	**590**	20	1	05/20/2014 19:40
Manganese	**37**	20	1	05/20/2014 19:40
Mercury	ND	0.050	1	05/20/2014 19:40
Selenium	ND	0.50	1	05/20/2014 19:40
Uranium	ND	0.50	1	05/20/2014 19:40

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	HH/TM-7
Date Received:	12/18/13 15:02	**Analytical Method:**	HH/TM-7
Date Prepared:	12/19/14	**Unit:**	mg/kg

Silica for Iron Oxide by Hydroxylamine-Hydrochloride

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005B**	**Solid/TOTAL**	**12/17/2013 12:20**	**ICP-JY**	**90740**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Silica	**6500**	B	11	10	05/21/2014 16:33

MW-1: 364.5-367.0	**1312545-007B**	**Solid/TOTAL**	**12/18/2013 09:00**	**ICP-JY**	**90740**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Silica	**5200**	B	11	10	05/21/2014 16:36

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	SSSA Part 3 Chapter 40
Date Received:	12/18/13 15:02	**Analytical Method:**	SW6020
Date Prepared:	4/23/14	**Unit:**	mg/Kg

Exchangeable Cations using Ammonium Acetate

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 27.5-30.0	**1312545-001B**	**Solid/SSSA**	**12/16/2013 14:35**	**ICP-MS1**	**89653**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Barium	**10**	B	0.50	1	05/12/2014 09:22
Calcium	**150**		10	1	05/12/2014 09:22
Lithium	ND		0.050	1	05/12/2014 09:22
Magnesium	**110**		2.0	1	05/12/2014 09:22
Potassium	**15**		5.0	1	05/12/2014 09:22
Sodium	**60**	B	10	1	05/12/2014 09:22
Strontium	**3.3**		2.0	1	05/12/2014 09:22

MW-1: 74.0-75.5	**1312545-002B**	**Solid/SSSA**	**12/17/2013 11:40**	**ICP-MS1**	**89653**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Barium	**9.5**	B	0.50	1	04/29/2014 15:46
Calcium	**450**		10	1	04/29/2014 15:46
Lithium	ND		0.050	1	04/29/2014 15:46
Magnesium	**120**		2.0	1	04/29/2014 15:46
Potassium	**57**		5.0	1	04/29/2014 15:46
Sodium	**71**	B	10	1	04/29/2014 15:46
Strontium	**2.9**		2.0	1	04/29/2014 15:46

MW-1: 98.5-101	**1312545-003B**	**Solid/SSSA**	**12/18/2013 15:02**	**ICP-MS1**	**89653**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Barium	**8.9**	B	0.50	1	04/29/2014 18:48
Calcium	**130**		10	1	04/29/2014 18:48
Lithium	ND		0.050	1	04/29/2014 18:48
Magnesium	**91**		2.0	1	04/29/2014 18:48
Potassium	**21**		5.0	1	04/29/2014 18:48
Sodium	**46**	B	10	1	04/29/2014 18:48
Strontium	**2.3**		2.0	1	04/29/2014 18:48

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	SSSA Part 3 Chapter 40
Date Received:	12/18/13 15:02	**Analytical Method:**	SW6020
Date Prepared:	4/23/14	**Unit:**	mg/Kg

Exchangeable Cations using Ammonium Acetate

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 139.5-142.0	**1312545-004B**	**Solid/SSSA**	**12/17/2013 12:00**	**ICP-MS1**	**89653**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Barium	**20**	B	0.50	1	04/29/2014 18:54
Calcium	**180**		10	1	04/29/2014 18:54
Lithium	ND		0.050	1	04/29/2014 18:54
Magnesium	**110**		2.0	1	04/29/2014 18:54
Potassium	**32**		5.0	1	04/29/2014 18:54
Sodium	**64**	B	10	1	04/29/2014 18:54
Strontium	**4.3**		2.0	1	04/29/2014 18:54

MW-1: 200-202.5	**1312545-005B**	**Solid/SSSA**	**12/17/2013 12:20**	**ICP-MS1**	**89653**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Barium	**9.9**	B	0.50	1	04/29/2014 19:01
Calcium	**180**		10	1	04/29/2014 19:01
Lithium	ND		0.050	1	04/29/2014 19:01
Magnesium	**80**		2.0	1	04/29/2014 19:01
Potassium	**36**		5.0	1	04/29/2014 19:01
Sodium	**52**	B	10	1	04/29/2014 19:01
Strontium	**3.1**		2.0	1	04/29/2014 19:01

MW-1: 297-298.5	**1312545-006B**	**Solid/SSSA**	**12/18/2013 08:20**	**ICP-MS1**	**89653**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Barium	**17**	B	0.50	1	04/29/2014 19:07
Calcium	**2500**		100	10	05/07/2014 12:22
Lithium	ND		0.050	1	04/29/2014 19:07
Magnesium	**780**		2.0	1	04/29/2014 19:07
Potassium	**90**		5.0	1	04/29/2014 19:07
Sodium	**200**	B	10	1	04/29/2014 19:07
Strontium	**27**		2.0	1	04/29/2014 19:07

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	SSSA Part 3 Chapter 40
Date Received:	12/18/13 15:02	**Analytical Method:**	SW6020
Date Prepared:	4/23/14	**Unit:**	mg/Kg

Exchangeable Cations using Ammonium Acetate

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 364.5-367.0	**1312545-007B**	**Solid/SSSA**	**12/18/2013 09:00**	**ICP-MS1**	**89653**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Barium	**8.3**	B	0.50	1	04/29/2014 19:13
Calcium	**220**		10	1	04/29/2014 19:13
Lithium	ND		0.050	1	04/29/2014 19:13
Magnesium	**52**		2.0	1	04/29/2014 19:13
Potassium	**22**		5.0	1	04/29/2014 19:13
Sodium	**52**	B	10	1	04/29/2014 19:13
Strontium	**2.3**		2.0	1	04/29/2014 19:13

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	SW3050B
Date Received:	12/18/13 15:02	**Analytical Method:**	SW6010B
Date Prepared:	12/19/14	**Unit:**	mg/kg

Silica for Iron Oxide

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005B**	**Solid/TOTAL**	**12/17/2013 12:20**	**ICP-JY**	**90740**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Silica	**6500**	B	11	10	05/21/2014 16:33

MW-1: 364.5-367.0	**1312545-007B**	**Solid/TOTAL**	**12/18/2013 09:00**	**ICP-JY**	**90740**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Silica	**5200**	B	11	10	05/21/2014 16:36

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	HH/TM-7
Date Received:	12/18/13 15:02	**Analytical Method:**	HH/TM-7
Date Prepared:	12/19/13	**Unit:**	mg/kg

Major Elements by Hydroxylamine- Hydrochloride

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005B**	**Solid/TOTAL**	**12/17/2013 12:20**	**ICP-MS1**	**90683**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	**2400**	50	1	05/20/2014 19:33
Arsenic	**1.8**	0.50	1	05/20/2014 19:33
Calcium	**810**	100	1	05/20/2014 19:33
Ferric Oxides	**3300**	20	1	05/20/2014 19:33
Hexachrome	ND	0.40	100	05/20/2014 19:33
Lead	**1.1**	0.50	1	05/20/2014 19:33
Magnesium	**770**	20	1	05/20/2014 19:33
Manganese	**37**	20	1	05/20/2014 19:33
Mercury	ND	0.050	1	05/20/2014 19:33
Selenium	ND	0.50	1	05/20/2014 19:33
Uranium	ND	0.50	1	05/20/2014 19:33

MW-1: 364.5-367.0	**1312545-007B**	**Solid/TOTAL**	**12/18/2013 09:00**	**ICP-MS1**	**90683**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	**1800**	50	1	05/20/2014 19:40
Arsenic	**0.72**	0.50	1	05/20/2014 19:40
Calcium	**820**	100	1	05/20/2014 19:40
Ferric Oxides	**2500**	20	1	05/20/2014 19:40
Hexachrome	ND	0.40	100	05/20/2014 19:40
Lead	**0.73**	0.50	1	05/20/2014 19:40
Magnesium	**590**	20	1	05/20/2014 19:40
Manganese	**37**	20	1	05/20/2014 19:40
Mercury	ND	0.050	1	05/20/2014 19:40
Selenium	ND	0.50	1	05/20/2014 19:40
Uranium	ND	0.50	1	05/20/2014 19:40

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	SW3050B
Date Received:	12/18/13 15:02	**Analytical Method:**	SW6010B
Date Prepared:	12/19/13	**Unit:**	mg/Kg

Phosphorus

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 27.5-30.0	**1312545-001A**	**Solid/TOTAL^**	**12/16/2013 14:35**	**ICP-JY**	**85317**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	**88**	15	1	05/06/2014 16:00

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002A**	**Solid/TOTAL^**	**12/17/2013 11:40**	**ICP-JY**	**85317**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	**120**	15	1	05/06/2014 16:02

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 98.5-101	**1312545-003A**	**Solid/TOTAL^**	**12/17/2013 11:50**	**ICP-JY**	**85317**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	**110**	15	1	05/06/2014 16:04

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 139.5-142.0	**1312545-004A**	**Solid/TOTAL^**	**12/17/2013 12:00**	**ICP-JY**	**85317**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	**110**	15	1	05/06/2014 16:06

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005A**	**Solid/TOTAL^**	**12/17/2013 12:20**	**ICP-JY**	**85317**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	**150**	15	1	05/06/2014 16:08

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	SW3050B
Date Received:	12/18/13 15:02	**Analytical Method:**	SW6010B
Date Prepared:	12/19/13	**Unit:**	mg/Kg

Phosphorus

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 297-298.5	**1312545-006A**	**Solid/TOTAL^**	**12/18/2013 08:20**	**ICP-JY**	**85317**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	**4000**	150	10	05/06/2014 16:52

MW-1: 364.5-367.0	**1312545-007A**	**Solid/TOTAL^**	**12/18/2013 09:00**	**ICP-JY**	**85317**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	**290**	15	1	05/06/2014 16:12

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method**	SW3060A
Date Received:	12/18/13 15:02	**Analytical Method:**	SW7199
Date Prepared:	12/20/13	**Unit:**	mg/Kg

TTLC Hexachrome by Alkaline Digestion and IC-UV Analysis

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 27.5-30.0	**1312545-001A**	**Solid/TOTAL**	**12/16/2013 14:35**	**IC2**	**85347**

Analytes	Result	RL	DF	Date Analyzed
Hexachrome	ND	4.0	1	12/26/2013 18:22

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002A**	**Solid/TOTAL**	**12/17/2013 11:40**	**IC2**	**85347**

Analytes	Result	RL	DF	Date Analyzed
Hexachrome	ND	4.0	1	12/26/2013 18:41

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 98.5-101	**1312545-003A**	**Solid/TOTAL**	**12/17/2013 11:50**	**IC2**	**85347**

Analytes	Result	RL	DF	Date Analyzed
Hexachrome	ND	4.0	1	12/26/2013 19:01

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 139.5-142.0	**1312545-004A**	**Solid/TOTAL**	**12/17/2013 12:00**	**IC2**	**85347**

Analytes	Result	RL	DF	Date Analyzed
Hexachrome	ND	4.0	1	12/26/2013 19:20

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005A**	**Solid/TOTAL**	**12/17/2013 12:20**	**IC2**	**85347**

Analytes	Result	RL	DF	Date Analyzed
Hexachrome	ND	4.0	1	12/26/2013 19:39

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TD Analyst's Initial

Angela Rydelius, Lab Manager

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method**	SW3060A
Date Received:	12/18/13 15:02	**Analytical Method:**	SW7199
Date Prepared:	12/20/13	**Unit:**	mg/Kg

TTLC Hexachrome by Alkaline Digestion and IC-UV Analysis

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 297-298.5	**1312545-006A**	**Solid/TOTAL**	**12/18/2013 08:20**	**IC2**	**85347**

Analytes	Result	RL	DF	Date Analyzed
Hexachrome	ND	4.0	1	12/26/2013 19:59

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 364.5-367.0	**1312545-007A**	**Solid/TOTAL**	**12/18/2013 09:00**	**IC2**	**85347**

Analytes	Result	RL	DF	Date Analyzed
Hexachrome	ND	4.0	1	12/26/2013 20:18

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	MAI_LCMS
Date Received:	12/18/13 15:02	**Analytical Method:**	E6850
Date Prepared:	1/8/14	**Unit:**	µg/Kg

Perchlorate by LC-MS

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 27.5-30.0	**1312545-001A**	**Solid**	**12/16/2013 14:35**	**LC3Q-MS1**	**85896**

Analytes	Result	RL	DF	Date Analyzed
Perchlorate	ND	10	1	01/10/2014 15:56

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002A**	**Solid**	**12/17/2013 11:40**	**LC3Q-MS1**	**85896**

Analytes	Result	RL	DF	Date Analyzed
Perchlorate	ND	10	1	01/10/2014 16:01

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 98.5-101	**1312545-003A**	**Solid**	**12/17/2013 11:50**	**LC3Q-MS1**	**85896**

Analytes	Result	RL	DF	Date Analyzed
Perchlorate	ND	10	1	01/10/2014 16:07

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 139.5-142.0	**1312545-004A**	**Solid**	**12/17/2013 12:00**	**LC3Q-MS1**	**85896**

Analytes	Result	RL	DF	Date Analyzed
Perchlorate	ND	10	1	01/10/2014 16:13

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005A**	**Solid**	**12/17/2013 12:20**	**LC3Q-MS1**	**85896**

Analytes	Result	RL	DF	Date Analyzed
Perchlorate	ND	10	1	01/10/2014 16:18

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	MAI_LCMS
Date Received:	12/18/13 15:02	**Analytical Method:**	E6850
Date Prepared:	1/8/14	**Unit:**	µg/Kg

Perchlorate by LC-MS

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 297-298.5	**1312545-006A**	**Solid**	**12/18/2013 08:20**	**LC3Q-MS1**	**85896**

Analytes	Result	RL	DF	Date Analyzed
Perchlorate	ND	10	1	01/10/2014 16:24

MW-1: 364.5-367.0	**1312545-007A**	**Solid**	**12/18/2013 09:00**	**LC3Q-MS1**	**85896**

Analytes	Result	RL	DF	Date Analyzed
Perchlorate	ND	10	1	01/10/2014 16:30

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method**	SW8330
Date Received:	12/18/13 15:02	**Analytical Method:**	SW8330
Date Prepared:	12/20/13	**Unit:**	mg/Kg

Nitroaromatics and Nitroamines by HPLC

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 27.5-30.0	**1312545-001A**	**Solid**	**12/16/2013 14:35**	**HPLC4**	**85379**

Analytes	Result	RL	DF	Date Analyzed
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	ND	0.080	1	12/21/2013 14:53
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	ND	0.080	1	12/21/2013 14:53
1,3-Dinitrobenzene (1,3-DNB)	ND	0.080	1	12/21/2013 14:53
2,4-Dinitrotoluene (2,4-DNT)	ND	0.080	1	12/21/2013 14:53
2,6-Dinitrotoluene (2,6-DNT)	ND	0.080	1	12/21/2013 14:53
HMX	ND	0.080	1	12/21/2013 14:53
Nitrobenzene (NB)	ND	0.080	1	12/21/2013 14:53
2-Nitrotoluene (2-NT)	ND	0.080	1	12/21/2013 14:53
3-Nitrotoluene (3-NT)	ND	0.080	1	12/21/2013 14:53
4-Nitrotoluene (4-NT)	ND	0.080	1	12/21/2013 14:53
RDX	ND	0.080	1	12/21/2013 14:53
1,3,5-Trinitrobenzene (1,3,5-TNB)	ND	0.080	1	12/21/2013 14:53
2,4,6-Trinitrotoluene (2,4,6-TNT)	ND	0.080	1	12/21/2013 14:53
Tetryl	ND	0.080	1	12/21/2013 14:53

Surrogates	REC (%)	Limits	
3,4-DNT	118	70-130	12/21/2013 14:53

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 JS Analyst's Initial Angela Rydelius, Lab Manager

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method**	SW8330
Date Received:	12/18/13 15:02	**Analytical Method:**	SW8330
Date Prepared:	12/20/13	**Unit:**	mg/Kg

Nitroaromatics and Nitroamines by HPLC

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002A**	**Solid**	**12/17/2013 11:40**	**HPLC4**	**85379**

Analytes	Result	RL	DF	Date Analyzed
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	ND	0.080	1	12/21/2013 15:37
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	ND	0.080	1	12/21/2013 15:37
1,3-Dinitrobenzene (1,3-DNB)	ND	0.080	1	12/21/2013 15:37
2,4-Dinitrotoluene (2,4-DNT)	ND	0.080	1	12/21/2013 15:37
2,6-Dinitrotoluene (2,6-DNT)	ND	0.080	1	12/21/2013 15:37
HMX	ND	0.080	1	12/21/2013 15:37
Nitrobenzene (NB)	ND	0.080	1	12/21/2013 15:37
2-Nitrotoluene (2-NT)	ND	0.080	1	12/21/2013 15:37
3-Nitrotoluene (3-NT)	ND	0.080	1	12/21/2013 15:37
4-Nitrotoluene (4-NT)	ND	0.080	1	12/21/2013 15:37
RDX	ND	0.080	1	12/21/2013 15:37
1,3,5-Trinitrobenzene (1,3,5-TNB)	ND	0.080	1	12/21/2013 15:37
2,4,6-Trinitrotoluene (2,4,6-TNT)	ND	0.080	1	12/21/2013 15:37
Tetryl	ND	0.080	1	12/21/2013 15:37

Surrogates	REC (%)	Limits	
3,4-DNT	117	70-130	12/21/2013 15:37

(Cont.)

 JS Analyst's Initial Angela Rydelius, Lab Manager

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method**	SW8330
Date Received:	12/18/13 15:02	**Analytical Method:**	SW8330
Date Prepared:	12/20/13	**Unit:**	mg/Kg

Nitroaromatics and Nitroamines by HPLC

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 98.5-101	**1312545-003A**	**Solid**	**12/17/2013 11:50**	**HPLC4**	**85379**

Analytes	Result	RL	DF	Date Analyzed
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	ND	0.080	1	12/21/2013 16:21
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	ND	0.080	1	12/21/2013 16:21
1,3-Dinitrobenzene (1,3-DNB)	ND	0.080	1	12/21/2013 16:21
2,4-Dinitrotoluene (2,4-DNT)	ND	0.080	1	12/21/2013 16:21
2,6-Dinitrotoluene (2,6-DNT)	ND	0.080	1	12/21/2013 16:21
HMX	ND	0.080	1	12/21/2013 16:21
Nitrobenzene (NB)	ND	0.080	1	12/21/2013 16:21
2-Nitrotoluene (2-NT)	ND	0.080	1	12/21/2013 16:21
3-Nitrotoluene (3-NT)	ND	0.080	1	12/21/2013 16:21
4-Nitrotoluene (4-NT)	ND	0.080	1	12/21/2013 16:21
RDX	ND	0.080	1	12/21/2013 16:21
1,3,5-Trinitrobenzene (1,3,5-TNB)	ND	0.080	1	12/21/2013 16:21
2,4,6-Trinitrotoluene (2,4,6-TNT)	ND	0.080	1	12/21/2013 16:21
Tetryl	ND	0.080	1	12/21/2013 16:21

Surrogates	REC (%)	Limits	
3,4-DNT	116	70-130	12/21/2013 16:21

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method**	SW8330
Date Received:	12/18/13 15:02	**Analytical Method:**	SW8330
Date Prepared:	12/20/13	**Unit:**	mg/Kg

Nitroaromatics and Nitroamines by HPLC

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 139.5-142.0	**1312545-004A**	**Solid**	**12/17/2013 12:00**	**HPLC4**	**85379**

Analytes	Result	RL	DF	Date Analyzed
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	ND	0.080	1	12/21/2013 17:06
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	ND	0.080	1	12/21/2013 17:06
1,3-Dinitrobenzene (1,3-DNB)	ND	0.080	1	12/21/2013 17:06
2,4-Dinitrotoluene (2,4-DNT)	ND	0.080	1	12/21/2013 17:06
2,6-Dinitrotoluene (2,6-DNT)	ND	0.080	1	12/21/2013 17:06
HMX	ND	0.080	1	12/21/2013 17:06
Nitrobenzene (NB)	ND	0.080	1	12/21/2013 17:06
2-Nitrotoluene (2-NT)	ND	0.080	1	12/21/2013 17:06
3-Nitrotoluene (3-NT)	ND	0.080	1	12/21/2013 17:06
4-Nitrotoluene (4-NT)	ND	0.080	1	12/21/2013 17:06
RDX	ND	0.080	1	12/21/2013 17:06
1,3,5-Trinitrobenzene (1,3,5-TNB)	ND	0.080	1	12/21/2013 17:06
2,4,6-Trinitrotoluene (2,4,6-TNT)	ND	0.080	1	12/21/2013 17:06
Tetryl	ND	0.080	1	12/21/2013 17:06

Surrogates	REC (%)	Limits	
3,4-DNT	115	70-130	12/21/2013 17:06

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method**	SW8330
Date Received:	12/18/13 15:02	**Analytical Method:**	SW8330
Date Prepared:	12/20/13	**Unit:**	mg/Kg

Nitroaromatics and Nitroamines by HPLC

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005A**	**Solid**	**12/17/2013 12:20**	**HPLC4**	**85379**

Analytes	Result	RL	DF	Date Analyzed
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	ND	0.080	1	12/21/2013 17:50
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	ND	0.080	1	12/21/2013 17:50
1,3-Dinitrobenzene (1,3-DNB)	ND	0.080	1	12/21/2013 17:50
2,4-Dinitrotoluene (2,4-DNT)	ND	0.080	1	12/21/2013 17:50
2,6-Dinitrotoluene (2,6-DNT)	ND	0.080	1	12/21/2013 17:50
HMX	ND	0.080	1	12/21/2013 17:50
Nitrobenzene (NB)	ND	0.080	1	12/21/2013 17:50
2-Nitrotoluene (2-NT)	ND	0.080	1	12/21/2013 17:50
3-Nitrotoluene (3-NT)	ND	0.080	1	12/21/2013 17:50
4-Nitrotoluene (4-NT)	ND	0.080	1	12/21/2013 17:50
RDX	ND	0.080	1	12/21/2013 17:50
1,3,5-Trinitrobenzene (1,3,5-TNB)	ND	0.080	1	12/21/2013 17:50
2,4,6-Trinitrotoluene (2,4,6-TNT)	ND	0.080	1	12/21/2013 17:50
Tetryl	ND	0.080	1	12/21/2013 17:50

Surrogates	REC (%)	Limits	
3,4-DNT	115	70-130	12/21/2013 17:50

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method**	SW8330
Date Received:	12/18/13 15:02	**Analytical Method:**	SW8330
Date Prepared:	12/20/13	**Unit:**	mg/Kg

Nitroaromatics and Nitroamines by HPLC

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 297-298.5	**1312545-006A**	**Solid**	**12/18/2013 08:20**	**HPLC4**	**85379**

Analytes	Result	RL	DF	Date Analyzed
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	ND	0.080	1	12/21/2013 18:34
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	ND	0.080	1	12/21/2013 18:34
1,3-Dinitrobenzene (1,3-DNB)	ND	0.080	1	12/21/2013 18:34
2,4-Dinitrotoluene (2,4-DNT)	ND	0.080	1	12/21/2013 18:34
2,6-Dinitrotoluene (2,6-DNT)	ND	0.080	1	12/21/2013 18:34
HMX	ND	0.080	1	12/21/2013 18:34
Nitrobenzene (NB)	ND	0.080	1	12/21/2013 18:34
2-Nitrotoluene (2-NT)	ND	0.080	1	12/21/2013 18:34
3-Nitrotoluene (3-NT)	ND	0.080	1	12/21/2013 18:34
4-Nitrotoluene (4-NT)	ND	0.080	1	12/21/2013 18:34
RDX	ND	0.080	1	12/21/2013 18:34
1,3,5-Trinitrobenzene (1,3,5-TNB)	ND	0.080	1	12/21/2013 18:34
2,4,6-Trinitrotoluene (2,4,6-TNT)	ND	0.080	1	12/21/2013 18:34
Tetryl	ND	0.080	1	12/21/2013 18:34

Surrogates	REC (%)	Limits	
3,4-DNT	114	70-130	12/21/2013 18:34

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method**	SW8330
Date Received:	12/18/13 15:02	**Analytical Method:**	SW8330
Date Prepared:	12/20/13	**Unit:**	mg/Kg

Nitroaromatics and Nitroamines by HPLC

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 364.5-367.0	**1312545-007A**	**Solid**	**12/18/2013 09:00**	**HPLC4**	**85379**

Analytes	Result	RL	DF	Date Analyzed
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	ND	0.080	1	12/21/2013 19:18
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	ND	0.080	1	12/21/2013 19:18
1,3-Dinitrobenzene (1,3-DNB)	ND	0.080	1	12/21/2013 19:18
2,4-Dinitrotoluene (2,4-DNT)	ND	0.080	1	12/21/2013 19:18
2,6-Dinitrotoluene (2,6-DNT)	ND	0.080	1	12/21/2013 19:18
HMX	ND	0.080	1	12/21/2013 19:18
Nitrobenzene (NB)	ND	0.080	1	12/21/2013 19:18
2-Nitrotoluene (2-NT)	ND	0.080	1	12/21/2013 19:18
3-Nitrotoluene (3-NT)	ND	0.080	1	12/21/2013 19:18
4-Nitrotoluene (4-NT)	ND	0.080	1	12/21/2013 19:18
RDX	ND	0.080	1	12/21/2013 19:18
1,3,5-Trinitrobenzene (1,3,5-TNB)	ND	0.080	1	12/21/2013 19:18
2,4,6-Trinitrotoluene (2,4,6-TNT)	ND	0.080	1	12/21/2013 19:18
Tetryl	ND	0.080	1	12/21/2013 19:18

Surrogates	REC (%)	Limits	
3,4-DNT	114	70-130	12/21/2013 19:18

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E415.1m
Date Received:	12/18/13 15:02	**Analytical Method:**	E415.1m
Date Prepared:	5/5/14	**Unit:**	mg/Kg

Total Nitrogen

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 27.5-30.0	**1312545-001B**	**Solid**	**12/16/2013 14:35**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
Total Nitrogen	**310**	200	1	05/05/2014 19:24

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002B**	**Solid**	**12/17/2013 11:40**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
Total Nitrogen	**210**	200	1	05/05/2014 20:09

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 98.5-101	**1312545-003B**	**Solid**	**12/18/2013 15:02**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
Total Nitrogen	**420**	200	1	05/05/2014 20:20

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 139.5-142.0	**1312545-004B**	**Solid**	**12/17/2013 12:00**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
Total Nitrogen	**450**	200	1	05/05/2014 20:31

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005B**	**Solid**	**12/17/2013 12:20**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
Total Nitrogen	**380**	200	1	05/05/2014 20:43

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E415.1m
Date Received:	12/18/13 15:02	**Analytical Method:**	E415.1m
Date Prepared:	5/5/14	**Unit:**	mg/Kg

Total Nitrogen

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 297-298.5	**1312545-006B**	**Solid**	**12/18/2013 08:20**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
Total Nitrogen	**1500**	200	1	05/05/2014 21:08

MW-1: 364.5-367.0	**1312545-007B**	**Solid**	**12/18/2013 09:00**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
Total Nitrogen	**770**	200	1	05/05/2014 21:44

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	SM5310Bm
Date Received:	12/18/13 15:02	**Analytical Method:**	SM5310Bm
Date Prepared:	5/5/14	**Unit:**	mg/kg

Total Organic Carbon (TOC)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 27.5-30.0	**1312545-001B**	**Solid**	**12/16/2013 14:35**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
TOC	ND	200	1	05/05/2014 19:24

MW-1: 74.0-75.5	**1312545-002B**	**Solid**	**12/17/2013 11:40**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
TOC	ND	200	1	05/05/2014 20:09

MW-1: 98.5-101	**1312545-003B**	**Solid**	**12/18/2013 15:02**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
TOC	ND	200	1	05/05/2014 20:20

MW-1: 139.5-142.0	**1312545-004B**	**Solid**	**12/17/2013 12:00**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
TOC	ND	200	1	05/05/2014 20:31

MW-1: 200-202.5	**1312545-005B**	**Solid**	**12/17/2013 12:20**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
TOC	ND	200	1	05/05/2014 20:43

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	SM5310Bm
Date Received:	12/18/13 15:02	**Analytical Method:**	SM5310Bm
Date Prepared:	5/5/14	**Unit:**	mg/kg

Total Organic Carbon (TOC)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 297-298.5	**1312545-006B**	**Solid**	**12/18/2013 08:20**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
TOC	**19,000**	200	1	05/05/2014 21:08

MW-1: 364.5-367.0	**1312545-007B**	**Solid**	**12/18/2013 09:00**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
TOC	ND	200	1	05/05/2014 21:44

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	5/16/14	**BatchID:**	90512
Date Analyzed:	5/19/14	**Extraction Method:**	Methods for Geochemical Analysis
Instrument:	ICP-MS1	**Analytical Method:**	SW6020
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-90512

QC Summary Report for SW6020

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Aluminum	ND	5290	50	5000	-	106	75-125
Barium	ND	5390	5.0	5000	-	108	75-125
Calcium	101	52,700	100	50000	-	105	75-125
Iron	ND	5360	20	5000	-	107	75-125
Magnesium	ND	5080	20	5000	-	102	75-125
Manganese	ND	5440	20	5000	-	109	75-125
Potassium	183	5580	50	5000	-	112	75-125
Sodium	301	49,300	100	50000	-	98.7	75-125
Strontium	ND	5280	20	5000	-	106	75-125
Titanium	37.9	581	0.50	500	-	116	75-125

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	12/19/13	**BatchID:**	90677
Date Analyzed:	5/6/14 - 5/20/14	**Extraction Method:**	Methods for Geochemical Analysis
Instrument:	ICP-JY	**Analytical Method:**	SW6010B
Matrix:	Soil	**Unit:**	mg/kg
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-90677

QC Summary Report for SW6010B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Phosphorous	ND	268	15	250	-	107	70-130
Silica	60.4	553	32	535	-	103	75-125

SH QA/QC Officer

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	12/19/13	**BatchID:**	90683
Date Analyzed:	5/20/14	**Extraction Method:**	SW3050B
Instrument:	ICP-MS1	**Analytical Method:**	SW6020
Matrix:	Soil	**Unit:**	mg/kg
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-90683

QC Summary Report for SW6020

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Aluminum	ND	549	50	500	-	110	75-125
Arsenic	ND	55.5	0.50	50	-	111	75-125
Calcium	ND	5240	100	5000	-	105	75-125
Ferric Oxides	ND	531	20	500	-	106	75-125
Lead	ND	53.2	0.50	50	-	106	75-125
Magnesium	ND	546	20	500	-	109	75-125
Manganese	ND	552	20	500	-	110	75-125
Selenium	ND	54.5	0.50	50	-	109	75-125
Uranium	ND	49.5	0.50	50	-	99.1	75-125

SH QA/QC Officer

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	4/23/14	**BatchID:**	89653
Date Analyzed:	4/29/14	**Extraction Method:**	SSSA Part 3 Chapter 40
Instrument:	ICP-MS1	**Analytical Method:**	SW6020
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89653

QC SUMMARY REPORT FOR SW6020

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Barium	3.89	54.3	0.50	50	-	109	80-120
Calcium	ND	495	10	500	-	98.9	80-120
Lithium	ND	4.93	0.050	5	-	98.5	80-120
Magnesium	ND	53.7	2.0	50	-	107	80-120
Potassium	ND	52.2	5.0	50	-	104	80-120
Sodium	18.1	531	10	500	-	106	80-120
Strontium	ND	53.5	2.0	50	-	107	80-120

SH QA/QC Officer

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	12/19/13	**BatchID:**	85317
Date Analyzed:	1/6/14 - 1/7/14	**Extraction Method:**	SW3050B
Instrument:	ICP-JY	**Analytical Method:**	SW6010B
Matrix:	Solid	**Unit:**	mg/Kg
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-85317

QC Summary Report for SW6010B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Phosphorous	ND	543	15	500	-	109	70-130

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	12/19/14	**BatchID:**	90740
Date Analyzed:	5/21/14	**Extraction Method:**	SW3050B
Instrument:	ICP-JY	**Analytical Method:**	SW6010B
Matrix:	Soil	**Unit:**	mg/kg
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-90740

QC Summary Report for SW6010B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Silica	2.35	185	1.1	214	-	86.5	75-125

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	12/20/13	**BatchID:**	85347
Date Analyzed:	12/26/13	**Extraction Method:**	SW3060A
Instrument:	IC2	**Analytical Method:**	SW7199
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-85347 1312614-007AMS/MSD

QC Summary Report for SW7199 (Hexachrome)

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Hexachrome	ND	211	4.0	200	-	105	80-120

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Hexachrome	202	196	200	ND	101	97.9	70-130	3.22	20

SH QA/QC Officer

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	12/20/13	**BatchID:**	85379
Date Analyzed:	12/21/13	**Extraction Method:**	SW8330
Instrument:	HPLC4	**Analytical Method:**	SW8330
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-85379 1312545-005AMS/MSD

QC Summary Report for SW8330

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	ND	-	0.080	-	-	-	-
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	ND	-	0.080	-	-	-	-
1,3-Dinitrobenzene (1,3-DNB)	ND	-	0.080	-	-	-	-
2,4-Dinitrotoluene (2,4-DNT)	ND	-	0.080	-	-	-	-
2,6-Dinitrotoluene (2,6-DNT)	ND	-	0.080	-	-	-	-
HMX	ND	0.728	0.080	0.80	-	91	80-120
Nitrobenzene (NB)	ND	-	0.080	-	-	-	-
2-Nitrotoluene (2-NT)	ND	0.769	0.080	0.80	-	96.1	80-120
3-Nitrotoluene (3-NT)	ND	0.758	0.080	0.80	-	94.7	80-120
4-Nitrotoluene (4-NT)	ND	0.769	0.080	0.80	-	96.2	80-120
RDX	ND	0.857	0.080	0.80	-	107	80-120
1,3,5-Trinitrobenzene (1,3,5-TNB)	ND	0.706	0.080	0.80	-	88.3	80-120
2,4,6-Trinitrotoluene (2,4,6-TNT)	ND	-	0.080	-	-	-	-
Tetryl	ND	-	0.080	-	-	-	-
Surrogate Recovery							
3,4-DNT	2.32	2.40		2	116	120	70-130

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
HMX	0.678	0.704	0.80	ND	84.7	88	70-130	3.76	30
2-Nitrotoluene (2-NT)	0.744	0.756	0.80	ND	92.9	94.6	70-130	1.72	30
3-Nitrotoluene (3-NT)	0.733	0.729	0.80	ND	91.6	91.1	70-130	0.497	30
4-Nitrotoluene (4-NT)	0.751	0.748	0.80	ND	93.9	93.6	70-130	0.359	30
RDX	0.811	0.622	0.80	ND	101	77.8	70-130	26.4	30
1,3,5-Trinitrobenzene (1,3,5-TNB)	0.792	0.790	0.80	ND	99	98.8	70-130	0.228	30
Surrogate Recovery									
3,4-DNT	2.30	2.31	2		115	115	70-130	0	30

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	1/8/14	**BatchID:**	85896
Date Analyzed:	1/10/14	**Extraction Method:**	MAI_LCMS
Instrument:	LC3Q-MS1	**Analytical Method:**	E6850
Matrix:	Soil	**Unit:**	mg/kg
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-85896 1312545-007AMS/MSD

QC Summary Report for E6850

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Perchlorate	ND	88.1	10	100	-	88.1	80-120

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Perchlorate	81.8	84.6	100	ND	81.8	84.6	70-130	3.37	20

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	5/5/14	**BatchID:**	90059
Date Analyzed:	5/5/14	**Extraction Method:**	SM5310Bm
Instrument:	TOC_CNS	**Analytical Method:**	SM5310Bm
Matrix:	Soil	**Unit:**	mg/kg
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-90059 1312545-001BMS/MSD

QC Summary Report for SM5310Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TOC	ND	8200	200	8200	-	100	80-120
Total Nitrogen	ND	1930	200	1900	-	101	80-120

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TOC	7940	7620	8200	ND	93.5	89.7	80-120	4.03	20
Total Nitrogen	2310	2340	1900	310	105	107	80-120	1.20	20

TODD ENGINEERS

2490 Mariner Square Loop, Suite 215, Alameda, CA 94501
510-747-6920 (voice) 510-747-6921(fax) bmotzer@toddengineers.com

Chain of Custody

Batch/Shipment No.:

Page: 1 of 1

Date: 12-18-2013

Lab Name: McCambell Analytical, Inc.

Address: 1534 Willow Pass Road
Pittsburg, CA 94565

Telephone: 925-252-9262; 877-252-9262

Samplers (Signatures) William E Motzer × Amber Ritchie

Analysis Request

	Sample Number	Matrix	Date	Time	Depth Interval	Cr(VI) - EPA 7199	Perchlorate by EPA 6860	DI TCLP Extraction by SW1311 w/ As, Cr analysis	CEC NH_4Ac Exchange Extraction with analysis for Ca, Na, Mg, K, Sr, Li Alkali & Alkaline earth metals	Nitroaromatics - EPA 8330	Mineral XRD w. quant. phase analysis	Mineral: resin impreg thin section prep and exam	SEM - EDA analysis for Ca & Na (SUB)	Na, K, Ca, Mg, Ba, Sr, Al, Fe Total Dissolution or XRF	TOC-TN by combustion	Total P on ash after combustion-E200.7	Number of Containers
1	MW-1: 27.5-30.0	Soil	12/16/13	1435	27.5-30.0'	✓	✓	✓	✓	✓				✓	✓	✓	2
2	MW-1: 74.0-75.5	Soil	12/17/13	1140	74.0-75.5'	✓	✓	✓	✓	✓				✓	✓	✓	2
3	MW-1: 98.5-101	Soil	12/17/13	1150	98.5-101'	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
4	MW-1 129.5-142.0	Soil	12/17/13	1200	129.5-142.0'	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
5	MW-1 200-202.5	Soil	12/17/13	1220	200.0-202.5'	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
6	MW-1 297.-298.5	Soil	12/18/13	0820	297.0-298.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
7	MW-1 364.5-367.0	Soil	12/18/13	0900	364.5-367.0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
8	MW-1	Soil															
9	MW-1	Soil															
10	MW-1	Soil															

Project Information

Project Name: MRWPCA
Project Manager: Edwin Lin, Senior Hydro.
Job No.: 60408
Shipping ID. No.:
Via:

Sample Receipt

Total No. of Containers: 22° wet ice
Chain of Custody Seals:
Rec'd Good Condition/Cold:
Conforms to Record:
Lab No.: 1312545

Special Instructions/Comments:

Relinquished By:
(Signature) William E Motzer (Time) 0920
(Date) 12/18/2013
(Printed Name) William E. Motzer
(Company) Todd Engineers

Received By:
× Amber Ritchie (Signature) 0920 (Time)
Amber Ritchie (Printed Name) 12-18-13 (Date)
(Company)

Relinquished By:
(Signature) Amber Ritchie (Time)
(Printed Name) (Date)
(Company)

Received By:
(Signature) Maria Venegas (Time)
(Printed Name) MAI (Date)
(Company) 12/18/13 1154

Relinquished By:
(Signature) (Time)
(Printed Name) (Date)
(Company)

Received By (Laboratory):
(Signature) (Time)
(Printed Name) (Date)
(Laboratory)

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Analytical Report

WorkOrder: 1312650

Report Created for: Todd Engineering
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501

Project Contact: Bill Motzer
Project P.O.:
Project Name: #60408; MRWPCA

Project Received: 12/20/2013

Analytical Report reviewed & approved for release on 05/16/2014 by:

Question about your data?

Click here to email McCampbell

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

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Glossary of Terms & Qualifier Definitions

Client: Todd Engineering
Project: #60408; MRWPCA
WorkOrder: 1312650

Glossary Abbreviation

95% Interval	95% Confident Interval
DF	Dilution Factor
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not detected at or above the indicated MDL or RL
NR	Matrix interferences, or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix; or sample diluted due to high matrix or analyte content.
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
TEQ	Toxicity Equivalence

Analytical Qualifier

B	analyte detected in the associated Method Blank
H	samples were analyzed out of holding time
S	spike recovery outside accepted recovery limits
a1	sample diluted due to matrix interference
a4	the reporting limits were raised due to the sample's matrix prohibiting a full volume extraction.
a7	reporting limit raised due to limited sample amount
a14	reporting limit raised due to the physical nature of the sample
a20	reporting limit raised due to matrix interference
c1	surrogate recovery outside of the control limits due to the dilution of the sample.
j1	see attached narrative

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Glossary of Terms & Qualifier Definitions

Client: Todd Engineering
Project: #60408; MRWPCA
WorkOrder: 1312650

Quality Control Qualifiers

F1	MS/MSD recovery was out of acceptance criteria; LCS validated the prep batch.
F2	LCS recovery for this compound is outside of acceptance limits.
F3	the surrogate standard recovery is outside of acceptance limits.

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	Methods for Geochemical Analysis
Date Received:	12/20/13 15:35	**Analytical Method:**	SW6020
Date Prepared:	5/16/14	**Unit:**	wt %

Major Elements as Oxides

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001B**	**Solid**	**12/19/2013 14:00**	**ICP-MS1**	**90512**

Analytes	Result	RL	DF	Date Analyzed
Al2O3	**12**	0.28	100	05/19/2014 16:41
BaO	ND	0.056	10	05/19/2014 11:03
CaO	**1.8**	0.35	10	05/19/2014 11:03
FeO	**5.0**	0.019	10	05/19/2014 11:03
K2O	**1.6**	0.15	10	05/19/2014 11:03
MgO	**2.7**	0.025	10	05/19/2014 11:03
MnO	**0.052**	0.026	10	05/19/2014 11:03
Na2O	**1.2**	0.20	10	05/19/2014 11:03
SrO	ND	0.024	10	05/19/2014 11:03
TiO2	**0.57**	0.25	100	05/19/2014 16:41

Analytical Comments: a1

MW-1: 433.0-435.0	**1312650-002B**	**Solid**	**12/19/2013 14:15**	**ICP-MS1**	**90512**

Analytes	Result	RL	DF	Date Analyzed
Al2O3	**9.9**	0.28	100	05/19/2014 16:59
BaO	**0.064**	0.056	10	05/19/2014 11:09
CaO	**2.1**	0.35	10	05/19/2014 11:09
FeO	**2.8**	0.019	10	05/19/2014 11:09
K2O	**1.5**	0.15	10	05/19/2014 11:09
MgO	**1.0**	0.025	10	05/19/2014 11:09
MnO	**0.028**	0.026	10	05/19/2014 11:09
Na2O	**2.2**	0.20	10	05/19/2014 11:09
SrO	**0.035**	0.024	10	05/19/2014 11:09
TiO2	**0.27**	0.25	100	05/19/2014 16:59

Analytical Comments: a1

(Cont.)

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	Methods for Geochemical Analysis
Date Received:	12/20/13 15:35	**Analytical Method:**	SW6020
Date Prepared:	5/16/14	**Unit:**	wt %

Major Elements as Oxides

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 472.0-474.5	**1312650-003B**	**Solid**	**12/19/2013 14:30**	**ICP-MS1**	**90512**

Analytes	Result	RL	DF	Date Analyzed
Al2O3	**8.0**	0.28	100	05/19/2014 17:06
BaO	**0.078**	0.056	10	05/19/2014 11:15
CaO	**1.9**	0.35	10	05/19/2014 11:15
FeO	**1.6**	0.019	10	05/19/2014 11:15
K2O	**1.7**	0.15	10	05/19/2014 11:15
MgO	**0.45**	0.025	10	05/19/2014 11:15
MnO	ND	0.026	10	05/19/2014 11:15
Na2O	**2.0**	0.20	10	05/19/2014 11:15
SrO	**0.036**	0.024	10	05/19/2014 11:15
TiO2	**0.14**	0.025	10	05/19/2014 11:15

Analytical Comments: a1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	Methods for Geochemical Analysis
Date Received:	12/20/13 15:35	**Analytical Method:**	SW6010B
Date Prepared:	12/20/14	**Unit:**	%

Major Elements as Oxides

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001B**	**Solid**	**12/19/2013 14:00**	**ICP-JY**	**90677**

Analytes	Result	RL	DF	Date Analyzed
P2O5	**0.13**	0.0035	1	05/06/2014 16:14
SiO2	**1.1**	0.032	10	05/20/2014 16:56

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 433.0-435.0	**1312650-002B**	**Solid**	**12/19/2013 14:15**	**ICP-JY**	**90677**

Analytes	Result	RL	DF	Date Analyzed
P2O5	**0.094**	0.0035	1	05/06/2014 16:20
SiO2	**0.78**	0.032	10	05/20/2014 16:58

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 472.0-474.5	**1312650-003B**	**Solid**	**12/19/2013 14:30**	**ICP-JY**	**90677**

Analytes	Result	RL	DF	Date Analyzed
P2O5	**0.14**	0.0035	1	05/06/2014 16:22
SiO2	**1.1**	0.032	10	05/20/2014 17:00

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	SSSA Part 3 Chapter 40
Date Received:	12/20/13 15:35	**Analytical Method:**	SW6020
Date Prepared:	4/23/14	**Unit:**	mg/Kg

Exchangeable Cations using Ammonium Acetate

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001B**	**Solid/SSSA**	**12/19/2013 14:00**	**ICP-MS1**	**89653**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Barium	**12**	B	0.50	1	04/29/2014 15:34
Calcium	**3300**		100	10	05/07/2014 12:09
Lithium	**0.30**		0.050	1	04/29/2014 15:34
Magnesium	**840**		20	10	05/07/2014 12:09
Potassium	**180**		5.0	1	04/29/2014 15:34
Sodium	**160**	B	10	1	04/29/2014 15:34
Strontium	**31**		2.0	1	04/29/2014 15:34

MW-1: 433.0-435.0	**1312650-002B**	**Solid/SSSA**	**12/19/2013 14:15**	**ICP-MS1**	**89653**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Barium	**9.2**	B	0.50	1	04/29/2014 15:40
Calcium	**2900**		100	10	05/07/2014 12:15
Lithium	**0.24**		0.050	1	04/29/2014 15:40
Magnesium	**750**		2.0	1	04/29/2014 15:40
Potassium	**140**		5.0	1	04/29/2014 15:40
Sodium	**160**	B	10	1	04/29/2014 15:40
Strontium	**24**		2.0	1	04/29/2014 15:40

MW-1: 472.0-474.5	**1312650-003B**	**Solid/SSSA**	**12/19/2013 14:30**	**ICP-MS1**	**89653**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Barium	**12**	B	0.50	1	05/12/2014 09:28
Calcium	**910**		100	10	05/12/2014 15:57
Lithium	ND		0.050	1	05/12/2014 09:28
Magnesium	**340**		2.0	1	05/12/2014 09:28
Potassium	**78**		5.0	1	05/12/2014 09:28
Sodium	**99**	B	10	1	05/12/2014 09:28
Strontium	**11**		2.0	1	05/12/2014 09:28

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	SW3050B
Date Received:	12/20/13 15:35	**Analytical Method:**	SW6010B
Date Prepared:	12/20/13	**Unit:**	mg/Kg

Phosphorus

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001A**	**Solid/TOTAL^**	**12/19/2013 14:00**	**ICP-JY**	**85317**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	**570**	15	1	05/06/2014 16:14

MW-1: 433.0-435.0	**1312650-002A**	**Solid/TOTAL^**	**12/19/2013 14:15**	**ICP-JY**	**85317**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	**410**	15	1	05/06/2014 16:20

MW-1: 472.0-474.5	**1312650-003A**	**Solid/TOTAL^**	**12/19/2013 14:30**	**ICP-JY**	**85317**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	**610**	15	1	05/06/2014 16:22

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	Methods for Geochemical Analysis
Date Received:	12/20/13 15:35	**Analytical Method:**	SW6020
Date Prepared:	5/16/14	**Unit:**	wt %

Major Elements as Oxides

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 472.0-474.5	**1312650-003B**	**Solid**	**12/19/2013 14:30**	**ICP-MS1**	**90512**

Analytes	Result	RL	DF	Date Analyzed
Al2O3	**8.0**	0.28	100	05/19/2014 17:06
BaO	**0.078**	0.056	10	05/19/2014 11:15
CaO	**1.9**	0.35	10	05/19/2014 11:15
FeO	**1.6**	0.019	10	05/19/2014 11:15
K2O	**1.7**	0.15	10	05/19/2014 11:15
MgO	**0.45**	0.025	10	05/19/2014 11:15
MnO	ND	0.026	10	05/19/2014 11:15
Na2O	**2.0**	0.20	10	05/19/2014 11:15
SrO	**0.036**	0.024	10	05/19/2014 11:15
TiO2	**0.14**	0.025	10	05/19/2014 11:15

Analytical Comments: a1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	SW3060A
Date Received:	12/20/13 15:35	**Analytical Method:**	SW7199
Date Prepared:	12/26/13	**Unit:**	mg/Kg

TTLC Hexachrome by Alkaline Digestion and IC-UV Analysis

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001A**	**Solid/TOTAL**	**12/19/2013 14:00**	**IC2**	**85478**

Analytes	Result	RL	DF	Date Analyzed
Hexachrome	ND	4.0	1	12/27/2013 18:19

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 433.0-435.0	**1312650-002A**	**Solid/TOTAL**	**12/19/2013 14:15**	**IC2**	**85478**

Analytes	Result	RL	DF	Date Analyzed
Hexachrome	ND	4.0	1	12/27/2013 18:38

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 472.0-474.5	**1312650-003A**	**Solid/TOTAL**	**12/19/2013 14:30**	**IC2**	**85478**

Analytes	Result	RL	DF	Date Analyzed
Hexachrome	ND	4.0	1	12/27/2013 18:57

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method**	SW8330
Date Received:	12/20/13 15:35	**Analytical Method:**	SW8330
Date Prepared:	12/30/13	**Unit:**	mg/Kg

Nitroaromatics and Nitroamines by HPLC

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001A**	**Solid**	**12/19/2013 14:00**	**HPLC4**	**85587**

Analytes	Result	RL	DF	Date Analyzed
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	ND	0.080	1	12/30/2013 17:58
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	ND	0.080	1	12/30/2013 17:58
1,3-Dinitrobenzene (1,3-DNB)	ND	0.080	1	12/30/2013 17:58
2,4-Dinitrotoluene (2,4-DNT)	ND	0.080	1	12/30/2013 17:58
2,6-Dinitrotoluene (2,6-DNT)	ND	0.080	1	12/30/2013 17:58
HMX	ND	0.080	1	12/30/2013 17:58
Nitrobenzene (NB)	ND	0.080	1	12/30/2013 17:58
2-Nitrotoluene (2-NT)	ND	0.080	1	12/30/2013 17:58
3-Nitrotoluene (3-NT)	ND	0.080	1	12/30/2013 17:58
4-Nitrotoluene (4-NT)	ND	0.080	1	12/30/2013 17:58
RDX	ND	0.080	1	12/30/2013 17:58
1,3,5-Trinitrobenzene (1,3,5-TNB)	ND	0.080	1	12/30/2013 17:58
2,4,6-Trinitrotoluene (2,4,6-TNT)	ND	0.080	1	12/30/2013 17:58
Tetryl	ND	0.080	1	12/30/2013 17:58

Surrogates	REC (%)	Limits	
3,4-DNT	99	70-130	12/30/2013 17:58

(Cont.)

JS Analyst's Initial

Angela Rydelius, Lab Manager

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method**	SW8330
Date Received:	12/20/13 15:35	**Analytical Method:**	SW8330
Date Prepared:	12/30/13	**Unit:**	mg/Kg

Nitroaromatics and Nitroamines by HPLC

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 433.0-435.0	**1312650-002A**	**Solid**	**12/19/2013 14:15**	**HPLC4**	**85587**

Analytes	Result	RL	DF	Date Analyzed
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	ND	0.080	1	12/30/2013 18:42
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	ND	0.080	1	12/30/2013 18:42
1,3-Dinitrobenzene (1,3-DNB)	ND	0.080	1	12/30/2013 18:42
2,4-Dinitrotoluene (2,4-DNT)	ND	0.080	1	12/30/2013 18:42
2,6-Dinitrotoluene (2,6-DNT)	ND	0.080	1	12/30/2013 18:42
HMX	ND	0.080	1	12/30/2013 18:42
Nitrobenzene (NB)	ND	0.080	1	12/30/2013 18:42
2-Nitrotoluene (2-NT)	ND	0.080	1	12/30/2013 18:42
3-Nitrotoluene (3-NT)	ND	0.080	1	12/30/2013 18:42
4-Nitrotoluene (4-NT)	ND	0.080	1	12/30/2013 18:42
RDX	ND	0.080	1	12/30/2013 18:42
1,3,5-Trinitrobenzene (1,3,5-TNB)	ND	0.080	1	12/30/2013 18:42
2,4,6-Trinitrotoluene (2,4,6-TNT)	ND	0.080	1	12/30/2013 18:42
Tetryl	ND	0.080	1	12/30/2013 18:42

Surrogates	REC (%)	Limits	
3,4-DNT	104	70-130	12/30/2013 18:42

(Cont.)

JS Analyst's Initial

Angela Rydelius, Lab Manager

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method**	SW8330
Date Received:	12/20/13 15:35	**Analytical Method:**	SW8330
Date Prepared:	12/30/13	**Unit:**	mg/Kg

Nitroaromatics and Nitroamines by HPLC

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 472.0-474.5	**1312650-003A**	**Solid**	**12/19/2013 14:30**	**HPLC4**	**85587**

Analytes	Result	RL	DF	Date Analyzed
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	ND	0.080	1	12/30/2013 20:55
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	ND	0.080	1	12/30/2013 20:55
1,3-Dinitrobenzene (1,3-DNB)	ND	0.080	1	12/30/2013 20:55
2,4-Dinitrotoluene (2,4-DNT)	ND	0.080	1	12/30/2013 20:55
2,6-Dinitrotoluene (2,6-DNT)	ND	0.080	1	12/30/2013 20:55
HMX	ND	0.080	1	12/30/2013 20:55
Nitrobenzene (NB)	ND	0.080	1	12/30/2013 20:55
2-Nitrotoluene (2-NT)	ND	0.080	1	12/30/2013 20:55
3-Nitrotoluene (3-NT)	ND	0.080	1	12/30/2013 20:55
4-Nitrotoluene (4-NT)	ND	0.080	1	12/30/2013 20:55
RDX	ND	0.080	1	12/30/2013 20:55
1,3,5-Trinitrobenzene (1,3,5-TNB)	ND	0.080	1	12/30/2013 20:55
2,4,6-Trinitrotoluene (2,4,6-TNT)	ND	0.080	1	12/30/2013 20:55
Tetryl	ND	0.080	1	12/30/2013 20:55

Surrogates	REC (%)	Limits	
3,4-DNT	102	70-130	12/30/2013 20:55

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	MAI_LCMS
Date Received:	12/20/13 15:35	**Analytical Method:**	E6850
Date Prepared:	5/5/14	**Unit:**	µg/Kg

Perchlorate by LC-MS

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001A**	**Solid**	**12/19/2013 14:00**	**LC3Q-MS1**	**90061**

Analytes	Result	RL	DF	Date Analyzed
Perchlorate	ND	0.10	10	05/06/2014 11:50

Analytical Comments: a1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 433.0-435.0	**1312650-002A**	**Solid**	**12/19/2013 14:15**	**LC3Q-MS1**	**90061**

Analytes	Result	RL	DF	Date Analyzed
Perchlorate	ND	0.010	1	05/06/2014 11:15

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 472.0-474.5	**1312650-003A**	**Solid**	**12/19/2013 14:30**	**LC3Q-MS1**	**90061**

Analytes	Result	RL	DF	Date Analyzed
Perchlorate	ND	0.010	1	05/06/2014 11:21

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	SM5310Bm
Date Received:	12/20/13 15:35	**Analytical Method:**	SM5310Bm
Date Prepared:	5/5/14	**Unit:**	mg/kg

Total Organic Carbon (TOC)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001B**	**Solid**	**12/19/2013 14:00**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
TOC	**9300**	200	1	05/05/2014 22:08

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 433.0-435.0	**1312650-002B**	**Solid**	**12/19/2013 14:15**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
TOC	ND	200	1	05/05/2014 22:19

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 472.0-474.5	**1312650-003B**	**Solid**	**12/19/2013 14:30**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
TOC	**340**	200	1	05/05/2014 22:30

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	E415.1m
Date Received:	12/20/13 15:35	**Analytical Method:**	E415.1m
Date Prepared:	5/5/14	**Unit:**	mg/Kg

Total Nitrogen

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001B**	**Solid**	**12/19/2013 14:00**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
Total Nitrogen	**1000**	200	1	05/05/2014 22:08

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 433.0-435.0	**1312650-002B**	**Solid**	**12/19/2013 14:15**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
Total Nitrogen	**560**	200	1	05/05/2014 22:19

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 472.0-474.5	**1312650-003B**	**Solid**	**12/19/2013 14:30**	**TOC_CNS**	**90059**

Analytes	Result	RL	DF	Date Analyzed
Total Nitrogen	**710**	200	1	05/05/2014 22:30

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	4/23/14	**BatchID:**	89653
Date Analyzed:	4/29/14	**Extraction Method:**	SSSA Part 3 Chapter 40
Instrument:	ICP-MS1	**Analytical Method:**	SW6020
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89653

QC SUMMARY REPORT FOR SW6020

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Barium	3.89	54.3	0.50	50	-	109	80-120
Calcium	ND	495	10	500	-	98.9	80-120
Lithium	ND	4.93	0.050	5	-	98.5	80-120
Magnesium	ND	53.7	2.0	50	-	107	80-120
Potassium	ND	52.2	5.0	50	-	104	80-120
Sodium	18.1	531	10	500	-	106	80-120
Strontium	ND	53.5	2.0	50	-	107	80-120

SH QA/QC Officer

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	12/19/13	**BatchID:**	85317
Date Analyzed:	1/6/14 - 1/7/14	**Extraction Method:**	SW3050B
Instrument:	ICP-JY	**Analytical Method:**	SW6010B
Matrix:	Solid	**Unit:**	mg/Kg
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-85317

QC Summary Report for SW6010B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Phosphorous	ND	543	15	500	-	109	70-130

SH QA/QC Officer

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	12/24/13	**BatchID:**	85478
Date Analyzed:	12/27/13	**Extraction Method:**	SW3060A
Instrument:	IC2	**Analytical Method:**	SW7199
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-85478 1312649-136AMS/MSD

QC Summary Report for SW7199 (Hexachrome)

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Hexachrome	ND	209	4.0	200	-	104	80-120

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Hexachrome	213	196	200	5.600	104	95.2	70-130	8.50	20

SH QA/QC Officer

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	12/30/13	**BatchID:**	85587
Date Analyzed:	12/30/13	**Extraction Method**	SW8330
Instrument:	HPLC4	**Analytical Method:**	SW8330
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-85587 1312650-002AMS/MSD

QC Summary Report for SW8330

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	ND	-	0.080	-	-	-	-
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	ND	-	0.080	-	-	-	-
1,3-Dinitrobenzene (1,3-DNB)	ND	-	0.080	-	-	-	-
2,4-Dinitrotoluene (2,4-DNT)	ND	-	0.080	-	-	-	-
2,6-Dinitrotoluene (2,6-DNT)	ND	-	0.080	-	-	-	-
HMX	ND	0.7261	0.080	0.80	-	90.8	80-120
Nitrobenzene (NB)	ND	-	0.080	-	-	-	-
2-Nitrotoluene (2-NT)	ND	0.8786	0.080	0.80	-	110	80-120
3-Nitrotoluene (3-NT)	ND	0.8718	0.080	0.80	-	109	80-120
4-Nitrotoluene (4-NT)	ND	0.8589	0.080	0.80	-	107	80-120
RDX	ND	0.8069	0.080	0.80	-	101	80-120
1,3,5-Trinitrobenzene (1,3,5-TNB)	ND	0.8406	0.080	0.80	-	105	80-120
2,4,6-Trinitrotoluene (2,4,6-TNT)	ND	-	0.080	-	-	-	-
Tetryl	ND	-	0.080	-	-	-	-
Surrogate Recovery							
3,4-DNT	2.018	1.806		2	101	90	70-130

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
HMX	0.6506	0.6627	0.80	ND	81.3	82.8	70-130	1.83	30
2-Nitrotoluene (2-NT)	0.7956	0.7468	0.80	ND	99.5	93.3	70-130	6.33	30
3-Nitrotoluene (3-NT)	0.7695	0.7197	0.80	ND	96.2	90	70-130	6.69	30
4-Nitrotoluene (4-NT)	0.7689	0.7242	0.80	ND	96.1	90.5	70-130	5.99	30
RDX	0.7128	0.7659	0.80	ND	89.1	95.7	70-130	7.18	30
1,3,5-Trinitrobenzene (1,3,5-TNB)	0.7451	0.7512	0.80	ND	93.1	93.9	70-130	0.814	30
Surrogate Recovery									
3,4-DNT	2.042	2.033	2		102	102	70-130	0	30

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	5/5/14	**BatchID:**	90061
Date Analyzed:	5/6/14	**Extraction Method:**	MAI_LCMS
Instrument:	LC3Q-MS1	**Analytical Method:**	E6850
Matrix:	Soil	**Unit:**	µg/Kg
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-90061 1312650-001AMS/MSD

QC Summary Report for E6850

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Perchlorate	ND	0.0829	0.010	0.10	-	82.9	80-120

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Perchlorate	NR	NR	0.10	ND<0.10	NR	NR	70-130	NR	20

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	5/5/14	**BatchID:**	90059
Date Analyzed:	5/5/14	**Extraction Method:**	SM5310Bm
Instrument:	TOC_CNS	**Analytical Method:**	SM5310Bm
Matrix:	Soil	**Unit:**	mg/kg
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-90059 1312545-001BMS/MSD

QC Summary Report for SM5310Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TOC	ND	8200	200	8200	-	100	80-120
Total Nitrogen	ND	1930	200	1900	-	101	80-120

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TOC	7940	7620	8200	ND	93.5	89.7	80-120	4.03	20
Total Nitrogen	2310	2340	1900	310	105	107	80-120	1.20	20

TODD ENGINEERS

2490 Mariner Square Loop, Suite 215, Alameda, CA 94501
510-747-6920 (voice) 510-747-6921(fax) bmotzer@toddengineers.com

Chain of Custody

Batch/Shipment No.:

Page: 1 of 1

Date: 12/19/13

Lab Name: McCambell Analytical, Inc.
Address: 1534 Willow Pass Road
Pittsburg, CA 94565
Telephone: 925-252-9262; 877-252-9262
Samplers (Signatures) William E. Motzer

Analysis Request

	Sample Number	Matrix	Date	Time	Depth Interval	Cr(VI) - EPA 7199	Perchlorate by EPA 6860	DI TCLP Extraction by SW1311 w/ As, Cr analysis	CEC NH_4Ac Exchange Extraction with analysis for Ca, Na, Mg, K, Sr, Li Alkali & Alkaline earth metals	Nitroaromatics - EPA 8330	Mineral XRD w. quant. phase analysis	Mineral: resin impreg thin section prep and exam	SEM - EDA analysis for Ca & Na (SUB)	Na, K, Ca, Mg, Ba, Sr, Al, Fe Total Dissolution or XRF	TOC-TN by combustion	Total P on ash after combustion-E200.7	Number of Containers
1	MW-1 398.5-401.0	Soil	12/19/13	1400	398.5'-401.0'	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
2	MW-1 433.0-435.0	Soil	12/19/13	1415	433.0'-435.0'	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
3	MW-1 472.0-474.5	Soil	12/19/13	1430	472.0'-474.5'	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2
4	MW-1	Soil															
5	MW-1	Soil															
6	MW-1	Soil															
7	MW-1	Soil															
8	MW-1	Soil															
9	MW-1	Soil															
10	MW-1	Soil															

Project Information

Project Name: MRWPCA
Project Manager: Edwin Lin, Senior Hydro.
Job No.: 60408
Shipping ID. No.:
Via:

Sample Receipt

Total No. of Containers: 1-2' 6
Chain of Custody Seals: N/a
Rec'd Good Condition/Cold: yes
Conforms to Record: yes
Lab No.: 1312650

Special Instructions/Comments:

Relinquished By:
(Signature) William E. Motzer (Time) 0850
(Printed Name) William E. Motzer (Date) 12/20/13
(Company) Todd Engineers

Received By:
(Signature) (Time) 350
(Printed Name) (Date) 12/20/13
(Company)

Relinquished By:
(Signature) (Time) 1,50pm
(Printed Name) (Date) 12/20/13
(Company)

Received By:
(Signature) Melissa Valles (Time) 1,50pm
(Printed Name) Melissa Valles (Date) 12/20/13
(Company) MAI

Relinquished By:
(Signature) (Time)
(Printed Name) (Date)
(Company)

Received By (Laboratory):
(Signature) (Time)
(Printed Name) (Date)
(Laboratory)

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1402489

Report Created for: Todd Engineering
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501

Project Contact: Bill Motzer
Project P.O.:
Project Name: Pilot Water

Project Received: 02/12/2014

Analytical Report reviewed & approved for release on 02/26/2014 by:

Question about your data?

Click here to email McCampbell

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

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Glossary of Terms & Qualifier Definitions

Client: Todd Engineering
Project: Pilot Water
WorkOrder: 1402489

Glossary Abbreviation

95% Interval	95% Confident Interval
DF	Dilution Factor
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not detected at or above the indicated MDL or RL
NR	Matrix interferences, or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix; or sample diluted due to high matrix or analyte content.
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
TEQ	Toxicity Equivalence

Analytical Qualifier

B	analyte detected in the associated Method Blank
H	samples were analyzed out of holding time
S	spike recovery outside accepted recovery limits
F	The dissolved metals sample was not filtered within 15 minutes of collection as required by the Code of Federal Regulations Part 136.
a1	sample diluted due to matrix interference
a7	reporting limit raised due to limited sample amount
c1	surrogate recovery outside of the control limits due to the dilution of the sample.

Quality Control Qualifiers

F2	LCS recovery for this compound is outside of acceptance limits.

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Case Narrative

Client: Todd Engineering **Work Order:** 1402489
Project: Pilot Water May 16, 2014

McCampbell Analytical incorporated the following method for the extraction of the Pilot Water sample:

Sample was rotated for 7 days. Upon completion of rotation McCampbell Analytical centrifuged the Pilot water extract for 12hrs and filtered through a 0.45 micron filter.

_____ Angela Rydelius, Lab Manager

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Project:	Pilot Water	**Extraction Method:**	E200.8
Date Received:	2/12/14 16:30	**Analytical Method:**	E200.8
Date Prepared:	4/23/14	**Unit:**	µg/L

CAM / CCR 17 Metals + Misc. Elements

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
Pilot Water	**1402489-001B**	**Water/DISS.**	**04/22/2014**	**ICP-MS1**	**89648**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Antimony	ND	F	5.0	10	04/26/2014 01:47
Arsenic	ND	F	5.0	10	04/26/2014 01:47
Barium	**140**	F	50	10	04/26/2014 01:47
Beryllium	ND	F	5.0	10	04/26/2014 01:47
Cadmium	ND	F	2.5	10	04/26/2014 01:47
Chromium	ND	F	5.0	10	04/26/2014 01:47
Cobalt	ND	F	5.0	10	04/26/2014 01:47
Copper	ND	F	5.0	10	04/26/2014 01:47
Lead	ND	F	5.0	10	04/26/2014 01:47
Mercury	ND	F	0.25	10	04/26/2014 01:47
Molybdenum	ND	F	5.0	10	04/26/2014 01:47
Nickel	ND	F	5.0	10	04/26/2014 01:47
Selenium	ND	F	5.0	10	04/26/2014 01:47
Silver	ND	F	1.9	10	04/26/2014 01:47
Thallium	ND	F	5.0	10	04/26/2014 01:47
Vanadium	ND	F	5.0	10	04/26/2014 01:47
Zinc	ND	F	50	10	04/26/2014 01:47
Aluminum	ND	F	500	10	04/26/2014 01:47
Calcium	**11,000**	F	1000	10	04/26/2014 01:47
Iron	ND	F	200	10	04/26/2014 01:47
Lithium	ND	F	50	10	04/26/2014 01:47
Magnesium	ND	F	200	10	04/26/2014 01:47
Manganese	ND	F	200	10	04/26/2014 01:47
Potassium	**2000**	F	500	10	04/26/2014 01:47
Sodium	**19,000**	F	1000	10	04/26/2014 01:47
Strontium	ND	F	200	10	04/26/2014 01:47
Uranium	ND	F	5.0	10	04/26/2014 01:47

Analytical Comments: a1,a7

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Project:	Pilot Water	**Extraction Method:**	E200.7
Date Received:	2/12/14 16:30	**Analytical Method:**	E200.7
Date Prepared:	4/23/14	**Unit:**	µg/L

Phosphorus

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
Pilot Water	**1402489-001B**	**Water/DISS.**	**04/22/2014**	**ICP-JY**	**89607**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	ND	500	10	05/02/2014 14:02

Analytical Comments: a7

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Project:	Pilot Water	**Extraction Method:**	E200.7
Date Received:	2/12/14 16:30	**Analytical Method:**	200.7
Date Prepared:	4/23/14	**Unit:**	µg/L

Silicon

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
Pilot Water	**1402489-001B**	**Water/DISS.**	**04/22/2014**	**ICP-JY**	**89609**

Analytes	Result	RL	DF	Date Analyzed
Silicon	**520**	500	10	05/02/2014 12:41

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Project:	Pilot Water	**Extraction Method:**	E415.3
Date Received:	2/12/14 16:30	**Analytical Method:**	E415.3
Date Prepared:	4/29/14	**Unit:**	mg/L

Dissolved Organic Carbon (DOC)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
Pilot Water	**1402489-001B**	**Water**	**04/22/2014**	**TOC_SHIMADZU**	**89604**

Analytes	Result	RL	DF	Date Analyzed
Dissolved Organic Carbon	**1.3**	0.70	1	04/29/2014 15:32

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Project:	Pilot Water	**Extraction Method:**	E218.6
Date Received:	2/12/14 16:30	**Analytical Method:**	E218.6
Date Prepared:	4/24/14	**Unit:**	µg/L

Hexachrome by IC

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
Pilot Water	**1402489-001B**	**Water**	**04/22/2014**	**IC2**	**89600**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Hexachrome	**0.21**	B	0.20	1	04/24/2014 15:09

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Project:	Pilot Water	**Extraction Method:**	E300.1
Date Received:	2/12/14 16:30	**Analytical Method:**	E300.1
Date Prepared:	4/24/14	**Unit:**	mg/L

Inorganic Anions by IC

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
Pilot Water	**1402489-001B**	**Water**	**04/22/2014**	**IC3**	**89601**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Bromide	ND		0.10	1	04/24/2014 14:46
Chloride	**2.0**	B	0.10	1	04/24/2014 15:27
Fluoride	ND		0.10	1	04/24/2014 14:46
Nitrate as N	**0.64**	B	0.10	1	04/24/2014 14:46
Nitrate as $NO3^-$	**2.8**	B	0.45	1	04/24/2014 14:46
Nitrite as N	ND		0.10	1	04/24/2014 14:46
Nitrite as $NO2^-$	ND		0.33	1	04/24/2014 14:46
Sulfate	**0.11**	B	0.10	1	04/24/2014 14:46

Surrogates	REC (%)	Limits	
Formate	105	90-115	04/24/2014 14:46

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Project:	Pilot Water	**Extraction Method:**	E350.1
Date Received:	2/12/14 16:30	**Analytical Method:**	E350.1
Date Prepared:	4/29/14	**Unit:**	mg/L

Ammonia as N

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
Pilot Water	**1402489-001B**	**Water/TOTAL**	**04/22/2014**	**SKALAR**	**89603**

Analytes	Result	RL	DF	Date Analyzed
Total Ammonia as N	**1.3**	0.10	1	04/29/2014 15:40

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Project:	Pilot Water	**Extraction Method:**	SM2320B
Date Received:	2/12/14 16:30	**Analytical Method:**	SM2320B
Date Prepared:	4/29/14	**Unit:**	mg $CaCO_3$/L

Total & Speciated Alkalinity as Calcium Carbonate

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
Pilot Water	**1402489-001B**	**Water**	**04/22/2014**	**Titrino**	**89602**

Analytes	Result	RL	DF	Date Analyzed
Total	**43.0**	1.00	1	04/29/2014 10:23
Carbonate	ND	1.00	1	04/29/2014 10:23
Bicarbonate	**43.0**	1.00	1	04/29/2014 10:23
Hydroxide	ND	1.00	1	04/29/2014 10:23

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Project:	Pilot Water	**Extraction Method:**	SM4500-Cl DE
Date Received:	2/12/14 16:30	**Analytical Method:**	SM4500-Cl DE
Date Prepared:	4/23/14	**Unit:**	mg/L

Chlorine, Total Residual

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
Pilot Water	**1402489-001B**	**Water**	**04/22/2014**	**Titrino**	**89615**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Chlorine	**2.1**	BH	0.40	10	04/23/2014 16:19

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Project:	Pilot Water	**Extraction Method:**	SM4500 OG
Date Received:	2/12/14 16:30	**Analytical Method:**	SM4500OG
Date Prepared:	5/1/14	**Unit:**	mg DO/L @ °C

Dissolved Oxygen

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
Pilot Water	**1402489-001B**	**Water**	**04/22/2014**	**WetChem**	**89612**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Dissolved Oxygen	**8.57 @ 23.1°C**	H	1.00	1	05/01/2014 18:40

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Project:	Pilot Water	**Extraction Method:**	E415.3
Date Received:	2/12/14 16:30	**Analytical Method:**	E415.3
Date Prepared:	4/30/14	**Unit:**	mg/L

Inorganic Carbon as Carbon Dioxide

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
Pilot Water	**1402489-001B**	**Water**	**04/22/2014**	**TOC_CNS**	**89605**

Analytes	Result	RL	DF	Date Analyzed
IC as CO2	**40**	3.7	1	04/30/2014 15:06

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Project:	Pilot Water	**Extraction Method:**	SM2580Bm
Date Received:	2/12/14 16:30	**Analytical Method:**	SM2580B, MAI
Date Prepared:	4/24/14	**Unit:**	±, mV vs. NHE

Oxidation-Reduction Potential (ORP)

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
Pilot Water	**1402489-001B**	**Water**	**04/22/2014**	**WetChem**	**89613**

Analytes	Result	Accuracy	DF	Date Analyzed
ORP	**636 @ 23.6°C**	10	1	04/24/2014 18:15

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Project:	Pilot Water	**Extraction Method:**	SM4500H+B
Date Received:	2/12/14 16:30	**Analytical Method:**	SM4500H+B
Date Prepared:	5/1/14	**Unit:**	±, pH units @ 25°C

pH

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
Pilot Water	**1402489-001B**	**Water**	**04/22/2014**	**WetChem**	**89608**

Analytes	Result	Qualifiers	Accuracy	DF	Date Analyzed
pH	**7.70**	H	0.05	1	05/01/2014 20:49

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Project:	Pilot Water	**Extraction Method:**	SM2510B
Date Received:	2/12/14 16:30	**Analytical Method:**	SM2510B
Date Prepared:	5/1/14	**Unit:**	µmhos/cm @ 25°C

Specific Conductivity at 25°C

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
Pilot Water	**1402489-001B**	**Water**	**04/22/2014**	**WetChem**	**89614**

Analytes	Result	RL	DF	Date Analyzed
Specific Conductivity	**139**	10.0	1	05/01/2014 20:25

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Project:	Pilot Water	**Extraction Method:**	SM4500 S-2 D
Date Received:	2/12/14 16:30	**Analytical Method:**	SM4500 S-2 D
Date Prepared:	5/1/14	**Unit:**	mg/L

Sulfide

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
Pilot Water	**1402489-001B**	**Water**	**04/22/2014**	**SPECTROPHOTOMETER**	**89610**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Sulfide	ND	H	0.050	1	05/01/2014 14:40

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Project:	Pilot Water	**Extraction Method:**	E351.2
Date Received:	2/12/14 16:30	**Analytical Method:**	E351.2
Date Prepared:	4/29/14	**Unit:**	mg/L

Total Kjeldahl Nitrogen

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
Pilot Water	**1402489-001B**	**Water/TOTAL**	**04/22/2014**	**SKALAR**	**89597**

Analytes	Result	RL	DF	Date Analyzed
TKN as N	**1.4**	0.30	1	04/30/2014 15:46

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Date Prepared:	4/22/14	**BatchID:**	89600
Date Analyzed:	4/23/14	**Extraction Method:**	E218.6
Instrument:	IC2	**Analytical Method:**	E218.6
Matrix:	Leachate	**Unit:**	µg/L
Project:	Pilot Water	**Sample ID:**	MB/LCS-89600 1312545-003DMS/MSD

QC Summary Report for E218.6

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Hexachrome	0.210	23.3	0.20	25	-	93.2	90-110

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Hexachrome	24.7	24.6	25	1.620	92.5	92	90-110	0.446	10

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Date Prepared:	4/22/14	**BatchID:**	89601
Date Analyzed:	4/24/14 - 4/25/14	**Extraction Method:**	E300.1
Instrument:	IC3	**Analytical Method:**	E300.1
Matrix:	Leachate	**Unit:**	mg/L
Project:	Pilot Water	**Sample ID:**	MB/LCS-89601 1312545-003DMS/MSD

QC Summary Report for E300.1

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Bromide	ND	0.964	0.10	1	-	96.4	85-115
Chloride	20.0	20.9	0.10	1	-	2090, F2	85-115
Fluoride	ND	1.10	0.10	1	-	110	85-115
Nitrate as N	0.647	1.62	0.10	1	-	162, F2	85-115
Nitrate as $NO3^-$	2.86	7.15	0.45	4.4	-	163, F2	85-115
Nitrite as N	ND	0.981	0.10	1	-	98.1	85-115
Nitrite as $NO2^-$	ND	3.24	0.33	3.3	-	98.1	85-115
Sulfate	0.121	1.10	0.10	1	-	110	85-115
Surrogate Recovery							
Formate	0.106	0.103		0.10	106	103	90-115

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Bromide	1.03	1.07	1	ND	103	107	85-115	3.31	15
Chloride	NR	NR	1	20.23	NR	NR	85-115	NR	15
Fluoride	1.32	1.34	1	0.2204	110	112	85-115	1.06	15
Nitrate as N	1.77	1.76	1	0.6401	113	112	85-115	0.298	15
Nitrate as $NO3^-$	7.83	7.81	4.4	2.834	114	113	85-115	0.298	15
Nitrite as N	1.07	1.07	1	ND	107	107	85-115	0	15
Nitrite as $NO2^-$	3.53	3.54	3.3	ND	107	107	85-115	0	15
Sulfate	1.53	1.53	1	0.4226	111	111	85-115	0	15
Surrogate Recovery									
Formate	0.104	0.104	0.10		104	104	90-115	0	10

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Date Prepared:	4/22/14	**BatchID:**	89603
Date Analyzed:	4/29/14	**Extraction Method:**	E350.1
Instrument:	SKALAR	**Analytical Method:**	E350.1
Matrix:	Water	**Unit:**	mg/L
Project:	Pilot Water	**Sample ID:**	MB/LCS-89603

QC Summary Report for E350.1

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Total Ammonia as N	ND	3.80	0.10	4	-	95.1	90-110

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Date Prepared:	4/22/14 - 4/23/14	**BatchID:**	89602
Date Analyzed:	4/29/14	**Extraction Method:**	SM2320B
Instrument:	Titrino	**Analytical Method:**	SM2320B
Matrix:	Water	**Test Method:**	SM2320B (Alkalinity)
Project:	Pilot Water		

QC Summary Report for Alkalinity

Lab ID	Analyte	Reporting Units	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	RPD	Acceptance Criteria (%)
1402489-001B	Total	mg $CaCO_3$/L	43.0	1	43.0	1	0	<20

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Date Prepared:	4/23/14	**BatchID:**	89648
Date Analyzed:	5/1/14	**Extraction Method:**	E200.8
Instrument:	ICP-MS1	**Analytical Method:**	E200.8
Matrix:	Water	**Unit:**	µg/L
Project:	Pilot Water	**Sample ID:**	MB/LCS-89648

QC Summary Report for E200.8

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Aluminum	ND	468	50	500	-	93.6	85-115
Antimony	ND	47.4	0.50	50	-	94.8	85-115
Arsenic	ND	48.2	0.50	50	-	96.3	85-115
Barium	ND	453	5.0	500	-	90.6	85-115
Beryllium	ND	46.8	0.50	50	-	93.6	85-115
Cadmium	ND	46.9	0.25	50	-	93.8	85-115
Calcium	ND	4820	100	5000	-	96.4	85-115
Chromium	ND	45.5	0.50	50	-	91.1	85-115
Cobalt	ND	47.8	0.50	50	-	95.6	85-115
Copper	ND	47.2	0.50	50	-	94.5	85-115
Iron	ND	491	20	500	-	98.2	85-115
Lead	ND	47.6	0.50	50	-	95.3	85-115
Lithium	ND	47.8	5.0	50	-	95.5	85-115
Magnesium	ND	479	20	500	-	95.9	85-115
Manganese	ND	472	20	500	-	94.4	85-115
Mercury	ND	1.10	0.025	1.25	-	87.8	85-115
Molybdenum	ND	46.1	0.50	50	-	92.2	85-115
Nickel	ND	46.8	0.50	50	-	93.7	85-115
Potassium	ND	452	50	500	-	90.4	85-115
Selenium	ND	48.1	0.50	50	-	96.2	85-115
Silver	ND	46.9	0.19	50	-	93.7	85-115
Sodium	ND	4880	100	5000	-	97.6	85-115
Strontium	ND	477	20	500	-	95.3	85-115
Thallium	ND	47.4	0.50	50	-	94.9	85-115
Uranium	ND	45.9	0.50	50	-	91.8	85-115
Vanadium	ND	45.6	0.50	50	-	91.2	85-115
Zinc	ND	476	5.0	500	-	95.3	85-115

SH QA/QC Officer

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Date Prepared:	4/22/14	**BatchID:**	89615
Date Analyzed:	4/23/14	**Extraction Method:**	SM4500-Cl DE
Instrument:	Titrino	**Analytical Method:**	SM4500-Cl DE
Matrix:	Water	**Unit:**	mg/L
Project:	Pilot Water	**Sample ID:**	MB-89615

QC Summary Report for SM4500-Cl DE

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Chlorine	2.13	-	0.40	-	-	-	-

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Date Prepared:	4/22/14	**BatchID:**	89604
Date Analyzed:	4/29/14	**Extraction Method:**	E415.3
Instrument:	TOC_SHIMADZU	**Analytical Method:**	E415.3
Matrix:	Water	**Unit:**	mg/L
Project:	Pilot Water	**Sample ID:**	MB/LCS-89604

QC Summary Report for E415.3

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TOC	ND	49.6	0.30	50	-	99.2	80-120

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Date Prepared:	4/23/14	**BatchID:**	89612
Date Analyzed:	5/1/14	**Extraction Method:**	SM4500 OG
Instrument:	WetChem	**Analytical Method:**	SM4500OG
Matrix:	Water	**Unit:**	mg DO/L @ °C
Project:	Pilot Water		

QC Summary Report for SM4500OG (Dissolved Oxygen)

SampID	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	Precision	Acceptance Criteria
1402489-001B	8.57 @ 23.1°C	1	8.56 @ 23.1°C	1	0.01	0.05

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Date Prepared:	4/22/14	**BatchID:**	89605
Date Analyzed:	4/30/14	**Extraction Method:**	E415.3
Instrument:	TOC_CNS	**Analytical Method:**	E415.3
Matrix:	Water	**Unit:**	mg/L
Project:	Pilot Water	**Sample ID:**	MB/LCS-89605

QC Summary Report for E415.3

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
IC as CO2	ND	38.3	3.7	36.7	-	104	80-120

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Date Prepared:	4/23/14	**BatchID:**	89712
Date Analyzed:	4/23/14	**Extraction Method:**	SM2580Bm
Instrument:	WetChem	**Analytical Method:**	SM2580B, MAI
Matrix:	Leachate	**Unit:**	±, mV vs. NHE
Project:	Pilot Water		

QC Summary Report for ORP (MAI)

SampID	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	RPD	Acceptance Criteria (%)
1312545-002D	577 @ 23.9°C	1	578 @ 24.0°C	1	0.27	<10

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Date Prepared:	4/22/14	**BatchID:**	89608
Date Analyzed:	4/23/14	**Extraction Method:**	SM4500H+B
Instrument:	WetChem	**Analytical Method:**	SM4500H+B
Matrix:	Leachate	**Unit:**	±, pH units @ 25°C
Project:	Pilot Water		

QC Summary Report for pH

SampID	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	Precision	Acceptance Criteria
1312545-002D	8.44	1	8.45	1	0.01	0.05

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Date Prepared:	4/22/14	**BatchID:**	89607
Date Analyzed:	5/2/14	**Extraction Method:**	E200.7
Instrument:	ICP-JY	**Analytical Method:**	E200.7
Matrix:	Water	**Unit:**	µg/L
Project:	Pilot Water	**Sample ID:**	MB/LCS-89607

QC Summary Report for E200.7

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Phosphorous	ND	1020	100	1000	-	102	80-120

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Date Prepared:	4/23/14	**BatchID:**	89614
Date Analyzed:	5/1/14	**Extraction Method:**	SM2510B
Instrument:	WetChem	**Analytical Method:**	SM2510B
Matrix:	Water	**Unit:**	µmhos/cm @ 25°C
Project:	Pilot Water		

QC Summary Report for Specific Conductivity

SampID	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	RPD	Acceptance Criteria (%)
1402489-001B	139	1	139	1	0.0719	<2

SH QA/QC Officer

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Date Prepared:	4/22/14	**BatchID:**	89609
Date Analyzed:	5/2/14	**Extraction Method:**	E200.7
Instrument:	ICP-JY	**Analytical Method:**	200.7
Matrix:	Water	**Unit:**	µg/L
Project:	Pilot Water	**Sample ID:**	MB/LCS-89609

QC Summary Report for E200.7

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Silicon	ND	913	50	1000	-	91.3	80-120

QA/QC Officer

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Date Prepared:	4/22/14	**BatchID:**	89610
Date Analyzed:	5/1/14	**Extraction Method:**	SM4500 S-2 D
Instrument:	SPECTROPHOTOMETER	**Analytical Method:**	SM4500 S-2 D
Matrix:	Water	**Unit:**	mg/L
Project:	Pilot Water	**Sample ID:**	MB/LCS-89610 1402489-001BMS/MSD

QC Summary Report For SM4500S2D

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Sulfide	ND	2.36	0.050	2.5	-	94.5	80-120

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Sulfide	2.03	2.03	2.5	ND	81.3	81.4	75-125	0.0975	20

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1402489
Date Prepared:	4/22/14	**BatchID:**	89597
Date Analyzed:	4/30/14	**Extraction Method:**	E351.2
Instrument:	SKALAR	**Analytical Method:**	E351.2
Matrix:	Water	**Unit:**	mg/L
Project:	Pilot Water	**Sample ID:**	MB/LCS-89597

QC Summary Report for E351.2 (TKN as N)

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TKN as N	ND	11.3	0.30	12	-	93.9	90-110

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CHAIN-OF-CUSTODY RECORD

WorkOrder: 1402489 **ClientCode: TEAC**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☒ EQuIS ☐ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Bill Motzer
Todd Engineering
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501
(510) 747-6920 FAX: (510) 747-6921

Email: bmotzer@toddengineers.com
cc/3rd Party:
PO:
ProjectNo: Pilot Water

Bill to:
Bill Motzer/ Accounts Payable
Todd Engineering
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501

Requested TAT: 5 days
Date Received: 02/12/2014
Date Printed: 05/01/2014

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
1402489-001	Pilot Water	Water	2/12/2014	☑		A	A	A	A	A	A			A		A
1402489-001	Pilot Water	Water	4/22/2014	☐	B	B	B	B	B	B	B	B	B	B	B	B

Test Legend:

1	218_6_W	2	300_1_W	3	Alka(spe)_W	4	AMMONIA_W	5	CAMMET(T)MS_W
6	CHLORINE1_W	7	DO_W	8	DOC_W	9	IC(CO2)_W	10	ORP_W
11	P_W	12	PH_W						

The following SampIDs: 001A, 001B contain testgroup.

Prepared by: Rosa Venegas

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.
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Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1402489 **ClientCode: TEAC**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☒ EQuIS ☐ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Bill Motzer
Todd Engineering
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501
(510) 747-6920 FAX: (510) 747-6921

Email: bmotzer@toddengineers.com
cc/3rd Party:
PO:
ProjectNo: Pilot Water

Bill to:
Bill Motzer/ Accounts Payable
Todd Engineering
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501

Requested TAT: 5 days
Date Received: 02/12/2014
Date Printed: 05/01/2014

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					13	14	15	16	17	18	19	20	21	22	23	24
1402489-001	Pilot Water	Water	2/12/2014	☑	A	A			A		A					
1402489-001	Pilot Water	Water	4/22/2014	☐	B	B	B	B		B	B					

Test Legend:

13	PRCALCULATION	14	SC_W	15	SI_W	16	SULFIDE_W	17	TDS_W
18	TKN_W	19	TOC_W	20		21		22	
23		24							

The following SampIDs: 001A, 001B contain testgroup.

Prepared by: Rosa Venegas

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

1402489

Batch/Shipment No.:

TODD GROUNDWATER

Chain of Custody

2490 Mariner Square Loop, Suite 215, Alameda, CA 94501
510-747-6920 (voice) 510-747-6921(fax) bmotzer@toddengineers.com

Page: 1 of 1

Date: February 12, 2014

Lab Name: McCambell Analytical, Inc.

Address: 1534 Willow Pass Road, Pittsburg, CA 94565

Telephone: 925-252-9262; 877-252-9262

Samplers (Signatures): NA

Analysis Request

	Sample Number	Matrix	Depth Interval	See attached analyte list	Number of Containers
1	RO Permeate Stabilized (Pilot Water)	Water	NA	X	8
2					
3					
4					
5					
6					
7					
8					
9					
10					

Project Information

Project Name: MRWPCA

Project Manager: Edwin Lin, Senior Hydro.

Job No.: 60408

Shipping ID. No.:

Via:

Sample Receipt

Total No. of Containers:

Chain of Custody Seals:

Rec'd Good Condition/Cold:

Conforms to Record:

Lab No.: 1402489

Special Instructions/Comments:

save-hold excess pilot water 19.3°

Relinquished By:

Gordon Williams

(Signature) (Time) 940

Trussell Technologies, Inc. (Date) 02-12-14

Relinquished By:

William E. Motzer 1130

(Signature) (Time)

William E. Motzer

(Printed Name) (Date)

Todd Groundwater 02-12-14

(Company)

Relinquished By:

(Signature) (Time)

(Printed Name) (Date)

(Company)

Received By:

William E. Motzer 940

(Signature) (Time)

(Printed Name) (Date)

William E. Motzer 02-12-14

(Company)

Todd Groundwater

Received By:

(Signature) (Time)

(Printed Name) (Date)

(Company)

Received By (Laboratory):

11:30

(Signature) (Time)

Rosa Vercegas 2/12

(Printed Name) (Date)

McCampbell Analytical Inc

(Laboratory)

Mineralogy – XRD, SEM-EDS, Thin section

Currently – 5 of 7 samples being analyzed from WO1312545; 3 of 3 samples from WO1312650 are scheduled for analysis

Please continue mineralogy analyses on the following samples:

5 of 7 samples from WO1312545 (do not analyze 27.5 – 30.0 or 74.0 – 75.5 samples)

2 of 3 samples from WO1312650 (do not analyze 472.0 – 474.5 sample)

Pilot Water Analysis

Measure and analyze for the following parameters of the pilot water prior to leaching tests:

Title 22 metals (CAM 17 plus Fe and Mn)
TOC
Oxidation Reduction Potential
pH
Electrical conductivity
Dissolved oxygen
Total alkalinity
Calcium
Chloride
Sodium
Langelier Saturation Index (LSI)

Leaching Analyses

Currently – 7 of 7 samples analyzed from WO1312545; 3 of 3 samples from WO1312650 are scheduled for analysis

Please perform TCLP (pilot water) extraction on the following samples:

6 of 7 samples from WO1312545 (do not analyze 27.5 – 30.0 sample)

2 of 3 samples from WO1312650 (do not analyze 472.0 – 474.5 sample)

Questions for Ed Hamilton:

Can we do the extraction based on a lower than 20:1 rock to water ratio (e.g., 10:1 or 5:1)?

Can we extend the extraction period to 1 week?

Please perform the following analyses on the pilot water leachate on the 8 samples identified above (6 from WO1312545 and 2 from WO1312650):

Title 22 metals (CAM 17 plus Fe and Mn)
Major cations and alkali(ne) earth metals (Ca, Na, Mg, K, Sr, and Li)

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Sample Receipt Checklist

Client Name:	**Todd Engineering**	Date and Time Received:	**2/12/2014 4:30:34 PM**
Project Name:	**Pilot Water**	LogIn Reviewed by:	Rosa Venegas
WorkOrder N°:	**1402489** Matrix: Water	Carrier:	Client Drop-In

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐
Chain of custody signed when relinquished and received?	Yes ☑	No ☐
Chain of custody agrees with sample labels?	Yes ☑	No ☐
Sample IDs noted by Client on COC?	Yes ☑	No ☐
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐
Sampler's name noted on COC?	Yes ☑	No ☐

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp: 19.3°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	NA ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☑	No ☐	NA ☐
Samples Received on Ice?	Yes ☐	No ☑	

** NOTE: If the "No" box is checked, see comments below.*

Comments:

McCampbell Analytical, Inc.

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Analytical Report

WorkOrder: 1312545

Report Created for: Todd Engineering
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501

Project Contact: Bill Motzer
Project P.O.:
Project Name: #60408; MRWPCA

Project Received: 12/18/2013

Analytical Report reviewed & approved for release on 05/16/2014 by:

Question about your data?

Click here to email McCampbell

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Glossary of Terms & Qualifier Definitions

Client: Todd Engineering
Project: #60408; MRWPCA
WorkOrder: 1312545

Glossary Abbreviation

95% Interval	95% Confident Interval
DF	Dilution Factor
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not detected at or above the indicated MDL or RL
NR	Matrix interferences, or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix; or sample diluted due to high matrix or analyte content.
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
TEQ	Toxicity Equivalence

Analytical Qualifier

B	analyte detected in the associated Method Blank
H	samples were analyzed out of holding time
S	spike recovery outside accepted recovery limits
a1	sample diluted due to matrix interference
a4	the reporting limits were raised due to the sample's matrix prohibiting a full volume extraction.
a7	reporting limit raised due to limited sample amount
a14	reporting limit raised due to the physical nature of the sample
c1	surrogate recovery outside of the control limits due to the dilution of the sample.
c2	low surrogate recovery caused by matrix interference.
c4	surrogate recovery outside of the control limits due to coelution with another peak(s) / cluttered chromatogram.
j1	see attached narrative

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Glossary of Terms & Qualifier Definitions

Client: Todd Engineering
Project: #60408; MRWPCA
WorkOrder: 1312545

Quality Control Qualifiers

F1	MS/MSD recovery and/or RPD was out of acceptance criteria; LCS validated the prep batch.
F2	LCS recovery for this compound is outside of acceptance limits.
F3	the surrogate standard recovery is outside of acceptance limits.

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Case Narrative

Client: Todd Engineering **Work Order:** 1312545
Project: #60408; MRWPCA May 16, 2014

McCampbell Analytical incorporated the following method for the extraction of all Leachate samples:

All Leachate samples were extracted at 1:5 ratio and rotated for 7 days using client-provided water as TCLP solution. Upon completion of rotation McCampbell Analytical centrifuged each extract for 12hrs and filtered through a 0.45 micron filter.

_____ Angela Rydelius, Lab Manager

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E200.8
Date Received:	12/18/13 15:02	**Analytical Method:**	E200.8
Date Prepared:	4/23/14	**Unit:**	µg/L

Leachate Metals - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002D**	**Water/Dissolved**	**12/17/2013 11:40**	**ICP-MS1**	**89648**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	ND	500	10	04/26/2014 02:31
Antimony	ND	5.0	10	04/26/2014 02:31
Arsenic	**5.5**	5.0	10	04/26/2014 02:31
Barium	**81**	50	10	04/26/2014 02:31
Beryllium	ND	5.0	10	04/26/2014 02:31
Cadmium	ND	2.5	10	04/26/2014 02:31
Calcium	**14,000**	1000	10	04/26/2014 02:31
Chromium	ND	5.0	10	04/26/2014 02:31
Cobalt	ND	5.0	10	04/26/2014 02:31
Copper	ND	5.0	10	04/26/2014 02:31
Iron	ND	200	10	04/26/2014 02:31
Lead	ND	5.0	10	04/26/2014 02:31
Lithium	ND	50	10	04/26/2014 02:31
Magnesium	**4700**	200	10	04/26/2014 02:31
Manganese	ND	200	10	04/26/2014 02:31
Mercury	ND	0.25	10	04/26/2014 02:31
Molybdenum	**16**	5.0	10	04/26/2014 02:31
Nickel	ND	5.0	10	04/26/2014 02:31
Potassium	**4600**	500	10	04/26/2014 02:31
Selenium	ND	5.0	10	04/26/2014 02:31
Silver	ND	1.9	10	04/26/2014 02:31
Sodium	**26,000**	1000	10	04/26/2014 02:31
Strontium	ND	200	10	04/26/2014 02:31
Thallium	ND	5.0	10	04/26/2014 02:31
Uranium	ND	5.0	10	04/26/2014 02:31
Vanadium	**6.5**	5.0	10	04/26/2014 02:31
Zinc	ND	50	10	04/26/2014 02:31

Analytical Comments: a1,a7,j1

(Cont.)

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E200.8
Date Received:	12/18/13 15:02	**Analytical Method:**	E200.8
Date Prepared:	4/23/14	**Unit:**	µg/L

Leachate Metals - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 98.5-101	**1312545-003D**	**Water/Dissolved**	**12/17/2013 11:50**	**ICP-MS1**	**89648**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	ND	500	10	04/26/2014 02:37
Antimony	ND	5.0	10	04/26/2014 02:37
Arsenic	ND	5.0	10	04/26/2014 02:37
Barium	**180**	50	10	04/26/2014 02:37
Beryllium	ND	5.0	10	04/26/2014 02:37
Cadmium	ND	2.5	10	04/26/2014 02:37
Calcium	**5200**	1000	10	04/26/2014 02:37
Chromium	ND	5.0	10	04/26/2014 02:37
Cobalt	ND	5.0	10	04/26/2014 02:37
Copper	ND	5.0	10	04/26/2014 02:37
Iron	ND	200	10	04/26/2014 02:37
Lead	ND	5.0	10	04/26/2014 02:37
Lithium	ND	50	10	04/26/2014 02:37
Magnesium	**2300**	200	10	04/26/2014 02:37
Manganese	ND	200	10	04/26/2014 02:37
Mercury	ND	0.25	10	04/26/2014 02:37
Molybdenum	ND	5.0	10	04/26/2014 02:37
Nickel	ND	5.0	10	04/26/2014 02:37
Potassium	**2600**	500	10	04/26/2014 02:37
Selenium	ND	5.0	10	04/26/2014 02:37
Silver	ND	1.9	10	04/26/2014 02:37
Sodium	**22,000**	1000	10	04/26/2014 02:37
Strontium	ND	200	10	04/26/2014 02:37
Thallium	ND	5.0	10	04/26/2014 02:37
Uranium	ND	5.0	10	04/26/2014 02:37
Vanadium	ND	5.0	10	04/26/2014 02:37
Zinc	ND	50	10	04/26/2014 02:37

Analytical Comments: a1,a7,j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E200.8
Date Received:	12/18/13 15:02	**Analytical Method:**	E200.8
Date Prepared:	4/23/14	**Unit:**	µg/L

Leachate Metals - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 139.5-142.0	**1312545-004D**	**Water/Dissolved**	**12/17/2013 12:00**	**ICP-MS1**	**89648**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	ND	500	10	04/26/2014 02:44
Antimony	ND	5.0	10	04/26/2014 02:44
Arsenic	ND	5.0	10	04/26/2014 02:44
Barium	**140**	50	10	04/26/2014 02:44
Beryllium	ND	5.0	10	04/26/2014 02:44
Cadmium	ND	2.5	10	04/26/2014 02:44
Calcium	**4300**	1000	10	04/26/2014 02:44
Chromium	ND	5.0	10	04/26/2014 02:44
Cobalt	ND	5.0	10	04/26/2014 02:44
Copper	ND	5.0	10	04/26/2014 02:44
Iron	ND	200	10	04/26/2014 02:44
Lead	ND	5.0	10	04/26/2014 02:44
Lithium	ND	50	10	04/26/2014 02:44
Magnesium	**1900**	200	10	04/26/2014 02:44
Manganese	ND	200	10	04/26/2014 02:44
Mercury	ND	0.25	10	04/26/2014 02:44
Molybdenum	ND	5.0	10	04/26/2014 02:44
Nickel	ND	5.0	10	04/26/2014 02:44
Potassium	**2400**	500	10	04/26/2014 02:44
Selenium	ND	5.0	10	04/26/2014 02:44
Silver	ND	1.9	10	04/26/2014 02:44
Sodium	**22,000**	1000	10	04/26/2014 02:44
Strontium	ND	200	10	04/26/2014 02:44
Thallium	ND	5.0	10	04/26/2014 02:44
Uranium	ND	5.0	10	04/26/2014 02:44
Vanadium	ND	5.0	10	04/26/2014 02:44
Zinc	ND	50	10	04/26/2014 02:44

Analytical Comments: a1,a7,j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E200.8
Date Received:	12/18/13 15:02	**Analytical Method:**	E200.8
Date Prepared:	4/23/14	**Unit:**	µg/L

Leachate Metals - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005D**	**Water/Dissolved**	**12/17/2013 12:20**	**ICP-MS1**	**89648**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	**900**	500	10	04/26/2014 02:50
Antimony	ND	5.0	10	04/26/2014 02:50
Arsenic	ND	5.0	10	04/26/2014 02:50
Barium	**330**	50	10	04/26/2014 02:50
Beryllium	ND	5.0	10	04/26/2014 02:50
Cadmium	ND	2.5	10	04/26/2014 02:50
Calcium	**6200**	1000	10	04/26/2014 02:50
Chromium	ND	5.0	10	04/26/2014 02:50
Cobalt	ND	5.0	10	04/26/2014 02:50
Copper	ND	5.0	10	04/26/2014 02:50
Iron	**1100**	200	10	04/26/2014 02:50
Lead	ND	5.0	10	04/26/2014 02:50
Lithium	ND	50	10	04/26/2014 02:50
Magnesium	**2000**	200	10	04/26/2014 02:50
Manganese	ND	200	10	04/26/2014 02:50
Mercury	ND	0.25	10	04/26/2014 02:50
Molybdenum	ND	5.0	10	04/26/2014 02:50
Nickel	ND	5.0	10	04/26/2014 02:50
Potassium	**3600**	500	10	04/26/2014 02:50
Selenium	ND	5.0	10	04/26/2014 02:50
Silver	ND	1.9	10	04/26/2014 02:50
Sodium	**26,000**	1000	10	04/26/2014 02:50
Strontium	ND	200	10	04/26/2014 02:50
Thallium	ND	5.0	10	04/26/2014 02:50
Uranium	ND	5.0	10	04/26/2014 02:50
Vanadium	**8.3**	5.0	10	04/26/2014 02:50
Zinc	**59**	50	10	04/26/2014 02:50

Analytical Comments: a1,a7,j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E200.8
Date Received:	12/18/13 15:02	**Analytical Method:**	E200.8
Date Prepared:	4/23/14	**Unit:**	µg/L

Leachate Metals - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 297-298.5	**1312545-006D**	**Water/Dissolved**	**12/18/2013 08:20**	**ICP-MS1**	**89648**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	**4300**	500	10	04/26/2014 02:56
Antimony	ND	5.0	10	04/26/2014 02:56
Arsenic	ND	5.0	10	04/26/2014 02:56
Barium	**930**	50	10	04/26/2014 02:56
Beryllium	ND	5.0	10	04/26/2014 02:56
Cadmium	**6.0**	2.5	10	04/26/2014 02:56
Calcium	**71,000**	1000	10	04/26/2014 02:56
Chromium	**24**	5.0	10	04/26/2014 02:56
Cobalt	ND	5.0	10	04/26/2014 02:56
Copper	**33**	5.0	10	04/26/2014 02:56
Iron	**8700**	200	10	04/26/2014 02:56
Lead	**11**	5.0	10	04/26/2014 02:56
Lithium	ND	50	10	04/26/2014 02:56
Magnesium	**18,000**	200	10	04/26/2014 02:56
Manganese	**360**	200	10	04/26/2014 02:56
Mercury	ND	0.25	10	04/26/2014 02:56
Molybdenum	ND	5.0	10	04/26/2014 02:56
Nickel	**30**	5.0	10	04/26/2014 02:56
Potassium	**2600**	500	10	04/26/2014 02:56
Selenium	ND	5.0	10	04/26/2014 02:56
Silver	ND	1.9	10	04/26/2014 02:56
Sodium	**42,000**	1000	10	04/26/2014 02:56
Strontium	**680**	200	10	04/26/2014 02:56
Thallium	ND	5.0	10	04/26/2014 02:56
Uranium	ND	5.0	10	04/26/2014 02:56
Vanadium	**31**	5.0	10	04/26/2014 02:56
Zinc	**550**	50	10	04/26/2014 02:56

Analytical Comments: a1,a7,j1

(Cont.)

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E200.8
Date Received:	12/18/13 15:02	**Analytical Method:**	E200.8
Date Prepared:	4/23/14	**Unit:**	µg/L

Leachate Metals - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 364.5-367.0	**1312545-007D**	**Water/Dissolved**	**12/18/2013 09:00**	**ICP-MS1**	**89648**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	**4800**	500	10	04/26/2014 03:03
Antimony	ND	5.0	10	04/26/2014 03:03
Arsenic	**7.6**	5.0	10	04/26/2014 03:03
Barium	**490**	50	10	04/26/2014 03:03
Beryllium	ND	5.0	10	04/26/2014 03:03
Cadmium	ND	2.5	10	04/26/2014 03:03
Calcium	**9400**	1000	10	04/26/2014 03:03
Chromium	**6.2**	5.0	10	04/26/2014 03:03
Cobalt	ND	5.0	10	04/26/2014 03:03
Copper	ND	5.0	10	04/26/2014 03:03
Iron	**1500**	200	10	04/26/2014 03:03
Lead	ND	5.0	10	04/26/2014 03:03
Lithium	ND	50	10	04/26/2014 03:03
Magnesium	**1600**	200	10	04/26/2014 03:03
Manganese	ND	200	10	04/26/2014 03:03
Mercury	ND	0.25	10	04/26/2014 03:03
Molybdenum	ND	5.0	10	04/26/2014 03:03
Nickel	**5.5**	5.0	10	04/26/2014 03:03
Potassium	**5400**	500	10	04/26/2014 03:03
Selenium	ND	5.0	10	04/26/2014 03:03
Silver	ND	1.9	10	04/26/2014 03:03
Sodium	**36,000**	1000	10	04/26/2014 03:03
Strontium	ND	200	10	04/26/2014 03:03
Thallium	ND	5.0	10	04/26/2014 03:03
Uranium	ND	5.0	10	04/26/2014 03:03
Vanadium	**17**	5.0	10	04/26/2014 03:03
Zinc	**62**	50	10	04/26/2014 03:03

Analytical Comments: a1,a7,j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E200.7
Date Received:	12/18/13 15:02	**Analytical Method:**	E200.7
Date Prepared:	4/22/14	**Unit:**	µg/L

Leachate Phosphorus - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002D**	**Water/Dissolved**	**12/17/2013 11:40**	**ICP-JY**	**89607**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	ND	500	10	05/02/2014 14:08

Analytical Comments: a7,j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 98.5-101	**1312545-003D**	**Water/Dissolved**	**12/17/2013 11:50**	**ICP-JY**	**89607**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	ND	500	10	05/02/2014 14:10

Analytical Comments: a7,j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 129.5-142.0	**1312545-004D**	**Water/Dissolved**	**12/17/2013 12:00**	**ICP-JY**	**89607**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	ND	500	10	05/02/2014 14:12

Analytical Comments: a7,j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005D**	**Water/Dissolved**	**12/17/2013 12:20**	**ICP-JY**	**89607**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	ND	500	10	05/02/2014 14:14

Analytical Comments: a7,j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 297-298.5	**1312545-006D**	**Water/Dissolved**	**12/18/2013 08:20**	**ICP-JY**	**89607**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	**22,000**	500	10	05/02/2014 14:16

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E200.7
Date Received:	12/18/13 15:02	**Analytical Method:**	E200.7
Date Prepared:	4/22/14	**Unit:**	µg/L

Leachate Phosphorus - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 364.5-367.0	**1312545-007D**	**Water/Dissolved**	**12/18/2013 09:00**	**ICP-JY**	**89607**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	**1000**	500	10	05/02/2014 14:22

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E200.7
Date Received:	12/18/13 15:02	**Analytical Method:**	200.7
Date Prepared:	4/22/14	**Unit:**	µg/L

Leachate Silicon - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002D**	**Water/Dissolved**	**12/17/2013 11:40**	**ICP-JY**	**89609**

Analytes	Result	RL	DF	Date Analyzed
Silicon	**7400**	500	10	05/02/2014 12:47

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 98.5-101	**1312545-003D**	**Water/Dissolved**	**12/17/2013 11:50**	**ICP-JY**	**89609**

Analytes	Result	RL	DF	Date Analyzed
Silicon	**8900**	500	10	05/02/2014 12:49

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 129.5-142.0	**1312545-004D**	**Water/Dissolved**	**12/17/2013 12:00**	**ICP-JY**	**89609**

Analytes	Result	RL	DF	Date Analyzed
Silicon	**11,000**	500	10	05/02/2014 12:51

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005D**	**Water/Dissolved**	**12/17/2013 12:20**	**ICP-JY**	**89609**

Analytes	Result	RL	DF	Date Analyzed
Silicon	**12,000**	500	10	05/02/2014 12:53

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 297-298.5	**1312545-006D**	**Water/Dissolved**	**12/18/2013 08:20**	**ICP-JY**	**89609**

Analytes	Result	RL	DF	Date Analyzed
Silicon	**110,000**	500	10	05/02/2014 12:55

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E200.7
Date Received:	12/18/13 15:02	**Analytical Method:**	200.7
Date Prepared:	4/22/14	**Unit:**	µg/L

Leachate Silicon - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 364.5-367.0	**1312545-007D**	**Water/Dissolved**	**12/18/2013 09:00**	**ICP-JY**	**89609**

Analytes	Result	RL	DF	Date Analyzed
Silicon	**28,000**	500	10	05/02/2014 13:05

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E218.6
Date Received:	12/18/13 15:02	**Analytical Method:**	E218.6
Date Prepared:	4/22/14	**Unit:**	µg/L

Leachate Hexachrome by IC - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002D**	**Water**	**12/17/2013 11:40**	**IC2**	**89600**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Hexachrome	**0.86**	BH	0.20	1	04/23/2014 17:26

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 98.5-101	**1312545-003D**	**Water**	**12/17/2013 11:50**	**IC2**	**89600**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Hexachrome	**1.6**	BH	0.20	1	04/23/2014 16:28

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 129.5-142.0	**1312545-004D**	**Water**	**12/17/2013 12:00**	**IC2**	**89600**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Hexachrome	**2.4**	BH	0.20	1	04/23/2014 17:45

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005D**	**Water**	**12/17/2013 12:20**	**IC2**	**89600**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Hexachrome	**0.61**	BH	0.20	1	04/23/2014 18:04

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 297-298.5	**1312545-006D**	**Water**	**12/18/2013 08:20**	**IC2**	**89600**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Hexachrome	**1.6**	BH	0.20	1	04/24/2014 16:46

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E218.6
Date Received:	12/18/13 15:02	**Analytical Method:**	E218.6
Date Prepared:	4/22/14	**Unit:**	µg/L

Leachate Hexachrome by IC - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 364.5-367.0	**1312545-007D**	**Water**	**12/18/2013 09:00**	**IC2**	**89600**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Hexachrome	**0.77**	BH	0.20	1	04/24/2014 16:07

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E300.1
Date Received:	12/18/13 15:02	**Analytical Method:**	E300.1
Date Prepared:	4/22/14	**Unit:**	mg/L

Leachate Inorganic Anions by IC - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002D**	**Water**	**12/17/2013 11:40**	**IC3**	**89601**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Bromide	ND	H	0.10	1	04/25/2014 01:49
Chloride	**20**	BH	1.0	10	04/25/2014 05:57
Fluoride	**0.31**	H	0.10	1	04/25/2014 01:49
Nitrate as N	**0.64**	BH	0.10	1	04/25/2014 01:49
Nitrate as $NO3^-$	**2.8**	BH	0.45	1	04/25/2014 01:49
Nitrite as N	ND	H	0.10	1	04/25/2014 01:49
Nitrite as $NO2^-$	ND	H	0.33	1	04/25/2014 01:49
Sulfate	**11**	BH	1.0	10	04/25/2014 05:57

Surrogates	REC (%)	Qualifiers	Limits	Analytical Comments: j1	
Formate	104	H	90-115		04/25/2014 01:49

MW-1: 98.5-101	**1312545-003D**	**Water**	**12/17/2013 11:50**	**IC3**	**89601**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Bromide	ND	H	0.10	1	04/25/2014 02:30
Chloride	**20**	BH	1.0	10	04/25/2014 06:39
Fluoride	**0.22**	H	0.10	1	04/25/2014 02:30
Nitrate as N	**0.64**	BH	0.10	1	04/25/2014 02:30
Nitrate as $NO3^-$	**2.8**	BH	0.45	1	04/25/2014 02:30
Nitrite as N	ND	H	0.10	1	04/25/2014 02:30
Nitrite as $NO2^-$	ND	H	0.33	1	04/25/2014 02:30
Sulfate	**0.42**	BH	0.10	1	04/25/2014 02:30

Surrogates	REC (%)	Qualifiers	Limits	Analytical Comments: j1	
Formate	104	H	90-115		04/25/2014 02:30

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E300.1
Date Received:	12/18/13 15:02	**Analytical Method:**	E300.1
Date Prepared:	4/22/14	**Unit:**	mg/L

Leachate Inorganic Anions by IC - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 139.5-142.0	**1312545-004D**	**Water**	**12/17/2013 12:00**	**IC3**	**89601**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Bromide	ND	H	0.10	1	04/25/2014 04:34
Chloride	**20**	BH	1.0	10	04/25/2014 07:20
Fluoride	**0.26**	H	0.10	1	04/25/2014 04:34
Nitrate as N	**0.65**	BH	0.10	1	04/25/2014 04:34
Nitrate as $NO3^-$	**2.9**	BH	0.45	1	04/25/2014 04:34
Nitrite as N	ND	H	0.10	1	04/25/2014 04:34
Nitrite as $NO2^-$	ND	H	0.33	1	04/25/2014 04:34
Sulfate	**0.93**	BH	0.10	1	04/25/2014 04:34

Surrogates	REC (%)	Qualifiers	Limits	Analytical Comments: j1
Formate	104	H	90-115	04/25/2014 04:34

MW-1: 200-202.5	**1312545-005D**	**Water**	**12/17/2013 12:20**	**IC3**	**89601**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Bromide	ND	H	0.10	1	04/25/2014 05:16
Chloride	**20**	BH	1.0	10	04/25/2014 08:02
Fluoride	**0.28**	H	0.10	1	04/25/2014 05:16
Nitrate as N	**0.64**	BH	0.10	1	04/25/2014 05:16
Nitrate as $NO3^-$	**2.8**	BH	0.45	1	04/25/2014 05:16
Nitrite as N	ND	H	0.10	1	04/25/2014 05:16
Nitrite as $NO2^-$	ND	H	0.33	1	04/25/2014 05:16
Sulfate	**0.34**	BH	0.10	1	04/25/2014 05:16

Surrogates	REC (%)	Qualifiers	Limits	Analytical Comments: j1
Formate	105	H	90-115	04/25/2014 05:16

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E300.1
Date Received:	12/18/13 15:02	**Analytical Method:**	E300.1
Date Prepared:	4/22/14	**Unit:**	mg/L

Leachate Inorganic Anions by IC - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 297-298.5	**1312545-006D**	**Water**	**12/18/2013 08:20**	**IC3**	**89601**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Bromide	ND	H	0.10	1	04/24/2014 19:36
Chloride	**26**	BH	1.0	10	04/25/2014 08:43
Fluoride	**0.32**	H	0.10	1	04/24/2014 19:36
Nitrate as N	**0.67**	BH	0.10	1	04/24/2014 19:36
Nitrate as $NO3^-$	**3.0**	BH	0.45	1	04/24/2014 19:36
Nitrite as N	ND	H	0.10	1	04/24/2014 19:36
Nitrite as $NO2^-$	ND	H	0.33	1	04/24/2014 19:36
Sulfate	**20**	BH	1.0	10	04/25/2014 08:43

Surrogates	REC (%)	Qualifiers	Limits	Analytical Comments: j1	
Formate	110	H	90-115		04/24/2014 19:36

MW-1: 364.5-367.0	**1312545-007D**	**Water**	**12/18/2013 09:00**	**IC3**	**89601**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Bromide	ND	H	0.10	1	04/24/2014 20:18
Chloride	**21**	BH	1.0	10	04/24/2014 23:03
Fluoride	**0.48**	H	0.10	1	04/24/2014 20:18
Nitrate as N	**0.65**	BH	0.10	1	04/24/2014 20:18
Nitrate as $NO3^-$	**2.9**	BH	0.45	1	04/24/2014 20:18
Nitrite as N	ND	H	0.10	1	04/24/2014 20:18
Nitrite as $NO2^-$	ND	H	0.33	1	04/24/2014 20:18
Sulfate	**8.5**	BH	1.0	10	04/24/2014 23:03

Surrogates	REC (%)	Qualifiers	Limits	Analytical Comments: j1	
Formate	108	H	90-115		04/24/2014 20:18

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	SM2320B
Date Received:	12/18/13 15:02	**Analytical Method:**	SM2320B
Date Prepared:	4/29/14	**Unit:**	mg $CaCO_3$/L

Total & Speciated Alkalinity as CaCO3 (Leachate) - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002D**	**Water**	**12/17/2013 11:40**	**Titrino**	**89602**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Total	**73.0**	H	1.00	1	04/29/2014 10:31
Carbonate	ND	H	1.00	1	04/29/2014 10:31
Bicarbonate	**73.0**	H	1.00	1	04/29/2014 10:31
Hydroxide	ND	H	1.00	1	04/29/2014 10:31

Analytical Comments: j1

MW-1: 98.5-101	**1312545-003D**	**Water**	**12/17/2013 11:50**	**Titrino**	**89602**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Total	**40.0**	H	1.00	1	04/29/2014 10:34
Carbonate	ND	H	1.00	1	04/29/2014 10:34
Bicarbonate	**40.0**	H	1.00	1	04/29/2014 10:34
Hydroxide	ND	H	1.00	1	04/29/2014 10:34

Analytical Comments: j1

MW-1: 139.5-142.0	**1312545-004D**	**Water**	**12/17/2013 12:00**	**Titrino**	**89602**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Total	**37.0**	H	1.00	1	04/29/2014 10:37
Carbonate	ND	H	1.00	1	04/29/2014 10:37
Bicarbonate	**37.0**	H	1.00	1	04/29/2014 10:37
Hydroxide	ND	H	1.00	1	04/29/2014 10:37

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	SM2320B
Date Received:	12/18/13 15:02	**Analytical Method:**	SM2320B
Date Prepared:	4/29/14	**Unit:**	mg $CaCO_3$/L

Total & Speciated Alkalinity as CaCO3 (Leachate) - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005D**	**Water**	**12/17/2013 12:20**	**Titrino**	**89602**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Total	**46.0**	H	1.00	1	04/29/2014 10:40
Carbonate	ND	H	1.00	1	04/29/2014 10:40
Bicarbonate	**46.0**	H	1.00	1	04/29/2014 10:40
Hydroxide	ND	H	1.00	1	04/29/2014 10:40

Analytical Comments: j1

MW-1: 297-298.5	**1312545-006D**	**Water**	**12/18/2013 08:20**	**Titrino**	**89602**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Total	**170**	H	1.00	1	04/29/2014 10:46
Carbonate	ND	H	1.00	1	04/29/2014 10:46
Bicarbonate	**170**	H	1.00	1	04/29/2014 10:46
Hydroxide	ND	H	1.00	1	04/29/2014 10:46

Analytical Comments: j1

MW-1: 364.5-367.0	**1312545-007D**	**Water**	**12/18/2013 09:00**	**Titrino**	**89602**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Total	**59.0**	H	1.00	1	04/29/2014 10:51
Carbonate	ND	H	1.00	1	04/29/2014 10:51
Bicarbonate	**59.0**	H	1.00	1	04/29/2014 10:51
Hydroxide	ND	H	1.00	1	04/29/2014 10:51

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E350.1
Date Received:	12/18/13 15:02	**Analytical Method:**	E350.1
Date Prepared:	4/22/14	**Unit:**	mg/L

Leachate Ammonia as N - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002D**	**Water**	**12/17/2013 11:40**	**SKALAR**	**89603**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Total Ammonia as N	**0.72**	H	0.10	1	04/29/2014 16:10

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 98.5-101	**1312545-003D**	**Water**	**12/17/2013 11:50**	**SKALAR**	**89603**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Total Ammonia as N	**0.58**	H	0.10	1	04/29/2014 16:14

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 139.5-142.0	**1312545-004D**	**Water**	**12/17/2013 12:00**	**SKALAR**	**89603**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Total Ammonia as N	**0.44**	H	0.10	1	04/29/2014 16:18

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005D**	**Water**	**12/17/2013 12:20**	**SKALAR**	**89603**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Total Ammonia as N	**0.50**	H	0.10	1	04/29/2014 16:21

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 297-298.5	**1312545-006D**	**Water**	**12/18/2013 08:20**	**SKALAR**	**89603**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Total Ammonia as N	ND	H	0.10	1	04/29/2014 19:06

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E350.1
Date Received:	12/18/13 15:02	**Analytical Method:**	E350.1
Date Prepared:	4/22/14	**Unit:**	mg/L

Leachate Ammonia as N - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 364.5-367.0	**1312545-007D**	**Water**	**12/18/2013 09:00**	**SKALAR**	**89603**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Total Ammonia as N	**0.42**	H	0.10	1	04/29/2014 19:10

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	SM4500-Cl DE
Date Received:	12/18/13 15:02	**Analytical Method:**	SM4500-Cl DE
Date Prepared:	4/23/14-4/24/14	**Unit:**	mg/L

Chlorine, Total Residual [Leachate] - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002D**	**Water**	**12/17/2013 11:40**	**Titrino**	**89615**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Chlorine	**1.5**	BH	0.40	10	04/23/2014 16:00

Analytical Comments: j1

MW-1: 98.5-101	**1312545-003D**	**Water**	**12/17/2013 11:50**	**Titrino**	**89615**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Chlorine	**1.6**	BH	0.40	10	04/23/2014 16:04

Analytical Comments: j1

MW-1: 139.5-142.0	**1312545-004D**	**Water**	**12/17/2013 12:00**	**Titrino**	**89615**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Chlorine	**1.3**	BH	0.40	10	04/23/2014 16:08

Analytical Comments: j1

MW-1: 200-202.5	**1312545-005D**	**Water**	**12/17/2013 12:20**	**Titrino**	**89615**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Chlorine	**1.6**	BH	0.40	10	04/23/2014 16:13

Analytical Comments: j1

MW-1: 297-298.5	**1312545-006D**	**Water**	**12/18/2013 08:20**	**Titrino**	**89615**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Chlorine	ND	BH	0.40	10	04/24/2014 15:49

Analytical Comments: a7,j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	SM4500-Cl DE
Date Received:	12/18/13 15:02	**Analytical Method:**	SM4500-Cl DE
Date Prepared:	4/23/14-4/24/14	**Unit:**	mg/L

Chlorine, Total Residual [Leachate] - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 364.5-367.0	**1312545-007D**	**Water**	**12/18/2013 09:00**	**Titrino**	**89615**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Chlorine	**1.7**	BH	0.40	10	04/24/2014 15:29

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E415.3
Date Received:	12/18/13 15:02	**Analytical Method:**	E415.3
Date Prepared:	4/22/14	**Unit:**	mg/L

Dissolved Organic Carbon (DOC) [Leachate] - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002D**	**Water**	**12/17/2013 11:40**	**TOC_SHIMADZU**	**89604**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Dissolved Organic Carbon	**1.4**	H	0.70	1	04/29/2014 15:46

Analytical Comments: j1

MW-1: 98.5-101	**1312545-003D**	**Water**	**12/17/2013 11:50**	**TOC_SHIMADZU**	**89604**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Dissolved Organic Carbon	**1.2**	H	0.70	1	04/29/2014 16:00

Analytical Comments: j1

MW-1: 139.5-142.0	**1312545-004D**	**Water**	**12/17/2013 12:00**	**TOC_SHIMADZU**	**89604**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Dissolved Organic Carbon	**1.1**	H	0.70	1	04/29/2014 16:14

Analytical Comments: j1

MW-1: 200-202.5	**1312545-005D**	**Water**	**12/17/2013 12:20**	**TOC_SHIMADZU**	**89604**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Dissolved Organic Carbon	**2.2**	H	0.70	1	04/29/2014 16:54

Analytical Comments: j1

MW-1: 297-298.5	**1312545-006D**	**Water**	**12/18/2013 08:20**	**TOC_SHIMADZU**	**89604**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Dissolved Organic Carbon	**16**	H	0.70	1	04/29/2014 18:01

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E415.3
Date Received:	12/18/13 15:02	**Analytical Method:**	E415.3
Date Prepared:	4/22/14	**Unit:**	mg/L

Dissolved Organic Carbon (DOC) [Leachate] - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 364.5-367.0	**1312545-007D**	**Water**	**12/18/2013 09:00**	**TOC_SHIMADZU**	**89604**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Dissolved Organic Carbon	**3**	H	0.70	1	04/29/2014 17:21

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E415.3
Date Received:	12/18/13 15:02	**Analytical Method:**	E415.3
Date Prepared:	4/22/14	**Unit:**	mg/L

Inorganic Carbon as Carbon Dioxide [Leachate] - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002D**	**Water**	**12/17/2013 11:40**	**TOC_CNS**	**89605**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
IC as CO2	**67**	H	3.7	1	04/30/2014 14:16

Analytical Comments: j1

MW-1: 98.5-101	**1312545-003D**	**Water**	**12/17/2013 11:50**	**TOC_CNS**	**89605**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
IC as CO2	**37**	H	3.7	1	04/30/2014 14:24

Analytical Comments: j1

MW-1: 139.5-142.0	**1312545-004D**	**Water**	**12/17/2013 12:00**	**TOC_CNS**	**89605**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
IC as CO2	**34**	H	3.7	1	04/30/2014 14:31

Analytical Comments: j1

MW-1: 200-202.5	**1312545-005D**	**Water**	**12/17/2013 12:20**	**TOC_CNS**	**89605**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
IC as CO2	**40**	H	3.7	1	04/30/2014 14:38

Analytical Comments: j1

MW-1: 297-298.5	**1312545-006D**	**Water**	**12/18/2013 08:20**	**TOC_CNS**	**89605**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
IC as CO2	**56**	H	3.7	1	04/30/2014 15:37

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E415.3
Date Received:	12/18/13 15:02	**Analytical Method:**	E415.3
Date Prepared:	4/22/14	**Unit:**	mg/L

Inorganic Carbon as Carbon Dioxide [Leachate] - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 364.5-367.0	**1312545-007D**	**Water**	**12/18/2013 09:00**	**TOC_CNS**	**89605**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
IC as CO2	**43**	H	3.7	1	04/30/2014 14:45

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	SM4500 S-2 D
Date Received:	12/18/13 15:02	**Analytical Method:**	SM4500 S-2 D
Date Prepared:	4/23/14-4/29/14	**Unit:**	mg/L

Leachate Sulfide - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002D**	**Water**	**12/17/2013 11:40**	**SPECTROPHOTOMETER**	**89610**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Sulfide	ND	H	0.050	1	04/23/2014 19:40

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 98.5-101	**1312545-003D**	**Water**	**12/17/2013 11:50**	**SPECTROPHOTOMETER**	**89610**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Sulfide	ND	H	0.050	1	04/23/2014 19:55

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 139.5-142.0	**1312545-004D**	**Water**	**12/17/2013 12:00**	**SPECTROPHOTOMETER**	**89610**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Sulfide	ND	H	0.050	1	04/23/2014 20:00

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005D**	**Water**	**12/17/2013 12:20**	**SPECTROPHOTOMETER**	**89610**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Sulfide	ND	H	0.050	1	04/23/2014 20:05

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 297-298.5	**1312545-006D**	**Water**	**12/18/2013 08:20**	**SPECTROPHOTOMETER**	**89610**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Sulfide	ND	H	0.050	1	04/29/2014 19:50

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	SM4500 S-2 D
Date Received:	12/18/13 15:02	**Analytical Method:**	SM4500 S-2 D
Date Prepared:	4/23/14-4/29/14	**Unit:**	mg/L

Leachate Sulfide - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 364.5-367.0	**1312545-007D**	**Water**	**12/18/2013 09:00**	**SPECTROPHOTOMETER**	**89610**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Sulfide	ND	H	0.050	1	04/24/2014 21:05

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E351.2
Date Received:	12/18/13 15:02	**Analytical Method:**	E351.2
Date Prepared:	4/29/14	**Unit:**	mg/L

Total Kjeldahl Nitrogen (Leachate) - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002D**	**Water**	**12/17/2013 11:40**	**SKALAR**	**89597**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
TKN as N	**0.82**	H	0.30	1	04/30/2014 14:54

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 98.5-101	**1312545-003D**	**Water**	**12/17/2013 11:50**	**SKALAR**	**89597**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
TKN as N	**1.4**	H	0.30	1	04/30/2014 14:58

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 139.5-142.0	**1312545-004D**	**Water**	**12/17/2013 12:00**	**SKALAR**	**89597**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
TKN as N	**0.55**	H	0.30	1	04/30/2014 15:02

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005D**	**Water**	**12/17/2013 12:20**	**SKALAR**	**89597**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
TKN as N	**0.73**	H	0.30	1	04/30/2014 15:06

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 297-298.5	**1312545-006D**	**Water**	**12/18/2013 08:20**	**SKALAR**	**89597**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
TKN as N	**3.1**	H	0.30	1	04/30/2014 15:09

Analytical Comments: j1

(Cont.)

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	E351.2
Date Received:	12/18/13 15:02	**Analytical Method:**	E351.2
Date Prepared:	4/29/14	**Unit:**	mg/L

Total Kjeldahl Nitrogen (Leachate) - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 364.5-367.0	**1312545-007D**	**Water**	**12/18/2013 09:00**	**SKALAR**	**89597**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
TKN as N	**0.73**	H	0.30	1	04/30/2014 15:13

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	SM2580Bm
Date Received:	12/18/13 15:02	**Analytical Method:**	SM2580B, MAI
Date Prepared:	4/23/14-4/24/14	**Unit:**	±, mV vs. NHE

Oxidation-Reduction Potential (ORP) (Leachate) - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002D**	**Water**	**12/17/2013 11:40**	**WetChem**	**89712**

Analytes	Result	Accuracy	DF	Date Analyzed
ORP	**577 @ 23.9°C**	10	1	04/23/2014 20:15

Analytical Comments: j1

MW-1: 98.5-101	**1312545-003D**	**Water**	**12/17/2013 11:50**	**WetChem**	**89712**

Analytes	Result	Accuracy	DF	Date Analyzed
ORP	**663 @ 23.6°C**	10	1	04/23/2014 20:25

Analytical Comments: j1

MW-1: 139.5-142.0	**1312545-004D**	**Water**	**12/17/2013 12:00**	**WetChem**	**89712**

Analytes	Result	Accuracy	DF	Date Analyzed
ORP	**665 @ 23.4°C**	10	1	04/23/2014 20:30

Analytical Comments: j1

MW-1: 200-202.5	**1312545-005D**	**Water**	**12/17/2013 12:20**	**WetChem**	**89712**

Analytes	Result	Accuracy	DF	Date Analyzed
ORP	**650 @ 23.9°C**	10	1	04/23/2014 20:35

Analytical Comments: j1

MW-1: 297-298.5	**1312545-006D**	**Water**	**12/18/2013 08:20**	**WetChem**	**89743**

Analytes	Result	Accuracy	DF	Date Analyzed
ORP	**479 @ 25.3°C**	10	1	04/24/2014 17:05

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	SM2580Bm
Date Received:	12/18/13 15:02	**Analytical Method:**	SM2580B, MAI
Date Prepared:	4/23/14-4/24/14	**Unit:**	±, mV vs. NHE

Oxidation-Reduction Potential (ORP) (Leachate) - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 364.5-367.0	**1312545-007D**	**Water**	**12/18/2013 09:00**	**WetChem**	**89743**

Analytes	Result	Accuracy	DF	Date Analyzed
ORP	**666 @ 24.3°C**	10	1	04/24/2014 17:00

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	SM4500H+B
Date Received:	12/18/13 15:02	**Analytical Method:**	SM4500H+B
Date Prepared:	4/23/14-4/24/14	**Unit:**	±, pH units @ 25°C

Leachate pH - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 74.0-75.5	**1312545-002D**	**Water**	**12/17/2013 11:40**	**WetChem**	**89608**

Analytes	Result	Qualifiers	Accuracy	DF	Date Analyzed
pH	**8.44**	H	0.05	1	04/23/2014 17:01

Analytical Comments: j1

MW-1: 98.5-101	**1312545-003D**	**Water**	**12/17/2013 11:50**	**WetChem**	**89608**

Analytes	Result	Qualifiers	Accuracy	DF	Date Analyzed
pH	**7.65**	H	0.05	1	04/23/2014 17:07

Analytical Comments: j1

MW-1: 139.5-142.0	**1312545-004D**	**Water**	**12/17/2013 12:00**	**WetChem**	**89608**

Analytes	Result	Qualifiers	Accuracy	DF	Date Analyzed
pH	**7.44**	H	0.05	1	04/23/2014 17:10

Analytical Comments: j1

MW-1: 200-202.5	**1312545-005D**	**Water**	**12/17/2013 12:20**	**WetChem**	**89608**

Analytes	Result	Qualifiers	Accuracy	DF	Date Analyzed
pH	**7.83**	H	0.05	1	04/23/2014 17:13

Analytical Comments: j1

MW-1: 297-298.5	**1312545-006D**	**Water**	**12/18/2013 08:20**	**WetChem**	**89608**

Analytes	Result	Qualifiers	Accuracy	DF	Date Analyzed
pH	**7.95**	H	0.05	1	04/24/2014 16:36

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Project:	#60408; MRWPCA	**Extraction Method:**	SM4500H+B
Date Received:	12/18/13 15:02	**Analytical Method:**	SM4500H+B
Date Prepared:	4/23/14-4/24/14	**Unit:**	±, pH units @ 25°C

Leachate pH - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 364.5-367.0	**1312545-007D**	**Water**	**12/18/2013 09:00**	**WetChem**	**89608**

Analytes	Result	Qualifiers	Accuracy	DF	Date Analyzed
pH	**8.11**	H	0.05	1	04/24/2014 16:39

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	SM2130B
Date Received:	12/20/13 15:35	**Analytical Method:**	SM2130B
Date Prepared:	5/27/14	**Unit:**	NTU

Turbidity

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 200-202.5	**1312545-005D**	**Water**	**12/17/2013 12:20**	**WetChem**	**91343**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Turbidity	**5.74**	H	0.100	1	05/27/2014 14:30

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 297-298.5	**1312545-006D**	**Water**	**12/18/2013 08:20**	**WetChem**	**91343**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Turbidity	**67.0**	H	0.100	1	05/27/2014 15:05

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 364.5-367.0	**1312545-007D**	**Water**	**12/18/2013 09:00**	**WetChem**	**91343**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Turbidity	**7.69**	H	0.100	1	05/27/2014 14:40

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	4/23/14	**BatchID:**	89648
Date Analyzed:	5/1/14	**Extraction Method:**	E200.8
Instrument:	ICP-MS1	**Analytical Method:**	E200.8
Matrix:	Water	**Unit:**	µg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89648

QC Summary Report for E200.8

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Aluminum	ND	468	50	500	-	93.6	85-115
Antimony	ND	47.4	0.50	50	-	94.8	85-115
Arsenic	ND	48.2	0.50	50	-	96.3	85-115
Barium	ND	453	5.0	500	-	90.6	85-115
Beryllium	ND	46.8	0.50	50	-	93.6	85-115
Cadmium	ND	46.9	0.25	50	-	93.8	85-115
Calcium	ND	4820	100	5000	-	96.4	85-115
Chromium	ND	45.5	0.50	50	-	91.1	85-115
Cobalt	ND	47.8	0.50	50	-	95.6	85-115
Copper	ND	47.2	0.50	50	-	94.5	85-115
Iron	ND	491	20	500	-	98.2	85-115
Lead	ND	47.6	0.50	50	-	95.3	85-115
Lithium	ND	47.8	5.0	50	-	95.5	85-115
Magnesium	ND	479	20	500	-	95.9	85-115
Manganese	ND	472	20	500	-	94.4	85-115
Mercury	ND	1.10	0.025	1.25	-	87.8	85-115
Molybdenum	ND	46.1	0.50	50	-	92.2	85-115
Nickel	ND	46.8	0.50	50	-	93.7	85-115
Potassium	ND	452	50	500	-	90.4	85-115
Selenium	ND	48.1	0.50	50	-	96.2	85-115
Silver	ND	46.9	0.19	50	-	93.7	85-115
Sodium	ND	4880	100	5000	-	97.6	85-115
Strontium	ND	477	20	500	-	95.3	85-115
Thallium	ND	47.4	0.50	50	-	94.9	85-115
Uranium	ND	45.9	0.50	50	-	91.8	85-115
Vanadium	ND	45.6	0.50	50	-	91.2	85-115
Zinc	ND	476	5.0	500	-	95.3	85-115

SH QA/QC Officer

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	4/22/14	**BatchID:**	89607
Date Analyzed:	5/2/14	**Extraction Method:**	E200.7
Instrument:	ICP-JY	**Analytical Method:**	E200.7
Matrix:	Water	**Unit:**	µg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89607

QC Summary Report for E200.7

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Phosphorous	ND	1020	100	1000	-	102	80-120

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	4/22/14	**BatchID:**	89609
Date Analyzed:	5/2/14	**Extraction Method:**	E200.7
Instrument:	ICP-JY	**Analytical Method:**	200.7
Matrix:	Water	**Unit:**	µg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89609

QC Summary Report for E200.7

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Silicon	ND	913	50	1000	-	91.3	80-120

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	4/22/14	**BatchID:**	89600
Date Analyzed:	4/23/14	**Extraction Method:**	E218.6
Instrument:	IC2	**Analytical Method:**	E218.6
Matrix:	Leachate	**Unit:**	µg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89600 1312545-003DMS/MSD

QC Summary Report for E218.6

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Hexachrome	0.210	23.3	0.20	25	-	93.2	90-110

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Hexachrome	24.7	24.6	25	1.620	92.5	92	90-110	0.446	10

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	4/22/14	**BatchID:**	89601
Date Analyzed:	4/24/14 - 4/25/14	**Extraction Method:**	E300.1
Instrument:	IC3	**Analytical Method:**	E300.1
Matrix:	Leachate	**Unit:**	mg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89601 1312545-003DMS/MSD

QC Summary Report for E300.1

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Bromide	ND	0.964	0.10	1	-	96.4	85-115
Chloride	20.0	20.9	0.10	1	-	2090, F2	85-115
Fluoride	ND	1.10	0.10	1	-	110	85-115
Nitrate as N	0.647	1.62	0.10	1	-	162, F2	85-115
Nitrate as $NO3^-$	2.86	7.15	0.45	4.4	-	163, F2	85-115
Nitrite as N	ND	0.981	0.10	1	-	98.1	85-115
Nitrite as $NO2^-$	ND	3.24	0.33	3.3	-	98.1	85-115
Sulfate	0.121	1.10	0.10	1	-	110	85-115
Surrogate Recovery							
Formate	0.106	0.103		0.10	106	103	90-115

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Bromide	1.03	1.07	1	ND	103	107	85-115	3.31	15
Chloride	NR	NR	1	20.23	NR	NR	85-115	NR	15
Fluoride	1.32	1.34	1	0.2204	110	112	85-115	1.06	15
Nitrate as N	1.77	1.76	1	0.6401	113	112	85-115	0.298	15
Nitrate as $NO3^-$	7.83	7.81	4.4	2.834	114	113	85-115	0.298	15
Nitrite as N	1.07	1.07	1	ND	107	107	85-115	0	15
Nitrite as $NO2^-$	3.53	3.54	3.3	ND	107	107	85-115	0	15
Sulfate	1.53	1.53	1	0.4226	111	111	85-115	0	15
Surrogate Recovery									
Formate	0.104	0.104	0.10		104	104	90-115	0	10

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	4/22/14 - 4/23/14	**BatchID:**	89602
Date Analyzed:	4/29/14	**Extraction Method:**	SM2320B
Instrument:	Titrino	**Analytical Method:**	SM2320B
Matrix:	Leachate	**Test Method:**	SM2320B (Alkalinity)
Project:	#60408; MRWPCA		

QC Summary Report for SM2320B (Alkalinity)

Lab ID	Analyte	Reporting Units	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	RPD	Acceptance Criteria (%)
1312545-002D	Total	mg $CaCO_3$/L	73.0	1	72.0	1	1.38	<20
1312545-003D	Total	mg $CaCO_3$/L	40.0	1	40.0	1	0	<20
1312545-004D	Total	mg $CaCO_3$/L	37.0	1	36.0	1	2.74	<20
1312545-005D	Total	mg $CaCO_3$/L	46.0	1	45.0	1	2.2	<20
1312545-006D	Total	mg $CaCO_3$/L	170	1	169	1	0.395	<20
1312545-007D	Total	mg $CaCO_3$/L	59.0	1	58.5	1	0.851	<20

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	4/22/14	**BatchID:**	89603
Date Analyzed:	4/29/14	**Extraction Method:**	E350.1
Instrument:	SKALAR	**Analytical Method:**	E350.1
Matrix:	Water	**Unit:**	mg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89603

QC Summary Report for E350.1

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Total Ammonia as N	ND	3.80	0.10	4	-	95.1	90-110

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	4/22/14	**BatchID:**	89615
Date Analyzed:	4/23/14	**Extraction Method:**	SM4500-Cl DE
Instrument:	Titrino	**Analytical Method:**	SM4500-Cl DE
Matrix:	Water	**Unit:**	mg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB-89615

QC Summary Report for Chlorine

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Chlorine	2.13	-	0.40	-	-	-	-

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	4/22/14	**BatchID:**	89604
Date Analyzed:	4/29/14	**Extraction Method:**	E415.3
Instrument:	TOC_SHIMADZU	**Analytical Method:**	E415.3
Matrix:	Water	**Unit:**	mg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89604

QC Summary Report for E415.3

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TOC	ND	49.6	0.30	50	-	99.2	80-120

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	4/22/14	**BatchID:**	89605
Date Analyzed:	4/30/14	**Extraction Method:**	E415.3
Instrument:	TOC_CNS	**Analytical Method:**	E415.3
Matrix:	Water	**Unit:**	mg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89605

QC Summary Report for E415.3

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
IC as CO2	ND	38.3	3.7	36.7	-	104	80-120

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	4/22/14	**BatchID:**	89610
Date Analyzed:	5/1/14	**Extraction Method:**	SM4500 S-2 D
Instrument:	SPECTROPHOTOMETER	**Analytical Method:**	SM4500 S-2 D
Matrix:	Water	**Unit:**	mg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89610 1402489-001BMS/MSD

QC Summary Report For SM4500S2D

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Sulfide	ND	2.36	0.050	2.5	-	94.5	80-120

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Sulfide	2.03	2.03	2.5	ND	81.3	81.4	75-125	0.0975	20

(Cont.)

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	4/22/14	**BatchID:**	89597
Date Analyzed:	4/30/14	**Extraction Method:**	E351.2
Instrument:	SKALAR	**Analytical Method:**	E351.2
Matrix:	Water	**Unit:**	mg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89597

QC Summary Report for E351.2 (TKN as N)

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TKN as N	ND	11.3	0.30	12	-	93.9	90-110

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Quality Control Report

Client: Todd Engineering
Date Prepared: 4/23/14
Date Analyzed: 4/23/14
Instrument: WetChem
Matrix: Leachate
Project: #60408; MRWPCA

WorkOrder: 1312545
BatchID: 89712
Extraction Method: SM2580Bm
Analytical Method: SM2580B, MAI
Unit: ±, mV vs. NHE

QC Summary Report for ORP (MAI)

SampID	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	RPD	Acceptance Criteria (%)
1312545-002D	577 @ 23.9°C	1	578 @ 24.0°C	1	0.27	<10

Client: Todd Engineering
Date Prepared: 4/24/14
Date Analyzed: 4/24/14
Instrument: WetChem
Matrix: Leachate
Project: #60408; MRWPCA

WorkOrder: 1312545
BatchID: 89743
Extraction Method: SM2580Bm
Analytical Method: SM2580B, MAI
Unit: ±, mV vs. NHE

QC Summary Report for ORP (MAI)

SampID	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	RPD	Acceptance Criteria (%)
1312650-001D	438 @ 24.3°C	1	439 @ 24.2°C	1	0.566	<10

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312545
Date Prepared:	4/22/14	**BatchID:**	89608
Date Analyzed:	4/23/14	**Extraction Method:**	SM4500H+B
Instrument:	WetChem	**Analytical Method:**	SM4500H+B
Matrix:	Leachate	**Unit:**	±, pH units @ 25°C
Project:	#60408; MRWPCA		

QC Summary Report for pH

SampID	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	Precision	Acceptance Criteria
1312545-002D	8.44	1	8.45	1	0.01	0.05

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Analytical Report

WorkOrder: 1312650

Report Created for: Todd Engineering
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501

Project Contact: Bill Motzer
Project P.O.:
Project Name: #60408; MRWPCA

Project Received: 12/20/2013

Analytical Report reviewed & approved for release on 05/16/2014 by:

Question about your data?

Click here to email McCampbell

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

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Glossary of Terms & Qualifier Definitions

Client: Todd Engineering
Project: #60408; MRWPCA
WorkOrder: 1312650

Glossary Abbreviation

95% Interval	95% Confident Interval
DF	Dilution Factor
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not detected at or above the indicated MDL or RL
NR	Matrix interferences, or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix; or sample diluted due to high matrix or analyte content.
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
TEQ	Toxicity Equivalence

Analytical Qualifier

B	analyte detected in the associated Method Blank
H	samples were analyzed out of holding time
S	spike recovery outside accepted recovery limits
a1	sample diluted due to matrix interference
a4	the reporting limits were raised due to the sample's matrix prohibiting a full volume extraction.
a7	reporting limit raised due to limited sample amount
a14	reporting limit raised due to the physical nature of the sample
a20	reporting limit raised due to matrix interference
c1	surrogate recovery outside of the control limits due to the dilution of the sample.
j1	see attached narrative

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Glossary of Terms & Qualifier Definitions

Client: Todd Engineering
Project: #60408; MRWPCA
WorkOrder: 1312650

Quality Control Qualifiers

F1	MS/MSD recovery was out of acceptance criteria; LCS validated the prep batch.
F2	LCS recovery for this compound is outside of acceptance limits.
F3	the surrogate standard recovery is outside of acceptance limits.

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Case Narrative

Client: Todd Engineering **Work Order:** 1312650
Project: #60408; MRWPCA May 16, 2014

McCampbell Analytical incorporated the following method for the extraction of all Leachate samples:

All Leachate samples were extracted at 1:5 ratio and rotated for 7 days using client-provided water as TCLP solution. Upon completion of rotation McCampbell Analytical centrifuged each extract for 12hrs and filtered through a 0.45 micron filter.

_____ Angela Rydelius, Lab Manager

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	E200.8
Date Received:	12/20/13 15:35	**Analytical Method:**	E200.8
Date Prepared:	4/23/14	**Unit:**	µg/L

Leachate Metals - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001D**	**Water/Dissolved**	**12/19/2013 14:00**	**ICP-MS1**	**89648**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	**970**	500	10	04/26/2014 01:54
Antimony	ND	5.0	10	04/26/2014 01:54
Arsenic	ND	5.0	10	04/26/2014 01:54
Barium	**50**	50	10	04/26/2014 01:54
Beryllium	ND	5.0	10	04/26/2014 01:54
Cadmium	**24**	2.5	10	04/26/2014 01:54
Calcium	**540,000**	10,000	100	05/01/2014 12:34
Chromium	ND	5.0	10	04/26/2014 01:54
Cobalt	**240**	5.0	10	04/26/2014 01:54
Copper	ND	5.0	10	04/26/2014 01:54
Iron	**48,000**	200	10	04/26/2014 01:54
Lead	ND	5.0	10	04/26/2014 01:54
Lithium	**140**	50	10	04/26/2014 01:54
Magnesium	**150,000**	1000	50	04/29/2014 01:40
Manganese	**4300**	200	10	04/26/2014 01:54
Mercury	ND	0.25	10	04/26/2014 01:54
Molybdenum	ND	5.0	10	04/26/2014 01:54
Nickel	**1800**	25	50	04/29/2014 01:40
Potassium	**20,000**	500	10	04/26/2014 01:54
Selenium	ND	5.0	10	04/26/2014 01:54
Silver	ND	1.9	10	04/26/2014 01:54
Sodium	**48,000**	1000	10	04/26/2014 01:54
Strontium	**3300**	200	10	04/26/2014 01:54
Thallium	ND	5.0	10	04/26/2014 01:54
Uranium	ND	5.0	10	04/26/2014 01:54
Vanadium	ND	5.0	10	04/26/2014 01:54
Zinc	**500**	50	10	04/26/2014 01:54

Analytical Comments: a1,a7,j1

(Cont.)

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	E200.8
Date Received:	12/20/13 15:35	**Analytical Method:**	E200.8
Date Prepared:	4/23/14	**Unit:**	µg/L

Leachate Metals - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 433.0-435.0	**1312650-002D**	**Water/Dissolved**	**12/19/2013 14:15**	**ICP-MS1**	**89648**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	ND	500	10	04/26/2014 02:00
Antimony	ND	5.0	10	04/26/2014 02:00
Arsenic	ND	5.0	10	04/26/2014 02:00
Barium	**200**	50	10	04/26/2014 02:00
Beryllium	ND	5.0	10	04/26/2014 02:00
Cadmium	ND	2.5	10	04/26/2014 02:00
Calcium	**6700**	1000	10	04/26/2014 02:00
Chromium	ND	5.0	10	04/26/2014 02:00
Cobalt	ND	5.0	10	04/26/2014 02:00
Copper	ND	5.0	10	04/26/2014 02:00
Iron	ND	200	10	04/26/2014 02:00
Lead	ND	5.0	10	04/26/2014 02:00
Lithium	ND	50	10	04/26/2014 02:00
Magnesium	**1900**	200	10	04/26/2014 02:00
Manganese	ND	200	10	04/26/2014 02:00
Mercury	ND	0.25	10	04/26/2014 02:00
Molybdenum	**14**	5.0	10	04/26/2014 02:00
Nickel	ND	5.0	10	04/26/2014 02:00
Potassium	**2500**	500	10	04/26/2014 02:00
Selenium	ND	5.0	10	04/26/2014 02:00
Silver	ND	1.9	10	04/26/2014 02:00
Sodium	**25,000**	1000	10	04/26/2014 02:00
Strontium	ND	200	10	04/26/2014 02:00
Thallium	ND	5.0	10	04/26/2014 02:00
Uranium	ND	5.0	10	04/26/2014 02:00
Vanadium	ND	5.0	10	04/26/2014 02:00
Zinc	ND	50	10	04/26/2014 02:00

Analytical Comments: a1,a7,j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	E200.7
Date Received:	12/20/13 15:35	**Analytical Method:**	E200.7
Date Prepared:	4/22/14	**Unit:**	µg/L

Leachate Phosphorus - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001D**	**Water/Dissolved**	**12/19/2013 14:00**	**ICP-JY**	**89607**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	ND	500	10	05/02/2014 14:04

Analytical Comments: a7,j1

MW-1: 433.0-435.0	**1312650-002D**	**Water/Dissolved**	**12/19/2013 14:15**	**ICP-JY**	**89607**

Analytes	Result	RL	DF	Date Analyzed
Phosphorous	ND	500	10	05/02/2014 14:06

Analytical Comments: a7,j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	E200.7
Date Received:	12/20/13 15:35	**Analytical Method:**	200.7
Date Prepared:	4/22/14	**Unit:**	µg/L

Leachate Silicon - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001D**	**Water/Dissolved**	**12/19/2013 14:00**	**ICP-JY**	**89609**

Analytes	Result	RL	DF	Date Analyzed
Silicon	**24,000**	500	10	05/02/2014 12:43

Analytical Comments: j1

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 433.0-435.0	**1312650-002D**	**Water/Dissolved**	**12/19/2013 14:15**	**ICP-JY**	**89609**

Analytes	Result	RL	DF	Date Analyzed
Silicon	**10,000**	500	10	05/02/2014 12:45

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	E218.6
Date Received:	12/20/13 15:35	**Analytical Method:**	E218.6
Date Prepared:	4/22/14	**Unit:**	µg/L

Leachate Hexachrome by IC - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001D**	**Water**	**12/19/2013 14:00**	**IC2**	**89600**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Hexachrome	ND	BH	0.20	1	04/24/2014 15:28

Analytical Comments: j1

MW-1: 433.0-435.0	**1312650-002D**	**Water**	**12/19/2013 14:15**	**IC2**	**89600**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Hexachrome	ND	BH	0.20	1	04/24/2014 15:48

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	E300.1
Date Received:	12/20/13 15:35	**Analytical Method:**	E300.1
Date Prepared:	4/22/14	**Unit:**	mg/L

Leachate Inorganic Anions by IC - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001D**	**Water**	**12/19/2013 14:00**	**IC3**	**89601**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Bromide	ND	H	0.10	1	04/24/2014 18:13
Chloride	**22**	BH	1.0	10	04/25/2014 14:39
Fluoride	**1.1**	H	0.10	1	04/24/2014 18:13
Nitrate as N	**0.61**	BH	0.10	1	04/24/2014 18:13
Nitrate as $NO3^-$	**2.7**	BH	0.45	1	04/24/2014 18:13
Nitrite as N	ND	H	0.10	1	04/24/2014 18:13
Nitrite as $NO2^-$	ND	H	0.33	1	04/24/2014 18:13
Sulfate	**2000**	BH	100	1000	04/24/2014 20:59

Surrogates	REC (%)	Qualifiers	Limits	Analytical Comments: j1	
Formate	99	H	90-115		04/25/2014 14:39

MW-1: 433.0-435.0	**1312650-002D**	**Water**	**12/19/2013 14:15**	**IC3**	**89601**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Bromide	ND	H	0.10	1	04/24/2014 18:55
Chloride	**22**	BH	1.0	10	04/24/2014 21:40
Fluoride	**0.14**	H	0.10	1	04/24/2014 18:55
Nitrate as N	**0.67**	BH	0.10	1	04/24/2014 18:55
Nitrate as $NO3^-$	**3.0**	BH	0.45	1	04/24/2014 18:55
Nitrite as N	ND	H	0.10	1	04/24/2014 18:55
Nitrite as $NO2^-$	ND	H	0.33	1	04/24/2014 18:55
Sulfate	**0.88**	BH	0.10	1	04/24/2014 18:55

Surrogates	REC (%)	Qualifiers	Limits	Analytical Comments: j1	
Formate	107	H	90-115		04/24/2014 18:55

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	SM2320B
Date Received:	12/20/13 15:35	**Analytical Method:**	SM2320B
Date Prepared:	4/29/14	**Unit:**	mg $CaCO_3$/L

Total & Speciated Alkalinity as CaCO3 (Leachate) - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001D**	**Water**	**12/19/2013 14:00**	**Titrino**	**89602**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Total	**1.07**	H	1.00	1	04/29/2014 11:06
Carbonate	ND	H	1.00	1	04/29/2014 11:06
Bicarbonate	**1.07**	H	1.00	1	04/29/2014 11:06
Hydroxide	ND	H	1.00	1	04/29/2014 11:06

Analytical Comments: j1

MW-1: 433.0-435.0	**1312650-002D**	**Water**	**12/19/2013 14:15**	**Titrino**	**89602**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Total	**44.7**	H	1.00	1	04/29/2014 10:59
Carbonate	ND	H	1.00	1	04/29/2014 10:59
Bicarbonate	**44.7**	H	1.00	1	04/29/2014 10:59
Hydroxide	ND	H	1.00	1	04/29/2014 10:59

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	E350.1
Date Received:	12/20/13 15:35	**Analytical Method:**	E350.1
Date Prepared:	4/22/14	**Unit:**	mg/L

Leachate Ammonia as N - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001D**	**Water**	**12/19/2013 14:00**	**SKALAR**	**89603**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Total Ammonia as N	**1.8**	H	0.10	1	04/29/2014 16:32

Analytical Comments: j1

MW-1: 433.0-435.0	**1312650-002D**	**Water**	**12/19/2013 14:15**	**SKALAR**	**89603**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Total Ammonia as N	**0.27**	H	0.10	1	04/29/2014 16:36

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	SM4500-Cl DE
Date Received:	12/20/13 15:35	**Analytical Method:**	SM4500-Cl DE
Date Prepared:	4/24/14	**Unit:**	mg/L

Chlorine, Total Residual [Leachate] - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001D**	**Water**	**12/19/2013 14:00**	**Titrino**	**89615**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Chlorine	ND	BH	0.40	10	04/24/2014 15:34

Analytical Comments: a7,j1

MW-1: 433.0-435.0	**1312650-002D**	**Water**	**12/19/2013 14:15**	**Titrino**	**89615**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Chlorine	**0.74**	BH	0.40	10	04/24/2014 15:38

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	E415.3
Date Received:	12/20/13 15:35	**Analytical Method:**	E415.3
Date Prepared:	4/22/14	**Unit:**	mg/L

Inorganic Carbon as Carbon Dioxide [Leachate] - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001D**	**Water**	**12/19/2013 14:00**	**TOC_CNS**	**89605**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
IC as CO2	**10**	H	3.7	1	04/30/2014 14:52

Analytical Comments: j1

MW-1: 433.0-435.0	**1312650-002D**	**Water**	**12/19/2013 14:15**	**TOC_CNS**	**89605**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
IC as CO2	**41**	H	3.7	1	04/30/2014 14:59

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	E415.3
Date Received:	12/20/13 15:35	**Analytical Method:**	E415.3
Date Prepared:	4/22/14	**Unit:**	mg/L

Dissolved Organic Carbon (DOC) [Leachate] - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001D**	**Water**	**12/19/2013 14:00**	**TOC_SHIMADZU**	**89604**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Dissolved Organic Carbon	**6.4**	H	0.70	1	04/29/2014 17:35

Analytical Comments: j1

MW-1: 433.0-435.0	**1312650-002D**	**Water**	**12/19/2013 14:15**	**TOC_SHIMADZU**	**89604**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Dissolved Organic Carbon	**1.2**	H	0.70	1	04/29/2014 17:47

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	SM4500 S-2 D
Date Received:	12/20/13 15:35	**Analytical Method:**	SM4500 S-2 D
Date Prepared:	4/24/14	**Unit:**	mg/L

Leachate Sulfide - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001D**	**Water**	**12/19/2013 14:00**	**SPECTROPHOTOMETER**	**89610**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Sulfide	ND	H	0.050	1	04/24/2014 20:50

Analytical Comments: j1

MW-1: 433.0-435.0	**1312650-002D**	**Water**	**12/19/2013 14:15**	**SPECTROPHOTOMETER**	**89610**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Sulfide	ND	H	0.050	1	04/24/2014 21:10

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	E351.2
Date Received:	12/20/13 15:35	**Analytical Method:**	E351.2
Date Prepared:	4/29/14	**Unit:**	mg/L

Total Kjeldahl Nitrogen (Leachate) - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001D**	**Water**	**12/19/2013 14:00**	**SKALAR**	**89597**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
TKN as N	**2.3**	H	0.30	1	04/30/2014 15:17

Analytical Comments: j1

MW-1: 433.0-435.0	**1312650-002D**	**Water**	**12/19/2013 14:15**	**SKALAR**	**89597**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
TKN as N	**0.39**	H	0.30	1	04/30/2014 15:20

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	SM2580Bm
Date Received:	12/20/13 15:35	**Analytical Method:**	SM2580B, MAI
Date Prepared:	4/24/14	**Unit:**	±, mV vs. NHE

Oxidation-Reduction Potential (ORP) (Leachate) - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001D**	**Water**	**12/19/2013 14:00**	**WetChem**	**89743**

Analytes	Result	Accuracy	DF	Date Analyzed
ORP	**438 @ 24.3°C**	10	1	04/24/2014 16:45

Analytical Comments: j1

MW-1: 433.0-435.0	**1312650-002D**	**Water**	**12/19/2013 14:15**	**WetChem**	**89743**

Analytes	Result	Accuracy	DF	Date Analyzed
ORP	**649 @ 26.4°C**	10	1	04/24/2014 16:55

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	SM4500H+B
Date Received:	12/20/13 15:35	**Analytical Method:**	SM4500H+B
Date Prepared:	4/24/14	**Unit:**	±, pH units @ 25°C

Leachate pH - Using Client-Provided Water as TCLP Solution

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001D**	**Water**	**12/19/2013 14:00**	**WetChem**	**89725**

Analytes	Result	Qualifiers	Accuracy	DF	Date Analyzed
pH	**5.04**	H	0.05	1	04/24/2014 16:27

Analytical Comments: j1

MW-1: 433.0-435.0	**1312650-002D**	**Water**	**12/19/2013 14:15**	**WetChem**	**89725**

Analytes	Result	Qualifiers	Accuracy	DF	Date Analyzed
pH	**7.84**	H	0.05	1	04/24/2014 16:33

Analytical Comments: j1

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Analytical Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Project:	#60408; MRWPCA	**Extraction Method:**	SM2130B
Date Received:	12/20/13 15:35	**Analytical Method:**	SM2130B
Date Prepared:	5/27/14	**Unit:**	NTU

Turbidity

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MW-1: 398.5-401.0	**1312650-001D**	**Water**	**12/19/2013 14:00**	**WetChem**	**91343**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Turbidity	**6.97**	H	0.100	1	05/27/2014 14:45

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	4/23/14	**BatchID:**	89648
Date Analyzed:	5/1/14	**Extraction Method:**	E200.8
Instrument:	ICP-MS1	**Analytical Method:**	E200.8
Matrix:	Water	**Unit:**	µg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89648

QC Summary Report for E200.8

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Aluminum	ND	468	50	500	-	93.6	85-115
Antimony	ND	47.4	0.50	50	-	94.8	85-115
Arsenic	ND	48.2	0.50	50	-	96.3	85-115
Barium	ND	453	5.0	500	-	90.6	85-115
Beryllium	ND	46.8	0.50	50	-	93.6	85-115
Cadmium	ND	46.9	0.25	50	-	93.8	85-115
Calcium	ND	4820	100	5000	-	96.4	85-115
Chromium	ND	45.5	0.50	50	-	91.1	85-115
Cobalt	ND	47.8	0.50	50	-	95.6	85-115
Copper	ND	47.2	0.50	50	-	94.5	85-115
Iron	ND	491	20	500	-	98.2	85-115
Lead	ND	47.6	0.50	50	-	95.3	85-115
Lithium	ND	47.8	5.0	50	-	95.5	85-115
Magnesium	ND	479	20	500	-	95.9	85-115
Manganese	ND	472	20	500	-	94.4	85-115
Mercury	ND	1.10	0.025	1.25	-	87.8	85-115
Molybdenum	ND	46.1	0.50	50	-	92.2	85-115
Nickel	ND	46.8	0.50	50	-	93.7	85-115
Potassium	ND	452	50	500	-	90.4	85-115
Selenium	ND	48.1	0.50	50	-	96.2	85-115
Silver	ND	46.9	0.19	50	-	93.7	85-115
Sodium	ND	4880	100	5000	-	97.6	85-115
Strontium	ND	477	20	500	-	95.3	85-115
Thallium	ND	47.4	0.50	50	-	94.9	85-115
Uranium	ND	45.9	0.50	50	-	91.8	85-115
Vanadium	ND	45.6	0.50	50	-	91.2	85-115
Zinc	ND	476	5.0	500	-	95.3	85-115

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	4/22/14	**BatchID:**	89607
Date Analyzed:	5/2/14	**Extraction Method:**	E200.7
Instrument:	ICP-JY	**Analytical Method:**	E200.7
Matrix:	Water	**Unit:**	µg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89607

QC Summary Report for E200.7

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Phosphorous	ND	1020	100	1000	-	102	80-120

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	4/22/14	**BatchID:**	89609
Date Analyzed:	5/2/14	**Extraction Method:**	E200.7
Instrument:	ICP-JY	**Analytical Method:**	200.7
Matrix:	Water	**Unit:**	µg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89609

QC Summary Report for E200.7

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Silicon	ND	913	50	1000	-	91.3	80-120

QA/QC Officer

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	4/22/14	**BatchID:**	89600
Date Analyzed:	4/23/14	**Extraction Method:**	E218.6
Instrument:	IC2	**Analytical Method:**	E218.6
Matrix:	Leachate	**Unit:**	µg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89600 1312545-003DMS/MSD

QC Summary Report for E218.6

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Hexachrome	0.210	23.3	0.20	25	-	93.2	90-110

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Hexachrome	24.7	24.6	25	1.620	92.5	92	90-110	0.446	10

SH QA/QC Officer

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	4/22/14	**BatchID:**	89601
Date Analyzed:	4/24/14 - 4/25/14	**Extraction Method:**	E300.1
Instrument:	IC3	**Analytical Method:**	E300.1
Matrix:	Leachate	**Unit:**	mg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89601 1312545-003DMS/MSD

QC Summary Report for E300.1

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Bromide	ND	0.964	0.10	1	-	96.4	85-115
Chloride	20.0	20.9	0.10	1	-	2090, F2	85-115
Fluoride	ND	1.10	0.10	1	-	110	85-115
Nitrate as N	0.647	1.62	0.10	1	-	162, F2	85-115
Nitrate as $NO3^-$	2.86	7.15	0.45	4.4	-	163, F2	85-115
Nitrite as N	ND	0.981	0.10	1	-	98.1	85-115
Nitrite as $NO2^-$	ND	3.24	0.33	3.3	-	98.1	85-115
Sulfate	0.121	1.10	0.10	1	-	110	85-115
Surrogate Recovery							
Formate	0.106	0.103		0.10	106	103	90-115

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Bromide	1.03	1.07	1	ND	103	107	85-115	3.31	15
Chloride	NR	NR	1	20.23	NR	NR	85-115	NR	15
Fluoride	1.32	1.34	1	0.2204	110	112	85-115	1.06	15
Nitrate as N	1.77	1.76	1	0.6401	113	112	85-115	0.298	15
Nitrate as $NO3^-$	7.83	7.81	4.4	2.834	114	113	85-115	0.298	15
Nitrite as N	1.07	1.07	1	ND	107	107	85-115	0	15
Nitrite as $NO2^-$	3.53	3.54	3.3	ND	107	107	85-115	0	15
Sulfate	1.53	1.53	1	0.4226	111	111	85-115	0	15
Surrogate Recovery									
Formate	0.104	0.104	0.10		104	104	90-115	0	10

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	4/22/14 - 4/23/14	**BatchID:**	89602
Date Analyzed:	4/29/14	**Extraction Method:**	SM2320B
Instrument:	Titrino	**Analytical Method:**	SM2320B
Matrix:	Leachate	**Test Method:**	SM2320B (Alkalinity)
Project:	#60408; MRWPCA		

QC Summary Report for SM2320B (Alkalinity)

Lab ID	Analyte	Reporting Units	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	RPD	Acceptance Criteria (%)
1312650-001D	Total	mg $CaCO_3$/L	1.07	1	ND	1	N/A	<20
1312650-002D	Total	mg $CaCO_3$/L	44.7	1	46.0	1	2.93	<20

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	4/22/14	**BatchID:**	89603
Date Analyzed:	4/29/14	**Extraction Method:**	E350.1
Instrument:	SKALAR	**Analytical Method:**	E350.1
Matrix:	Water	**Unit:**	mg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89603

QC Summary Report for E350.1

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Total Ammonia as N	ND	3.80	0.10	4	-	95.1	90-110

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	4/22/14	**BatchID:**	89615
Date Analyzed:	4/23/14	**Extraction Method:**	SM4500-Cl DE
Instrument:	Titrino	**Analytical Method:**	SM4500-Cl DE
Matrix:	Water	**Unit:**	mg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB-89615

QC Summary Report for Chlorine

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Chlorine	2.13	-	0.40	-	-	-	-

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	4/22/14	**BatchID:**	89605
Date Analyzed:	4/30/14	**Extraction Method:**	E415.3
Instrument:	TOC_CNS	**Analytical Method:**	E415.3
Matrix:	Water	**Unit:**	mg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89605

QC Summary Report for E415.3

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
IC as CO2	ND	38.3	3.7	36.7	-	104	80-120

QA/QC Officer

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	4/22/14	**BatchID:**	89604
Date Analyzed:	4/29/14	**Extraction Method:**	E415.3
Instrument:	TOC_SHIMADZU	**Analytical Method:**	E415.3
Matrix:	Water	**Unit:**	mg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89604

QC Summary Report for E415.3

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TOC	ND	49.6	0.30	50	-	99.2	80-120

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	4/22/14	**BatchID:**	89610
Date Analyzed:	5/1/14	**Extraction Method:**	SM4500 S-2 D
Instrument:	SPECTROPHOTOMETER	**Analytical Method:**	SM4500 S-2 D
Matrix:	Water	**Unit:**	mg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89610 1402489-001BMS/MSD

QC Summary Report For SM4500S2D

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Sulfide	ND	2.36	0.050	2.5	-	94.5	80-120

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Sulfide	2.03	2.03	2.5	ND	81.3	81.4	75-125	0.0975	20

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	4/22/14	**BatchID:**	89597
Date Analyzed:	4/30/14	**Extraction Method:**	E351.2
Instrument:	SKALAR	**Analytical Method:**	E351.2
Matrix:	Water	**Unit:**	mg/L
Project:	#60408; MRWPCA	**Sample ID:**	MB/LCS-89597

QC Summary Report for E351.2 (TKN as N)

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TKN as N	ND	11.3	0.30	12	-	93.9	90-110

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	4/24/14	**BatchID:**	89743
Date Analyzed:	4/24/14	**Extraction Method:**	SM2580Bm
Instrument:	WetChem	**Analytical Method:**	SM2580B, MAI
Matrix:	Leachate	**Unit:**	±, mV vs. NHE
Project:	#60408; MRWPCA		

QC Summary Report for ORP (MAI)

SampID	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	RPD	Acceptance Criteria (%)
1312650-001D	438 @ 24.3°C	1	439 @ 24.2°C	1	0.566	<10

QA/QC Officer

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Quality Control Report

Client:	Todd Engineering	**WorkOrder:**	1312650
Date Prepared:	4/24/14	**BatchID:**	89725
Date Analyzed:	4/24/14	**Extraction Method:**	SM4500H+B
Instrument:	WetChem	**Analytical Method:**	SM4500H+B
Matrix:	Leachate	**Unit:**	±, pH units @ 25°C
Project:	#60408; MRWPCA		

QC Summary Report for pH

SampID	Sample Result	Sample DF	Dup / Serial Dilution Result	Dup / Serial Dilution DF	Precision	Acceptance Criteria
1312650-001D	5.04	1	5.05	1	0.01	0.05

SH QA/QC Officer

Case Narrative

Client: Todd Engineering **Work Order:** 1312545
Project: #60408; MRWPCA May 16, 2014

Leaching Procedure

For the leaching procedure, 160 grams of sample and 800 milliliters of pilot water (1g:5ml ratio) solution were rotated for 7 days (Associated Design & Manufacturing TCLP Rotator Model 3740-12BRE-11). Immediately following rotation, the leachate was poured into 60 milliliter vials and centrifuged for 12 hours at 2,500 RPMs, with the exception for #1312545-006 (297.0 - 298.5 feet) which was centrifuged for 16 hours to address residual elevated turbidity following 12 hours of centrifuging. Leachate from each vial was filtered through 0.45 micron filter prior to analysis of selected constituents.

Case Narrative: Turbidity study, results and recommendations for WO 1312545, 1312650 & 1402489

Initial leachate extracts that were obtained at a 2:1 water:sediment ratio and rotated for 7 days, then filtered through 0.7um glass fiber filters. They contained copious sediment, high turbidity, and 100-300mg/L Al, and were deemed to be unusable to evaluate trace and minor element leaching of the sediment by the pilot water.

To determine the most appropriate extraction procedure, two of the samples were mixed in 1:5 wt ratio with the pilot water by vortexing for 30 minutes, then centrifuged for 6, 12 and 24 hours at 2,500 rpms. Turbidity and CAM17+ metals were measured on each including the pilot water. All sample were filtered thru a 0.45um filter prior to measurements and the metals samples were preserved with standard 2% HNO3 after filtration.

The results are broadly similar for the various centrifugation times for the sediments. Although Al shows differences, all of its values are reasonably small (<1ppm). There is some loss of Fe & Mn, & occasional other elements as centrifuge times are increased. Turbidity results are noted below followed by metals data.

We selected 12 hours as the best compromise, based on retention of trace elements, and our extraction supervisor's observation that it filtered much more easily than the 6hr centrifuged equivalent. We have limited centrifuge capacity available for this size sample container so 12hr is helpful relative to 24hr for more reasonable turn around time.

Turbidity Results (NTU):

- 6hr, centrifuge, MB-before filtration= 0.075
- 6hr, centrifuge, MB-after filtration = 0.075

- 12hr, centrifuge, MB-before filtration= 0.075
- 12hr, centrifuge, MB-after filtration= 0.075

- 24hr, centrifuge, MB-before filtration= 0.075
- 24hr, centrifuge, MB-after filtration= 0.075

- 6hr, centrifuge, 1312545-004A before filtration= 141
- 6hr, centrifuge, 1312545-004A after filtered= 12

- 12hr, centrifuge, 1312545-004A before filtration= 84
- 12hr, centrifuge, 1312545-004A after filtered= 12

- 24hr, centrifuge, 1312545-004A before filtration= 4.0 - Aberrant
- 24hr, centrifuge, 1312545-004A after filtration= 0.9 – Aberrant

- 6hr, centrifuge, 1312545-006A before filtration= 506
- 6hr, centrifuge, 1312545-006A after filtered= 25

- 12hr, centrifuge, 1312545-006A before filtration= 685
- 12hr, centrifuge, 1312545-006A after filtered= 31

- 24hr, centrifuge, 1312545-006A before filtration= 153

- 24hr, centrifuge, 1312545-006A after filtration= 95

Vortage for 30min + Centrifuge 6hr/12hr/24hr

C:\ICPCHEM\1\DATA\041414_A.B\204SMPL.D\204SMPL.D#

1402489 = PILOT WATER

Vortex 30 minutes, Centrifuge 6hrs

Turbidity = 0.075NTU

MB - 6hr

Sample QC Report

Data File:	C:\ICPCHEM\1\DATA\041414_A.B\204SMPL.D\204SMPL.D#
Date Acquired:	Apr 15 2014 05:33 am
Operator:	
Sample Name:	mb cam di w
Misc Info:	6hr cent. filter with 0.45uM
Current Method:	C:\ICPCHEM\1\METHODS\5point_Z.M
Calibration File:	C:\ICPCHEM\1\CALIB\5point_Z.C
Last Cal Update:	Apr 12 2014 10:36 pm
Vial Number:	3105
Sample Type:	Sample
Frep Dil Factor:	1.00
Total Dil Factor:	1.00

Step	Tune Name
#1	h2.u
#2	he.u
#3	norm.u
#4	

T = 0.075

Read this Column
ug/L

QC Elements

Element			Conc.	Corr. Conc.	RSD(%)	High Limit	Flag
27	aluminium	# 3	-2.5090 ppb	-2.5090	14.05	1100	
121	antimony	# 3	-0.0673 ppb	-0.0673	7.22	110	
75	arsenic	# 2	0.0510 ppb	0.0510	60.08	110	
137	barium	# 3	346.3000 ppb	346.3000	5.59	1100	
9	beryllium	# 3	0.0253 ppb	0.0253	53.40	110	
11	boron	# 3	920.8000 ppb	920.8000	4.37	110	high
114	cadmium	# 3	0.0230 ppb	0.0230	28.26	110	
40	calcium	# 1	8665.0000 ppb	8665.0000	1.36	11000	
52	chromium	# 2	0.4828 ppb	0.4828	5.60	110	
59	cobalt	# 3	0.0170 ppb	0.0170	31.11	110	
63	copper	# 2	0.4289 ppb	0.4289	8.59	110	
56	iron	# 1	-0.3989 ppb	-0.3989	4.93	11000	
208	lead	# 3	0.0241 ppb	0.0241	5.14	110	
7	lithium	# 3	1.4370 ppb	1.4370	7.28	110	
24	magnesium	# 3	71.0800 ppb	71.0800	5.31	11000	
55	manganese	# 3	0.0328 ppb	0.0328	52.68	11000	
202	mercury	# 3	0.0390 ppb	0.0390	16.01	3	
201	mercury	# 2	0.0469 ppb	0.0469	11.20	3	
201	mercury	# 3	0.0495 ppb	0.0495	4.23	3	
95	molybdenum	# 3	0.0534 ppb	0.0534	42.50	110	
60	nickel	# 2	0.0279 ppb	0.0279	120.87	110	
39	potassium	# 3	1432.0000 ppb	1432.0000	5.37	11000	
78	selenium	# 1	-0.0266 ppb	-0.0266	213.82	110	
107	silver	# 3	0.1437 ppb	0.1437	11.55	110	
23	sodium	# 1	18990.0000 ppb	18990.0000	0.60	11000	high
88	strontium	# 3	11.9800 ppb	11.9800	4.36	1100	
159	terbium	# 3	-0.0031 ppb	-0.0031	51.80	1100	
159	terbium	# 1	-0.0119 ppb	-0.0119	2.10	1100	
159	terbium	# 2	-0.0049 ppb	-0.0049	36.75	1100	
205	thallium	# 3	0.0014 ppb	0.0014	96.24	110	
232	thorium	# 3	-0.1696 ppb	-0.1696	4.35	110	
118	tin	# 3	-0.2392 ppb	-0.2392	3.39	110	
47	titanium	# 3	0.1066 ppb	0.1066	23.24	110	
182	tungsten	# 3	0.0050 ppb	0.0050	155.87	11	
238	uranium	# 3	-0.0005 ppb	-0.0005	114.13	110	
51	vanadium	# 2	0.0212 ppb	0.0212	162.76	110	
66	zinc	# 3	22.1100 ppb	22.1100	4.35	1100	
66	zinc	# 2	22.1600 ppb	22.1600	0.41	1100	

ISTD Elements

Element			CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
209	bismuth	# 2	521901.50	0.36	593621.81	87.9	60 - 125	
209	bismuth	# 3	1523731.80	4.86	1712813.00	89.0	60 - 125	
72	germanium	# 3	457742.66	3.89	439661.75	104.1	60 - 125	
72	germanium	# 2	32137.96	0.37	31666.97	101.5	60 - 125	
72	germanium	# 1	350712.47	0.38	340631.78	103.0	60 - 125	
165	holmium	# 3	2250388.80	4.41	2420327.50	93.0	60 - 125	
165	holmium	# 1	1729476.30	0.40	1888396.90	91.6	60 - 125	
165	holmium	# 2	668976.44	0.53	726423.19	92.1	60 - 125	
115	indium	# 3	1474584.00	5.55	1464354.30	100.7	60 - 125	
6	lithium	# 3	656104.56	3.28	645804.63	101.6	60 - 125	
45	scandium	# 1	768445.63	0.69	722619.00	106.3	60 - 125	
45	scandium	# 2	20697.71	0.67	20182.60	102.6	60 - 125	
45	scandium	# 3	1042508.30	4.75	957419.69	108.9	60 - 125	

ISTD Ref File : C:\ICPCHEM\1\DATA\041214_A.B\010CALB.D\010CALB.D#

2 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: **Fail**
ISTD: **Pass**

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\041414_A.B\203SMPL.D\203SMPL.D#
Date Acquired: Apr 15 2014 05:27 am
Operator:
Sample Name: mb cam di w
Misc Info: 12hr cent. filter with 0.45uM
Current Method: C:\ICPCHEM\1\METHODS\5point_Z.M
Calibration File: C:\ICPCHEM\1\CALIB\5point_Z.C
Last Cal Update: Apr 12 2014 10:36 pm
Vial Number: 3101
Sample Type: Sample
Prep Dil Factor: 1.00
Total Dil Factor: 1.00

MB-12hr

Step	Tune Name
#1	h2.u
#2	he.u
#3	norm.u
#4	

1402489 = PILOT WATER

Vortex 30 minutes, Centrifuge 12hrs

Turbidity = 0.075NTU

Read this Column
ug/L

T= 0.075

QC Elements

Element			Conc.	Corr. Conc.	RSD(%)	High Limit	Flag
27	aluminium	# 3	-4.1890 ppb	-4.1890	9.71	1100	
121	antimony	# 3	-0.0741 ppb	-0.0741	3.49	110	
75	arsenic	# 2	0.0714 ppb	0.0714	122.93	110	
137	barium	# 3	400.0000 ppb	400.0000	7.37	1100	
9	beryllium	# 3	0.0277 ppb	0.0277	21.65	110	
11	boron	# 3	1027.0000 ppb	1027.0000	5.51	110	high
114	cadmium	# 3	0.0196 ppb	0.0196	76.05	110	
40	calcium	# 1	8619.0000 ppb	8619.0000	0.86	11000	
52	chromium	# 2	0.7682 ppb	0.7682	6.16	110	
59	cobalt	# 3	0.0267 ppb	0.0267	15.02	110	
63	copper	# 2	0.5410 ppb	0.5410	8.98	110	
56	iron	# 1	-0.6128 ppb	-0.6128	5.50	11000	
208	lead	# 3	0.0637 ppb	0.0637	10.61	110	
7	lithium	# 3	1.9230 ppb	1.9230	9.14	110	
24	magnesium	# 3	66.5400 ppb	66.5400	6.82	11000	
55	manganese	# 3	0.1142 ppb	0.1142	32.26	11000	
202	mercury	# 3	0.0398 ppb	0.0398	3.33	3	
201	mercury	# 2	0.0387 ppb	0.0387	8.48	3	
201	mercury	# 3	0.0468 ppb	0.0468	17.31	3	
95	molybdenum	# 3	0.0567 ppb	0.0567	41.23	110	
60	nickel	# 2	0.0819 ppb	0.0819	26.76	110	
39	potassium	# 3	1367.0000 ppb	1367.0000	7.34	11000	
78	selenium	# 1	0.0210 ppb	0.0210	53.90	110	
107	silver	# 3	-0.0005 ppb	-0.0005	396.97	110	
23	sodium	# 1	19090.0000 ppb	19090.0000	0.91	11000	high
88	strontium	# 3	12.2600 ppb	12.2600	5.55	1100	
159	terbium	# 3	0.0018 ppb	0.0018	75.48	1100	
159	terbium	# 1	-0.0099 ppb	-0.0099	17.93	1100	
159	terbium	# 2	-0.0028 ppb	-0.0028	64.71	1100	
205	thallium	# 3	0.0041 ppb	0.0041	42.32	110	
232	thorium	# 3	-0.1266 ppb	-0.1266	5.97	110	
118	tin	# 3	-0.2286 ppb	-0.2286	3.08	110	
47	titanium	# 3	0.1493 ppb	0.1493	3.04	110	
182	tungsten	# 3	0.0449 ppb	0.0449	13.84	11	
238	uranium	# 3	0.0020 ppb	0.0020	36.32	110	
51	vanadium	# 2	-0.0054 ppb	-0.0054	328.16	110	
66	zinc	# 3	19.5800 ppb	19.5800	6.26	1100	
66	zinc	# 2	20.4000 ppb	20.4000	6.17	1100	

ISTD Elements

Element			CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
209	bismuth	# 2	522421.97	0.62	593621.81	88.0	60 - 125	
209	bismuth	# 3	1592413.00	7.96	1712813.00	93.0	60 - 125	
72	germanium	# 3	473755.88	6.77	439661.75	107.8	60 - 125	
72	germanium	# 2	31934.78	1.08	31666.97	100.8	60 - 125	
72	germanium	# 1	351403.09	1.31	340631.78	103.2	60 - 125	
165	holmium	# 3	2351650.30	8.28	2420327.50	97.2	60 - 125	
165	holmium	# 1	1724841.00	0.24	1888396.90	91.3	60 - 125	
165	holmium	# 2	665500.69	0.68	726423.19	91.6	60 - 125	
115	indium	# 3	1533404.60	8.96	1464354.30	104.7	60 - 125	
6	lithium	# 3	679167.25	6.59	645804.63	105.2	60 - 125	
45	scandium	# 1	766938.13	1.12	722619.00	106.1	60 - 125	
45	scandium	# 2	20465.21	0.58	20182.60	101.4	60 - 125	
45	scandium	# 3	1085895.60	7.86	957419.69	113.4	60 - 125	

ISTD Ref File : C:\ICPCHEM\1\DATA\041214_A.B\010CALB.D\010CALB.D#

2 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Sample QC Report

Data File:	C:\ICPCHEM\1\DATA\041414_A.B\205SMPL.D\205SMPL.D#
Date Acquired:	Apr 15 2014 05:40 am
Operator:	
Sample Name:	mb cam di w
Misc Info:	24hr test
Current Method:	C:\ICPCHEM\1\METHODS\5point_Z.M
Calibration File:	C:\ICPCHEM\1\CALIB\5point_Z.C
Last Cal Update:	Apr 12 2014 10:36 pm
Vial Number:	3108
Sample Type:	Sample
Prep Dil Factor:	1.00
Total Dil Factor:	1.00

MB - 24hr

1402489 = PILOT WATER

Vortex 30 minutes, Centrifuge 24hrs

Turbidity = 0.075NTU

Step	Tune Name
#1	h2.u
#2	he.u
#3	norm.u
#4	

Read this Column
ug/L

T=0.075

QC Elements

Element			Conc.	Corr. Conc.	RSD(%)	High Limit	Flag
27	aluminium	# 3	9.0400 ppb	9.0400	7.09	1100	
121	antimony	# 3	-0.0729 ppb	-0.0729	1.05	110	
75	arsenic	# 2	0.1108 ppb	0.1108	25.84	110	
137	barium	# 3	257.2000 ppb	257.2000	2.89	1100	
9	beryllium	# 3	0.0380 ppb	0.0380	28.71	110	
11	boron	# 3	1153.0000 ppb	1153.0000	1.85	110	**high**
114	cadmium	# 3	0.0224 ppb	0.0224	34.34	110	
40	calcium	# 1	9042.0000 ppb	9042.0000	2.39	11000	
52	chromium	# 2	0.7370 ppb	0.7370	6.00	110	
59	cobalt	# 3	0.0379 ppb	0.0379	10.44	110	
63	copper	# 2	0.3818 ppb	0.3818	9.21	110	
56	iron	# 1	-0.0621 ppb	-0.0621	94.90	11000	
208	lead	# 3	0.0354 ppb	0.0354	6.10	110	
7	lithium	# 3	2.3860 ppb	2.3860	7.82	110	
24	magnesium	# 3	169.7000 ppb	169.7000	3.50	11000	
55	manganese	# 3	0.1127 ppb	0.1127	13.51	11000	
202	mercury	# 3	0.0419 ppb	0.0419	6.14	3	
201	mercury	# 2	0.0356 ppb	0.0356	9.58	3	
201	mercury	# 3	0.0521 ppb	0.0521	6.34	3	
95	molybdenum	# 3	0.0441 ppb	0.0441	29.41	110	
60	nickel	# 2	0.1007 ppb	0.1007	44.48	110	
39	potassium	# 3	1442.0000 ppb	1442.0000	3.64	11000	
78	selenium	# 1	0.0671 ppb	0.0671	128.81	110	
107	silver	# 3	0.0006 ppb	0.0006	175.73	110	
23	sodium	# 1	20250.0000 ppb	20250.0000	2.50	11000	**high**
88	strontium	# 3	10.0600 ppb	10.0600	3.26	1100	
159	terbium	# 3	-0.0022 ppb	-0.0022	19.75	1100	
159	terbium	# 1	-0.0120 ppb	-0.0120	5.22	1100	
159	terbium	# 2	-0.0041 ppb	-0.0041	68.33	1100	
205	thallium	# 3	0.0013 ppb	0.0013	33.36	110	
232	thorium	# 3	-0.2048 ppb	-0.2048	2.86	110	
118	tin	# 3	-0.2355 ppb	-0.2355	0.56	110	
47	titanium	# 3	0.2199 ppb	0.2199	37.84	110	
182	tungsten	# 3	0.0577 ppb	0.0577	2.03	11	
238	uranium	# 3	-0.0002 ppb	-0.0002	520.96	110	
51	vanadium	# 2	-0.0038 ppb	-0.0038	583.58	110	
66	zinc	# 3	38.5300 ppb	38.5300	3.14	1100	
66	zinc	# 2	37.2300 ppb	37.2300	2.46	1100	

ISTD Elements

Element			CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
209	bismuth	# 2	525871.19	1.38	593621.81	88.6	60 - 125	
209	bismuth	# 3	1489429.50	1.86	1712813.00	87.0	60 - 125	
72	germanium	# 3	448126.97	2.58	439661.75	101.9	60 - 125	
72	germanium	# 2	32434.67	2.02	31666.97	102.4	60 - 125	
72	germanium	# 1	346432.88	1.13	340631.78	101.7	60 - 125	
165	holmium	# 3	2192794.30	3.55	2420327.50	90.6	60 - 125	
165	holmium	# 1	1687247.60	1.79	1888396.90	89.3	60 - 125	
165	holmium	# 2	672330.44	1.31	726423.19	92.6	60 - 125	
115	indium	# 3	1427759.80	2.63	1464354.30	97.5	60 - 125	
6	lithium	# 3	638746.94	3.18	645804.63	98.9	60 - 125	
45	scandium	# 1	753755.06	2.05	722619.00	104.3	60 - 125	
45	scandium	# 2	20864.05	2.77	20182.60	103.4	60 - 125	
45	scandium	# 3	1011701.90	3.41	957419.69	105.7	60 - 125	

ISTD Ref File : C:\ICPCHEM\1\DATA\041214_A.B\010CALB.D\010CALB.D#

2 :Element Failures — 0 :Max. Number of Failures Allowed
0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: **Fail**
ISTD: **Pass**

Vortage for 30min + centrifuge 6hr, 12hr, 24hr,

Sample QC Report

Data File:	C:\ICPCHEM\1\DATA\041414_A.B\206SMPL.D\206SMPL.D#
Date Acquired:	Apr 15 2014 05:46 am
Operator:	
Sample Name:	1312545-004acam di w
Misc Info:	6hr cent. filter with 0.45uM
Current Method:	C:\ICPCHEM\1\METHODS\5point_Z.M
Calibration File:	C:\ICPCHEM\1\CALIB\5point_Z.C
Last Cal Update:	Apr 12 2014 10:36 pm
Vial Number:	3106
Sample Type:	Sample
Prep Dil Factor:	10.00
Total Dil Factor:	10.00

Step	Tune Name
#1	h2.u
#2	he.u
#3	norm.u
#4	

6hr

1312545-004a = MW-1 129.5-142.0

Vortex 30 minutes, Centrifuge 6hrs

Turbidity = 141 / 12 NTU before/ after centrifuging

Read this Column
ug/L

Turbidity
~~mg/L~~
141 / 12

QC Elements

Element			Conc.	Corr. Conc.	RSD(%)	High Limit	Flag
27	aluminium	# 3	322.5000 ppb	3225.0000	1.79	1100	
121	antimony	# 3	-0.0851 ppb	-0.8510	2.67	110	
75	arsenic	# 2	0.2369 ppb	2.3690	29.49	110	
137	barium	# 3	31.6300 ppb	316.3000	0.48	1100	
9	beryllium	# 3	0.0096 ppb	0.0957	54.52	110	
11	boron	# 3	114.5000 ppb	1145.0000	1.52	110	
114	cadmium	# 3	0.0126 ppb	0.1261	47.03	110	high
40	calcium	# 1	388.3000 ppb	3883.0000	0.52	11000	
52	chromium	# 2	0.3304 ppb	3.3040	12.33	110	
59	cobalt	# 3	0.0195 ppb	0.1947	29.40	110	
63	copper	# 2	0.0121 ppb	0.1209	54.11	110	
56	iron	# 1	104.0000 ppb	1040.0000	0.67	11000	
208	lead	# 3	0.0645 ppb	0.6449	7.38	110	
7	lithium	# 3	-0.0081 ppb	-0.0806	2641.10	110	
24	magnesium	# 3	192.3000 ppb	1923.0000	0.57	11000	
55	manganese	# 3	0.5398 ppb	5.3980	4.65	11000	
202	mercury	# 3	0.0009 ppb	0.0086	98.22	3	
201	mercury	# 2	0.0011 ppb	0.0111	177.01	3	
201	mercury	# 3	0.0030 ppb	0.0299	20.39	3	
95	molybdenum	# 3	-0.0160 ppb	-0.1603	26.30	110	
60	nickel	# 2	0.3154 ppb	3.1540	9.92	110	
39	potassium	# 3	174.1000 ppb	1741.0000	3.12	11000	
78	selenium	# 1	0.0142 ppb	0.1421	363.05	110	
107	silver	# 3	0.0003 ppb	0.0029	734.55	110	
23	sodium	# 1	2279.0000 ppb	22790.0000	1.31	11000	
88	strontium	# 3	5.2090 ppb	52.0900	1.55	1100	
159	terbium	# 3	-0.0039 ppb	-0.0385	25.46	1100	
159	terbium	# 1	-0.0104 ppb	-0.1037	11.23	1100	
159	terbium	# 2	-0.0026 ppb	-0.0260	41.28	1100	
205	thallium	# 3	-0.0009 ppb	-0.0085	243.69	110	
232	thorium	# 3	-0.1827 ppb	-1.8270	2.00	110	
118	tin	# 3	-0.2356 ppb	-2.3560	1.47	110	
47	titanium	# 3	7.5230 ppb	75.2300	0.86	110	
182	tungsten	# 3	-0.0019 ppb	-0.0186	98.55	11	
238	uranium	# 3	0.0082 ppb	0.0819	35.14	110	
51	vanadium	# 2	0.3481 ppb	3.4810	7.62	110	
66	zinc	# 3	2.2290 ppb	22.2900	2.69	1100	
66	zinc	# 2	2.2970 ppb	22.9700	9.48	1100	

ISTD Elements

Element			CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
209	bismuth	# 2	528080.00	1.52	593621.81	89.0	60 - 125	
209	bismuth	# 3	1542989.10	0.76	1712813.00	90.1	60 - 125	
72	germanium	# 3	438553.47	0.45	439661.75	99.7	60 - 125	
72	germanium	# 2	30541.96	2.21	31666.97	96.4	60 - 125	
72	germanium	# 1	343811.38	1.06	340631.78	100.9	60 - 125	
165	holmium	# 3	2240053.80	0.25	2420327.50	92.6	60 - 125	
165	holmium	# 1	1735038.40	2.26	1888396.90	91.9	60 - 125	
165	holmium	# 2	664363.75	2.21	726423.19	91.5	60 - 125	
115	indium	# 3	1436190.10	0.62	1464354.30	98.1	60 - 125	
6	lithium	# 3	597286.25	1.29	645804.63	92.5	60 - 125	
45	scandium	# 1	738539.19	0.87	722619.00	102.2	60 - 125	
45	scandium	# 2	19467.78	1.34	20182.60	96.5	60 - 125	
45	scandium	# 3	971384.44	1.01	957419.69	101.5	60 - 125	

ISTD Ref File : C:\ICPCHEM\1\DATA\041214_A.B\010CALB.D\010CALB.D#

1 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes:	**Fail**
ISTD:	**Pass**

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\041414_A.B\207SMPL.D\207SMPL.D#
Date Acquired: Apr 15 2014 05:52 am
Operator:
Sample Name: 1312545-004acam di w
Misc Info: 12hr cent. filter with 0.45uM
Current Method: C:\ICPCHEM\1\METHODS\5point_Z.M
Calibration File: C:\ICPCHEM\1\CALIB\5point_Z.C
Last Cal Update: Apr 12 2014 10:36 pm
Vial Number: 3102
Sample Type: Sample
Prep Dil Factor: 10.00
Total Dil Factor: 10.00

Step	Tune Name
#1	h2.u
#2	he.u
#3	norm.u
#4	

12hr

1312545-004a = MW-1 129.5-142.0

Vortex 30 minutes, Centrifuge 12hrs

Turbidity = 84 / 12 NTU before/ after centrifuging

84/12

Read this Column
ug/L

QC Elements

Element			Conc.	Corr. Conc.	RSD(%)	High Limit	Flag
27	aluminium	# 3	213.6000 ppb	2136.0000	7.57	1100	
121	antimony	# 3	-0.0855 ppb	-0.8545	4.09	110	
75	arsenic	# 2	0.0433 ppb	0.4332	114.10	110	
137	barium	# 3	10.7200 ppb	107.2000	0.90	1100	
9	beryllium	# 3	0.0197 ppb	0.1973	31.89	110	
11	boron	# 3	118.2000 ppb	1182.0000	1.15	110	high
114	cadmium	# 3	0.0177 ppb	0.1771	70.86	110	
40	calcium	# 1	375.9000 ppb	3759.0000	1.72	11000	
52	chromium	# 2	0.2505 ppb	2.5050	22.32	110	
59	cobalt	# 3	0.0137 ppb	0.1365	27.40	110	
63	copper	# 2	0.0036 ppb	0.0364	308.31	110	
56	iron	# 1	71.6600 ppb	716.6000	1.51	11000	
208	lead	# 3	0.0530 ppb	0.5296	3.73	110	
7	lithium	# 3	-0.0880 ppb	-0.8804	91.42	110	
24	magnesium	# 3	184.0000 ppb	1840.0000	0.81	11000	
55	manganese	# 3	0.3325 ppb	3.3250	5.06	11000	
202	mercury	# 3	0.0008 ppb	0.0079	236.33	3	
201	mercury	# 2	0.0014 ppb	0.0136	61.73	3	
201	mercury	# 3	-0.0005 ppb	-0.0051	416.62	3	
95	molybdenum	# 3	-0.0113 ppb	-0.1133	27.37	110	
60	nickel	# 2	0.2375 ppb	2.3750	17.42	110	
39	potassium	# 3	178.5000 ppb	1785.0000	2.27	11000	
78	selenium	# 1	0.0256 ppb	0.2562	148.71	110	
107	silver	# 3	0.0003 ppb	0.0028	768.06	110	
23	sodium	# 1	2240.0000 ppb	22400.0000	1.92	11000	
88	strontium	# 3	3.8880 ppb	38.8800	0.71	1100	
159	terbium	# 3	-0.0047 ppb	-0.0466	11.64	1100	
159	terbium	# 1	-0.0115 ppb	-0.1147	4.62	1100	
159	terbium	# 2	-0.0063 ppb	-0.0631	11.00	1100	
205	thallium	# 3	-0.0003 ppb	-0.0029	411.15	110	
232	thorium	# 3	-0.1915 ppb	-1.9150	1.70	110	
118	tin	# 3	-0.2333 ppb	-2.3330	3.42	110	
47	titanium	# 3	5.2460 ppb	52.4600	9.11	110	
182	tungsten	# 3	0.0029 ppb	0.0289	267.40	11	
238	uranium	# 3	0.0054 ppb	0.0541	13.99	110	
51	vanadium	# 2	0.3869 ppb	3.8690	12.55	110	
66	zinc	# 3	3.5530 ppb	35.5300	2.77	1100	
66	zinc	# 2	3.7560 ppb	37.5600	1.57	1100	

ISTD Elements

Element			CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)		Flag
209	bismuth	# 2	530104.75	1.15	593621.81	89.3	60 -	125	
209	bismuth	# 3	1535698.50	0.11	1712813.00	89.7	60 -	125	
72	germanium	# 3	436790.03	0.05	439661.75	99.3	60 -	125	
72	germanium	# 2	30835.28	1.62	31666.97	97.4	60 -	125	
72	germanium	# 1	342647.38	1.68	340631.78	100.6	60 -	125	
165	holmium	# 3	2206916.50	0.71	2420327.50	91.2	60 -	125	
165	holmium	# 1	1733472.80	0.81	1888396.90	91.8	60 -	125	
165	holmium	# 2	666324.75	1.95	726423.19	91.7	60 -	125	
115	indium	# 3	1443388.60	0.70	1464354.30	98.6	60 -	125	
6	lithium	# 3	589967.00	1.60	645804.63	91.4	60 -	125	
45	scandium	# 1	734049.00	1.24	722619.00	101.6	60 -	125	
45	scandium	# 2	19444.44	2.63	20182.60	96.3	60 -	125	
45	scandium	# 3	972688.31	0.72	957419.69	101.6	60 -	125	

ISTD Ref File : C:\ICPCHEM\1\DATA\041214_A.B\010CALB.D\010CALB.D#

1 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: **Fail**
ISTD: **Pass**

ABERRANT TURBIDITY DATA - EXCLUDED

24hr

Sample QC Report

Data File:	C:\ICPCHEM\1\DATA\041414_A.B\208SMPL.D\208SMPL.D#
Date Acquired:	Apr 15 2014 05:59 am
Operator:	
Sample Name:	1312545-004acam di w
Misc Info:	24hr test
Current Method:	C:\ICPCHEM\1\METHODS\5point_Z.M
Calibration File:	C:\ICPCHEM\1\CALIB\5point_Z.C
Last Cal Update:	Apr 12 2014 10:36 pm
Vial Number:	3109
Sample Type:	Sample
Prep Dil Factor:	10.00
Total Dil Factor:	10.00

Step	Tune Name
#1	h2.u
#2	he.u
#3	norm.u
#4	

1312545-004a = MW-1 129.5-142.0

Vortex 30 minutes, Centrifuge 24hrs

Turbidity = 4.0 / 0.9 NTU before/ after centrifuging

Read this Column
ug/L

4.0 / 0.9

QC Elements

Element			Conc.	Corr. Conc.	RSD(%)	High Limit	Flag
27	aluminium	# 3	60.7800 ppb	607.8000	9.79	1100	
121	antimony	# 3	-0.0883 ppb	-0.8829	3.70	110	
75	arsenic	# 2	0.1387 ppb	1.3870	71.12	110	
137	barium	# 3	24.4100 ppb	244.1000	1.67	1100	
9	beryllium	# 3	0.0047 ppb	0.0469	47.00	110	
11	boron	# 3	129.0000 ppb	1290.0000	2.23	110	high
114	cadmium	# 3	0.0056 ppb	0.0557	222.98	110	
40	calcium	# 1	381.7000 ppb	3817.0000	1.29	11000	
52	chromium	# 2	0.0578 ppb	0.5781	44.09	110	
59	cobalt	# 3	0.0061 ppb	0.0614	52.32	110	
63	copper	# 2	-0.0093 ppb	-0.0935	99.85	110	
56	iron	# 1	16.1300 ppb	161.3000	1.97	11000	
208	lead	# 3	0.0062 ppb	0.0619	26.48	110	
7	lithium	# 3	-0.2992 ppb	-2.9920	64.17	110	
24	magnesium	# 3	195.0000 ppb	1950.0000	2.79	11000	
55	manganese	# 3	-0.0117 ppb	-0.1173	153.45	11000	
202	mercury	# 3	0.0008 ppb	0.0084	107.43	3	
201	mercury	# 2	0.0004 ppb	0.0035	0.31	3	
201	mercury	# 3	-0.0014 ppb	-0.0135	220.43	3	
95	molybdenum	# 3	-0.0100 ppb	-0.1004	46.32	110	
60	nickel	# 2	0.0713 ppb	0.7126	44.20	110	
39	potassium	# 3	159.1000 ppb	1591.0000	4.66	11000	
78	selenium	# 1	0.0255 ppb	0.2550	40.71	110	
107	silver	# 3	-0.0014 ppb	-0.0139	71.36	110	
23	sodium	# 1	2291.0000 ppb	22910.0000	0.70	11000	
88	strontium	# 3	3.7160 ppb	37.1600	1.48	1100	
159	terbium	# 3	-0.0056 ppb	-0.0560	4.86	1100	
159	terbium	# 1	-0.0126 ppb	-0.1264	3.62	1100	
159	terbium	# 2	-0.0068 ppb	-0.0676	15.70	1100	
205	thallium	# 3	-0.0020 ppb	-0.0202	24.68	110	
232	thorium	# 3	-0.2150 ppb	-2.1500	2.49	110	
118	tin	# 3	-0.2319 ppb	-2.3190	2.09	110	
47	titanium	# 3	1.0460 ppb	10.4600	8.17	110	
182	tungsten	# 3	0.0045 ppb	0.0450	99.40	11	
238	uranium	# 3	-0.0025 ppb	-0.0245	7.85	110	
51	vanadium	# 2	0.1900 ppb	1.9000	17.75	110	
66	zinc	# 3	11.9200 ppb	119.2000	2.07	1100	
66	zinc	# 2	11.5300 ppb	115.3000	3.43	1100	

ISTD Elements

Element			CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
209	bismuth	# 2	528246.13	0.03	593621.81	89.0	60 - 125	
209	bismuth	# 3	1533758.30	1.56	1712813.00	89.5	60 - 125	
72	germanium	# 3	433860.53	0.90	439661.75	98.7	60 - 125	
72	germanium	# 2	30918.82	0.94	31666.97	97.6	60 - 125	
72	germanium	# 1	343525.84	0.62	340631.78	100.8	60 - 125	
165	holmium	# 3	2201616.80	1.54	2420327.50	91.0	60 - 125	
165	holmium	# 1	1727097.80	2.20	1888396.90	91.5	60 - 125	
165	holmium	# 2	659796.06	0.36	726423.19	90.8	60 - 125	
115	indium	# 3	1421069.30	1.24	1464354.30	97.0	60 - 125	
6	lithium	# 3	589513.31	0.88	645804.63	91.3	60 - 125	
45	scandium	# 1	734362.63	1.12	722619.00	101.6	60 - 125	
45	scandium	# 2	19389.94	0.92	20182.60	96.1	60 - 125	
45	scandium	# 3	961411.56	2.82	957419.69	100.4	60 - 125	

ISTD Ref File : C:\ICPCHEM\1\DATA\041214_A.B\010CALB.D\010CALB.D#

1 :Element Failures — 0 :Max. Number of Failures Allowed

0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail

ISTD: Pass

Vortage For 30min + Centrifuge 6hr, 12hr, 24hr

C:\ICPCHEM\1\DATA\041414_A.B\214SMPL.D\214SMPL.D#

1312545-006a = MW-1 297-298.5

Vortex 30 minutes, Centrifuge 6hrs

Turbidity = 506 / 25 NTU before / after centrifuging

Sample QC Report

Data File:	C:\ICPCHEM\1\DATA\041414_A.B\214SMPL.D\214SMPL.D#
Date Acquired:	Apr 15 2014 06:37 am
Operator:	
Sample Name:	1312545-006acam di w
Misc Info:	6hr cent. filter with 0.45uM
Current Method:	C:\ICPCHEM\1\METHODS\5point_Z.M
Calibration File:	C:\ICPCHEM\1\CALIB\5point_Z.C
Last Cal Update:	Apr 12 2014 10:36 pm
Vial Number:	3107
Sample Type:	Sample
Prep Dil Factor:	10.00
Total Dil Factor:	10.00

6hr

Step	Tune Name
#1	h2.u
#2	he.u
#3	norm.u
#4	

NTU Turbidity 506/25

Read this Column ug/L

QC Elements

Element			Conc.	Corr. Conc.	RSD(%)	High Limit	Flag
27	aluminium	# 3	84.1600 ppb	841.6000	15.68	1100	
121	antimony	# 3	-0.0147 ppb	-0.1468	63.58	110	
75	arsenic	# 2	0.1840 ppb	1.8400	35.25	110	
137	barium	# 3	38.3200 ppb	383.2000	7.73	1100	
9	beryllium	# 3	0.0321 ppb	0.3208	23.08	110	
11	boron	# 3	162.6000 ppb	1626.0000	8.11	110	high
114	cadmium	# 3	0.1504 ppb	1.5040	4.53	110	
40	calcium	# 1	2275.0000 ppb	22750.0000	1.11	11000	
52	chromium	# 2	0.6373 ppb	6.3730	9.83	110	
59	cobalt	# 3	0.0566 ppb	0.5662	20.22	110	
63	copper	# 2	0.8948 ppb	8.9480	3.36	110	
56	iron	# 1	156.2000 ppb	1562.0000	0.66	11000	
208	lead	# 3	0.2840 ppb	2.8400	5.06	110	
7	lithium	# 3	-0.0752 ppb	-0.7516	357.77	110	
24	magnesium	# 3	386.6000 ppb	3866.0000	8.34	11000	
55	manganese	# 3	5.8640 ppb	58.6400	8.79	11000	
202	mercury	# 3	0.0018 ppb	0.0181	69.66	3	
201	mercury	# 2	0.0030 ppb	0.0301	65.50	3	
201	mercury	# 3	0.0019 ppb	0.0188	174.92	3	
95	molybdenum	# 3	0.0812 ppb	0.8120	24.95	110	
60	nickel	# 2	0.6340 ppb	6.3400	12.83	110	
39	potassium	# 3	155.7000 ppb	1557.0000	15.44	11000	
78	selenium	# 1	0.1546 ppb	1.5460	28.43	110	
107	silver	# 3	0.0040 ppb	0.0400	66.38	110	
23	sodium	# 1	3861.0000 ppb	38610.0000	1.88	11000	
88	strontium	# 3	19.5400 ppb	195.4000	5.49	1100	
159	terbium	# 3	0.0333 ppb	0.3328	15.90	1100	
159	terbium	# 1	0.0083 ppb	0.0826	70.17	1100	
159	terbium	# 2	0.0236 ppb	0.2355	23.71	1100	
205	thallium	# 3	0.0035 ppb	0.0354	53.08	110	
232	thorium	# 3	0.1637 ppb	1.6370	12.40	110	
118	tin	# 3	~~-0.2243 ppb~~	-2.2430	4.39	110	
47	titanium	# 3	8.4120 ppb	84.1200	18.82	110	
182	tungsten	# 3	0.0143 ppb	0.1425	21.05	11	
238	uranium	# 3	0.0837 ppb	0.8370	2.63	110	
51	vanadium	# 2	1.3290 ppb	13.2900	4.21	110	
66	zinc	# 3	14.2100 ppb	142.1000	7.12	1100	
66	zinc	# 2	14.1900 ppb	141.9000	0.96	1100	

ISTD Elements

Element			CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
209	bismuth	# 2	522160.34	0.36	593621.81	88.0	60 - 125	
209	bismuth	# 3	1593035.10	6.94	1712813.00	93.0	60 - 125	
72	germanium	# 3	449003.84	5.07	439661.75	102.1	60 - 125	
72	germanium	# 2	30354.95	0.31	31666.97	95.9	60 - 125	
72	germanium	# 1	339768.78	0.27	340631.78	99.7	60 - 125	
165	holmium	# 3	2298783.50	7.60	2420327.50	95.0	60 - 125	
165	holmium	# 1	1721097.50	0.70	1888396.90	91.1	60 - 125	
165	holmium	# 2	654627.75	0.40	726423.19	90.1	60 - 125	
115	indium	# 3	1496594.90	8.33	1464354.30	102.2	60 - 125	
6	lithium	# 3	603119.50	8.07	645804.63	93.4	60 - 125	
45	scandium	# 1	730031.44	0.94	722619.00	101.0	60 - 125	
45	scandium	# 2	19131.28	1.91	20182.60	94.8	60 - 125	
45	scandium	# 3	1000997.90	7.31	957419.69	104.6	60 - 125	

ISTD Ref File : C:\ICPCHEM\1\DATA\041214_A.B\010CALB.D\010CALB.D#

1 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

C:\ICPCHEM\1\RPTTMP\sample_A.qct

4/15/2014 6:42 AM

Sample QC Report

12hr

Data File:	C:\ICPCHEM\1\DATA\041414_A.B\210SMPL.D\210SMPL.D#
Date Acquired:	Apr 15 2014 06:11 am
Operator:	
Sample Name:	1312545-006acam di w
Misc Info:	12hr cent. filter with 0.45uM
Current Method:	C:\ICPCHEM\1\METHODS\5point_Z.M
Calibration File:	C:\ICPCHEM\1\CALIB\5point_Z.C
Last Cal Update:	Apr 12 2014 10:36 pm
Vial Number:	3103
Sample Type:	Sample
Prep Dil Factor:	10.00
Total Dil Factor:	10.00

Step	Tune Name
#1	h2.u
#2	he.u
#3	norm.u
#4	

1312545-006a = MW-1 297-298.5

Vortex 30 minutes, Centrifuge 12hrs

Turbidity = 685 / 31 NTU before / after centrifuging

685 / 31

Read this Column
ug/L

QC Elements

Element			Conc.	Corr. Conc.	RSD(%)	High Limit	Flag
27	aluminium	# 3	93.6800 ppb	936.8000	16.68	1100	
121	antimony	# 3	-0.0706 ppb	-0.7055	7.26	110	
75	arsenic	# 2	0.2164 ppb	2.1640	44.35	110	
137	barium	# 3	29.2200 ppb	292.2000	9.48	1100	
9	beryllium	# 3	0.0340 ppb	0.3397	42.83	110	
11	boron	# 3	210.4000 ppb	2104.0000	9.27	110	high
114	cadmium	# 3	0.1726 ppb	1.7260	6.73	110	
40	calcium	# 1	2896.0000 ppb	28960.0000	0.77	11000	
52	chromium	# 2	0.7049 ppb	7.0490	4.35	110	
59	cobalt	# 3	0.0830 ppb	0.8297	9.88	110	
63	copper	# 2	1.0930 ppb	10.9300	3.23	110	
56	iron	# 1	170.4000 ppb	1704.0000	0.90	11000	
208	lead	# 3	0.3753 ppb	3.7530	9.32	110	
7	lithium	# 3	-0.0623 ppb	-0.6232	483.63	110	
24	magnesium	# 3	447.4000 ppb	4474.0000	10.12	11000	
55	manganese	# 3	8.5510 ppb	85.5100	9.46	11000	
202	mercury	# 3	0.0006 ppb	0.0064	59.21	3	
201	mercury	# 2	0.0049 ppb	0.0488	24.24	3	
201	mercury	# 3	0.0021 ppb	0.0208	145.67	3	
95	molybdenum	# 3	0.1013 ppb	1.0130	30.25	110	
60	nickel	# 2	0.9035 ppb	9.0350	8.56	110	
39	potassium	# 3	158.3000 ppb	1583.0000	18.11	11000	
78	selenium	# 1	0.2540 ppb	2.5400	27.32	110	
107	silver	# 3	0.0017 ppb	0.0173	50.48	110	
23	sodium	# 1	4406.0000 ppb	44060.0000	1.06	11000	
88	strontium	# 3	24.0900 ppb	240.9000	7.95	1100	
159	terbium	# 3	0.0113 ppb	0.1125	7.76	1100	
159	terbium	# 1	0.0089 ppb	0.0894	16.08	1100	
159	terbium	# 2	0.0109 ppb	0.1089	21.47	1100	
205	thallium	# 3	-0.0017 ppb	-0.0172	64.22	110	
232	thorium	# 3	-0.0723 ppb	-0.7230	37.84	110	
118	tin	# 3	-0.2346 ppb	-2.3460	0.55	110	
47	titanium	# 3	9.0080 ppb	90.0800	10.56	110	
182	tungsten	# 3	0.0299 ppb	0.2993	13.85	11	
238	uranium	# 3	0.0995 ppb	0.9950	8.29	110	
51	vanadium	# 2	1.5920 ppb	15.9200	0.94	110	
66	zinc	# 3	20.6000 ppb	206.0000	8.42	1100	
66	zinc	# 2	21.1600 ppb	211.6000	4.39	1100	

ISTD Elements

Element			CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
209	bismuth	# 2	519398.75	0.34	593621.81	87.5	60 - 125	
209	bismuth	# 3	1608782.40	8.51	1712813.00	93.9	60 - 125	
72	germanium	# 3	452379.00	8.15	439661.75	102.9	60 - 125	
72	germanium	# 2	30316.52	0.62	31666.97	95.7	60 - 125	
72	germanium	# 1	339923.59	1.01	340631.78	99.8	60 - 125	
165	holmium	# 3	2331412.30	9.90	2420327.50	96.3	60 - 125	
165	holmium	# 1	1728052.00	1.04	1888396.90	91.5	60 - 125	
165	holmium	# 2	653371.94	0.73	726423.19	89.9	60 - 125	
115	indium	# 3	1502704.90	8.76	1464354.30	102.6	60 - 125	
6	lithium	# 3	614633.63	9.65	645804.63	95.2	60 - 125	
45	scandium	# 1	727554.75	1.25	722619.00	100.7	60 - 125	
45	scandium	# 2	18877.63	1.22	20182.60	93.5	60 - 125	
45	scandium	# 3	1014771.10	9.19	957419.69	106.0	60 - 125	

ISTD Ref File : C:\ICPCHEM\1\DATA\041214_A.B\010CALB.D\010CALB.D#

1 :Element Failures
0 :ISTD Failures

0 :Max. Number of Failures Allowed
0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes:	**Fail**
ISTD:	**Pass**

Sample QC Report

1312545-006a = MW-1 297-298.5

Vortex 30 minutes, Centrifuge 24hrs

Turbidity = 153 / 95 NTU before / after centrifuging

24 hr

153 / 95

Data File:	C:\ICPCHEM\1\DATA\041414_A.B\215SMPL.D\215SMPL.D#
Date Acquired:	Apr 15 2014 06:43 am
Operator:	
Sample Name:	1312545-006acam di w
Misc Info:	24hr test
Current Method:	C:\ICPCHEM\1\METHODS\5point_Z.M
Calibration File:	C:\ICPCHEM\1\CALIB\5point_Z.C
Last Cal Update:	Apr 12 2014 10:36 pm
Vial Number:	3110
Sample Type:	Sample
Prep Dil Factor:	10.00
Total Dil Factor:	10.00

Step	Tune Name
#1	h2.u
#2	he.u
#3	norm.u
#4	

Read this Column
ug/L

QC Elements

Element			Conc.	Corr. Conc.	RSD(%)	High Limit	Flag
27	aluminium	# 3	695.1000 ppb	6951.0000	30.26	1100	
121	antimony	# 3	-0.0366 ppb	-0.3655	37.84	110	
75	arsenic	# 2	0.4226 ppb	4.2260	15.31	110	
137	barium	# 3	95.6500 ppb	956.5000	1.87	1100	
9	beryllium	# 3	0.0776 ppb	0.7755	9.44	110	
11	boron	# 3	137.4000 ppb	1374.0000	2.13	110	high
114	cadmium	# 3	0.6497 ppb	6.4970	4.84	110	
40	calcium	# 1	7662.0000 ppb	76620.0000	1.33	11000	
52	chromium	# 2	3.1120 ppb	31.1200	2.46	110	
59	cobalt	# 3	0.4508 ppb	4.5080	4.50	110	
63	copper	# 2	3.6530 ppb	36.5300	3.57	110	
56	iron	# 1	1230.0000 ppb	12300.0000	1.19	11000	
208	lead	# 3	1.3480 ppb	13.4800	1.03	110	
7	lithium	# 3	0.3152 ppb	3.1520	63.86	110	
24	magnesium	# 3	1981.0000 ppb	19810.0000	0.49	11000	
55	manganese	# 3	43.3800 ppb	433.8000	2.16	11000	
202	mercury	# 3	0.0104 ppb	0.1038	14.55	3	
201	mercury	# 2	0.0132 ppb	0.1324	11.74	3	
201	mercury	# 3	0.0128 ppb	0.1283	29.78	3	
95	molybdenum	# 3	0.1332 ppb	1.3320	11.70	110	
60	nickel	# 2	3.3380 ppb	33.3800	7.40	110	
39	potassium	# 3	224.5000 ppb	2245.0000	9.34	11000	
78	selenium	# 1	0.2911 ppb	2.9110	11.69	110	
107	silver	# 3	0.0110 ppb	0.1099	18.12	110	
23	sodium	# 1	3008.0000 ppb	30080.0000	1.58	11000	
88	strontium	# 3	73.6700 ppb	736.7000	1.10	1100	
159	terbium	# 3	0.0613 ppb	0.6129	6.44	1100	
159	terbium	# 1	0.0542 ppb	0.5420	4.82	1100	
159	terbium	# 2	0.0524 ppb	0.5236	1.82	1100	
205	thallium	# 3	0.0017 ppb	0.0166	92.47	110	
232	thorium	# 3	0.4839 ppb	4.8390	31.60	110	
118	tin	# 3	-0.2045 ppb	-2.0450	2.39	110	
47	titanium	# 3	40.9400 ppb	409.4000	20.95	110	
182	tungsten	# 3	0.0183 ppb	0.1829	16.24	11	
238	uranium	# 3	0.3535 ppb	3.5350	1.43	110	
51	vanadium	# 2	3.4340 ppb	34.3400	1.43	110	
66	zinc	# 3	53.8200 ppb	538.2000	1.57	1100	
66	zinc	# 2	53.1300 ppb	531.3000	2.03	1100	

ISTD Elements

Element			CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)		Flag
209	bismuth	# 2	520115.31	0.57	593621.81	87.6	60 -	125	
209	bismuth	# 3	1541473.00	1.40	1712813.00	90.0	60 -	125	
72	germanium	# 3	435441.06	1.36	439661.75	99.0	60 -	125	
72	germanium	# 2	30258.02	1.39	31666.97	95.6	60 -	125	
72	germanium	# 1	340762.94	0.23	340631.78	100.0	60 -	125	
165	holmium	# 3	2239460.00	2.14	2420327.50	92.5	60 -	125	
165	holmium	# 1	1731375.10	1.10	1888396.90	91.7	60 -	125	
165	holmium	# 2	655230.94	1.12	726423.19	90.2	60 -	125	
115	indium	# 3	1433841.90	1.76	1464354.30	97.9	60 -	125	
6	lithium	# 3	586536.13	4.24	645804.63	90.8	60 -	125	
45	scandium	# 1	736068.81	0.67	722619.00	101.9	60 -	125	
45	scandium	# 2	18969.43	0.83	20182.60	94.0	60 -	125	
45	scandium	# 3	974842.56	2.55	957419.69	101.8	60 -	125	

ISTD Ref File : C:\ICPCHEM\1\DATA\041214_A.B\010CALB.D\010CALB.D#

1 :Element Failures — 0 :Max. Number of Failures Allowed

0 :ISTD Failures — 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes:	Fail
ISTD:	Pass

Case Narrative for WOs 1312545 Solids and 1312650 Solids

Issues with *Major Elements as Oxides* Analysis

In order for the oxide concentrations of a sample to be correctly obtained, the sample needs to be fully digested such that all metals are brought into solution. Many oxides are difficult or impossible to dissolve with an atmospheric pressure, high temperature acid digest, so a lithium borate fusion extraction was used as this should in theory make it possible to bring the entire sample into solution. The procedure used is described in USGS Methods for Geochemical Analysis, USGS Bulletin 1770, pB4-B6. After the extraction and analysis, it was apparent that the sample wasn't adequately digested by the fusion method or the post-fusion acid digestion as there were still solid particles at the base of the digest tube, and the sum of the oxides fell short of the expected 100%.

Silicon dioxide is likely one the oxides that wasn't fully represented by the analysis as it is a difficult mineral to digest without the aid of pressurized microwave digestion. Because sand (quartz) is the principal constituent of most of the samples, the percent concentration for silicon dioxide should be significantly higher (75-99%) than the ~1% that was obtained for a majority of the samples tested. The solids left on the bottom of the digestion tube appeared to be sand which is comprised mainly of silicon dioxide. There is also the potential that other difficult to digest oxides may have been under-represented, but which ones were affected and by how much is unknown.

Delano Boese, Metals Supervisor & Edward Hamilton, Lab Director

DRAFT - COMMUNICATION

MRWPCA – Groundwater Replenishment (GWR) Project

Date: **February 10, 2014**

To: **Todd Engineers**

From: **Trussell Technologies, Inc.**
Gordon J. Williams, Ph.D., P.E.
Sarah Triolo
John Kenny

Subject: **Post-treatment stabilization bench-top protocol**

This communication provides an explanation of the bench-top post-treatment stabilization protocol that will be used as part of the Monterey Groundwater Replenishment (GWR) pilot testing. Reverse osmosis (RO) permeate from the GWR pilot plant will be collected and stabilized using a bench-scale setup to produce the water for Todd Engineers for leaching tests. There are several strategies available for full-scale RO permeate stabilization (*e.g.*, approaches that use calcite contactors, lime saturators, caustic, carbon dioxide addition), but the most straightforward approach for bench testing is to use a combination of calcium chloride, caustic, and carbon dioxide (CO_2) addition. Although this approach may differ from the full-scale stabilization process, it is expected to achieve a similar water quality to what can be expected for the full-scale GWR process. As the final product water quality goals for the GWR project have yet to be determined, the approach taken for this protocol is to mimic the goals established for the Orange County Water District (OCWD) Groundwater Replenishment System (GWRS).

OCWD has invested considerable effort developing GWRS water quality goals (Table 1). OCWD has balanced factors related the corrosion of pipelines and the groundwater water quality in developing their goals. Calcium will be added in the form of calcium chloride ($CaCl_2$), along with sodium hydroxide (NaOH) to increase the alkalinity, and finally bubbling in CO_2 gas to bring the pH down to the target goal. As a result of this approach the final chloride concentration of the lab-treated water will be higher (from approximately 3 mg/L at full-scale to approximately 30 mg/L on the bench), but it is not anticipated that this will impact the leaching experiments.

Table 1: GWR Bench-Scale Post-treatment Stabilization Goals

Parameter	Unit	Target Value
LSI[a]	**--**	**-0.1**
Calcium	**mg/L as $CaCO_3$**	**32**
Alkalinity	**mg/L as $CaCO_3$**	**40**
pH	**--**	**8.5**

[a]Langelier Saturation Index

The stabilization experiment will be conducted in two batches due to volumetric constraints. Each batch will produce 16 liters (L) of stabilized water, for a total of 32 L of product water for Todd Engineers. The 16 L of RO permeate will be collected in a five-gallon glass carboy. While the RO permeate is being sampled for the stabilization experiment, grab samples will also be collected for the monthly pilot water quality sampling campaign, which includes a significant amount of water quality data.

The following analysis will be performed at the bench top, prior to stabilization:

- Turbidity
- Alkalinity
- Temperature
- pH, and
- Calcium.

The following water quality values will be assumed from previous RO permeate samples:

- TDS
- Chloride, and
- Sulfate

The stabilization experiment will be carried out as follows:

1. Add calcium in the form of calcium chloride dihydrate ($CaCl_2 \bullet 2H_2O$) to a produce a calcium concentration of 32 mg/L as $CaCO_3$ (approximately 34 mg/L as $CaCO_3$)
2. Increase the alkalinity through the addition of sodium hydroxide (NaOH) until a target alkalinity of 40 mg/L as $CaCO_3$ is reached
3. Bubble carbon dioxide through the solution to lower the pH just below $CaCO_3$ saturation with a glass diffuser and plastic tubing until the solution reaches a target pH of approximately 8.5
4. Store in eight 4 L amber glass bottles with no headspace at room temperature. Samples will be transported at ambient temperatures

Todd Engineers will pick up the samples from Trussell Technologies at 1904 Franklin Street, Suite 800, Oakland, on the morning of Wednesday February 12, 2014.

CHAIN OF CUSTODY

Client: MRWPCA/Todd Engineers

Project: Todd Engineers Leaching Experiment

Sampled by: G. Williams, S. Triolo, J. Kenny

Sample Location: RO permeate with bench-scale stabilization

Sample date and time: 2/11/14 Composite (9:30 AM and 8:00 PM)

Sample water quality at time of sampling:

Temperature: 21.7 C
pH: 8.5
Alkalinity: ~40 mg/L as CaCO3
Calcium: ~26 mg/L as CaCO3

Requested analyses: Todd Engineers Soil Leaching Study

NOTES

- 8 x 4-L bottles – glass amber (no head space); 32L total
- RO permeate samples stabilized with Calcium chloride and caustic soda
- Samples were initially stripped of CO_2 to raise pH, Ca and NaOH added to reach target pH, alk, and LSI
- Bench scale stabilization conducted in two batches; both batches were evenly distributed between both bottles

Relinquished by (name/sign)	Company	Date/Time	Received by (name/sign)	Company
Gordon Williams	TT	2/12/14 940	William E. [illegible]	Todd Groundwater

1904 Franklin Street Suite 800, Oakland, CA 94612
Tel (858) 458-1030 Fax (626) 486-0571

Trussell TECHNOLOGIES INC

APPENDIX F

Alpha Analytical Laboratory Reports and Chain-of-Custody Form

(Groundwater Quality)

APPENDIX F

Alpha Analytical Laboratory Reports and Chain-of-Custody Form

(Groundwater Quality)

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com
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Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

ELAP Certificate Numbers 1551 and 2728

18 February 2014

Todd Groundwater
Attn: Dr. Bill Motzer
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501
RE: Groundwater Reuse Project
Work Order: 14A1643

Enclosed are the results of analyses for samples received by the laboratory on 01/29/14 21:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jeanette Poplin

Jeanette L. Poplin For David S. Pingatore
Project Manager

Alpha Analytical Laboratories Inc.
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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Project: Project Number:	Dr. Bill Motzer Groundwater Reuse Project 60408	Reported: 02/18/14 11:04

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MRWPCA MW-1	14A1643-01	Water	01/29/14 14:15	01/29/14 21:15
Trip Blank	14A1643-02	Water	01/29/14 14:15	01/29/14 21:15

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Metals (Drinking Water) by EPA 200 Series Methods
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
Mercury	ND	0.060	1.0	ug/l	1	AA43136	02/05/14 09:00	02/05/14 13:37	EPA 245.1	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Metals by EPA 200 Series Methods
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
Calcium	**17**	0.010	1.0	mg/l	1	AA43133	01/31/14 14:45	02/05/14 12:48	EPA 200.7	
Magnesium	**6.5**	0.0080	1.0	"	"	"	"	"	"	
Potassium	**3.4**	0.0080	1.0	"	"	"	"	"	"	
Sodium	**50**	0.020	1.0	"	"	"	"	"	"	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Metals by EPA Method 200.8 ICP/MS
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
Aluminum	**2700**	20	500	ug/l	10	AB40328	02/03/14 09:47	02/11/14 16:46	EPA 200.8	
Antimony	**0.51**	0.020	6.0	"	1	"	"	02/05/14 14:35	"	J
Arsenic	**2.8**	0.070	2.0	"	"	"	"	"	"	
Barium	**40**	0.030	100	"	"	"	"	"	"	J
Beryllium	**0.044**	0.020	1.0	"	"	"	"	"	"	J
Boron	**36**	6.0	50	"	"	"	"	"	"	J
Cadmium	**0.15**	0.020	1.0	"	"	"	"	"	"	J
Chromium	**13**	0.080	10	"	"	"	"	"	"	
Copper	**3.7**	0.040	0.50	"	"	"	"	"	"	
Iron	**4000**	18	500	"	10	"	"	02/11/14 16:46	"	
Lead	**1.3**	0.020	5.0	"	1	"	"	02/05/14 14:35	"	J
Manganese	**150**	0.030	5.0	"	"	"	"	"	"	
Nickel	**8.1**	0.060	10	"	"	"	"	"	"	J
Selenium	**1.5**	0.070	5.0	"	"	"	"	"	"	J
Silver	**0.028**	0.020	0.10	"	"	"	"	"	"	J
Thallium	**0.027**	0.020	1.0	"	"	"	"	"	"	J
Uranium	**0.33**	0.020	1.0	pCi/l	"	"	"	"	"	J
Vanadium	**9.5**	0.30	1.0	ug/l	"	"	"	"	"	
Zinc	**69**	0.50	5.0	"	"	"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Conventional Chemistry Parameters by APHA/EPA Methods
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
Bicarbonate	**70**	0.060	5.0	mg/l	1	AA43121	02/11/14 10:19	02/11/14 17:00	SM2320B	
Color	**28**	6.0	10	Color Units	2	AA42421	01/31/14 07:40	01/31/14 07:40	SM2120B	
MBAS, calculated as LAS, mw 340	ND	0.030	0.050	mg/l	1	AA43107	01/31/14 07:27	02/04/14 16:00	SM5540C	U
Odor	**1.4**		1.0	T.O.N.	"	AA42421	01/30/14 13:32	01/30/14 13:32	EPA 140.1	OD-1
Perchlorate	ND	0.90	4.0	ug/l	"	AB41141	02/11/14 09:49	02/11/14 12:26	EPA 314.0	U
Specific Conductance (EC)	**270**	1.0	20	umhos/cm	"	AA43044	01/30/14 13:00	01/30/14 17:00	SM2510B	
Total Dissolved Solids	**220**	5.0	10	mg/l	"	AB40322	02/03/14 09:00	02/05/14 08:30	SM2540C	
Turbidity	**71**	0.040	0.10	NTU	"	AA43044	01/30/14 13:00	01/30/14 17:00	SM2130B	
Nitrate + Nitrite as N	**0.61**	0.0086	0.40	mg/l	"	AB41339	02/13/14 10:39	02/13/14 11:18	EPA 300.0	
Total Organic Carbon	**0.898**	0.100	0.300	"	"	AA43131	01/31/14 13:10	01/31/14 20:10	SM5310C	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Miscellaneous Physical/Conventional Chemistry Parameters
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
Cyanide (total)	ND	0.0020	0.10	mg/l	1	AB40428	02/04/14 09:46	02/05/14 15:18	10-204-00-1X	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Anions by EPA Method 300.0
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
Nitrate as NO3	**2.7**	0.20	2.0	mg/l	1	AA43037	01/30/14 11:23	01/30/14 21:42	EPA 300.0	
Chloride	**79**	0.15	2.5	"	5	"	"	01/30/14 21:27	"	
Fluoride	ND	0.070	0.10	"	1	"	"	01/30/14 21:42	"	U
Nitrite as N	ND	0.020	0.40	"	"	"	"	"	"	U
Sulfate as SO4	**9.9**	0.090	0.50	"	"	"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
Acetone	ND	0.80	5.0	ug/l	1	AB40523	02/03/14 09:12	02/04/14 16:54	EPA 524.2	U
Acrylonitrile	ND	0.20	5.0	"	"	"	"	"	"	U
Benzene	ND	0.20	0.30	"	"	"	"	"	"	U
Bromobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Bromochloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Bromodichloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
Bromoform	ND	0.50	0.50	"	"	"	"	"	"	U
Bromomethane	ND	0.20	0.50	"	"	"	"	"	"	U
n-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
sec-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
tert-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Carbon disulfide	ND	0.20	0.50	"	"	"	"	"	"	U
Carbon tetrachloride	ND	0.30	0.50	"	"	"	"	"	"	U
Chlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Chloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
Chloroform	ND	0.50	0.50	"	"	"	"	"	"	U
Chloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
2-Chlorotoluene	ND	0.20	0.50	"	"	"	"	"	"	U
4-Chlorotoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Dibromochloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
1,2-Dibromo-3-chloropropane	ND	0.36	0.50	"	"	"	"	"	"	U
1,2-Dibromoethane (EDB)	ND	0.14	0.50	"	"	"	"	"	"	U
Dibromomethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,2-Dichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,4-Dichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
trans-1,4-Dichloro-2-butene	ND	0.095	5.0	"	"	"	"	"	"	U
Dichlorodifluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
1,2-Dichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethene	ND	0.10	0.30	"	"	"	"	"	"	U
cis-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
1,2-Dichloropropane	ND	0.20	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
1,3-Dichloropropane	ND	0.20	0.50	ug/l	1	AB40523	02/03/14 09:12	02/04/14 16:54	EPA 524.2	U
2,2-Dichloropropane	ND	0.10	0.50	"	"	"	"	"	"	U
1,1-Dichloropropene	ND	0.10	0.50	"	"	"	"	"	"	U
cis-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichloropropene (total)	ND	0.20	0.50	"	"	"	"	"	"	U
2-Hexanone	ND	0.097	5.0	"	"	"	"	"	"	U
Ethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Hexachlorobutadiene	ND	0.30	0.50	"	"	"	"	"	"	U
Isopropylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
p-Isopropyltoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Methyl ethyl ketone	ND	0.40	1.0	"	"	"	"	"	"	U
Methyl iodide	ND	0.12	2.0	"	"	"	"	"	"	U
Methyl isobutyl ketone	ND	0.30	1.0	"	"	"	"	"	"	U
Methylene chloride	ND	0.40	0.50	"	"	"	"	"	"	U
Naphthalene	ND	0.20	0.50	"	"	"	"	"	"	U
n-Propylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Styrene	**0.18**	0.10	0.50	"	"	"	"	"	"	J
1,1,1,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Tetrachloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Toluene	**2.0**	0.10	0.50	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
1,2,4-Trichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,1-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorofluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorotrifluoroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,2,3-Trichloropropane	ND	0.13	0.50	"	"	"	"	"	"	U
1,2,4-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
1,3,5-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Vinyl chloride	ND	0.10	0.50	"	"	"	"	"	"	U
m,p-Xylene	ND	0.20	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
o-Xylene	ND	0.10	0.50	ug/l	1	AB40523	02/03/14 09:12	02/04/14 16:54	EPA 524.2	U
Xylenes (total)	ND	0.20	0.50	"	"	"	"	"	"	U
Trihalomethanes (total)	ND	0.50	0.50	"	"	"	"	"	"	U
Methyl tert-butyl ether	ND	0.50	0.50	"	"	"	"	"	"	U
Ethyl tert-butyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Tert-amyl methyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Surrogate: Bromofluorobenzene		*98.8 %*	*70-130*			"	"	"	"	
Surrogate: Dibromofluoromethane		*95.2 %*	*70-130*			"	"	"	"	
Surrogate: Toluene-d8		*99.8 %*	*70-130*			"	"	"	"	
Trip Blank (14A1643-02) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
Acetone	ND	0.80	5.0	ug/l	1	AB40523	02/03/14 09:12	02/04/14 17:28	EPA 524.2	U
Acrylonitrile	ND	0.20	5.0	"	"	"	"	"	"	U
Benzene	ND	0.20	0.30	"	"	"	"	"	"	U
Bromobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Bromochloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Bromodichloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
Bromoform	ND	0.50	0.50	"	"	"	"	"	"	U
Bromomethane	ND	0.20	0.50	"	"	"	"	"	"	U
n-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
sec-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
tert-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Carbon disulfide	ND	0.20	0.50	"	"	"	"	"	"	U
Carbon tetrachloride	ND	0.30	0.50	"	"	"	"	"	"	U
Chlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Chloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
Chloroform	ND	0.50	0.50	"	"	"	"	"	"	U
Chloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
2-Chlorotoluene	ND	0.20	0.50	"	"	"	"	"	"	U
4-Chlorotoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Dibromochloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
1,2-Dibromo-3-chloropropane	ND	0.36	0.50	"	"	"	"	"	"	U
1,2-Dibromoethane (EDB)	ND	0.14	0.50	"	"	"	"	"	"	U
Dibromomethane	ND	0.20	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Trip Blank (14A1643-02) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
1,2-Dichlorobenzene	ND	0.20	0.50	ug/l	1	AB40523	02/03/14 09:12	02/04/14 17:28	EPA 524.2	U
1,3-Dichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,4-Dichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
trans-1,4-Dichloro-2-butene	ND	0.095	5.0	"	"	"	"	"	"	U
Dichlorodifluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
1,2-Dichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethene	ND	0.10	0.30	"	"	"	"	"	"	U
cis-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
1,2-Dichloropropane	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichloropropane	ND	0.20	0.50	"	"	"	"	"	"	U
2,2-Dichloropropane	ND	0.10	0.50	"	"	"	"	"	"	U
1,1-Dichloropropene	ND	0.10	0.50	"	"	"	"	"	"	U
cis-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichloropropene (total)	ND	0.20	0.50	"	"	"	"	"	"	U
2-Hexanone	ND	0.097	5.0	"	"	"	"	"	"	U
Ethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Hexachlorobutadiene	ND	0.30	0.50	"	"	"	"	"	"	U
Isopropylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
p-Isopropyltoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Methyl ethyl ketone	ND	0.40	1.0	"	"	"	"	"	"	U
Methyl iodide	ND	0.12	2.0	"	"	"	"	"	"	U
Methyl isobutyl ketone	ND	0.30	1.0	"	"	"	"	"	"	U
Methylene chloride	ND	0.40	0.50	"	"	"	"	"	"	U
Naphthalene	ND	0.20	0.50	"	"	"	"	"	"	U
n-Propylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Styrene	ND	0.10	0.50	"	"	"	"	"	"	U
1,1,1,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Tetrachloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Toluene	ND	0.10	0.50	"	"	"	"	"	"	U
1,2,3-Trichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Trip Blank (14A1643-02) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
1,2,4-Trichlorobenzene	ND	0.20	0.50	ug/l	1	AB40523	02/03/14 09:12	02/04/14 17:28	EPA 524.2	U
1,1,1-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorofluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorotrifluoroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,2,3-Trichloropropane	ND	0.13	0.50	"	"	"	"	"	"	U
1,2,4-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
1,3,5-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Vinyl chloride	ND	0.10	0.50	"	"	"	"	"	"	U
m,p-Xylene	ND	0.20	0.50	"	"	"	"	"	"	U
o-Xylene	ND	0.10	0.50	"	"	"	"	"	"	U
Xylenes (total)	ND	0.20	0.50	"	"	"	"	"	"	U
Trihalomethanes (total)	ND	0.50	0.50	"	"	"	"	"	"	U
Methyl tert-butyl ether	ND	0.50	0.50	"	"	"	"	"	"	U
Ethyl tert-butyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Tert-amyl methyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Surrogate: Bromofluorobenzene		*99.2 %*	*70-130*			"	"	"	"	
Surrogate: Dibromofluoromethane		*96.3 %*	*70-130*			"	"	"	"	
Surrogate: Toluene-d8		*98.9 %*	*70-130*			"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Chlorinated Pesticides and PCBs by EPA Method 508
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
Aldrin	ND	0.010	0.050	ug/l	1	AA43038	01/30/14 11:31	02/01/14 03:03	EPA 508	U
Chloroneb	ND	0.20	0.50	"	"	"	"	"	"	U
Chlorobenzilate	ND	2.0	5.0	"	"	"	"	"	"	U
Chlorothalonil	ND	0.030	0.10	"	"	"	"	"	"	U
DCPA	ND	0.020	0.040	"	"	"	"	"	"	U
4,4´-DDD	ND	0.020	0.050	"	"	"	"	"	"	U
4,4´-DDE	ND	0.020	0.050	"	"	"	"	"	"	U
4,4´-DDT	ND	0.020	0.020	"	"	"	"	"	"	U
Dieldrin	ND	0.010	0.010	"	"	"	"	"	"	U
Endosulfan I	ND	0.020	0.050	"	"	"	"	"	"	U
Endosulfan II	ND	0.020	0.050	"	"	"	"	"	"	U
Endosulfan sulfate	ND	0.020	0.020	"	"	"	"	"	"	U
Endrin	ND	0.030	0.10	"	"	"	"	"	"	U
Endrin aldehyde	ND	0.020	0.050	"	"	"	"	"	"	U
HCH-alpha	ND	0.010	0.050	"	"	"	"	"	"	U
HCH-beta	ND	0.020	0.050	"	"	"	"	"	"	U
HCH-delta	ND	0.030	0.050	"	"	"	"	"	"	U
HCH-gamma (Lindane)	ND	0.010	0.010	"	"	"	"	"	"	U
Heptachlor	ND	0.010	0.010	"	"	"	"	"	"	U
Heptachlor epoxide	ND	0.010	0.010	"	"	"	"	"	"	U
Hexachlorobenzene	ND	0.010	0.040	"	"	"	"	"	"	U
Hexachlorocyclopentadiene	ND	0.040	0.40	"	"	"	"	"	"	U
Methoxychlor	ND	0.020	0.020	"	"	"	"	"	"	U
cis-Permethrin	ND	0.070	0.20	"	"	"	"	"	"	U
trans-Permethrin	ND	0.090	0.20	"	"	"	"	"	"	U
Propachlor	ND	0.070	0.20	"	"	"	"	"	"	U
Trifluralin	ND	0.020	0.040	"	"	"	"	"	"	U
PCB-1016	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1221	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1232	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1242	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1248	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1254	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1260	ND	0.030	0.50	"	"	"	"	"	"	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Chlorinated Pesticides and PCBs by EPA Method 508
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
Total PCBs	ND	0.30	0.50	ug/l	1	AA43038	01/30/14 11:31	02/01/14 03:03	EPA 508	U
Toxaphene	ND	0.40	0.50	"	"	"	"	"	"	U
Chlordane (tech)	ND	0.030	0.050	"	"	"	"	"	"	U
Surrogate: Dibutylchlorendate		*86.8 %*	*70-130*			"	"	"	"	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Nitrogen- and Phosphorus- Pesticides by EPA Method 507
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
Alachlor	ND	0.50	0.50	ug/l	1	AB40730	02/08/14 15:03	02/11/14 07:22	EPA 507	U
Atrazine	ND	0.30	0.50	"	"	"	"	"	"	U
Bromacil	ND	0.50	5.0	"	"	"	"	"	"	U
Butachlor	ND	0.40	0.50	"	"	"	"	"	"	U
Dimethoate	ND	0.20	1.0	"	"	"	"	"	"	U
Metolachlor	ND	0.30	0.50	"	"	"	"	"	"	U
Metribuzin	ND	0.40	0.50	"	"	"	"	"	"	U
Molinate	ND	0.20	0.50	"	"	"	"	"	"	U
Prometryn	ND	0.50	0.50	"	"	"	"	"	"	U
Propachlor	ND	0.30	0.50	"	"	"	"	"	"	U
Simazine	ND	0.30	0.50	"	"	"	"	"	"	U
Thiobencarb	ND	0.20	1.0	"	"	"	"	"	"	U
Surrogate: 1,3-Dimethyl-2-nitrobenzene		*88.6 %*	*70-130*			*"*	*"*	*"*	*"*	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Organic Analytes by EPA Method 504.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
1,2-Dibromo-3-chloropropane	ND	0.0040	0.010	ug/l	1	AB40359	02/04/14 10:00	02/05/14 02:21	EPA 504.1	U
1,2-Dibromoethane (EDB)	ND	0.0050	0.020	"	"	"	"	"	"	U
Trip Blank (14A1643-02) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
1,2-Dibromo-3-chloropropane	ND	0.0040	0.010	ug/l	1	AB40359	02/04/14 10:00	02/05/14 02:56	EPA 504.1	U
1,2-Dibromoethane (EDB)	ND	0.0050	0.020	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Chlorinated Acids by EPA Method 515.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
Acifluorfen	ND	0.50	1.0	ug/l	1	AB40536	02/06/14 14:29	02/08/14 04:19	EPA 515.1	U
Bentazon	ND	0.40	0.40	"	"	"	"	"	"	U
2,4-D	ND	0.80	1.0	"	"	"	"	"	"	U
Dalapon	ND	6.0	6.0	"	"	"	"	"	"	U
2,4-DB	ND	4.0	5.0	"	"	"	"	"	"	U
Dicamba	ND	0.40	0.40	"	"	"	"	"	"	U
Dichlorprop	ND	1.0	1.0	"	"	"	"	"	"	U
Dinoseb	ND	0.80	1.0	"	"	"	"	"	"	U
4-Nitrophenol	ND	0.70	1.0	"	"	"	"	"	"	U
Pentachlorophenol	ND	0.20	0.20	"	"	"	"	"	"	U
Picloram	ND	0.50	1.0	"	"	"	"	"	"	U
2,4,5-T	ND	0.40	0.50	"	"	"	"	"	"	U
2,4,5-TP (Silvex)	ND	0.50	0.50	"	"	"	"	"	"	U
Surrogate: DCAA		*90.2 %*	*70-130*			*"*	*"*	*"*	*"*	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Carbamates by EPA Method 531.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
Aldicarb	ND	0.70	3.0	ug/l	1	AA42932	01/30/14 09:25	01/31/14 02:53	EPA 531.1	U
Aldicarb sulfone	ND	0.70	4.0	"	"	"	"	"	"	U
Aldicarb sulfoxide	ND	0.80	3.0	"	"	"	"	"	"	U
Carbaryl	ND	0.70	5.0	"	"	"	"	"	"	U
Carbofuran	ND	2.0	5.0	"	"	"	"	"	"	U
3-Hydroxycarbofuran	ND	0.90	3.0	"	"	"	"	"	"	U
Methiocarb	ND	2.0	5.0	"	"	"	"	"	"	U
Methomyl	ND	2.0	2.0	"	"	"	"	"	"	U
Oxamyl	ND	0.80	20	"	"	"	"	"	"	U
Propoxur	ND	2.0	5.0	"	"	"	"	"	"	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Endothall by EPA Method 548.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
Endothall	ND	2.0	45	ug/l	1	AB40357	02/04/14 14:37	02/06/14 15:13	EPA 548.1	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Glyphosate by EPA Method 547
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
Glyphosate	ND	3.0	10	ug/l	1	AB40427	02/04/14 09:22	02/04/14 23:29	EPA 547	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Diquat by EPA Method 549.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
Diquat	ND	2.0	2.0	ug/l	1	AA43118	02/03/14 09:48	02/10/14 21:03	EPA 549.2	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Haloacetic Acids by EPA Method 552.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water Sampled: 01/29/14 14:15 Received: 01/29/14 21:15										
Monobromoacetic Acid	ND	0.8	1.0	ug/l	1	AB40444	02/05/14 13:05	02/07/14 20:08	EPA 552.2	U
Monochloroacetic Acid	ND	1.1	2.0	"	"	"	"	"	"	U
Dibromoacetic Acid	ND	0.8	1.0	"	"	"	"	"	"	U
Dichloroacetic Acid	ND	1.0	1.0	"	"	"	"	"	"	U
Trichloroacetic Acid	ND	1.0	1.0	"	"	"	"	"	"	U
Total Haloacetic Acids (HAA5)	ND	1.0	1.0	"	"	"	"	"	"	U
Surrogate: 2,3-Dibromopropionic Acid		*108 %*	*70-130*			"	"	"	"	
Surrogate: 2-Bromopropionic Acid		*97.2 %*	*70-130*			"	"	"	"	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Semivolatile Organic Compounds by EPA Method 525.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MRWPCA MW-1 (14A1643-01) Water	**Sampled: 01/29/14 14:15**		**Received: 01/29/14 21:15**							**A-02**
Benzo (a) pyrene	ND	0.11	0.13	ug/l	1.32	AB40727	02/08/14 13:35	02/13/14 17:59	EPA 525.2	U
Di(2-ethylhexyl)adipate	ND	0.53	6.6	"	"	"	"	"	"	U
Di(2-ethylhexyl)phthalate	**0.29**	0.26	4.0	"	"	"	"	"	"	J
Surrogate: 1,3-Dimethyl-2-nitrobenzene		*50.2 %*	*70-130*			"	"	"	"	
Surrogate: Perylene-d12		*19.0 %*	*70-130*			"	"	"	"	
Surrogate: Triphenyl phosphate		*55.2 %*	*70-130*			"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Metals (Drinking Water) by EPA 200 Series Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43136 - EPA 245.1 Hg Water											
Blank (AA43136-BLK1)					Prepared & Analyzed: 02/05/14						
Mercury	ND	0.060	1.0	ug/l							U
LCS (AA43136-BS1)					Prepared & Analyzed: 02/05/14						
Mercury	2.30	0.060	1.0	ug/l	2.50		92.0	80-120			
Duplicate (AA43136-DUP1)		**Source: 14A1575-02**			Prepared & Analyzed: 02/05/14						
Mercury	ND	0.060	1.0	ug/l		ND				20	U
Matrix Spike (AA43136-MS1)		**Source: 14A1575-02**			Prepared & Analyzed: 02/05/14						
Mercury	2.26	0.060	1.0	ug/l	2.50	ND	90.4	60-140			
Matrix Spike (AA43136-MS2)		**Source: 14B0218-01**			Prepared & Analyzed: 02/05/14						
Mercury	2.32	0.060	1.0	ug/l	2.50	0.0600	90.4	60-140			
Matrix Spike Dup (AA43136-MSD1)		**Source: 14A1575-02**			Prepared & Analyzed: 02/05/14						
Mercury	2.29	0.060	1.0	ug/l	2.50	ND	91.6	60-140	1.32	20	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Metals by EPA 200 Series Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43133 - Metals Digest											
Blank (AA43133-BLK1)					Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	ND	0.010	1.0	mg/l							U
Magnesium	ND	0.0080	1.0	"							U
Potassium	ND	0.0080	1.0	"							U
Sodium	ND	0.020	1.0	"							U
LCS (AA43133-BS1)					Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	5.36	0.010	1.0	mg/l	5.88		91.2	85-115			
Magnesium	7.09	0.0080	1.0	"	8.00		88.6	85-115			
Potassium	7.97	0.0080	1.0	"	8.00		99.6	85-115			
Sodium	7.75	0.020	1.0	"	8.00		96.8	85-115			
Duplicate (AA43133-DUP1)		**Source: 14A1643-01**			Prepared: 01/31/14 Analyzed: 02/12/14						
Calcium	18.2	0.010	1.0	mg/l		16.5			9.76	20	
Magnesium	6.86	0.0080	1.0	"		6.53			4.91	20	
Potassium	3.66	0.0080	1.0	"		3.35			8.82	20	
Sodium	52.8	0.020	1.0	"		50.2			5.03	20	
Matrix Spike (AA43133-MS1)		**Source: 14A1643-01**			Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	22.4	0.010	1.0	mg/l	5.88	16.5	100	70-130			
Magnesium	13.0	0.0080	1.0	"	8.00	6.53	81.3	70-130			
Potassium	10.8	0.0080	1.0	"	8.00	3.35	92.8	70-130			
Sodium	58.8	0.020	1.0	"	8.00	50.2	107	70-130			
Matrix Spike (AA43133-MS2)		**Source: 14A1713-01**			Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	35.4	0.010	1.0	mg/l	5.88	28.8	112	70-130			
Magnesium	11.0	0.0080	1.0	"	8.00	3.85	89.5	70-130			
Potassium	11.1	0.0080	1.0	"	8.00	3.56	94.7	70-130			
Sodium	47.2	0.020	1.0	"	8.00	38.1	114	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Metals by EPA 200 Series Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43133 - Metals Digest											
Matrix Spike Dup (AA43133-MSD1)		**Source: 14A1643-01**			Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	23.2	0.010	1.0	mg/l	5.88	16.5	113	70-130	3.39	20	
Magnesium	14.3	0.0080	1.0	"	8.00	6.53	97.1	70-130	9.24	20	
Potassium	11.0	0.0080	1.0	"	8.00	3.35	95.8	70-130	2.21	20	
Sodium	60.3	0.020	1.0	"	8.00	50.2	126	70-130	2.49	20	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40328 - EPA 200.8											
Blank (AB40328-BLK1)					Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	ND	2.0	50	ug/l							U
Antimony	ND	0.020	6.0	"							U
Arsenic	ND	0.070	2.0	"							U
Barium	ND	0.030	100	"							U
Beryllium	ND	0.020	1.0	"							U
Boron	17.8	6.0	50	"							J
Cadmium	ND	0.020	1.0	"							U
Chromium	ND	0.080	10	"							U
Copper	ND	0.040	0.50	"							U
Iron	ND	1.8	50	"							U
Lead	ND	0.020	5.0	"							U
Manganese	ND	0.030	5.0	"							U
Nickel	ND	0.060	10	"							U
Selenium	0.0754	0.070	5.0	"							J
Silver	ND	0.020	0.10	"							U
Thallium	ND	0.020	1.0	"							U
Uranium	ND	0.020	1.0	pCi/l							U
Vanadium	ND	0.30	1.0	ug/l							U
Zinc	1.13	0.50	5.0	"							J
LCS (AB40328-BS1)					Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	483	2.0	50	ug/l	520		92.8	85-115			
Antimony	20.1	0.020	6.0	"	20.0		100	85-115			
Arsenic	19.7	0.070	2.0	"	20.0		98.7	85-115			
Barium	19.1	0.030	100	"	20.0		95.4	85-115			J
Beryllium	18.8	0.020	1.0	"	20.0		94.1	85-115			
Boron	110	6.0	50	"	100		110	85-115			
Cadmium	18.8	0.020	1.0	"	20.0		94.0	85-115			
Chromium	19.3	0.080	10	"	20.0		96.6	85-115			
Copper	19.0	0.040	0.50	"	20.0		95.1	85-115			
Iron	502	1.8	50	"	520		96.6	85-115			
Lead	17.5	0.020	5.0	"	20.0		87.5	85-115			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40328 - EPA 200.8											
LCS (AB40328-BS1)					Prepared: 02/03/14 Analyzed: 02/04/14						
Manganese	18.8	0.030	5.0	ug/l	20.0		94.2	85-115			
Nickel	19.3	0.060	10	"	20.0		96.6	85-115			
Selenium	20.1	0.070	5.0	"	20.0		100	85-115			
Silver	18.1	0.020	0.10	"	20.0		90.4	85-115			
Thallium	17.1	0.020	1.0	"	20.0		85.6	85-115			
Uranium	11.5	0.020	1.0	pCi/l	13.4		85.5	85-115			
Vanadium	19.8	0.30	1.0	ug/l	20.0		99.0	85-115			
Zinc	98.6	0.50	5.0	"	100		98.6	85-115			
Duplicate (AB40328-DUP1)		**Source: 14A1755-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	1120	2.0	50	ug/l		1150			1.98	20	
Antimony	0.0754	0.020	6.0	"		0.0744			1.34	20	J
Arsenic	1.08	0.070	2.0	"		1.15			6.89	20	J
Barium	70.3	0.030	100	"		68.3			2.85	20	J
Beryllium	0.0788	0.020	1.0	"		0.0838			6.24	20	J
Boron	37.9	6.0	50	"		36.2			4.75	20	J
Cadmium	0.0848	0.020	1.0	"		0.0857			1.11	20	J
Chromium	0.470	0.080	10	"		0.382			20.5	20	J
Copper	12.8	0.040	0.50	"		12.3			3.69	20	
Iron	412	1.8	50	"		408			0.910	20	
Lead	1.06	0.020	5.0	"		1.12			4.92	20	J
Manganese	6.46	0.030	5.0	"		7.23			11.3	20	
Nickel	1.21	0.060	10	"		1.20			1.54	20	J
Selenium	0.159	0.070	5.0	"		0.171			7.50	20	J
Silver	0.0362	0.020	0.10	"		0.0220			48.8	20	J
Thallium	0.105	0.020	1.0	"		0.0948			9.86	20	J
Uranium	0.249	0.020	1.0	pCi/l		0.265			6.25	20	J
Vanadium	1.52	0.30	1.0	ug/l		1.64			7.56	20	
Zinc	6.79	0.50	5.0	"		6.73			0.780	20	

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2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40328 - EPA 200.8											
Matrix Spike (AB40328-MS1)		**Source: 14A1755-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	1570	2.0	50	ug/l	520	1150	81.5	70-130			
Antimony	18.9	0.020	6.0	"	20.0	0.0744	94.1	70-130			
Arsenic	19.9	0.070	2.0	"	20.0	1.15	93.5	70-130			
Barium	85.5	0.030	100	"	20.0	68.3	85.8	70-130			J
Beryllium	17.8	0.020	1.0	"	20.0	0.0838	88.5	70-130			
Boron	114	6.0	50	"	100	36.2	78.1	70-130			
Cadmium	18.7	0.020	1.0	"	20.0	0.0857	93.0	70-130			
Chromium	17.4	0.080	10	"	20.0	0.382	85.1	70-130			
Copper	29.6	0.040	0.50	"	20.0	12.3	86.4	70-130			
Iron	858	1.8	50	"	520	408	86.4	70-130			
Lead	19.8	0.020	5.0	"	20.0	1.12	93.4	70-130			
Manganese	23.4	0.030	5.0	"	20.0	7.23	80.7	70-130			
Nickel	18.2	0.060	10	"	20.0	1.20	85.0	70-130			
Selenium	18.7	0.070	5.0	"	20.0	0.171	92.7	70-130			
Silver	17.9	0.020	0.10	"	20.0	0.0220	89.3	70-130			
Thallium	18.5	0.020	1.0	"	20.0	0.0948	92.1	70-130			
Uranium	13.5	0.020	1.0	pCi/l	13.4	0.265	98.5	70-130			
Vanadium	19.1	0.30	1.0	ug/l	20.0	1.64	87.4	70-130			
Zinc	98.9	0.50	5.0	"	100	6.73	92.1	70-130			
Matrix Spike (AB40328-MS2)		**Source: 14B0124-02**			Prepared: 02/05/14 Analyzed: 02/06/14						
Aluminum	529	2.0	50	ug/l	520	70.3	88.1	70-130			
Antimony	20.4	0.020	6.0	"	20.0	0.0711	102	70-130			
Arsenic	21.4	0.070	2.0	"	20.0	2.13	96.2	70-130			
Barium	35.8	0.030	100	"	20.0	16.9	94.7	70-130			J
Beryllium	19.3	0.020	1.0	"	20.0	ND	96.4	70-130			
Boron	150	6.0	50	"	100	63.0	87.0	70-130			
Cadmium	19.4	0.020	1.0	"	20.0	ND	97.0	70-130			
Chromium	20.0	0.080	10	"	20.0	0.590	97.0	70-130			
Copper	19.6	0.040	0.50	"	20.0	1.39	90.9	70-130			
Iron	602	1.8	50	"	520	91.5	98.1	70-130			
Lead	20.2	0.020	5.0	"	20.0	0.0825	101	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40328 - EPA 200.8											
Matrix Spike (AB40328-MS2)		**Source: 14B0124-02**			Prepared: 02/05/14 Analyzed: 02/06/14						
Manganese	26.7	0.030	5.0	ug/l	20.0	7.07	98.0	70-130			
Nickel	19.5	0.060	10	"	20.0	0.983	92.8	70-130			
Selenium	19.2	0.070	5.0	"	20.0	0.207	95.2	70-130			
Silver	19.4	0.020	0.10	"	20.0	ND	97.2	70-130			
Thallium	19.8	0.020	1.0	"	20.0	ND	99.0	70-130			
Uranium	14.2	0.020	1.0	pCi/l	13.4	0.107	105	70-130			
Vanadium	24.6	0.30	1.0	ug/l	20.0	5.40	95.9	70-130			
Zinc	99.9	0.50	5.0	"	100	3.69	96.2	70-130			
Matrix Spike Dup (AB40328-MSD1)		**Source: 14A1755-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	1580	2.0	50	ug/l	520	1150	83.4	70-130	0.635	20	
Antimony	19.7	0.020	6.0	"	20.0	0.0744	98.1	70-130	4.13	20	
Arsenic	20.5	0.070	2.0	"	20.0	1.15	96.6	70-130	3.05	20	
Barium	88.4	0.030	100	"	20.0	68.3	100	70-130	3.29	20	J
Beryllium	19.1	0.020	1.0	"	20.0	0.0838	95.3	70-130	7.32	20	
Boron	125	6.0	50	"	100	36.2	88.8	70-130	8.99	20	
Cadmium	19.7	0.020	1.0	"	20.0	0.0857	98.0	70-130	5.25	20	
Chromium	18.0	0.080	10	"	20.0	0.382	88.1	70-130	3.40	20	
Copper	30.7	0.040	0.50	"	20.0	12.3	91.9	70-130	3.64	20	
Iron	860	1.8	50	"	520	408	86.8	70-130	0.291	20	
Lead	21.5	0.020	5.0	"	20.0	1.12	102	70-130	8.35	20	
Manganese	23.8	0.030	5.0	"	20.0	7.23	83.1	70-130	2.03	20	
Nickel	18.6	0.060	10	"	20.0	1.20	87.2	70-130	2.36	20	
Selenium	19.1	0.070	5.0	"	20.0	0.171	94.8	70-130	2.29	20	
Silver	19.1	0.020	0.10	"	20.0	0.0220	95.5	70-130	6.75	20	
Thallium	20.0	0.020	1.0	"	20.0	0.0948	99.5	70-130	7.72	20	
Uranium	14.5	0.020	1.0	pCi/l	13.4	0.265	107	70-130	7.74	20	
Vanadium	19.8	0.30	1.0	ug/l	20.0	1.64	91.0	70-130	3.68	20	
Zinc	105	0.50	5.0	"	100	6.73	97.9	70-130	5.71	20	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43044 - General Preparation											
Duplicate (AA43044-DUP1)		**Source: 14A1628-02**			Prepared & Analyzed: 01/30/14						
Specific Conductance (EC)	360	1.0	20	umhos/cm		384			6.45	10	
Batch AA43107 - General Preparation											
Blank (AA43107-BLK1)					Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	ND	0.030	0.050	mg/l							U
LCS (AA43107-BS1)					Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	0.205	0.030	0.050	mg/l	0.200		103	80-120			
Duplicate (AA43107-DUP1)		**Source: 14A1588-02**			Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	ND	0.030	0.050	mg/l		ND				20	U
Matrix Spike (AA43107-MS1)		**Source: 14A1588-02**			Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	0.208	0.030	0.050	mg/l	0.200	ND	104	80-120			
Matrix Spike Dup (AA43107-MSD1)		**Source: 14A1588-02**			Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	0.210	0.030	0.050	mg/l	0.200	ND	105	80-120	0.826	20	
Batch AA43121 - General Preparation											
Duplicate (AA43121-DUP1)		**Source: 14B0229-03**			Prepared: 02/01/14 Analyzed: 02/11/14						
Bicarbonate	42.7	0.060	5.0	mg/l		42.7			0.00	20	
Batch AA43131 - General Prep											
Blank (AA43131-BLK1)					Prepared & Analyzed: 01/31/14						
Total Organic Carbon	0.142	0.100	0.300	mg/l							J

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43131 - General Prep											
LCS (AA43131-BS1)					Prepared & Analyzed: 01/31/14						
Total Organic Carbon	10.9	0.100	0.300	mg/l	10.0		109	85-115			
LCS Dup (AA43131-BSD1)					Prepared & Analyzed: 01/31/14						
Total Organic Carbon	10.4	0.100	0.300	mg/l	10.0		104	85-115	4.47	20	
Duplicate (AA43131-DUP1)		**Source: 14A1101-01**			Prepared & Analyzed: 01/31/14						
Total Organic Carbon	0.853	0.100	0.300	mg/l		0.895			4.80	20	
Matrix Spike (AA43131-MS1)		**Source: 14A1101-02**			Prepared & Analyzed: 01/31/14						
Total Organic Carbon	21.5	0.200	0.600	mg/l	20.0	0.789	103	70-130			
Matrix Spike Dup (AA43131-MSD1)		**Source: 14A1101-02**			Prepared & Analyzed: 01/31/14						
Total Organic Carbon	21.8	0.200	0.600	mg/l	20.0	0.789	105	70-130	1.81	20	
Batch AB40322 - General Preparation											
Blank (AB40322-BLK1)					Prepared: 02/03/14 Analyzed: 02/05/14						
Total Dissolved Solids	ND	5.0	10	mg/l							U
Duplicate (AB40322-DUP1)		**Source: 14A1635-01**			Prepared: 02/03/14 Analyzed: 02/05/14						
Total Dissolved Solids	361	5.0	10	mg/l		352			2.52	30	
Duplicate (AB40322-DUP2)		**Source: 14A1730-01**			Prepared: 02/03/14 Analyzed: 02/05/14						
Total Dissolved Solids	1010	5.0	10	mg/l		964			4.46	30	
Batch AB41141 - General Preparation											
Blank (AB41141-BLK1)					Prepared & Analyzed: 02/11/14						
Perchlorate	0.967	0.90	4.0	ug/l							J

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41141 - General Preparation											
LCS (AB41141-BS1)					Prepared & Analyzed: 02/11/14						
Perchlorate	23.9	0.90	4.0	ug/l	25.0		95.5	85-115			
Duplicate (AB41141-DUP1)		**Source: 14A1643-01**			Prepared & Analyzed: 02/11/14						
Perchlorate	ND	0.90	4.0	ug/l		ND				15	U
Matrix Spike (AB41141-MS1)		**Source: 14A1643-01**			Prepared & Analyzed: 02/11/14						
Perchlorate	25.9	0.90	4.0	ug/l	25.0	ND	104	70-130			
Matrix Spike Dup (AB41141-MSD1)		**Source: 14A1643-01**			Prepared & Analyzed: 02/11/14						
Perchlorate	25.9	0.90	4.0	ug/l	25.0	ND	104	70-130	0.00386	15	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Miscellaneous Physical/Conventional Chemistry Parameters - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40428 - General Preparation											
Blank (AB40428-BLK1)					Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	ND	0.0020	0.10	mg/l							U
LCS (AB40428-BS1)					Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.202	0.0020	0.10	mg/l	0.200		101	85-115			
Duplicate (AB40428-DUP1)		**Source: 14A1492-02**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	ND	0.0020	0.10	mg/l		ND				25	U
Matrix Spike (AB40428-MS1)		**Source: 14A1492-02**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.188	0.0020	0.10	mg/l	0.200	ND	93.9	85-115			
Matrix Spike (AB40428-MS2)		**Source: 14A1635-01**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.220	0.0020	0.10	mg/l	0.200	ND	110	85-115			
Matrix Spike Dup (AB40428-MSD1)		**Source: 14A1492-02**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.186	0.0020	0.10	mg/l	0.200	ND	92.8	85-115	1.23	25	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Anions by EPA Method 300.0 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43037 - General Preparation											
Blank (AA43037-BLK1)					Prepared & Analyzed: 01/30/14						
Nitrate as NO3	ND	0.20	2.0	mg/l							U
Sulfate as SO4	ND	0.090	0.50	"							U
Nitrite as N	ND	0.020	0.40	"							U
Chloride	ND	0.030	0.50	"							U
Fluoride	ND	0.070	0.10	"							U
LCS (AA43037-BS1)					Prepared & Analyzed: 01/30/14						
Nitrate as NO3	22	0.20	2.0	mg/l	22.2		100	90-110			
Nitrite as N	5.18	0.020	0.40	"	5.00		104	90-110			
Sulfate as SO4	20.0	0.090	0.50	"	20.0		99.8	90-110			
Chloride	10.1	0.030	0.50	"	10.0		101	90-110			
Fluoride	5.17	0.070	0.10	"	5.00		103	90-110			
Duplicate (AA43037-DUP1)		**Source: 14A1612-01**			Prepared: 01/30/14 Analyzed: 01/31/14						
Nitrate as NO3	76	1.0	10	mg/l		76			0.434	20	
Chloride	49.3	0.15	2.5	"		48.5			1.72	20	
Fluoride	ND	0.070	0.10	"		ND				20	U
Sulfate as SO4	13.1	0.090	0.50	"		13.2			0.396	20	
Nitrite as N	ND	0.020	0.40	"		ND				20	U
Matrix Spike (AA43037-MS1)		**Source: 14A1612-01**			Prepared: 01/30/14 Analyzed: 01/31/14						
Nitrate as NO3	100	1.0	10	mg/l	24.7	76	98.0	80-120			
Sulfate as SO4	33.9	0.45	2.5	"	22.2	13.2	93.5	80-120			
Fluoride	4.96	0.35	0.50	"	5.56	ND	89.3	80-120			
Nitrite as N	5.37	0.10	2.0	"	5.56	ND	96.6	80-120			
Chloride	59.9	0.15	2.5	"	11.1	48.5	103	80-120			
Matrix Spike (AA43037-MS2)		**Source: 14A1643-01**			Prepared: 01/30/14 Analyzed: 01/31/14						
Nitrate as NO3	27	1.0	10	mg/l	24.7	2.7	97.4	80-120			
Chloride	90.7	0.15	2.5	"	11.1	78.6	108	80-120			
Fluoride	5.13	0.35	0.50	"	5.56	ND	92.4	80-120			
Sulfate as SO4	31.5	0.45	2.5	"	22.2	9.88	97.4	80-120			
Nitrite as N	5.55	0.10	2.0	"	5.56	ND	99.9	80-120			

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Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Anions by EPA Method 300.0 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43037 - General Preparation											
Matrix Spike Dup (AA43037-MSD1)		**Source: 14A1612-01**			Prepared: 01/30/14 Analyzed: 01/31/14						
Nitrate as NO3	100	1.0	10	mg/l	24.7	76	98.4	80-120	0.116	20	
Sulfate as SO4	34.1	0.45	2.5	"	22.2	13.2	94.2	80-120	0.425	20	
Nitrite as N	5.39	0.10	2.0	"	5.56	ND	97.1	80-120	0.516	20	
Chloride	60.0	0.15	2.5	"	11.1	48.5	103	80-120	0.102	20	
Fluoride	5.01	0.35	0.50	"	5.56	ND	90.2	80-120	1.00	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
Blank (AB40523-BLK1)					Prepared & Analyzed: 02/03/14						
Acetone	ND	0.80	5.0	ug/l							U
Acrylonitrile	ND	0.20	5.0	"							U
Benzene	ND	0.20	0.30	"							U
Bromobenzene	ND	0.10	0.50	"							U
Bromochloromethane	ND	0.20	0.50	"							U
Bromodichloromethane	ND	0.50	0.50	"							U
Bromoform	ND	0.50	0.50	"							U
Bromomethane	ND	0.20	0.50	"							U
n-Butylbenzene	ND	0.10	0.50	"							U
sec-Butylbenzene	ND	0.10	0.50	"							U
tert-Butylbenzene	ND	0.10	0.50	"							U
Carbon disulfide	ND	0.20	0.50	"							U
Carbon tetrachloride	ND	0.30	0.50	"							U
Chlorobenzene	ND	0.20	0.50	"							U
Chloroethane	ND	0.10	0.50	"							U
Chloroform	ND	0.50	0.50	"							U
Chloromethane	ND	0.20	0.50	"							U
2-Chlorotoluene	ND	0.20	0.50	"							U
4-Chlorotoluene	ND	0.10	0.50	"							U
Dibromochloromethane	ND	0.50	0.50	"							U
1,2-Dibromo-3-chloropropane	ND	0.36	0.50	"							U
1,2-Dibromoethane (EDB)	ND	0.14	0.50	"							U
Dibromomethane	ND	0.20	0.50	"							U
1,2-Dichlorobenzene	ND	0.20	0.50	"							U
1,3-Dichlorobenzene	ND	0.20	0.50	"							U
trans-1,4-Dichloro-2-butene	ND	0.095	5.0	"							U
1,4-Dichlorobenzene	ND	0.10	0.50	"							U
Dichlorodifluoromethane	ND	0.20	0.50	"							U
1,1-Dichloroethane	ND	0.10	0.50	"							U
1,2-Dichloroethane	ND	0.20	0.50	"							U
1,1-Dichloroethene	ND	0.10	0.30	"							U
cis-1,2-Dichloroethene	ND	0.20	0.50	"							U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
Blank (AB40523-BLK1)					Prepared & Analyzed: 02/03/14						
trans-1,2-Dichloroethene	ND	0.20	0.50	ug/l							U
1,2-Dichloropropane	ND	0.20	0.50	"							U
1,3-Dichloropropane	ND	0.20	0.50	"							U
2,2-Dichloropropane	ND	0.10	0.50	"							U
1,1-Dichloropropene	ND	0.10	0.50	"							U
cis-1,3-Dichloropropene	ND	0.20	0.50	"							U
trans-1,3-Dichloropropene	ND	0.20	0.50	"							U
Ethylbenzene	ND	0.10	0.50	"							U
1,3-Dichloropropene (total)	ND	0.20	0.50	"							U
2-Hexanone	ND	0.097	5.0	"							U
Hexachlorobutadiene	ND	0.30	0.50	"							U
Isopropylbenzene	ND	0.20	0.50	"							U
p-Isopropyltoluene	ND	0.10	0.50	"							U
Methyl ethyl ketone	ND	0.40	1.0	"							U
Methyl iodide	ND	0.12	2.0	"							U
Methyl isobutyl ketone	ND	0.30	1.0	"							U
Methylene chloride	ND	0.40	0.50	"							U
Naphthalene	ND	0.20	0.50	"							U
n-Propylbenzene	ND	0.20	0.50	"							U
Styrene	ND	0.10	0.50	"							U
1,1,1,2-Tetrachloroethane	ND	0.20	0.50	"							U
1,1,2,2-Tetrachloroethane	ND	0.20	0.50	"							U
Tetrachloroethene	ND	0.20	0.50	"							U
Toluene	ND	0.10	0.50	"							U
1,2,3-Trichlorobenzene	ND	0.10	0.50	"							U
1,2,4-Trichlorobenzene	ND	0.20	0.50	"							U
1,1,1-Trichloroethane	ND	0.20	0.50	"							U
1,1,2-Trichloroethane	ND	0.20	0.50	"							U
Trichloroethene	ND	0.20	0.50	"							U
Trichlorofluoromethane	ND	0.20	0.50	"							U
Trichlorotrifluoroethane	ND	0.20	0.50	"							U
1,2,3-Trichloropropane	ND	0.13	0.50	"							U

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2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
Blank (AB40523-BLK1)					Prepared & Analyzed: 02/03/14						
1,2,4-Trimethylbenzene	ND	0.10	0.50	ug/l							U
1,3,5-Trimethylbenzene	ND	0.10	0.50	"							U
Vinyl chloride	ND	0.10	0.50	"							U
m,p-Xylene	ND	0.20	0.50	"							U
o-Xylene	ND	0.10	0.50	"							U
Xylenes (total)	ND	0.20	0.50	"							U
Trihalomethanes (total)	ND	0.50	0.50	"							U
Methyl tert-butyl ether	ND	0.50	0.50	"							U
Ethyl tert-butyl ether	ND	0.20	0.50	"							U
Tert-amyl methyl ether	ND	0.20	0.50	"							U
Surrogate: Bromofluorobenzene	*24.6*			*"*	*25.0*		*98.3*	*70-130*			
Surrogate: Dibromofluoromethane	*23.4*			*"*	*25.0*		*93.4*	*70-130*			
Surrogate: Toluene-d8	*24.8*			*"*	*25.0*		*99.3*	*70-130*			
LCS (AB40523-BS1)					Prepared & Analyzed: 02/03/14						
Acetone	21.8	0.80	5.0	ug/l	20.0		109	70-130			
Acrylonitrile	5.49	0.20	5.0	"	5.00		110	70-130			
Benzene	4.86	0.20	0.30	"	5.00		97.2	70-130			
Bromobenzene	4.87	0.10	0.50	"	5.00		97.4	70-130			
Bromochloromethane	4.99	0.20	0.50	"	5.00		99.8	70-130			
Bromodichloromethane	4.76	0.50	0.50	"	5.00		95.2	70-130			
Bromoform	4.54	0.50	0.50	"	5.00		90.8	70-130			
Bromomethane	5.21	0.20	0.50	"	5.00		104	70-130			
n-Butylbenzene	4.94	0.10	0.50	"	5.00		98.8	70-130			
sec-Butylbenzene	4.94	0.10	0.50	"	5.00		98.8	70-130			
tert-Butylbenzene	5.07	0.10	0.50	"	5.00		101	70-130			
Carbon disulfide	4.99	0.20	0.50	"	5.00		99.8	70-130			
Carbon tetrachloride	4.48	0.30	0.50	"	5.00		89.6	70-130			
Chlorobenzene	4.94	0.20	0.50	"	5.00		98.8	70-130			
Chloroethane	5.47	0.10	0.50	"	5.00		109	70-130			
Chloroform	5.06	0.50	0.50	"	5.00		101	70-130			
Chloromethane	5.63	0.20	0.50	"	5.00		113	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
LCS (AB40523-BS1)					Prepared & Analyzed: 02/03/14						
2-Chlorotoluene	4.97	0.20	0.50	ug/l	5.00		99.4	70-130			
4-Chlorotoluene	5.04	0.10	0.50	"	5.00		101	70-130			
Dibromochloromethane	4.79	0.50	0.50	"	5.00		95.8	70-130			
1,2-Dibromo-3-chloropropane	5.46	0.36	0.50	"	5.00		109	70-130			
1,2-Dibromoethane (EDB)	4.99	0.14	0.50	"	5.00		99.8	70-130			
Dibromomethane	4.96	0.20	0.50	"	5.00		99.2	70-130			
1,2-Dichlorobenzene	4.92	0.20	0.50	"	5.00		98.4	70-130			
1,3-Dichlorobenzene	4.84	0.20	0.50	"	5.00		96.8	70-130			
1,4-Dichlorobenzene	4.86	0.10	0.50	"	5.00		97.2	70-130			
trans-1,4-Dichloro-2-butene	4.54	0.095	5.0	"	5.00		90.8	70-130			J
Dichlorodifluoromethane	5.94	0.20	0.50	"	5.00		119	70-130			
1,1-Dichloroethane	5.26	0.10	0.50	"	5.00		105	70-130			
1,2-Dichloroethane	5.05	0.20	0.50	"	5.00		101	70-130			
1,1-Dichloroethene	4.85	0.10	0.30	"	5.00		97.0	70-130			
cis-1,2-Dichloroethene	5.17	0.20	0.50	"	5.00		103	70-130			
trans-1,2-Dichloroethene	4.90	0.20	0.50	"	5.00		98.0	70-130			
1,2-Dichloropropane	5.01	0.20	0.50	"	5.00		100	70-130			
1,3-Dichloropropane	5.18	0.20	0.50	"	5.00		104	70-130			
2,2-Dichloropropane	4.34	0.10	0.50	"	5.00		86.8	70-130			
1,1-Dichloropropene	4.74	0.10	0.50	"	5.00		94.8	70-130			
cis-1,3-Dichloropropene	5.42	0.20	0.50	"	5.00		108	70-130			
trans-1,3-Dichloropropene	4.43	0.20	0.50	"	5.00		88.6	70-130			
2-Hexanone	5.00	0.097	5.0	"	5.00		100	70-130			
Ethylbenzene	4.99	0.10	0.50	"	5.00		99.8	70-130			
Hexachlorobutadiene	4.57	0.30	0.50	"	5.00		91.4	70-130			
Isopropylbenzene	5.14	0.20	0.50	"	5.00		103	70-130			
p-Isopropyltoluene	4.96	0.10	0.50	"	5.00		99.2	70-130			
Methyl ethyl ketone	10.9	0.40	1.0	"	10.0		109	70-130			
Methyl iodide	5.04	0.12	2.0	"	5.00		101	70-130			
Methyl isobutyl ketone	10.2	0.30	1.0	"	10.0		102	70-130			
Methylene chloride	4.68	0.40	0.50	"	5.00		93.6	70-130			
Naphthalene	5.61	0.20	0.50	"	5.00		112	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
LCS (AB40523-BS1)					Prepared & Analyzed: 02/03/14						
n-Propylbenzene	5.19	0.20	0.50	ug/l	5.00		104	70-130			
Styrene	5.23	0.10	0.50	"	5.00		105	70-130			
1,1,1,2-Tetrachloroethane	4.54	0.20	0.50	"	5.00		90.8	70-130			
1,1,2,2-Tetrachloroethane	5.08	0.20	0.50	"	5.00		102	70-130			
Tetrachloroethene	4.76	0.20	0.50	"	5.00		95.2	70-130			
Toluene	4.96	0.10	0.50	"	5.00		99.2	70-130			
1,2,3-Trichlorobenzene	5.54	0.10	0.50	"	5.00		111	70-130			
1,2,4-Trichlorobenzene	5.06	0.20	0.50	"	5.00		101	70-130			
1,1,1-Trichloroethane	4.85	0.20	0.50	"	5.00		97.0	70-130			
1,1,2-Trichloroethane	5.08	0.20	0.50	"	5.00		102	70-130			
Trichloroethene	4.77	0.20	0.50	"	5.00		95.4	70-130			
Trichlorofluoromethane	5.34	0.20	0.50	"	5.00		107	70-130			
Trichlorotrifluoroethane	5.42	0.20	0.50	"	5.00		108	70-130			
1,2,3-Trichloropropane	5.07	0.13	0.50	"	5.00		101	70-130			
1,2,4-Trimethylbenzene	5.17	0.10	0.50	"	5.00		103	70-130			
1,3,5-Trimethylbenzene	5.00	0.10	0.50	"	5.00		100	70-130			
Vinyl chloride	5.10	0.10	0.50	"	5.00		102	70-130			
m,p-Xylene	9.81	0.20	0.50	"	10.0		98.1	70-130			
o-Xylene	5.07	0.10	0.50	"	5.00		101	70-130			
Xylenes (total)	14.9	0.20	0.50	"	15.0		99.2	70-130			
Methyl tert-butyl ether	5.00	0.50	0.50	"	5.00		100	70-130			
Ethyl tert-butyl ether	5.28	0.20	0.50	"	5.00		106	70-130			
Tert-amyl methyl ether	5.25	0.20	0.50	"	5.00		105	70-130			
Surrogate: Bromofluorobenzene	*24.8*			*"*	*25.0*		*99.4*	*70-130*			
Surrogate: Dibromofluoromethane	*23.9*			*"*	*25.0*		*95.4*	*70-130*			
Surrogate: Toluene-d8	*25.1*			*"*	*25.0*		*101*	*70-130*			
LCS Dup (AB40523-BSD1)					Prepared & Analyzed: 02/03/14						
Acetone	21.6	0.80	5.0	ug/l	20.0		108	70-130	1.06	30	
Acrylonitrile	5.42	0.20	5.0	"	5.00		108	70-130	1.28	30	
Benzene	4.79	0.20	0.30	"	5.00		95.8	70-130	1.45	30	
Bromobenzene	4.90	0.10	0.50	"	5.00		98.0	70-130	0.614	30	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
LCS Dup (AB40523-BSD1)					Prepared & Analyzed: 02/03/14						
Bromochloromethane	4.89	0.20	0.50	ug/l	5.00		97.8	70-130	2.02	30	
Bromodichloromethane	4.86	0.50	0.50	"	5.00		97.2	70-130	2.08	30	
Bromoform	4.50	0.50	0.50	"	5.00		90.0	70-130	0.885	30	
Bromomethane	5.26	0.20	0.50	"	5.00		105	70-130	0.955	30	
n-Butylbenzene	4.86	0.10	0.50	"	5.00		97.2	70-130	1.63	30	
sec-Butylbenzene	4.84	0.10	0.50	"	5.00		96.8	70-130	2.04	30	
tert-Butylbenzene	4.96	0.10	0.50	"	5.00		99.2	70-130	2.19	30	
Carbon disulfide	4.96	0.20	0.50	"	5.00		99.2	70-130	0.603	30	
Carbon tetrachloride	4.42	0.30	0.50	"	5.00		88.4	70-130	1.35	30	
Chlorobenzene	4.78	0.20	0.50	"	5.00		95.6	70-130	3.29	30	
Chloroethane	5.51	0.10	0.50	"	5.00		110	70-130	0.729	30	
Chloroform	4.98	0.50	0.50	"	5.00		99.6	70-130	1.59	30	
Chloromethane	5.75	0.20	0.50	"	5.00		115	70-130	2.11	30	
2-Chlorotoluene	4.88	0.20	0.50	"	5.00		97.6	70-130	1.83	30	
4-Chlorotoluene	4.90	0.10	0.50	"	5.00		98.0	70-130	2.82	30	
Dibromochloromethane	4.77	0.50	0.50	"	5.00		95.4	70-130	0.418	30	
1,2-Dibromo-3-chloropropane	5.48	0.36	0.50	"	5.00		110	70-130	0.366	25	
1,2-Dibromoethane (EDB)	4.91	0.14	0.50	"	5.00		98.2	70-130	1.62	25	
Dibromomethane	4.90	0.20	0.50	"	5.00		98.0	70-130	1.22	30	
1,2-Dichlorobenzene	4.81	0.20	0.50	"	5.00		96.2	70-130	2.26	30	
1,3-Dichlorobenzene	4.78	0.20	0.50	"	5.00		95.6	70-130	1.25	30	
1,4-Dichlorobenzene	4.72	0.10	0.50	"	5.00		94.4	70-130	2.92	30	
trans-1,4-Dichloro-2-butene	4.70	0.095	5.0	"	5.00		94.0	70-130	3.46	25	J
Dichlorodifluoromethane	5.79	0.20	0.50	"	5.00		116	70-130	2.56	30	
1,1-Dichloroethane	5.24	0.10	0.50	"	5.00		105	70-130	0.381	30	
1,2-Dichloroethane	4.96	0.20	0.50	"	5.00		99.2	70-130	1.80	30	
1,1-Dichloroethene	4.89	0.10	0.30	"	5.00		97.8	70-130	0.821	30	
cis-1,2-Dichloroethene	5.01	0.20	0.50	"	5.00		100	70-130	3.14	30	
trans-1,2-Dichloroethene	4.82	0.20	0.50	"	5.00		96.4	70-130	1.65	30	
1,2-Dichloropropane	4.92	0.20	0.50	"	5.00		98.4	70-130	1.81	30	
1,3-Dichloropropane	4.98	0.20	0.50	"	5.00		99.6	70-130	3.94	30	
2,2-Dichloropropane	4.24	0.10	0.50	"	5.00		84.8	70-130	2.33	30	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
LCS Dup (AB40523-BSD1)					Prepared & Analyzed: 02/03/14						
1,1-Dichloropropene	4.64	0.10	0.50	ug/l	5.00		92.8	70-130	2.13	30	
cis-1,3-Dichloropropene	5.41	0.20	0.50	"	5.00		108	70-130	0.185	30	
trans-1,3-Dichloropropene	4.43	0.20	0.50	"	5.00		88.6	70-130	0.00	30	
Ethylbenzene	4.92	0.10	0.50	"	5.00		98.4	70-130	1.41	30	
2-Hexanone	4.97	0.097	5.0	"	5.00		99.4	70-130	0.602	25	J
Hexachlorobutadiene	4.70	0.30	0.50	"	5.00		94.0	70-130	2.80	30	
Isopropylbenzene	5.06	0.20	0.50	"	5.00		101	70-130	1.57	30	
p-Isopropyltoluene	4.91	0.10	0.50	"	5.00		98.2	70-130	1.01	30	
Methyl ethyl ketone	10.5	0.40	1.0	"	10.0		105	70-130	3.73	30	
Methyl iodide	4.98	0.12	2.0	"	5.00		99.6	70-130	1.20	25	
Methyl isobutyl ketone	9.94	0.30	1.0	"	10.0		99.4	70-130	3.07	30	
Methylene chloride	4.78	0.40	0.50	"	5.00		95.6	70-130	2.11	30	
Naphthalene	5.65	0.20	0.50	"	5.00		113	70-130	0.710	30	
n-Propylbenzene	5.14	0.20	0.50	"	5.00		103	70-130	0.968	30	
Styrene	5.18	0.10	0.50	"	5.00		104	70-130	0.961	30	
1,1,1,2-Tetrachloroethane	4.49	0.20	0.50	"	5.00		89.8	70-130	1.11	30	
1,1,2,2-Tetrachloroethane	4.96	0.20	0.50	"	5.00		99.2	70-130	2.39	30	
Tetrachloroethene	4.50	0.20	0.50	"	5.00		90.0	70-130	5.62	30	
Toluene	4.83	0.10	0.50	"	5.00		96.6	70-130	2.66	30	
1,2,3-Trichlorobenzene	5.52	0.10	0.50	"	5.00		110	70-130	0.362	30	
1,2,4-Trichlorobenzene	5.08	0.20	0.50	"	5.00		102	70-130	0.394	30	
1,1,1-Trichloroethane	4.87	0.20	0.50	"	5.00		97.4	70-130	0.412	30	
1,1,2-Trichloroethane	4.99	0.20	0.50	"	5.00		99.8	70-130	1.79	30	
Trichloroethene	4.78	0.20	0.50	"	5.00		95.6	70-130	0.209	30	
Trichlorofluoromethane	5.36	0.20	0.50	"	5.00		107	70-130	0.374	30	
Trichlorotrifluoroethane	5.24	0.20	0.50	"	5.00		105	70-130	3.38	30	
1,2,3-Trichloropropane	4.89	0.13	0.50	"	5.00		97.8	70-130	3.61	25	
1,2,4-Trimethylbenzene	5.11	0.10	0.50	"	5.00		102	70-130	1.17	30	
1,3,5-Trimethylbenzene	4.90	0.10	0.50	"	5.00		98.0	70-130	2.02	30	
Vinyl chloride	5.01	0.10	0.50	"	5.00		100	70-130	1.78	30	
m,p-Xylene	9.61	0.20	0.50	"	10.0		96.1	70-130	2.06	30	
o-Xylene	4.88	0.10	0.50	"	5.00		97.6	70-130	3.82	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
LCS Dup (AB40523-BSD1)					Prepared & Analyzed: 02/03/14						
Xylenes (total)	14.5	0.20	0.50	ug/l	15.0		96.6	70-130	2.66	30	
Methyl tert-butyl ether	4.92	0.50	0.50	"	5.00		98.4	70-130	1.61	30	
Ethyl tert-butyl ether	5.35	0.20	0.50	"	5.00		107	70-130	1.32	30	
Tert-amyl methyl ether	5.20	0.20	0.50	"	5.00		104	70-130	0.957	30	
Surrogate: Bromofluorobenzene	*25.0*			*"*	*25.0*		*99.9*	*70-130*			
Surrogate: Dibromofluoromethane	*23.9*			*"*	*25.0*		*95.6*	*70-130*			
Surrogate: Toluene-d8	*25.0*			*"*	*25.0*		*99.9*	*70-130*			
Matrix Spike (AB40523-MS1)		**Source: 14A1588-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
Acetone	21.5	0.80	5.0	ug/l	20.0	ND	108	70-130			
Acrylonitrile	5.26	0.20	5.0	"	5.00	ND	105	70-130			
Benzene	4.79	0.20	0.30	"	5.00	ND	95.8	70-130			
Bromobenzene	5.11	0.10	0.50	"	5.00	ND	102	70-130			
Bromochloromethane	5.11	0.20	0.50	"	5.00	ND	102	70-130			
Bromodichloromethane	4.76	0.50	0.50	"	5.00	ND	95.2	70-130			
Bromoform	4.59	0.50	0.50	"	5.00	ND	91.8	70-130			
Bromomethane	5.15	0.20	0.50	"	5.00	ND	103	70-130			
n-Butylbenzene	4.59	0.10	0.50	"	5.00	ND	91.8	70-130			
sec-Butylbenzene	4.98	0.10	0.50	"	5.00	ND	99.6	70-130			
tert-Butylbenzene	5.24	0.10	0.50	"	5.00	ND	105	70-130			
Carbon disulfide	4.96	0.20	0.50	"	5.00	ND	99.2	70-130			
Carbon tetrachloride	4.66	0.30	0.50	"	5.00	ND	93.2	70-130			
Chlorobenzene	4.99	0.20	0.50	"	5.00	ND	99.8	70-130			
Chloroethane	5.32	0.10	0.50	"	5.00	ND	106	70-130			
Chloroform	5.17	0.50	0.50	"	5.00	ND	103	70-130			
Chloromethane	5.63	0.20	0.50	"	5.00	ND	113	70-130			
2-Chlorotoluene	5.16	0.20	0.50	"	5.00	ND	103	70-130			
4-Chlorotoluene	4.98	0.10	0.50	"	5.00	ND	99.6	70-130			
Dibromochloromethane	4.86	0.50	0.50	"	5.00	ND	97.2	70-130			
1,2-Dibromo-3-chloropropane	5.18	0.36	0.50	"	5.00	ND	104	70-130			
1,2-Dibromoethane (EDB)	4.84	0.14	0.50	"	5.00	ND	96.8	70-130			
Dibromomethane	5.02	0.20	0.50	"	5.00	ND	100	70-130			

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Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
Matrix Spike (AB40523-MS1)		**Source: 14A1588-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
1,2-Dichlorobenzene	4.78	0.20	0.50	ug/l	5.00	ND	95.6	70-130			
1,3-Dichlorobenzene	4.99	0.20	0.50	"	5.00	ND	99.8	70-130			
1,4-Dichlorobenzene	4.65	0.10	0.50	"	5.00	ND	93.0	70-130			
trans-1,4-Dichloro-2-butene	3.95	0.095	5.0	"	5.00	ND	79.0	70-130			J
Dichlorodifluoromethane	5.90	0.20	0.50	"	5.00	ND	118	70-130			
1,1-Dichloroethane	5.27	0.10	0.50	"	5.00	ND	105	70-130			
1,2-Dichloroethane	5.05	0.20	0.50	"	5.00	ND	101	70-130			
1,1-Dichloroethene	5.18	0.10	0.30	"	5.00	ND	104	70-130			
cis-1,2-Dichloroethene	5.19	0.20	0.50	"	5.00	ND	104	70-130			
trans-1,2-Dichloroethene	5.01	0.20	0.50	"	5.00	ND	100	70-130			
1,2-Dichloropropane	4.78	0.20	0.50	"	5.00	ND	95.6	70-130			
1,3-Dichloropropane	4.94	0.20	0.50	"	5.00	ND	98.8	70-130			
2,2-Dichloropropane	4.69	0.10	0.50	"	5.00	ND	93.8	70-130			
1,1-Dichloropropene	4.67	0.10	0.50	"	5.00	ND	93.4	70-130			
cis-1,3-Dichloropropene	5.25	0.20	0.50	"	5.00	ND	105	70-130			
trans-1,3-Dichloropropene	4.29	0.20	0.50	"	5.00	ND	85.8	70-130			
2-Hexanone	4.68	0.097	5.0	"	5.00	ND	93.6	70-130			J
Ethylbenzene	5.04	0.10	0.50	"	5.00	ND	101	70-130			
Hexachlorobutadiene	4.29	0.30	0.50	"	5.00	ND	85.8	70-130			
Isopropylbenzene	5.29	0.20	0.50	"	5.00	ND	106	70-130			
p-Isopropyltoluene	5.08	0.10	0.50	"	5.00	ND	102	70-130			
Methyl ethyl ketone	10.3	0.40	1.0	"	10.0	ND	103	70-130			
Methyl iodide	5.38	0.12	2.0	"	5.00	ND	108	70-130			
Methyl isobutyl ketone	9.45	0.30	1.0	"	10.0	ND	94.5	70-130			
Methylene chloride	4.31	0.40	0.50	"	5.00	ND	86.2	70-130			
Naphthalene	5.17	0.20	0.50	"	5.00	ND	103	70-130			
n-Propylbenzene	5.36	0.20	0.50	"	5.00	ND	107	70-130			
Styrene	5.27	0.10	0.50	"	5.00	ND	105	70-130			
1,1,1,2-Tetrachloroethane	4.70	0.20	0.50	"	5.00	ND	94.0	70-130			
1,1,2,2-Tetrachloroethane	4.89	0.20	0.50	"	5.00	ND	97.8	70-130			
Tetrachloroethene	4.92	0.20	0.50	"	5.00	ND	98.4	70-130			
Toluene	5.00	0.10	0.50	"	5.00	ND	100	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
Matrix Spike (AB40523-MS1)		**Source: 14A1588-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
1,2,3-Trichlorobenzene	5.13	0.10	0.50	ug/l	5.00	ND	103	70-130			
1,2,4-Trichlorobenzene	4.71	0.20	0.50	"	5.00	ND	94.2	70-130			
1,1,1-Trichloroethane	5.10	0.20	0.50	"	5.00	ND	102	70-130			
1,1,2-Trichloroethane	5.02	0.20	0.50	"	5.00	ND	100	70-130			
Trichloroethene	4.98	0.20	0.50	"	5.00	ND	99.6	70-130			
Trichlorofluoromethane	5.44	0.20	0.50	"	5.00	ND	109	70-130			
Trichlorotrifluoroethane	5.40	0.20	0.50	"	5.00	ND	108	70-130			
1,2,3-Trichloropropane	5.05	0.13	0.50	"	5.00	ND	101	70-130			
1,2,4-Trimethylbenzene	5.29	0.10	0.50	"	5.00	ND	106	70-130			
1,3,5-Trimethylbenzene	5.08	0.10	0.50	"	5.00	ND	102	70-130			
Vinyl chloride	5.05	0.10	0.50	"	5.00	ND	101	70-130			
m,p-Xylene	9.97	0.20	0.50	"	10.0	ND	99.7	70-130			
o-Xylene	5.12	0.10	0.50	"	5.00	ND	102	70-130			
Xylenes (total)	15.1	0.20	0.50	"	15.0	ND	101	70-130			
Methyl tert-butyl ether	4.49	0.50	0.50	"	5.00	ND	89.8	70-130			
Ethyl tert-butyl ether	4.96	0.20	0.50	"	5.00	ND	99.2	70-130			
Tert-amyl methyl ether	4.80	0.20	0.50	"	5.00	ND	96.0	70-130			
Surrogate: Bromofluorobenzene	*24.6*			*"*	*25.0*		*98.3*	*70-130*			
Surrogate: Dibromofluoromethane	*23.8*			*"*	*25.0*		*95.4*	*70-130*			
Surrogate: Toluene-d8	*24.6*			*"*	*25.0*		*98.5*	*70-130*			
Matrix Spike Dup (AB40523-MSD1)		**Source: 14A1588-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
Acetone	21.7	0.80	5.0	ug/l	20.0	ND	109	70-130	0.971	30	
Acrylonitrile	5.22	0.20	5.0	"	5.00	ND	104	70-130	0.763	30	
Benzene	4.68	0.20	0.30	"	5.00	ND	93.6	70-130	2.32	30	
Bromobenzene	4.78	0.10	0.50	"	5.00	ND	95.6	70-130	6.67	30	
Bromochloromethane	5.02	0.20	0.50	"	5.00	ND	100	70-130	1.78	30	
Bromodichloromethane	4.78	0.50	0.50	"	5.00	ND	95.6	70-130	0.419	30	
Bromoform	4.59	0.50	0.50	"	5.00	ND	91.8	70-130	0.00	30	
Bromomethane	5.01	0.20	0.50	"	5.00	ND	100	70-130	2.76	30	
n-Butylbenzene	4.08	0.10	0.50	"	5.00	ND	81.6	70-130	11.8	30	
sec-Butylbenzene	4.45	0.10	0.50	"	5.00	ND	89.0	70-130	11.2	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
Matrix Spike Dup (AB40523-MSD1)		**Source: 14A1588-01**		Prepared: 02/03/14 Analyzed: 02/04/14							
tert-Butylbenzene	4.78	0.10	0.50	ug/l	5.00	ND	95.6	70-130	9.18	30	
Carbon disulfide	4.67	0.20	0.50	"	5.00	ND	93.4	70-130	6.02	30	
Carbon tetrachloride	4.57	0.30	0.50	"	5.00	ND	91.4	70-130	1.95	30	
Chlorobenzene	4.71	0.20	0.50	"	5.00	ND	94.2	70-130	5.77	30	
Chloroethane	5.25	0.10	0.50	"	5.00	ND	105	70-130	1.32	30	
Chloroform	5.07	0.50	0.50	"	5.00	ND	101	70-130	1.95	30	
Chloromethane	5.41	0.20	0.50	"	5.00	ND	108	70-130	3.99	30	
2-Chlorotoluene	4.63	0.20	0.50	"	5.00	ND	92.6	70-130	10.8	30	
4-Chlorotoluene	4.54	0.10	0.50	"	5.00	ND	90.8	70-130	9.24	30	
Dibromochloromethane	4.71	0.50	0.50	"	5.00	ND	94.2	70-130	3.13	30	
1,2-Dibromo-3-chloropropane	5.18	0.36	0.50	"	5.00	ND	104	70-130	0.00	25	
1,2-Dibromoethane (EDB)	4.80	0.14	0.50	"	5.00	ND	96.0	70-130	0.830	25	
Dibromomethane	4.88	0.20	0.50	"	5.00	ND	97.6	70-130	2.83	30	
1,2-Dichlorobenzene	4.52	0.20	0.50	"	5.00	ND	90.4	70-130	5.59	30	
1,3-Dichlorobenzene	4.52	0.20	0.50	"	5.00	ND	90.4	70-130	9.88	30	
trans-1,4-Dichloro-2-butene	3.99	0.095	5.0	"	5.00	ND	79.8	70-130	1.01	25	J
1,4-Dichlorobenzene	4.33	0.10	0.50	"	5.00	ND	86.6	70-130	7.13	30	
Dichlorodifluoromethane	5.39	0.20	0.50	"	5.00	ND	108	70-130	9.03	30	
1,1-Dichloroethane	5.24	0.10	0.50	"	5.00	ND	105	70-130	0.571	30	
1,2-Dichloroethane	4.94	0.20	0.50	"	5.00	ND	98.8	70-130	2.20	30	
1,1-Dichloroethene	4.91	0.10	0.30	"	5.00	ND	98.2	70-130	5.35	30	
cis-1,2-Dichloroethene	5.13	0.20	0.50	"	5.00	ND	103	70-130	1.16	30	
trans-1,2-Dichloroethene	4.73	0.20	0.50	"	5.00	ND	94.6	70-130	5.75	30	
1,2-Dichloropropane	4.78	0.20	0.50	"	5.00	ND	95.6	70-130	0.00	30	
1,3-Dichloropropane	4.86	0.20	0.50	"	5.00	ND	97.2	70-130	1.63	30	
2,2-Dichloropropane	4.67	0.10	0.50	"	5.00	ND	93.4	70-130	0.427	30	
1,1-Dichloropropene	4.38	0.10	0.50	"	5.00	ND	87.6	70-130	6.41	30	
cis-1,3-Dichloropropene	5.17	0.20	0.50	"	5.00	ND	103	70-130	1.54	30	
trans-1,3-Dichloropropene	4.23	0.20	0.50	"	5.00	ND	84.6	70-130	1.41	30	
Ethylbenzene	4.69	0.10	0.50	"	5.00	ND	93.8	70-130	7.19	30	
2-Hexanone	4.63	0.097	5.0	"	5.00	ND	92.6	70-130	1.07	25	J
Hexachlorobutadiene	4.09	0.30	0.50	"	5.00	ND	81.8	70-130	4.77	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
Matrix Spike Dup (AB40523-MSD1)		**Source: 14A1588-01**		Prepared: 02/03/14 Analyzed: 02/04/14							
Isopropylbenzene	4.79	0.20	0.50	ug/l	5.00	ND	95.8	70-130	9.92	30	
p-Isopropyltoluene	4.42	0.10	0.50	"	5.00	ND	88.4	70-130	13.9	30	
Methyl ethyl ketone	10.2	0.40	1.0	"	10.0	ND	102	70-130	1.56	30	
Methyl iodide	5.32	0.12	2.0	"	5.00	ND	106	70-130	1.12	25	
Methyl isobutyl ketone	9.31	0.30	1.0	"	10.0	ND	93.1	70-130	1.49	30	
Methylene chloride	4.17	0.40	0.50	"	5.00	ND	83.4	70-130	3.30	30	
Naphthalene	5.24	0.20	0.50	"	5.00	ND	105	70-130	1.34	30	
n-Propylbenzene	4.69	0.20	0.50	"	5.00	ND	93.8	70-130	13.3	30	
Styrene	4.91	0.10	0.50	"	5.00	ND	98.2	70-130	7.07	30	
1,1,1,2-Tetrachloroethane	4.58	0.20	0.50	"	5.00	ND	91.6	70-130	2.59	30	
1,1,2,2-Tetrachloroethane	4.78	0.20	0.50	"	5.00	ND	95.6	70-130	2.28	30	
Tetrachloroethene	4.32	0.20	0.50	"	5.00	ND	86.4	70-130	13.0	30	
Toluene	4.75	0.10	0.50	"	5.00	ND	95.0	70-130	5.13	30	
1,2,3-Trichlorobenzene	5.01	0.10	0.50	"	5.00	ND	100	70-130	2.37	30	
1,2,4-Trichlorobenzene	4.41	0.20	0.50	"	5.00	ND	88.2	70-130	6.58	30	
1,1,1-Trichloroethane	5.04	0.20	0.50	"	5.00	ND	101	70-130	1.18	30	
1,1,2-Trichloroethane	4.88	0.20	0.50	"	5.00	ND	97.6	70-130	2.83	30	
Trichloroethene	4.70	0.20	0.50	"	5.00	ND	94.0	70-130	5.79	30	
Trichlorofluoromethane	5.05	0.20	0.50	"	5.00	ND	101	70-130	7.44	30	
Trichlorotrifluoroethane	4.83	0.20	0.50	"	5.00	ND	96.6	70-130	11.1	30	
1,2,3-Trichloropropane	4.84	0.13	0.50	"	5.00	ND	96.8	70-130	4.25	25	
1,2,4-Trimethylbenzene	4.73	0.10	0.50	"	5.00	ND	94.6	70-130	11.2	30	
1,3,5-Trimethylbenzene	4.58	0.10	0.50	"	5.00	ND	91.6	70-130	10.4	30	
Vinyl chloride	4.75	0.10	0.50	"	5.00	ND	95.0	70-130	6.12	30	
m,p-Xylene	9.08	0.20	0.50	"	10.0	ND	90.8	70-130	9.34	30	
o-Xylene	4.80	0.10	0.50	"	5.00	ND	96.0	70-130	6.45	30	
Xylenes (total)	13.9	0.20	0.50	"	15.0	ND	92.5	70-130	8.35	30	
Methyl tert-butyl ether	4.48	0.50	0.50	"	5.00	ND	89.6	70-130	0.223	30	
Ethyl tert-butyl ether	4.97	0.20	0.50	"	5.00	ND	99.4	70-130	0.201	30	
Tert-amyl methyl ether	4.86	0.20	0.50	"	5.00	ND	97.2	70-130	1.24	30	
Surrogate: Bromofluorobenzene	*24.6*			*"*	*25.0*		*98.6*	*70-130*			
Surrogate: Dibromofluoromethane	*24.0*			*"*	*25.0*		*96.0*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
Matrix Spike Dup (AB40523-MSD1)		**Source: 14A1588-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
Surrogate: Toluene-d8	*24.4*			*ug/l*	*25.0*		*97.4*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43038 - SVOAs in Water GC											
Blank (AA43038-BLK1)					Prepared: 01/30/14 Analyzed: 01/31/14						
Aldrin	ND	0.010	0.050	ug/l							U
Chloroneb	ND	0.20	0.50	"							U
Chlorobenzilate	ND	2.0	5.0	"							U
Chlorothalonil	ND	0.030	0.10	"							U
DCPA	ND	0.020	0.040	"							U
4,4´-DDD	ND	0.020	0.050	"							U
4,4´-DDE	ND	0.020	0.050	"							U
4,4´-DDT	ND	0.020	0.020	"							U
Dieldrin	ND	0.010	0.010	"							U
Endosulfan I	ND	0.020	0.050	"							U
Endosulfan II	ND	0.020	0.050	"							U
Endosulfan sulfate	ND	0.020	0.020	"							U
Endrin	ND	0.030	0.10	"							U
Endrin aldehyde	ND	0.020	0.050	"							U
HCH-alpha	ND	0.010	0.050	"							U
HCH-beta	ND	0.020	0.050	"							U
HCH-delta	ND	0.030	0.050	"							U
HCH-gamma (Lindane)	ND	0.010	0.010	"							U
Heptachlor	ND	0.010	0.010	"							U
Heptachlor epoxide	ND	0.010	0.010	"							U
Hexachlorocyclopentadiene	ND	0.040	0.40	"							U
Hexachlorobenzene	ND	0.010	0.040	"							U
Methoxychlor	ND	0.020	0.020	"							U
cis-Permethrin	ND	0.070	0.20	"							U
trans-Permethrin	ND	0.090	0.20	"							U
Propachlor	ND	0.070	0.20	"							U
Trifluralin	ND	0.020	0.040	"							U
PCB-1016	ND	0.030	0.50	"							U
PCB-1221	ND	0.030	0.50	"							U
PCB-1232	ND	0.030	0.50	"							U
PCB-1242	ND	0.030	0.50	"							U
PCB-1248	ND	0.030	0.50	"							U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43038 - SVOAs in Water GC											
Blank (AA43038-BLK1)					Prepared: 01/30/14 Analyzed: 01/31/14						
PCB-1254	ND	0.030	0.50	ug/l							U
PCB-1260	ND	0.030	0.50	"							U
Total PCBs	ND	0.30	0.50	"							U
Toxaphene	ND	0.40	0.50	"							U
Chlordane (tech)	ND	0.030	0.050	"							U
Surrogate: Dibutylchlorendate	*0.959*			*"*	*0.952*		*101*	*70-130*			
LCS (AA43038-BS1)					Prepared: 01/30/14 Analyzed: 02/01/14						
Aldrin	0.258	0.010	0.050	ug/l	0.280		92.3	70-130			
Chloroneb	2.60	0.20	0.50	"	2.80		92.8	70-130			
Chlorobenzilate	3.09	2.0	5.0	"	2.80		110	70-130			J
Chlorothalonil	0.299	0.030	0.10	"	0.280		107	70-130			
DCPA	0.284	0.020	0.040	"	0.280		101	70-130			
4,4´-DDD	0.202	0.020	0.050	"	0.280		72.2	70-130			
4,4´-DDE	0.274	0.020	0.050	"	0.280		98.0	70-130			
4,4´-DDT	0.275	0.020	0.020	"	0.280		98.1	70-130			
Dieldrin	0.278	0.010	0.010	"	0.280		99.4	70-130			
Endosulfan I	0.280	0.020	0.050	"	0.280		99.9	70-130			
Endosulfan II	0.273	0.020	0.050	"	0.280		97.6	70-130			
Endosulfan sulfate	0.287	0.020	0.020	"	0.280		102	70-130			
Endrin	0.303	0.030	0.10	"	0.280		108	70-130			
Endrin aldehyde	0.284	0.020	0.050	"	0.280		101	70-130			
HCH-alpha	0.259	0.010	0.050	"	0.280		92.6	70-130			
HCH-beta	0.272	0.020	0.050	"	0.280		97.0	70-130			
HCH-delta	0.276	0.030	0.050	"	0.280		98.7	70-130			
HCH-gamma (Lindane)	0.267	0.010	0.010	"	0.280		95.3	70-130			
Heptachlor	0.264	0.010	0.010	"	0.280		94.3	70-130			
Heptachlor epoxide	0.269	0.010	0.010	"	0.280		96.1	70-130			
Hexachlorobenzene	0.227	0.010	0.040	"	0.280		81.0	70-130			
Hexachlorocyclopentadiene	0.325	0.040	0.40	"	0.560		58.0	15-90			J
Methoxychlor	0.283	0.020	0.020	"	0.280		101	70-130			
cis-Permethrin	1.50	0.070	0.20	"	1.40		107	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43038 - SVOAs in Water GC											
LCS (AA43038-BS1)					Prepared: 01/30/14 Analyzed: 02/01/14						
trans-Permethrin	1.53	0.090	0.20	ug/l	1.40		109	70-130			
Propachlor	0.290	0.070	0.20	"	0.280		104	70-130			
Trifluralin	0.411	0.020	0.040	"	0.420		97.8	70-130			
Surrogate: Dibutylchlorendate	*0.912*			*"*	*0.952*		*95.8*	*70-130*			
LCS Dup (AA43038-BSD1)					Prepared: 01/30/14 Analyzed: 02/01/14						
Aldrin	0.268	0.010	0.050	ug/l	0.280		95.7	70-130	3.62	25	
Chloroneb	2.71	0.20	0.50	"	2.80		96.7	70-130	4.09	25	
Chlorobenzilate	3.24	2.0	5.0	"	2.80		116	70-130	4.70	25	J
Chlorothalonil	0.311	0.030	0.10	"	0.280		111	70-130	4.00	25	
DCPA	0.294	0.020	0.040	"	0.280		105	70-130	3.49	25	
4,4´-DDD	0.210	0.020	0.050	"	0.280		75.2	70-130	3.96	25	
4,4´-DDE	0.286	0.020	0.050	"	0.280		102	70-130	4.27	25	
4,4´-DDT	0.288	0.020	0.020	"	0.280		103	70-130	4.76	25	
Dieldrin	0.290	0.010	0.010	"	0.280		104	70-130	4.19	25	
Endosulfan I	0.291	0.020	0.050	"	0.280		104	70-130	4.03	25	
Endosulfan II	0.283	0.020	0.050	"	0.280		101	70-130	3.55	25	
Endosulfan sulfate	0.301	0.020	0.020	"	0.280		107	70-130	4.76	25	
Endrin	0.316	0.030	0.10	"	0.280		113	70-130	4.19	25	
Endrin aldehyde	0.296	0.020	0.050	"	0.280		106	70-130	4.05	25	
HCH-alpha	0.272	0.010	0.050	"	0.280		97.3	70-130	4.91	25	
HCH-beta	0.282	0.020	0.050	"	0.280		101	70-130	3.61	25	
HCH-delta	0.288	0.030	0.050	"	0.280		103	70-130	4.18	25	
HCH-gamma (Lindane)	0.279	0.010	0.010	"	0.280		99.7	70-130	4.50	25	
Heptachlor	0.273	0.010	0.010	"	0.280		97.7	70-130	3.56	25	
Heptachlor epoxide	0.281	0.010	0.010	"	0.280		100	70-130	4.42	25	
Hexachlorocyclopentadiene	0.345	0.040	0.40	"	0.560		61.7	15-90	6.10	50	J
Hexachlorobenzene	0.240	0.010	0.040	"	0.280		85.6	70-130	5.53	25	
Methoxychlor	0.298	0.020	0.020	"	0.280		106	70-130	5.01	25	
cis-Permethrin	1.58	0.070	0.20	"	1.40		113	70-130	5.41	25	
trans-Permethrin	1.62	0.090	0.20	"	1.40		116	70-130	5.91	25	
Propachlor	0.301	0.070	0.20	"	0.280		108	70-130	3.83	25	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43038 - SVOAs in Water GC											
LCS Dup (AA43038-BSD1)					Prepared: 01/30/14 Analyzed: 02/01/14						
Trifluralin	0.427	0.020	0.040	ug/l	0.420		102	70-130	3.96	25	
Surrogate: Dibutylchlorendate	*0.941*			*"*	*0.952*		*98.8*	*70-130*			
Matrix Spike (AA43038-MS1)		**Source: 14A1635-01**			Prepared: 01/30/14 Analyzed: 02/01/14						
Aldrin	0.255	0.010	0.050	ug/l	0.280	ND	91.2	70-130			
Chloroneb	2.50	0.20	0.50	"	2.80	ND	89.2	70-130			
Chlorobenzilate	3.12	2.0	5.0	"	2.80	ND	111	70-130			J
Chlorothalonil	0.299	0.030	0.10	"	0.280	ND	107	70-130			
DCPA	0.285	0.020	0.040	"	0.280	ND	102	70-130			
4,4´-DDD	0.222	0.020	0.050	"	0.280	ND	79.3	70-130			
4,4´-DDE	0.280	0.020	0.050	"	0.280	ND	100	70-130			
4,4´-DDT	0.281	0.020	0.020	"	0.280	ND	100	70-130			
Dieldrin	0.284	0.010	0.010	"	0.280	ND	102	70-130			
Endosulfan I	0.280	0.020	0.050	"	0.280	ND	100	70-130			
Endosulfan II	0.283	0.020	0.050	"	0.280	ND	101	70-130			
Endosulfan sulfate	0.292	0.020	0.020	"	0.280	ND	104	70-130			
Endrin	0.306	0.030	0.10	"	0.280	ND	109	70-130			
Endrin aldehyde	0.284	0.020	0.050	"	0.280	ND	102	70-130			
HCH-alpha	0.257	0.010	0.050	"	0.280	ND	91.9	70-130			
HCH-beta	0.273	0.020	0.050	"	0.280	ND	97.5	70-130			
HCH-delta	0.279	0.030	0.050	"	0.280	ND	99.8	70-130			
HCH-gamma (Lindane)	0.267	0.010	0.010	"	0.280	ND	95.3	70-130			
Heptachlor	0.261	0.010	0.010	"	0.280	ND	93.2	70-130			
Heptachlor epoxide	0.277	0.010	0.010	"	0.280	ND	98.8	70-130			
Hexachlorocyclopentadiene	0.358	0.040	0.40	"	0.560	ND	63.9	15-90			J
Hexachlorobenzene	0.225	0.010	0.040	"	0.280	ND	80.4	70-130			
Methoxychlor	0.297	0.020	0.020	"	0.280	ND	106	70-130			
cis-Permethrin	1.40	0.070	0.20	"	1.40	ND	100	70-130			
trans-Permethrin	1.44	0.090	0.20	"	1.40	ND	103	70-130			
Propachlor	0.285	0.070	0.20	"	0.280	ND	102	70-130			
Trifluralin	0.414	0.020	0.040	"	0.420	ND	98.6	70-130			
Surrogate: Dibutylchlorendate	*0.934*			*"*	*0.952*		*98.1*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43038 - SVOAs in Water GC											
Matrix Spike Dup (AA43038-MSD1)		**Source: 14A1635-01**		Prepared: 01/30/14 Analyzed: 02/01/14							
Aldrin	0.255	0.010	0.050	ug/l	0.280	ND	91.1	70-130	0.148	25	
Chloroneb	2.55	0.20	0.50	"	2.80	ND	91.2	70-130	2.25	25	
Chlorobenzilate	3.18	2.0	5.0	"	2.80	ND	114	70-130	2.03	25	J
Chlorothalonil	0.302	0.030	0.10	"	0.280	ND	108	70-130	0.907	25	
DCPA	0.288	0.020	0.040	"	0.280	ND	103	70-130	1.15	25	
4,4´-DDD	0.223	0.020	0.050	"	0.280	ND	79.8	70-130	0.557	25	
4,4´-DDE	0.280	0.020	0.050	"	0.280	ND	100	70-130	0.148	25	
4,4´-DDT	0.284	0.020	0.020	"	0.280	ND	102	70-130	1.18	25	
Dieldrin	0.286	0.010	0.010	"	0.280	ND	102	70-130	0.667	25	
Endosulfan I	0.285	0.020	0.050	"	0.280	ND	102	70-130	1.64	25	
Endosulfan II	0.283	0.020	0.050	"	0.280	ND	101	70-130	0.0502	25	
Endosulfan sulfate	0.296	0.020	0.020	"	0.280	ND	106	70-130	1.20	25	
Endrin	0.310	0.030	0.10	"	0.280	ND	111	70-130	1.51	25	
Endrin aldehyde	0.290	0.020	0.050	"	0.280	ND	103	70-130	1.83	25	
HCH-alpha	0.261	0.010	0.050	"	0.280	ND	93.3	70-130	1.48	25	
HCH-beta	0.276	0.020	0.050	"	0.280	ND	98.7	70-130	1.17	25	
HCH-delta	0.283	0.030	0.050	"	0.280	ND	101	70-130	1.39	25	
HCH-gamma (Lindane)	0.270	0.010	0.010	"	0.280	ND	96.4	70-130	1.15	25	
Heptachlor	0.263	0.010	0.010	"	0.280	ND	94.0	70-130	0.878	25	
Heptachlor epoxide	0.277	0.010	0.010	"	0.280	ND	98.8	70-130	0.00397	25	
Hexachlorocyclopentadiene	0.366	0.040	0.40	"	0.560	ND	65.4	15-90	2.41	50	J
Hexachlorobenzene	0.229	0.010	0.040	"	0.280	ND	81.8	70-130	1.71	25	
Methoxychlor	0.299	0.020	0.020	"	0.280	ND	107	70-130	0.522	25	
cis-Permethrin	1.37	0.070	0.20	"	1.40	ND	97.6	70-130	2.67	25	
trans-Permethrin	1.41	0.090	0.20	"	1.40	ND	101	70-130	1.64	25	
Propachlor	0.297	0.070	0.20	"	0.280	ND	106	70-130	4.07	25	
Trifluralin	0.416	0.020	0.040	"	0.420	ND	99.0	70-130	0.441	25	
Surrogate: Dibutylchlorendate	*0.955*			*"*	*0.952*		*100*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40730 - SVOAs in Water GC											
Blank (AB40730-BLK1)					Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	ND	0.50	0.50	ug/l							U
Atrazine	ND	0.30	0.50	"							U
Bromacil	ND	0.50	5.0	"							U
Butachlor	ND	0.40	0.50	"							U
Dimethoate	ND	0.20	1.0	"							U
Metolachlor	ND	0.30	0.50	"							U
Metribuzin	ND	0.40	0.50	"							U
Molinate	ND	0.20	0.50	"							U
Prometryn	ND	0.50	0.50	"							U
Propachlor	ND	0.30	0.50	"							U
Simazine	ND	0.30	0.50	"							U
Thiobencarb	ND	0.20	1.0	"							U
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.69*			*"*	*2.00*		*84.3*	*70-130*			
LCS (AB40730-BS1)					Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	1.88	0.50	0.50	ug/l	2.00		94.2	62-128			
Atrazine	1.92	0.30	0.50	"	2.00		96.1	62-122			
Bromacil	1.94	0.50	5.0	"	2.00		96.9	61-121			J
Butachlor	1.99	0.40	0.50	"	2.00		99.3	66-126			
Dimethoate	1.97	0.20	1.0	"	2.00		98.3	67-127			
Metolachlor	1.93	0.30	0.50	"	2.00		96.6	63-123			
Metribuzin	1.91	0.40	0.50	"	2.00		95.4	71-131			
Molinate	1.95	0.20	0.50	"	2.00		97.4	44-137			
Prometryn	1.95	0.50	0.50	"	2.00		97.6	63-123			
Propachlor	1.95	0.30	0.50	"	2.00		97.3	66-126			
Simazine	1.94	0.30	0.50	"	2.00		96.9	70-130			
Thiobencarb	2.01	0.20	1.0	"	2.00		100	69-129			
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.80*			*"*	*2.00*		*89.8*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40730 - SVOAs in Water GC											
LCS Dup (AB40730-BSD1)					Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	2.02	0.50	0.50	ug/l	2.00		101	62-128	6.95	30	
Atrazine	2.01	0.30	0.50	"	2.00		100	62-122	4.47	30	
Bromacil	2.14	0.50	5.0	"	2.00		107	61-121	10.0	30	J
Butachlor	2.09	0.40	0.50	"	2.00		105	66-126	5.23	30	
Dimethoate	2.17	0.20	1.0	"	2.00		108	67-127	9.82	30	
Metolachlor	2.02	0.30	0.50	"	2.00		101	63-123	4.37	30	
Metribuzin	2.04	0.40	0.50	"	2.00		102	71-131	6.92	30	
Molinate	1.94	0.20	0.50	"	2.00		96.8	44-137	0.569	30	
Prometryn	2.07	0.50	0.50	"	2.00		103	63-123	5.75	30	
Propachlor	2.00	0.30	0.50	"	2.00		100	66-126	2.80	30	
Simazine	2.09	0.30	0.50	"	2.00		105	70-130	7.61	30	
Thiobencarb	2.19	0.20	1.0	"	2.00		109	69-129	8.57	30	
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.85*			*"*	*2.00*		*92.6*	*70-130*			
Matrix Spike (AB40730-MS1)		**Source: 14A1588-01**			Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	1.81	0.50	0.50	ug/l	2.00	ND	90.7	62-128			
Atrazine	1.79	0.30	0.50	"	2.00	ND	89.7	62-122			
Bromacil	1.75	0.50	5.0	"	2.00	ND	87.5	61-121			J
Butachlor	1.85	0.40	0.50	"	2.00	ND	92.6	66-126			
Dimethoate	1.70	0.20	1.0	"	2.00	ND	84.9	67-127			
Metolachlor	1.82	0.30	0.50	"	2.00	ND	91.2	63-123			
Metribuzin	1.78	0.40	0.50	"	2.00	ND	89.2	71-131			
Molinate	1.87	0.20	0.50	"	2.00	ND	93.4	44-137			
Prometryn	1.68	0.50	0.50	"	2.00	ND	83.9	63-123			
Propachlor	1.93	0.30	0.50	"	2.00	ND	96.6	66-126			
Simazine	1.85	0.30	0.50	"	2.00	ND	92.5	70-130			
Thiobencarb	1.90	0.20	1.0	"	2.00	ND	95.2	69-129			
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.51*			*"*	*2.00*		*75.3*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40730 - SVOAs in Water GC											
Matrix Spike Dup (AB40730-MSD1)		**Source: 14A1588-01**		Prepared: 02/08/14 Analyzed: 02/11/14							
Alachlor	1.91	0.50	0.50	ug/l	2.00	ND	95.3	62-128	4.97	30	
Atrazine	1.96	0.30	0.50	"	2.00	ND	98.2	62-122	9.04	30	
Bromacil	2.13	0.50	5.0	"	2.00	ND	107	61-121	19.7	30	J
Butachlor	2.02	0.40	0.50	"	2.00	ND	101	66-126	8.67	30	
Dimethoate	2.14	0.20	1.0	"	2.00	ND	107	67-127	23.0	30	
Metolachlor	1.96	0.30	0.50	"	2.00	ND	97.9	63-123	7.12	30	
Metribuzin	2.02	0.40	0.50	"	2.00	ND	101	71-131	12.3	30	
Molinate	1.79	0.20	0.50	"	2.00	ND	89.6	44-137	4.16	30	
Prometryn	2.02	0.50	0.50	"	2.00	ND	101	63-123	18.4	30	
Propachlor	1.93	0.30	0.50	"	2.00	ND	96.4	66-126	0.171	30	
Simazine	2.07	0.30	0.50	"	2.00	ND	104	70-130	11.3	30	
Thiobencarb	1.96	0.20	1.0	"	2.00	ND	97.8	69-129	2.64	30	
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.60*			*"*	*2.00*		*79.9*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Organic Analytes by EPA Method 504.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40359 - EPA 504.1											
Blank (AB40359-BLK1)					Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	ND	0.0040	0.010	ug/l							U
1,2-Dibromoethane (EDB)	ND	0.0050	0.020	"							U
LCS (AB40359-BS1)					Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	0.262	0.0040	0.010	ug/l	0.250		105	70-130			
1,2-Dibromoethane (EDB)	0.255	0.0050	0.020	"	0.250		102	70-130			
LCS Dup (AB40359-BSD1)					Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	0.273	0.0040	0.010	ug/l	0.250		109	70-130	4.17	25	
1,2-Dibromoethane (EDB)	0.270	0.0050	0.020	"	0.250		108	70-130	5.47	25	
Matrix Spike (AB40359-MS1)		**Source: 14A1588-01**			Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	0.212	0.0040	0.010	ug/l	0.250	ND	84.8	70-130			
1,2-Dibromoethane (EDB)	0.214	0.0050	0.020	"	0.250	ND	85.5	70-130			
Matrix Spike Dup (AB40359-MSD1)		**Source: 14A1588-01**			Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	0.211	0.0040	0.010	ug/l	0.250	ND	84.2	70-130	0.698	25	
1,2-Dibromoethane (EDB)	0.212	0.0050	0.020	"	0.250	ND	84.8	70-130	0.771	25	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Chlorinated Acids by EPA Method 515.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40536 - EPA 515.1											
Blank (AB40536-BLK1)					Prepared: 02/06/14 Analyzed: 02/07/14						
Acifluorfen	ND	0.50	1.0	ug/l							U
Bentazon	ND	0.40	0.40	"							U
2,4-D	ND	0.80	1.0	"							U
Dalapon	ND	6.0	6.0	"							U
2,4-DB	ND	4.0	5.0	"							U
Dicamba	ND	0.40	0.40	"							U
Dichlorprop	ND	1.0	1.0	"							U
Dinoseb	ND	0.80	1.0	"							U
4-Nitrophenol	ND	0.70	1.0	"							U
Pentachlorophenol	ND	0.20	0.20	"							U
Picloram	ND	0.50	1.0	"							U
2,4,5-T	ND	0.40	0.50	"							U
2,4,5-TP (Silvex)	ND	0.50	0.50	"							U
Surrogate: DCAA	*13.2*			*"*	*14.2*		*93.2*	*70-130*			
LCS (AB40536-BS1)					Prepared: 02/06/14 Analyzed: 02/07/14						
Acifluorfen	1.04	0.50	1.0	ug/l	0.960		109	70-130			
Bentazon	1.48	0.40	0.40	"	1.92		76.9	70-130			
2,4-D	1.68	0.80	1.0	"	1.92		87.8	48-124			
Dalapon	11.3	6.0	6.0	"	12.5		90.3	40-112			
2,4-DB	7.11	4.0	5.0	"	7.68		92.6	54-123			
Dicamba	0.876	0.40	0.40	"	0.960		91.3	70-130			
Dichlorprop	2.70	1.0	1.0	"	2.88		93.7	54-106			
Dinoseb	5.59	0.80	1.0	"	6.42		87.1	20-105			
4-Nitrophenol	1.13	0.70	1.0	"	0.960		117	60-202			
Pentachlorophenol	0.840	0.20	0.20	"	0.960		87.5	70-130			
Picloram	1.07	0.50	1.0	"	0.960		111	70-130			
2,4,5-T	0.892	0.40	0.50	"	0.960		93.0	68-166			
2,4,5-TP (Silvex)	0.900	0.50	0.50	"	0.960		93.7	70-130			
Surrogate: DCAA	*14.5*			*"*	*14.2*		*102*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Chlorinated Acids by EPA Method 515.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40536 - EPA 515.1											
LCS Dup (AB40536-BSD1)					Prepared: 02/06/14 Analyzed: 02/07/14						
Acifluorfen	1.03	0.50	1.0	ug/l	0.960		108	70-130	0.944	50	
Bentazon	1.63	0.40	0.40	"	1.92		84.8	70-130	9.86	50	
2,4-D	1.69	0.80	1.0	"	1.92		88.0	48-124	0.327	50	
Dalapon	11.4	6.0	6.0	"	12.5		91.2	40-112	0.968	50	
2,4-DB	7.24	4.0	5.0	"	7.68		94.3	54-123	1.84	50	
Dicamba	0.877	0.40	0.40	"	0.960		91.4	70-130	0.0891	50	
Dichlorprop	2.69	1.0	1.0	"	2.88		93.5	54-106	0.220	50	
Dinoseb	5.77	0.80	1.0	"	6.42		89.9	20-105	3.18	50	
4-Nitrophenol	0.901	0.70	1.0	"	0.960		93.8	60-202	22.3	50	J
Pentachlorophenol	0.841	0.20	0.20	"	0.960		87.6	70-130	0.0986	50	
Picloram	0.964	0.50	1.0	"	0.960		100	70-130	10.5	50	J
2,4,5-T	0.931	0.40	0.50	"	0.960		96.9	68-166	4.18	50	
2,4,5-TP (Silvex)	0.964	0.50	0.50	"	0.960		100	70-130	6.85	50	
Surrogate: DCAA	*14.2*			*"*	*14.2*		*99.8*	*70-130*			
Matrix Spike (AB40536-MS1)		**Source: 14A1588-01**			Prepared: 02/06/14 Analyzed: 02/08/14						
Acifluorfen	0.696	0.50	1.0	ug/l	0.960	ND	72.5	70-130			J
Bentazon	1.79	0.40	0.40	"	1.92	ND	93.0	70-130			
2,4-D	1.50	0.80	1.0	"	1.92	ND	78.3	48-124			
Dalapon	11.1	6.0	6.0	"	12.5	ND	88.8	40-112			
2,4-DB	7.08	4.0	5.0	"	7.68	ND	92.2	54-123			
Dicamba	0.867	0.40	0.40	"	0.960	ND	90.3	70-130			
Dichlorprop	2.75	1.0	1.0	"	2.88	ND	95.6	54-106			
Dinoseb	5.23	0.80	1.0	"	6.42	ND	81.4	20-105			
4-Nitrophenol	0.969	0.70	1.0	"	0.960	ND	101	60-202			J
Pentachlorophenol	0.642	0.20	0.20	"	0.960	ND	66.9	70-130			QM-07
Picloram	0.973	0.50	1.0	"	0.960	ND	101	70-130			J
2,4,5-T	0.862	0.40	0.50	"	0.960	ND	89.8	68-166			
2,4,5-TP (Silvex)	0.911	0.50	0.50	"	0.960	ND	94.9	70-130			
Surrogate: DCAA	*13.8*			*"*	*14.2*		*97.5*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Chlorinated Acids by EPA Method 515.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40536 - EPA 515.1											
Matrix Spike Dup (AB40536-MSD1)		**Source: 14A1588-01**		Prepared: 02/06/14 Analyzed: 02/08/14							
Acifluorfen	0.926	0.50	1.0	ug/l	0.960	ND	96.5	70-130	28.3	50	J
Bentazon	1.79	0.40	0.40	"	1.92	ND	93.5	70-130	0.474	50	
2,4-D	1.64	0.80	1.0	"	1.92	ND	85.2	48-124	8.45	50	
Dalapon	11.5	6.0	6.0	"	12.5	ND	92.3	40-112	3.86	50	
2,4-DB	7.32	4.0	5.0	"	7.68	ND	95.4	54-123	3.40	50	
Dicamba	0.910	0.40	0.40	"	0.960	ND	94.8	70-130	4.86	50	
Dichlorprop	2.90	1.0	1.0	"	2.88	ND	101	54-106	5.12	50	
Dinoseb	5.49	0.80	1.0	"	6.42	ND	85.5	20-105	4.84	50	
4-Nitrophenol	1.04	0.70	1.0	"	0.960	ND	108	60-202	6.64	50	
Pentachlorophenol	0.721	0.20	0.20	"	0.960	ND	75.1	70-130	11.5	50	
Picloram	1.16	0.50	1.0	"	0.960	ND	121	70-130	17.4	50	
2,4,5-T	0.945	0.40	0.50	"	0.960	ND	98.4	68-166	9.12	50	
2,4,5-TP (Silvex)	0.967	0.50	0.50	"	0.960	ND	101	70-130	5.94	50	
Surrogate: DCAA	*14.5*			*"*	*14.2*		*102*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Carbamates by EPA Method 531.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA42932 - HPLC											
Blank (AA42932-BLK1)					Prepared & Analyzed: 01/30/14						
Aldicarb	ND	0.70	3.0	ug/l							U
Aldicarb sulfone	ND	0.70	4.0	"							U
Aldicarb sulfoxide	ND	0.80	3.0	"							U
Carbaryl	ND	0.70	5.0	"							U
Carbofuran	ND	2.0	5.0	"							U
3-Hydroxycarbofuran	ND	0.90	3.0	"							U
Methiocarb	ND	2.0	5.0	"							U
Methomyl	ND	2.0	2.0	"							U
Oxamyl	ND	0.80	20	"							U
Propoxur	ND	2.0	5.0	"							U
LCS (AA42932-BS1)					Prepared & Analyzed: 01/30/14						
Aldicarb	20.2	0.70	3.0	ug/l	20.0		101	80-120			
Aldicarb sulfone	19.4	0.70	4.0	"	19.0		102	80-120			
Aldicarb sulfoxide	19.6	0.80	3.0	"	19.8		98.9	80-120			
Carbaryl	19.3	0.70	5.0	"	20.0		96.4	80-120			
Carbofuran	20.4	2.0	5.0	"	20.0		102	80-120			
3-Hydroxycarbofuran	20.7	0.90	3.0	"	20.0		104	80-120			
Methiocarb	20.4	2.0	5.0	"	20.0		102	80-120			
Methomyl	20.5	2.0	2.0	"	20.0		102	80-120			
Oxamyl	19.3	0.80	20	"	20.0		96.5	80-120			J
Propoxur	20.5	2.0	5.0	"	20.0		103	80-120			
LCS Dup (AA42932-BSD1)					Prepared & Analyzed: 01/30/14						
Aldicarb	19.9	0.70	3.0	ug/l	20.0		99.3	80-120	1.91	20	
Aldicarb sulfone	20.1	0.70	4.0	"	19.0		106	80-120	3.52	20	
Aldicarb sulfoxide	19.8	0.80	3.0	"	19.8		99.8	80-120	0.858	20	
Carbaryl	20.7	0.70	5.0	"	20.0		104	80-120	7.36	20	
Carbofuran	21.9	2.0	5.0	"	20.0		109	80-120	6.80	20	
3-Hydroxycarbofuran	20.3	0.90	3.0	"	20.0		102	80-120	1.87	20	
Methiocarb	19.1	2.0	5.0	"	20.0		95.3	80-120	6.64	20	
Methomyl	20.4	2.0	2.0	"	20.0		102	80-120	0.165	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Carbamates by EPA Method 531.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA42932 - HPLC											
LCS Dup (AA42932-BSD1)					Prepared & Analyzed: 01/30/14						
Oxamyl	19.5	0.80	20	ug/l	20.0		97.5	80-120	1.06	20	J
Propoxur	21.3	2.0	5.0	"	20.0		106	80-120	3.46	20	
Matrix Spike (AA42932-MS1)		**Source: 14A1643-01**			Prepared: 01/30/14 Analyzed: 01/31/14						
Aldicarb	19.4	0.70	3.0	ug/l	20.0	ND	97.2	80-120			
Aldicarb sulfone	19.6	0.70	4.0	"	19.0	ND	103	80-120			
Aldicarb sulfoxide	19.5	0.80	3.0	"	19.8	ND	98.6	80-120			
Carbaryl	20.0	0.70	5.0	"	20.0	ND	99.9	80-120			
Carbofuran	19.7	2.0	5.0	"	20.0	ND	98.4	80-120			
3-Hydroxycarbofuran	19.8	0.90	3.0	"	20.0	ND	98.9	80-120			
Methiocarb	19.1	2.0	5.0	"	20.0	ND	95.3	80-120			
Methomyl	20.3	2.0	2.0	"	20.0	ND	101	80-120			
Oxamyl	19.9	0.80	20	"	20.0	ND	99.7	80-120			J
Propoxur	19.8	2.0	5.0	"	20.0	ND	99.0	80-120			
Matrix Spike Dup (AA42932-MSD1)		**Source: 14A1643-01**			Prepared: 01/30/14 Analyzed: 01/31/14						
Aldicarb	18.6	0.70	3.0	ug/l	20.0	ND	92.9	80-120	4.53	20	
Aldicarb sulfone	19.0	0.70	4.0	"	19.0	ND	100	80-120	3.38	20	
Aldicarb sulfoxide	19.0	0.80	3.0	"	19.8	ND	96.1	80-120	2.58	20	
Carbaryl	19.3	0.70	5.0	"	20.0	ND	96.7	80-120	3.24	20	
Carbofuran	18.8	2.0	5.0	"	20.0	ND	94.1	80-120	4.43	20	
3-Hydroxycarbofuran	20.9	0.90	3.0	"	20.0	ND	104	80-120	5.39	20	
Methiocarb	18.4	2.0	5.0	"	20.0	ND	92.1	80-120	3.43	20	
Methomyl	19.6	2.0	2.0	"	20.0	ND	97.8	80-120	3.62	20	
Oxamyl	18.7	0.80	20	"	20.0	ND	93.3	80-120	6.68	20	J
Propoxur	19.5	2.0	5.0	"	20.0	ND	97.6	80-120	1.47	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Endothall by EPA Method 548.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40357 - EPA 548.1											
Blank (AB40357-BLK1)					Prepared: 02/04/14 Analyzed: 02/06/14						
Endothall	ND	2.0	45	ug/l							U
LCS (AB40357-BS1)					Prepared: 02/04/14 Analyzed: 02/06/14						
Endothall	209	2.0	45	ug/l	200		104	80-120			
LCS Dup (AB40357-BSD1)					Prepared: 02/04/14 Analyzed: 02/06/14						
Endothall	217	2.0	45	ug/l	200		108	80-120	3.75	30	
Matrix Spike (AB40357-MS1)		**Source: 14A1588-01**			Prepared: 02/04/14 Analyzed: 02/06/14						
Endothall	187	2.0	45	ug/l	200	ND	93.7	80-120			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Glyphosate by EPA Method 547 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40427 - HPLC											
Blank (AB40427-BLK1)					Prepared & Analyzed: 02/04/14						
Glyphosate	ND	3.0	10	ug/l							U
LCS (AB40427-BS1)					Prepared & Analyzed: 02/04/14						
Glyphosate	111	3.0	10	ug/l	120		92.7	66-126			
LCS Dup (AB40427-BSD1)					Prepared & Analyzed: 02/04/14						
Glyphosate	112	3.0	10	ug/l	120		93.7	66-126	1.08	30	
Matrix Spike (AB40427-MS1)		**Source: 14B0093-01**			Prepared: 02/04/14 Analyzed: 02/05/14						
Glyphosate	111	3.0	10	ug/l	120	ND	92.7	66-126			
Matrix Spike Dup (AB40427-MSD1)		**Source: 14B0093-01**			Prepared: 02/04/14 Analyzed: 02/05/14						
Glyphosate	110	3.0	10	ug/l	120	ND	92.0	66-126	0.801	30	

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Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Diquat by EPA Method 549.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43118 - HPLC											
Blank (AA43118-BLK1)					Prepared: 02/03/14 Analyzed: 02/10/14						
Diquat	ND	2.0	2.0	ug/l							U
LCS (AA43118-BS1)					Prepared: 02/03/14 Analyzed: 02/10/14						
Diquat	16.5	2.0	2.0	ug/l	19.8		83.3	70-130			
LCS Dup (AA43118-BSD1)					Prepared: 02/03/14 Analyzed: 02/10/14						
Diquat	16.2	2.0	2.0	ug/l	19.8		81.6	70-130	2.03	25	
Matrix Spike (AA43118-MS1)		**Source: 14A1755-01**			Prepared: 02/03/14 Analyzed: 02/10/14						
Diquat	8.63	2.0	2.0	ug/l	19.8	ND	43.5	70-130			QM-05

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408		Reported: 02/18/14 11:04

Haloacetic Acids by EPA Method 552.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40444 - EPA 552.2											
Blank (AB40444-BLK1)					Prepared: 02/05/14 Analyzed: 02/07/14						
Monobromoacetic Acid	ND	0.8	1.0	ug/l							U
Monochloroacetic Acid	ND	1.1	2.0	"							U
Dibromoacetic Acid	ND	0.8	1.0	"							U
Dichloroacetic Acid	ND	1.0	1.0	"							U
Trichloroacetic Acid	ND	1.0	1.0	"							U
Total Haloacetic Acids (HAA5)	ND	1.0	1.0	"							U
Surrogate: 2,3-Dibromopropionic Acid	*8.41*			*"*	*10.0*		*83.8*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*10.5*			*"*	*10.0*		*105*	*70-130*			
LCS (AB40444-BS1)					Prepared: 02/05/14 Analyzed: 02/07/14						
Monobromoacetic Acid	22.8	0.8	1.0	ug/l	25.0		91.1	70-130			
Monochloroacetic Acid	25.3	1.1	2.0	"	25.0		101	70-130			
Dibromoacetic Acid	22.8	0.8	1.0	"	25.0		91.0	70-130			
Dichloroacetic Acid	23.2	1.0	1.0	"	25.0		93.0	70-130			
Trichloroacetic Acid	21.8	1.0	1.0	"	25.0		87.2	70-130			
Surrogate: 2,3-Dibromopropionic Acid	*8.18*			*"*	*10.0*		*81.6*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*8.36*			*"*	*10.0*		*83.6*	*70-130*			
Matrix Spike (AB40444-MS1)		**Source: 14A1572-01**			Prepared: 02/05/14 Analyzed: 02/08/14						
Monobromoacetic Acid	26.0	0.8	1.0	ug/l	25.0	ND	104	70-130			
Monochloroacetic Acid	26.4	1.1	2.0	"	25.0	ND	106	70-130			
Dibromoacetic Acid	33.8	0.8	1.0	"	25.0	1.60	129	70-130			
Dichloroacetic Acid	25.3	1.0	1.0	"	25.0	ND	101	70-130			
Trichloroacetic Acid	25.6	1.0	1.0	"	25.0	1.23	97.4	70-130			
Surrogate: 2,3-Dibromopropionic Acid	*12.4*			*"*	*10.0*		*124*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*11.4*			*"*	*10.0*		*114*	*70-130*			
Matrix Spike (AB40444-MS2)		**Source: 14A1702-01**			Prepared: 02/05/14 Analyzed: 02/08/14						
Monobromoacetic Acid	23.4	0.8	1.0	ug/l	25.0	ND	93.6	70-130			
Monochloroacetic Acid	25.5	1.1	2.0	"	25.0	ND	102	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:04

Haloacetic Acids by EPA Method 552.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40444 - EPA 552.2											
Matrix Spike (AB40444-MS2)		**Source: 14A1702-01**			Prepared: 02/05/14 Analyzed: 02/08/14						
Dibromoacetic Acid	31.1	0.8	1.0	ug/l	25.0	ND	124	70-130			
Dichloroacetic Acid	36.3	1.0	1.0	"	25.0	12.8	94.3	70-130			
Trichloroacetic Acid	34.6	1.0	1.0	"	25.0	12.2	89.6	70-130			
Surrogate: 2,3-Dibromopropionic Acid	*12.7*			*"*	*10.0*		*127*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*9.49*			*"*	*10.0*		*94.9*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Semivolatile Organic Compounds by EPA Method 525.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40727 - EPA 525.2											
Blank (AB40727-BLK1)					Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	ND	0.080	0.10	ug/l							U
Di(2-ethylhexyl)adipate	ND	0.40	5.0	"							U
Di(2-ethylhexyl)phthalate	ND	0.20	3.0	"							U
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.23*			*"*	*5.00*		*105*	*70-130*			
Surrogate: Perylene-d12	*3.73*			*"*	*5.00*		*74.6*	*70-130*			
Surrogate: Triphenyl phosphate	*4.72*			*"*	*5.00*		*94.4*	*70-130*			
LCS (AB40727-BS1)					Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	2.13	0.080	0.10	ug/l	3.00		71.0	70-130			
Di(2-ethylhexyl)adipate	2.49	0.40	5.0	"	3.00		83.0	70-130			J
Di(2-ethylhexyl)phthalate	2.40	0.20	3.0	"	3.00		80.0	70-130			J
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.36*			*"*	*5.00*		*107*	*70-130*			
Surrogate: Perylene-d12	*4.65*			*"*	*5.00*		*93.0*	*70-130*			
Surrogate: Triphenyl phosphate	*5.36*			*"*	*5.00*		*107*	*70-130*			
LCS Dup (AB40727-BSD1)					Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	2.40	0.080	0.10	ug/l	3.00		80.0	70-130	11.9	20	
Di(2-ethylhexyl)adipate	2.70	0.40	5.0	"	3.00		90.0	70-130	8.09	20	J
Di(2-ethylhexyl)phthalate	2.57	0.20	3.0	"	3.00		85.7	70-130	6.84	20	J
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.39*			*"*	*5.00*		*108*	*70-130*			
Surrogate: Perylene-d12	*4.84*			*"*	*5.00*		*96.8*	*70-130*			
Surrogate: Triphenyl phosphate	*5.47*			*"*	*5.00*		*109*	*70-130*			
Matrix Spike (AB40727-MS1)		**Source: 14A1714-01**			Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	2.79	0.080	0.10	ug/l	3.00	ND	93.0	70-130			
Di(2-ethylhexyl)adipate	3.11	0.40	5.0	"	3.00	ND	104	70-130			J
Di(2-ethylhexyl)phthalate	2.79	0.20	3.0	"	3.00	ND	93.0	70-130			J
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.27*			*"*	*5.00*		*105*	*70-130*			
Surrogate: Perylene-d12	*5.52*			*"*	*5.00*		*110*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:04

Semivolatile Organic Compounds by EPA Method 525.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40727 - EPA 525.2											
Matrix Spike (AB40727-MS1)		**Source: 14A1714-01**			Prepared: 02/08/14 Analyzed: 02/13/14						
Surrogate: Triphenyl phosphate	*5.65*			*ug/l*	*5.00*		*113*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Project: Project Number:	Dr. Bill Motzer Groundwater Reuse Project 60408	Reported: 02/18/14 11:04

Notes and Definitions

A-02	Dilution required due to high suspended solids. Data should be considered informational only.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration, detected but not quantified (DNQ).
OD-1	Odor described as "WAX"
QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
U	Analyte included in analysis, but not detected at or above MDL.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1401906

Report Created for: Alpha Analytical Laboratories
208 Mason Street
Ukiah, CA 95482

Project Contact: David S. Pingatore
Project P.O.:
Project Name: #14A1643

Project Received: 01/31/2014

Analytical Report reviewed & approved for release on 02/06/2014 by:

Question about your data?

Click here to email McCampbell

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Glossary of Terms & Qualifier Definitions

Client: Alpha Analytical Laboratories
Project: #14A1643
WorkOrder: 1401906

Glossary Abbreviation	Description
95% Interval	95% Confident Interval
DF	Dilution Factor
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not detected at or above the indicated MDL or RL
NR	Matrix interferences, or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix; or sample diluted due to high matrix or analyte content.
RD	Relative Difference
RL	Reporting Limit
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
TEQ	Toxicity Equivalence

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Analytical Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	1401906
Project:	#14A1643	**Extraction Method**	E218.6
Date Received:	1/31/14 12:19	**Analytical Method:**	E218.6
Date Prepared:	1/31/14	**Unit:**	µg/L

Hexachrome by IC

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
MRWPCA MW-1	**1401906-001A**	**Water**	**01/29/2014 14:15**	**IC2**	**86616**

Analytes	Result	RL	DF	Date Analyzed
Hexachrome	**1.1**	0.050	1	01/31/2014 18:29

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Quality Control Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	1401906
Date Prepared:	1/31/14	**BatchID:**	86616
Date Analyzed:	1/31/14	**Extraction Method**	E218.6
Instrument:	IC2	**Analytical Method:**	E218.6
Matrix:	Water	**Unit:**	µg/L
Project:	#14A1643	**Sample ID:**	MB/LCS-86616 1401905-001AMS/MSD

QC Summary Report for E218.6

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Hexachrome	ND	25.38	0.050	25	-	102	90-110

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Hexachrome	24.94	25.03	25	1.560	93.5	93.9	90-110	0.360	10

McCampbell Analytical, Inc.

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Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1401906 **ClientCode: ALPU**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
David S. Pingatore
Alpha Analytical Laboratories
208 Mason Street
Ukiah, CA 95482
(707) 468-0401 FAX: (707) 468-5267

Email: sspeaks@alpha-labs.com;david@alpha-lab
cc:
PO:
ProjectNo: #14A1643

Bill to:
Accounts Payable
Alpha Analytical Laboratories
208 Mason Street
Ukiah, CA 95482

Requested TAT: 5 days

Date Received: 01/31/2014
Date Printed: 01/31/2014

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
1401906-001	MRWPCA MW-1	Water	1/29/2014 14:15	☐	A											

Test Legend:

1	218_6_DW	2		3		4		5	
6		7		8		9		10	
11		12							

Prepared by: Maria Venegas

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

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WORK ORDER SUMMARY

Client Name: ALPHA ANALYTICAL LABORATORIES
QC Level: LEVEL 2
Work Order: 1401906
Project: #14A1643
Client Contact: David S. Pingatore
Date Received: 1/31/2014
Comments:
Contact's Email: sspeaks@alpha-labs.com;david@alpha-labs.com

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Number of Containers	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1401906-001A	MRWPCA MW-1	Water	E218.6 (Hexachrome)	1	250mL HDPE w/ (NH4)2SO4	☐	1/29/2014 14:15	5 days	Present	☐	

*** NOTE: STLC and TCLP extractions require 48 hrs to complete; therefore, all TATs begin after the extraction is completed (i.e., 24hr TAT yields results in 72 hrs from sample submission).**

Bottle Legend:

250mL HDPE w/ (NH4)2SO4 = 250mL HDPE Bottle w/ Ammonium Sulfate

1401906

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

14A1643

SENDING LABORATORY:	**RECEIVING LABORATORY:**
Alpha Analytical Laboratories, Inc.	McCampbell Analytical
208 Mason St.	1534 Willowpass Rd.
Ukiah, CA 95482	Pittsburg, CA 94565
Phone: (707)468-0401	Phone :(925) 252-9262
Fax: (707)468-5267	Fax: (925) 252-9269
Project Manager: David S. Pingatore	**Terms: Net 30**

Analysis	Due	Expires	Comments
14A1643-01 MRWPCA MW-1 [Water] Sampled 01/29/14 14:15 Pacific			
Cr6 218.6 DW	02/13/14 12:00	02/03/14 14:15	
Containers Supplied:			
250ml Poly - (NH4)2SO4 (A			

☐ *Report to State*

System Name: NO **Employed by:**

User ID: **Sampler:**

System Number:

3.2

CONDITION APPROPRIATE
HEAD SPACE ABSENT CONTAINERS
DECHLORINATED IN LAB PRESERVED IN LAB

PRESERVATION	VOAS	O&G	METALS	OTHER

Released By	Date	Received By	Date
[signature]	01/31/14	[signature]	1/31/14
[signature]	1/31/14	[signature]	1/31/14 1158

Page 1 of 1

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Sample Receipt Checklist

Client Name:	**Alpha Analytical Laboratories**	Date and Time Received:	**1/31/2014 12:19:55 PM**
Project Name:	**#14A1643**	LogIn Reviewed by:	Maria Venegas
WorkOrder N°:	**1401906** Matrix: Water	Carrier:	Client Drop-In

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐
Chain of custody signed when relinquished and received?	Yes ☑	No ☐
Chain of custody agrees with sample labels?	Yes ☑	No ☐
Sample IDs noted by Client on COC?	Yes ☑	No ☐
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐
Sampler's name noted on COC?	Yes ☐	No ☑

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp: 3.2°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	NA ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☑	No ☐	

(Ice Type: BLUE ICE)

** NOTE: If the "No" box is checked, see comments below.*

Comments:

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com

Laboratory & Corporate: 208 Mason Street, Ukiah, CA 95482
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Service Center & Micro Lab: 6398 Dougherty Rd, Ste 35, Dublin, CA 94568
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Chain of Custody Record

Reports and Invoices will be delivered by email in .pdf format.

Lab No. 14A1643

Report to:	Invoice to (if different):	Project Info for Report:
Company: Todd Engineers	Company:	Project ID: Groundwater Reuse Project
Attn: Dr. Bill Motzer	Attn:	
Address: 2490 Mariner Square Loop, Suite 215 Alameda, CA 94501	Address:	Project No: Project # 60408
Phone/Fax: 510.747.6920 / 510.747.6921	Phone/Fax:	PO/Reference :
Email Address: bmotzer@toddengineers.com	Email Address:	

Samplers Signature:

Print:

Signature below authorizes work under terms stated on reverse side.

TAT: 10 days ● RUSH: 5 days ○ 48 hours ○ Other: ___days ○

Lab Approval Required For Rush TATs

Sample Notes (lab use only): Temperature: DU 4.8 / <12 deg. C; Shipment Method:; Custody Seals: Y / N

Sample Identification	Sampled: Date	Sampled: Time	Container: 40ml VOA	Poly	Amber glass	Soil jar		Preservative: NaOH	HNO3	H2SO4	Other	None	Matrix: Water	Soil		Total Number of Containers	Analyses Requested: Inorganics Scan, DU-General Physical Scan	200.7 - Ca, K, Mg, Na	200.8 - Ag, B, Cu, Fe, Mn, U, V, Zn	Bicarbonate, Chloride, Conductivity	MBAS, Perchlorate, TDS, Sulfate	HAA5, TOC	507, 508, 515, 525 DHS, 531, 547, 548, 549	504.1, 524.2 Sample Traps scan	Asbestos DW (sub TEM Lab)	Cr6 218.6 DW (sub MAI)	Dioxin 2,3,7,8 TCDD DW (sub UL)	Sample Notes or CDPH Source Numbers:
MRWPCA MW-1	1-29-14	1415		x	x			x	x			x	x			4	x	x	x	x	x							
			x		x						x		x			3						x						
				x	x						x	x	x			10							x					(507/508/515.1 = one 1L BRA ea)
			x								x		x			7								x				
					x							x	x			2									x			
				x							x		x			1										x		
					x							x	x			2											x	
Trip blank ($0.00 analysis)	1-29-14	1415	x								x	x	x			2								x				

Relinquished by:	Received by:	Date:	Time:
[signature]	[signature]	1-29-14	1525
[signature]	Rodney Santillan	1/29/14	17:45
Rodney Santillan	[signature]	1-29-14	1850
[signature]	[signature]	1-29-14	2115

CDPH Write On EDT Transmission? ○ Yes ○ No

State System Number:

If "Y" please enter the Source Number(s) in the column above

CA Geotracker EDF Report? ○ Yes ○ No

Global ID: Sampling Company Log Code:

EDF to (Email Address):

Travel and Site Time: Mileage: Misc. Supplies:

ASBESTOS TEM LABORATORIES, INC.

EPA 600/4-83 Drinking Water
Transmission Electron Microscopy
Analytical Report

Laboratory Job # 1288-00570

630 Bancroft Way
Berkeley, CA 94710
(510) 704-8930
FAX (510) 704-8429

ASBESTOS TEM LABORATORIES, INC

Certified by
CA DPH ELAP
Lab No. 1866

Feb/12/2014

David S. Pingatore
Alpha Analytical Laboratories, Inc.
208 Mason Street
Ukiah, CA 95482

RE: LABORATORY JOB # 1288-00570
Transmission electron microscopy analytical results for 1 water sample(s).
Job Site:
Job No.: 14A1643

Enclosed please find results for the TEM analysis of one or more water samples. The analytical procedures were performed according to EPA Method 100.2 for the analysis of asbestos in drinking water.

Prior to analysis, samples are checked for damage, disruption of any chain-of-custody seals, and completeness of accompanying paperwork. If no problems are found, samples are then logged-in, each given a unique laboratory number, and a hard copy containing all pertinent information is generated. This, and all other relevant paper work are kept with each sample throughout the analytical procedures to assure proper analysis.

Preparation of water samples is performed within a HEPA filtered, Class 100 air, laminar flow clean bench environment. Prior to filtration, water sample containers are ultrasonicated, and the exterior surfaces cleaned. An aliquot of water is drawn from the sample container and drawn through a special filtration apparatus and collected onto a mixed cellulose ester (MCE) or polycarbonate (PC) filter. The filters are removed from the apparatus and dried. A portion of each sample filter is sectioned, placed onto a glass microscope slide, and carbon coated. The filters are further sectioned and placed carbon side up onto 200-mesh copper TEM sample grids in a solvent bath until all filter material is dissolved. The TEM grids are removed and placed into labeled grid storage boxes.

TEM analysis is performed on a Philips EM-300 or CM-12 transmission electron microscope operating at 80 or 100 kV. Initially, the grid is scanned at low and medium magnification to insure proper sample loading, and coherence of the carbon support film. Then TEM grid openings are analyzed at a magnification of 10,000X. All fibers >10 um in length and exhibiting an aspect ratio >3:1 are analyzed. Scanning continues until either 100 asbestiform fibers >10um in length are counted, or an analytical sensitivity of 0.2 million fibers per liter (MFL) is achieved. Analyzed fibers are subjected to detailed morphological and selected area diffraction (SAED) analysis. Fibers indicated as asbestos, or potentially asbestos, are further analyzed by energy dispersive X-ray (EDX) analysis as needed. The number of asbestos fibers detected, and other analytical parameters, are then used to calculate the concentration of asbestos in MFL. The results are entered into a standard report format and reviewed by the analyst and the laboratory manager before release to the client.

Sincerely Yours,

Laboratory Manager
ASBESTOS TEM LABORATORIES, INC.

--- These results relate only to the samples tested and must not be reproduced, except in full, with the approval of the laboratory. This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government. ---

630 Bancroft Way • BERKELEY, CA 94710 • (510) 704-8930 • FAX (510) 704-8429
www.asbestostemlabs.com *With Offices in Reno, NV (775) 359-3377*

TRANSMISSION ELECTRON MICROSCOPY ANALYTICAL REPORT

Contact:	David S. Pingatore		
Address:	Alpha Analytical Laboratories, Inc. 208 Mason Street Ukiah, CA 95482	Report No.:	323872
		Date:	Feb-12-14
Job Site / No.	14A1643	Total Samples Analyzed:	1
		Sample Collector:	

CLIENT SAMPLE #	**14A1643-01**	**SAMPLE LOCATION/DESCRIPTION**	MW-1
Laboratory Sample #	1288-00570-001		

WATER SAMPLE DATA

Date/Time Collected	Jan-29-14 / 2:15 pm	Volume Submitted (ml)	1000
Date/Time Lab Received	Jan-30-14 / 4:40 pm	Volume Filtered (ml)	1
Date/Time Filtered	Jan-30-14 / 7:20 pm	Filter & Pore Size	MCE 0.22
Date/Time Analyzed	Feb-12-14 / 9:50 am	UV/Ozone Treated:	NO

IDENTIFIED STRUCTURES (>10um)			
ASBESTOS		OTHER	
CHRYS	AMPH	AMBIG	NON-ASB
NSD	NSD	NSD	NSD

CALCULATED ASBESTOS STRUCTURE CONCENTRATION (>10um)		
CHRYS	AMPH	TOTAL
< 0.3 MFL	< 0.3 MFL	< 0.3 MFL

COMMENTS

No asbestos detected. Very heavy particle loading.

Filter Loading: HEAVY

SAED Photo ID Nos.

TEM / ANALYTICAL PARAMETERS

Grid Openings Scanned at 10,000X	40	Analytical Sensitivity	0.3 MFL
Grid Opening Area (mm2)	0.0094	95% UCL	1.00 MFL
Scan Area (mm2)	0.3760	95% LCL	0 MFL

WATER SAMPLE LAB BLANK RESULTS

Lab ID#	Blank 9485	Analytical Sensitivity	0.01 MFL
Grid Openings Scanned at 10,000X	8	Asbestos Structure Concentration	<0.01 MFL
Volume Filtered (ml)	300		

NOTATION KEY

Chrys. - Chrysotile Asbestos
Amph. - Amphibole Asbestos
NSD - No Structures Detected
1 mm = 1 millimeter

1 um = 1 micron = 0.001 mm
MFL = Millions of Fibers per Liter
UCL = Upper Confidence Level
LCL = Lower Confidence Level

ANALYST SIGNATURE

Stephanie Dunn
LAB QC REVIEWER SIGNATURE

ASBESTOS TEM LABORATORIES, INC.
www.asbestostemlabs.com
630 BANCROFT WAY, BERKELEY, CA 94710 (510) 704-8930
With Offices in Reno, NV (775) 359-3377

ALS Environmental
ALS Group USA, Corp.
1317 South 13th Avenue
Kelso, WA 98626
T: +1 360 577 7222
F: +1 360 636 1068
www.alsglobal.com

February 20, 2014 Analytical Report for Service Request No: K1400990

David Pingatore
Alpha Analytical Laboratories, Inc.
6398 Dougherty Road, Suite 35
Dublin, CA 94568

RE: 14A1643

Dear David:

Enclosed are the results of the sample submitted to our laboratory on January 31, 2014. For your reference, these analyses have been assigned our service request number K1400990.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3293. You may also contact me via Email at Shar.Samy@alsglobal.com.

Respectfully submitted,

ALS Group USA Corp. dba ALS Environmental

Shar Samy, Ph.D.
Project Manager

SS/mj

RIGHT SOLUTIONS | RIGHT PARTNER

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2286
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L12-28
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Georgia DNR	http://www.gaepd.org/Documents/techguide_pcb.html#cel	881
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
Indiana DOH	http://www.in.gov/isdh/24859.htm	C-WA-01
ISO 17025	http://www.pjlabs.com/	L12-27
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	3016
Maine DHS	Not available	WA0035
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-368
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA35
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA200001
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	4704427-08-TX
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C1203
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.caslab.com or at the accreditation bodies web site

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

ALS ENVIRONMENTAL

Client:	Alpha Analytical Laboratories, Inc.	**Service Request No.:**	K1400990
Project:	14A1634	**Date Received:**	01/31/14
Sample Matrix:	Water		

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Matrix/Duplicate Matrix Spike (MS/DMS), and Laboratory Control Sample (LCS).

Sample Receipt

One water sample was received for analysis at ALS Environmental on 01/31/14. The sample was received in good condition and consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4ºC upon receipt at the laboratory.

Explosives by EPA Method 8330

Elevated Detection Limits:
The detection limit was elevated for 3,5-Dinitroaniline in sample 14A1643-01. The chromatogram indicated the presence of non-target background components. The matrix interference prevented adequate resolution of the target compound at the normal limit. No further corrective action was appropriate.

Sample Notes and Discussion:
Insufficient sample volume was received to perform a Matrix Spike/Matrix Spike Duplicate (MS/MSD). A Laboratory Control Sample/Duplicate Laboratory Control Sample (LCS/DLCS) was analyzed and reported in lieu of the MS/MSD.

No other anomalies associated with the analysis of this sample were observed.

Approved by_____

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

14A1635

K1400991

SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: David S. Pingatore

RECEIVING LABORATORY:

ALS Environmental - Kelso
1317 S. 13th Ave
Kelso, WA 98626
Phone :(360) 577-7222
Fax: -
Terms: Net 30

Analysis	Due	Expires	Comments
14A1635-01 PRTIW (At Mission Memorial) [Water] Sampled 01/29/14 14:57 Pacific			
8330B Explosives Water	02/13/14 12:00	02/05/14 14:57	
Containers Supplied:			
1L Amber- Unpres. (AD) 1L Amber- Unpres. (AE)			

☐ *Report to State*

System Name: _____ **Employed by:** _____

User ID: _____ **Sampler:** _____

System Number: _____

+QC

Released By	Date	Received By	Date
	1-30-14	ALS	1/31/14 1020

(ALS)

PC SHAK

Cooler Receipt and Preservation Form

Client / Project: Alpha Analytical Service Request K14 00991

Received: 1/31/14 Opened: 1/31/14 By: UL Unloaded: 1/31/14 By: UL

. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*

. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* _____ *NA*

. Were custody seals on coolers? NA Y N If yes, how many and where? _____

If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected. Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
-0.1	-0.3	—	—	-0.2	337	14A1643/14A1635	1289425001489639 52	

. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____

. Were custody papers properly filled out (ink, signed, etc.)? NA Y N

. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N

. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N

. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N

. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N

10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N

11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N

12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

Page ____ *of* ____

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Alpha Analytical Laboratories, Inc. (Uki	**Service Request:**	K1400990
Project:	14A1643	**Date Collected:**	01/29/2014
Sample Matrix:	Water	**Date Received:**	01/31/2014

Nitroaromatics and Nitramines (Explosives)

Sample Name:	14A1643-01	**Units:**	ug/L
Lab Code:	K1400990-001	**Basis:**	NA
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	8330B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
HMX	ND	U	0.11	0.011	1	02/04/14	02/08/14	KWG1400907	
RDX	ND	U	0.11	0.019	1	02/04/14	02/08/14	KWG1400907	
1,3,5-Trinitrobenzene	ND	U	0.22	0.054	1	02/04/14	02/08/14	KWG1400907	
1,3-Dinitrobenzene	ND	U	0.11	0.0091	1	02/04/14	02/08/14	KWG1400907	
3,5-Dinitroaniline	ND	Ui	0.30	0.30	1	02/04/14	02/08/14	KWG1400907	
TETRYL	ND	U	0.11	0.045	1	02/04/14	02/08/14	KWG1400907	
Nitrobenzene	ND	U	0.11	0.014	1	02/04/14	02/08/14	KWG1400907	
4-Amino-2,6-dinitrotoluene	ND	U	0.11	0.018	1	02/04/14	02/08/14	KWG1400907	
2-Amino-4,6-dinitrotoluene	ND	U	0.11	0.0095	1	02/04/14	02/08/14	KWG1400907	
2,4,6-Trinitrotoluene	ND	U	0.11	0.028	1	02/04/14	02/08/14	KWG1400907	
2,6-Dinitrotoluene	ND	U	0.22	0.058	1	02/04/14	02/08/14	KWG1400907	
2,4-Dinitrotoluene	ND	U	0.11	0.0097	1	02/04/14	02/08/14	KWG1400907	
2-Nitrotoluene	ND	U	0.11	0.035	1	02/04/14	02/08/14	KWG1400907	
4-Nitrotoluene	ND	U	0.11	0.021	1	02/04/14	02/08/14	KWG1400907	
3-Nitrotoluene	ND	U	0.11	0.0069	1	02/04/14	02/08/14	KWG1400907	
Nitroglycerin	ND	U	1.1	0.42	1	02/04/14	02/08/14	KWG1400907	
Pentaerythritol Tetranitrate	ND	U	0.54	0.20	1	02/04/14	02/08/14	KWG1400907	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1-Chloro-3-nitrobenzene	81	23-98	02/08/14	Acceptable

Comments:

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Alpha Analytical Laboratories, Inc. (Uki	**Service Request:**	K1400990
Project:	14A1643	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Nitroaromatics and Nitramines (Explosives)

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG1400907-3	**Basis:**	NA
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	8330B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
HMX	ND	U	0.099	0.010	1	02/04/14	02/08/14	KWG1400907	
RDX	ND	U	0.099	0.017	1	02/04/14	02/08/14	KWG1400907	
1,3,5-Trinitrobenzene	ND	U	0.20	0.050	1	02/04/14	02/08/14	KWG1400907	
1,3-Dinitrobenzene	ND	U	0.099	0.0085	1	02/04/14	02/08/14	KWG1400907	
3,5-Dinitroaniline	ND	U	0.099	0.013	1	02/04/14	02/08/14	KWG1400907	
TETRYL	ND	U	0.10	0.042	1	02/04/14	02/08/14	KWG1400907	
Nitrobenzene	ND	U	0.099	0.013	1	02/04/14	02/08/14	KWG1400907	
4-Amino-2,6-dinitrotoluene	ND	U	0.099	0.016	1	02/04/14	02/08/14	KWG1400907	
2-Amino-4,6-dinitrotoluene	ND	U	0.099	0.0089	1	02/04/14	02/08/14	KWG1400907	
2,4,6-Trinitrotoluene	ND	U	0.099	0.026	1	02/04/14	02/08/14	KWG1400907	
2,6-Dinitrotoluene	ND	U	0.20	0.054	1	02/04/14	02/08/14	KWG1400907	
2,4-Dinitrotoluene	ND	U	0.099	0.0091	1	02/04/14	02/08/14	KWG1400907	
2-Nitrotoluene	ND	U	0.10	0.032	1	02/04/14	02/08/14	KWG1400907	
4-Nitrotoluene	ND	U	0.099	0.019	1	02/04/14	02/08/14	KWG1400907	
3-Nitrotoluene	ND	U	0.099	0.0064	1	02/04/14	02/08/14	KWG1400907	
Nitroglycerin	ND	U	0.99	0.39	1	02/04/14	02/08/14	KWG1400907	
Pentaerythritol Tetranitrate	ND	U	0.50	0.18	1	02/04/14	02/08/14	KWG1400907	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1-Chloro-3-nitrobenzene	68	23-98	02/08/14	Acceptable

Comments:

Client: Alpha Analytical Laboratories, Inc. (Uki
Service Request: K1400990
Project: 14A1643
Sample Matrix: Water

Surrogate Recovery Summary
Nitroaromatics and Nitramines (Explosives)

Extraction Method: METHOD
Units: Percent
Analysis Method: 8330B
Level: Low

Sample Name	Lab Code	Sur1
14A1643-01	K1400990-001	81
Method Blank	KWG1400907-3	68
Lab Control Sample	KWG1400907-1	70
Duplicate Lab Control Sample	KWG1400907-2	69

Surrogate Recovery Control Limits (%)

Sur1 = 1-Chloro-3-nitrobenzene 23-98

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	Alpha Analytical Laboratories, Inc. (Uki	**Service Request:**	K1400990
Project:	14A1643	**Date Extracted:**	02/04/2014
Sample Matrix:	Water	**Date Analyzed:**	02/08/2014

Lab Control Spike/Duplicate Lab Control Spike Summary
Nitroaromatics and Nitramines (Explosives)

Extraction Method:	METHOD	**Units:**	ug/L
Analysis Method:	8330B	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG1400907

	Lab Control Sample KWG1400907-1 Lab Control Spike			Duplicate Lab Control Sample KWG1400907-2 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
HMX	6.40	8.00	80	6.33	8.00	79	11-147	1	30
RDX	6.20	8.00	77	6.17	8.00	77	10-142	0	30
1,3,5-Trinitrobenzene	5.95	8.00	74	5.93	8.00	74	16-137	0	30
1,3-Dinitrobenzene	6.03	8.00	75	6.01	8.00	75	26-125	0	30
3,5-Dinitroaniline	5.95	8.00	74	5.91	8.00	74	30-133	1	30
TETRYL	6.12	8.00	77	6.00	8.00	75	29-123	2	30
Nitrobenzene	5.92	8.00	74	5.88	8.00	74	10-116	1	30
4-Amino-2,6-dinitrotoluene	6.09	8.00	76	6.08	8.00	76	55-117	0	30
2-Amino-4,6-dinitrotoluene	5.98	8.00	75	5.95	8.00	74	54-116	0	30
2,4,6-Trinitrotoluene	5.93	8.00	74	5.90	8.00	74	47-118	1	30
2,6-Dinitrotoluene	5.98	8.00	75	5.95	8.00	74	40-108	1	30
2,4-Dinitrotoluene	5.89	8.00	74	5.85	8.00	73	50-111	1	30
2-Nitrotoluene	5.64	8.00	70	5.58	8.00	70	12-110	1	30
4-Nitrotoluene	5.64	8.00	71	5.57	8.00	70	16-113	1	30
3-Nitrotoluene	5.92	8.00	74	5.84	8.00	73	13-109	1	30
Nitroglycerin	6.30	8.00	79	6.13	8.00	77	15-136	3	30
Pentaerythritol Tetranitrate	6.19	8.00	77	6.18	8.00	77	66-103	0	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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Report Date: 02/24/14 10:54
Received Date: 01/31/14 10:20
Turnaround Time: Normal

Project: 14A1643

Phones: (925) 872-9637
Fax: (707) 468-5267

P.O. #:

Attn: David S. Pingatore

Client: Alpha Analytical Laboratories - Ukiah
208 Mason St
Ukiah, CA 95482

Dear David S. Pingatore :

Enclosed are the results of analyses for samples received 1/31/2014 with the Chain of Custody document. The samples were received in good condition, at 2.4 °C and on ice. All analysis met the method criteria except as noted below or in the report with data qualifiers.

Lab Sample ID: 4A31032-01 **Sample ID: 14A1643-01** **Matrix:** Water
Sampled by: Client **Sampled: 01/29/14 14:15** **Sample Note: MRWPCA MW-1**

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
N-Nitrosodiethylamine	ND		2.0	ng/l	1	EPA 1625M	2/3/14	2/5/14 14:19	W4B0023	
N-Nitrosodimethylamine	ND		2.0	ng/l	1	EPA 1625M	2/3/14	2/5/14 14:19	W4B0023	
N-Nitrosodi-n-butylamine	ND		2.0	ng/l	1	EPA 1625M	2/3/14	2/5/14 14:19	W4B0023	
N-Nitrosodi-n-propylamine	ND		2.0	ng/l	1	EPA 1625M	2/3/14	2/5/14 14:19	W4B0023	
N-Nitrosomethylethylamine	ND		2.0	ng/l	1	EPA 1625M	2/3/14	2/5/14 14:19	W4B0023	
N-Nitrosomorpholine	ND		2.0	ng/l	1	EPA 1625M	2/3/14	2/5/14 14:19	W4B0023	
N-Nitrosopiperidine	ND		2.0	ng/l	1	EPA 1625M	2/3/14	2/5/14 14:19	W4B0023	
N-Nitrosopyrrolidine	ND		2.0	ng/l	1	EPA 1625M	2/3/14	2/5/14 14:19	W4B0023	
17-a-Ethynylestradiol	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 17:48	W4B0281	
17-b-Estradiol	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 17:48	W4B0281	
Estrone	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 17:48	W4B0281	
Progesterone	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 17:48	W4B0281	
Testosterone	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 17:48	W4B0281	
Bisphenol A	**390**		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 22:51	W4B0283	
Gemfibrozil	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 22:51	W4B0283	
Ibuprofen	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 22:51	W4B0283	
Iopromide	ND		5.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 22:51	W4B0283	
Naproxen	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 22:51	W4B0283	
Salicylic Acid	ND		50	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 22:51	W4B0283	
Triclosan	ND		2.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 22:51	W4B0283	

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Lab Sample ID: 4A31032-01 **Sample ID: 14A1643-01** **Matrix:** Water
Sampled by: Client **Sampled: 01/29/14 14:15** **Sample Note: MRWPCA MW-1**

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
Acetaminophen	ND		20	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
Amoxicillin	**14**		10	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
Atenolol	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
Atorvastatin	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
Azithromycin	ND		10	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
Caffeine	**6.8**		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
Carbamazepine	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
Ciprofloxacin	**5.9**		5.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
Cotinine	ND		2.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
DEET	**6.0**		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
Diazepam	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
Fluoxetine	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
Meprobamate	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
Methadone	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
Oxybenzone	**87**		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
Phenytoin	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
Primidone	ND		10	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	R-01
Sucralose	ND		5.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
Sulfamethoxazole	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
TCEP	**6.4**		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
TCPP	**11**		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	B
TDCPP	**3.8**		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	
Trimethoprim	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:21	W4B0282	

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Quality Control Section

Nitrosamines by isotopic dilution GC/MS CI Mode - Quality Control

Batch W4B0023 - EPA 1625M

Blank (W4B0023-BLK1) — **Prepared: 02/03/14 Analyzed: 02/04/14 21:48**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine		ND		ng/l					
N-Nitrosomethylethylamine		ND		ng/l					
N-Nitrosodiethylamine		ND		ng/l					
N-Nitrosodi-n-propylamine		ND		ng/l					
N-Nitrosomorpholine		ND		ng/l					
N-Nitrosopyrrolidine		ND		ng/l					
N-Nitrosopiperidine		ND		ng/l					
N-Nitrosodi-n-butylamine		ND		ng/l					

Blank (W4B0023-BLK2) — **Prepared: 02/03/14 Analyzed: 02/05/14 14:48**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine		ND	QC-2	ng/l					
N-Nitrosomethylethylamine		ND	QC-2	ng/l					
N-Nitrosodiethylamine		ND	QC-2	ng/l					
N-Nitrosodi-n-propylamine		ND	QC-2	ng/l					
N-Nitrosomorpholine		ND	QC-2	ng/l					
N-Nitrosopyrrolidine		ND	QC-2	ng/l					
N-Nitrosopiperidine		ND	QC-2	ng/l					
N-Nitrosodi-n-butylamine		ND	QC-2	ng/l					

LCS (W4B0023-BS1) — **Prepared: 02/03/14 Analyzed: 02/04/14 22:17**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine		3.47		ng/l	3.00	116	50-150		
N-Nitrosomethylethylamine		2.67		ng/l	3.00	89	50-150		
N-Nitrosodiethylamine		2.79		ng/l	3.00	93	50-150		
N-Nitrosodi-n-propylamine		1.94		ng/l	3.00	65	50-150		
N-Nitrosomorpholine		2.50		ng/l	3.00	83	50-150		
N-Nitrosopyrrolidine		2.91		ng/l	3.00	97	50-150		
N-Nitrosopiperidine		2.83		ng/l	3.00	94	50-150		
N-Nitrosodi-n-butylamine		3.49		ng/l	3.00	116	50-150		

LCS (W4B0023-BS2) — **Prepared: 02/03/14 Analyzed: 02/05/14 13:23**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine		3.61	QC-2	ng/l	3.00	120	50-150		
N-Nitrosomethylethylamine		2.65	QC-2	ng/l	3.00	88	50-150		
N-Nitrosodiethylamine		2.20	QC-2	ng/l	3.00	73	50-150		
N-Nitrosodi-n-propylamine		1.95	QC-2	ng/l	3.00	65	50-150		
N-Nitrosomorpholine		3.06	QC-2	ng/l	3.00	102	50-150		
N-Nitrosopyrrolidine		2.94	QC-2	ng/l	3.00	98	50-150		
N-Nitrosopiperidine		3.14	QC-2	ng/l	3.00	105	50-150		
N-Nitrosodi-n-butylamine		4.29	QC-2	ng/l	3.00	143	50-150		

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Nitrosamines by isotopic dilution GC/MS CI Mode - Quality Control

Batch W4B0023 - EPA 1625M

Matrix Spike (W4B0023-MS1) **Source: 4A31028-01** **Prepared: 02/03/14** **Analyzed: 02/04/14 23:15**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine	ND	2.69		ng/l	3.00	90	50-150		
N-Nitrosomethylethylamine	ND	2.88		ng/l	3.00	96	50-150		
N-Nitrosodiethylamine	ND	3.34		ng/l	3.00	111	50-150		
N-Nitrosodi-n-propylamine	ND	2.40		ng/l	3.00	80	50-150		
N-Nitrosomorpholine	ND	2.95		ng/l	3.00	98	50-150		
N-Nitrosopyrrolidine	ND	3.14		ng/l	3.00	105	50-150		
N-Nitrosopiperidine	ND	2.87		ng/l	3.00	96	50-150		
N-Nitrosodi-n-butylamine	ND	3.46		ng/l	3.00	115	50-150		

Matrix Spike Dup (W4B0023-MSD1) **Source: 4A31028-01** **Prepared: 02/03/14** **Analyzed: 02/04/14 22:46**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine	ND	2.76		ng/l	3.00	92	50-150	3	30
N-Nitrosomethylethylamine	ND	2.78		ng/l	3.00	93	50-150	4	30
N-Nitrosodiethylamine	ND	4.40		ng/l	3.00	147	50-150	27	30
N-Nitrosodi-n-propylamine	ND	3.11		ng/l	3.00	104	50-150	26	30
N-Nitrosomorpholine	ND	2.92		ng/l	3.00	97	50-150	1	30
N-Nitrosopyrrolidine	ND	3.14		ng/l	3.00	105	50-150	0.3	30
N-Nitrosopiperidine	ND	3.28		ng/l	3.00	109	50-150	14	30
N-Nitrosodi-n-butylamine	ND	4.74	MS-05	ng/l	3.00	158	50-150	31	30

PPCPs - Pharmaceuticals by LC/MSMS-ESI+ - Quality Control

Batch W4B0282 - EPA 1694M-ESI+

Blank (W4B0282-BLK1) **Prepared: 02/07/14** **Analyzed: 02/18/14 22:39**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Acetaminophen		ND		ng/l					
Caffeine		ND		ng/l					
Sulfamethoxazole		ND		ng/l					
Trimethoprim		ND		ng/l					
Azithromycin		ND		ng/l					
Cotinine		ND		ng/l					
Atenolol		ND		ng/l					
Ciprofloxacin		ND		ng/l					
Carbamazepine		ND		ng/l					
DEET		ND		ng/l					
Fluoxetine		ND		ng/l					
Atorvastatin		ND		ng/l					
Methadone		ND		ng/l					
Primidone		ND		ng/l					
Diazepam		ND		ng/l					
TCPP		2.23	B	ng/l					
TCEP		ND		ng/l					
TDCPP		ND		ng/l					
Phenytoin		ND		ng/l					

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PPCPs - Pharmaceuticals by LC/MSMS-ESI+ - Quality Control

Batch W4B0282 - EPA 1694M-ESI+

Blank (W4B0282-BLK1) — **Prepared: 02/07/14 Analyzed: 02/18/14 22:39**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Amoxicillin		ND		ng/l					
Meprobamate		ND		ng/l					
Sucralose		ND		ng/l					
Oxybenzone		ND		ng/l					

LCS (W4B0282-BS1) — **Prepared: 02/07/14 Analyzed: 02/18/14 22:53**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Acetaminophen		435		ng/l	400	109	66-156		
Caffeine		17.4		ng/l	20.0	87	55-152		
Sulfamethoxazole		17.6		ng/l	20.0	88	60-133		
Trimethoprim		18.6		ng/l	20.0	93	67-139		
Azithromycin		199		ng/l	200	100	52-166		
Cotinine		22.6		ng/l	20.0	113	68-155		
Atenolol		21.0		ng/l	20.0	105	56-164		
Ciprofloxacin		83.8		ng/l	100	84	51-168		
Carbamazepine		19.3		ng/l	20.0	96	60-135		
DEET		15.5		ng/l	20.0	78	45-135		
Fluoxetine		23.8		ng/l	20.0	119	55-150		
Atorvastatin		16.3		ng/l	20.0	82	0.1-173		
Methadone		19.0		ng/l	20.0	95	62-137		
Primidone		17.1		ng/l	20.0	86	54-147		
Diazepam		18.3		ng/l	20.0	92	58-127		
TCPP		18.1		ng/l	20.0	90	24-149		
TCEP		17.5		ng/l	20.0	88	25-149		
TDCPP		17.7		ng/l	20.0	88	20-158		
Phenytoin		18.2		ng/l	20.0	91	69-138		
Amoxicillin		164		ng/l	200	82	14-167		
Meprobamate		20.5		ng/l	20.0	102	11-166		
Sucralose		95.7		ng/l	100	96	50-150		
Oxybenzone		15.4		ng/l	20.0	77	50-150		

LCS Dup (W4B0282-BSD1) — **Prepared: 02/07/14 Analyzed: 02/18/14 23:07**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Acetaminophen		499		ng/l	400	125	66-156	14	30
Caffeine		18.2		ng/l	20.0	91	55-152	4	30
Sulfamethoxazole		19.4		ng/l	20.0	97	60-133	10	30
Trimethoprim		18.4		ng/l	20.0	92	67-139	1	30
Azithromycin		206		ng/l	200	103	52-166	3	30
Cotinine		26.7		ng/l	20.0	134	68-155	17	30
Atenolol		23.0		ng/l	20.0	115	56-164	9	30
Ciprofloxacin		83.4		ng/l	100	83	51-168	0.5	30
Carbamazepine		19.7		ng/l	20.0	98	60-135	2	30
DEET		16.4		ng/l	20.0	82	45-135	6	30
Fluoxetine		22.8		ng/l	20.0	114	55-150	4	30

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PPCPs - Pharmaceuticals by LC/MSMS-ESI+ - Quality Control

Batch W4B0282 - EPA 1694M-ESI+

LCS Dup (W4B0282-BSD1) — **Prepared: 02/07/14 Analyzed: 02/18/14 23:07**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Atorvastatin		15.1		ng/l	20.0	76	0.1-173	8	30
Methadone		19.1		ng/l	20.0	96	62-137	0.5	30
Primidone		16.2		ng/l	20.0	81	54-147	5	30
Diazepam		18.9		ng/l	20.0	94	58-127	3	30
TCPP		21.0		ng/l	20.0	105	24-149	15	30
TCEP		20.6		ng/l	20.0	103	25-149	16	30
TDCPP		18.9		ng/l	20.0	94	20-158	7	30
Phenytoin		18.4		ng/l	20.0	92	69-138	1	30
Amoxicillin		164		ng/l	200	82	14-167	0	30
Meprobamate		20.6		ng/l	20.0	103	11-166	0.5	30
Sucralose		93.0		ng/l	100	93	50-150	3	30
Oxybenzone		18.3		ng/l	20.0	92	50-150	17	30

PPCPs - Pharmaceuticals by LC/MSMS-ESI- - Quality Control

Batch W4B0283 - EPA 1694M-ESI-

Blank (W4B0283-BLK1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:08**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Bisphenol A		1.99	B	ng/l					
Gemfibrozil		ND		ng/l					
Ibuprofen		ND		ng/l					
Naproxen		ND		ng/l					
Salicylic Acid		ND		ng/l					
Triclosan		ND		ng/l					
Iopromide		ND		ng/l					

LCS (W4B0283-BS1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:22**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Bisphenol A		19.5		ng/l	20.0	98	53-168		
Gemfibrozil		18.0		ng/l	20.0	90	76-122		
Ibuprofen		17.7		ng/l	20.0	88	67-139		
Naproxen		17.3		ng/l	20.0	86	64-138		
Salicylic Acid		171		ng/l	200	86	56-229		
Triclosan		38.9		ng/l	40.0	97	76-139		
Iopromide		114		ng/l	100	114	0.1-163		

LCS Dup (W4B0283-BSD1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:37**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Bisphenol A		18.4		ng/l	20.0	92	53-168	6	30
Gemfibrozil		18.3		ng/l	20.0	92	76-122	2	30
Ibuprofen		19.8		ng/l	20.0	99	67-139	11	30
Naproxen		19.1		ng/l	20.0	96	64-138	10	30
Salicylic Acid		183		ng/l	200	92	56-229	7	30
Triclosan		40.5		ng/l	40.0	101	76-139	4	30

Weck Laboratories, Inc 14859 East Clark Avenue, City of Industry, California 91745-1396 (626) 336-2139 FAX (626) 336-2634
www.wecklabs.com

Certificate of Analysis

PPCPs - Pharmaceuticals by LC/MSMS-ESI- - Quality Control

Batch W4B0283 - EPA 1694M-ESI-

LCS Dup (W4B0283-BSD1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:37**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Iopromide		104		ng/l	100	104	0.1-163	9	30

PPCPs - Hormones by LC/MSMS-APCI - Quality Control

Batch W4B0281 - EPA 1694M-APCI

Blank (W4B0281-BLK1) — **Prepared: 02/07/14 Analyzed: 02/19/14 16:58**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
17-a-Ethynylestradiol		ND		ng/l					
17-b-Estradiol		ND		ng/l					
Estrone		ND		ng/l					
Progesterone		ND		ng/l					
Testosterone		ND		ng/l					

LCS (W4B0281-BS1) — **Prepared: 02/07/14 Analyzed: 02/19/14 17:15**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
17-a-Ethynylestradiol		19.1		ng/l	20.0	96	68-159		
17-b-Estradiol		18.0		ng/l	20.0	90	65-146		
Estrone		17.6		ng/l	20.0	88	59-141		
Progesterone		17.8		ng/l	20.0	89	58-154		
Testosterone		24.8		ng/l	20.0	124	60-172		

LCS Dup (W4B0281-BSD1) — **Prepared: 02/07/14 Analyzed: 02/19/14 17:31**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
17-a-Ethynylestradiol		18.9		ng/l	20.0	94	68-159	1	30
17-b-Estradiol		18.4		ng/l	20.0	92	65-146	2	30
Estrone		18.3		ng/l	20.0	92	59-141	4	30
Progesterone		18.1		ng/l	20.0	90	58-154	2	30
Testosterone		26.0		ng/l	20.0	130	60-172	5	30

Weck Laboratories, Inc 14859 East Clark Avenue, City of Industry, California 91745-1396 (626) 336-2139 FAX (626) 336-2634
www.wecklabs.com

Certificate of Analysis

Notes:
The Chain of Custody document is part of the analytical report.
Any remaining sample(s) for testing will be disposed of one month from the final report date unless other arrangements are made in advance.
All results are expressed on wet weight basis unless otherwise specified.

An Absence of Total Coliform meets the drinking water standards as established by the State of California Department of Health Services.
The Reporting Limit (RL) is referenced as laboratory's Practical Quantitation Limit (PQL).
For Potable water analysis, the Reporting Limit (RL) is referenced as Detection Limit for reporting purposes (DLRs) defined by EPA.

If sample collected by Weck Laboratories, sampled in accordance to lab SOP MIS002

Authorized Signature
Contact: Kim G Tu
(Project Manager)

ELAP # 1132
LACSD # 10143
NELAC # 04229CA

The results in this report apply to the samples analyzed in accordance with the chain of custody document. Weck Laboratories certifies that the test results meet all requirements of NELAC unless noted in the Case Narrative. This analytical report must be reproduced in its entirety.

Flags for Data Qualifiers:

B	Blank contamination. The analyte was found in the associated blank as well as in the sample.
MS-05	The spike recovery and/or RPD were outside acceptance limits for the MS and/or MSD due to possible matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
QC-2	This QC sample was reanalyzed to complement samples that require re-analysis on different date. See analysis date.
R-01	The Reporting Limit for this analyte has been raised to account for matrix interference.
ND	NOT DETECTED at or above the Reporting Limit. If J-value reported, then NOT DETECTED at or above the Method Detection Limit (MDL).
Sub	Subcontracted analysis, original report enclosed.
DL	Method Detection Limit
RL	Method Reporting Limit
MDA	Minimum Detectable Activity
NR	Not Reportable

Weck Laboratories, Inc 14859 East Clark Avenue, City of Industry, California 91745-1396 (626) 336-2139 FAX (626) 336-2634
www.wecklabs.com

NELAC NARRATIVE PAGE

Client: Alpha Analytical Report #: 310987NP

Underwriters Laboratories is a NELAP accredited laboratory. All reported results meet the requirements of the NELAC standards, unless otherwise noted.

UL contact person: James Van Fleit

NELAP requires complete reporting of deviations from method requirements, regardless of the suspected impact on the data. Quality control failures not reported within the report summary are noted here.

There were no quality control failures.

Note: This report may not be reproduced, except in full, without written approval from UL. UL is accredited by the National Environmental Laboratory Accreditation Program (NELAP).

Authorized Signature Title Date

UL LLC
110 S. Hill St., South Bend, IN 46617-2702 USA
T: 800.332.4345 / F: 574.233.8207 / W: UL.com

Laboratory Report

Client:	Alpha Analytical	Report:	310987
Attn:	David Pingatore 6398 Dougherty Road, Suite 35 Dublin, CA 94568	Priority:	Standard Written
		Status:	Final
		PWS ID:	Not Supplied
Copies to:	None		

Sample Information

UL ID #	Client ID	Method	Collected Date / Time	Collected By:	Received Date / Time
2967032	14A1643-01	905.0	01/29/14 14:15	Client	02/04/14 11:45
2967033	14A1643-01	1613	01/29/14 14:15	Client	02/04/14 11:45
2967034	14A1643-01	7110 B	01/29/14 14:15	Client	02/04/14 11:45
2967035	14A1643-01	7500-Ra B	01/29/14 14:15	Client	02/04/14 11:45
2967035	14A1643-01	7500-Ra D	01/29/14 14:15	Client	02/04/14 11:45
2967036	14A1643-01	300.0	01/29/14 14:15	Client	02/04/14 11:45
2967037	14A1643-01	300.1	01/29/14 14:15	Client	02/04/14 11:45

Report Summary

Note: See attached page for additional comments.

Note: Sample containers were provided by the client except for Methods 300.0 and 300.1.

Note: Strontium-90 analysis was performed by General Engineering Laboratories, Charleston, SC.

Note: Dioxin analysis was performed by Pace Analytical, Minneapolis, MN.

Detailed quantitative results are presented on the following pages. The results presented relate only to the samples provided for analysis.

We appreciate the opportunity to provide you with this analysis. If you have any questions concerning this report, please do not hesitate to call James Van Fleit at (574) 233-4777.

Note: This report may not be reproduced, except in full, without written approval from UL. UL is accredited by the National Environmental Laboratory Accreditation Program (NELAP).

Authorized Signature | Title | Date

Client Name: Alpha Analytical
Report #: 310987

UL LLC
110 S. Hill St., South Bend, IN 46617-2702 USA
T: 800.332.4345 / F: 574.233.8207 / W: UL.com

Client Name: Alpha Analytical

Report #: 310987

Sampling Point: 14A1643-01

PWS ID: Not Supplied

General Chemistry

Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	UL ID #
14998-27-7	Chlorite	300.0	1000 *	20	< 20	ug/L	---	02/06/14 23:35	2967036
15541-45-4	Bromate	300.1	10 *	5.0	< 5.0	ug/L	---	02/05/14 03:19	2967037

Radionuclides

Analyte ID #	Analyte	Method	Reg Limit	DL**	Result	Units	Preparation Date	Analyzed	UL ID #
---	Gross Alpha	7110 B	15 *	3.0	**6.3 ± 1.2**	pCi/L	02/21/14 07:49	02/27/14 10:40	2967034
---	Gross Beta	7110 B	50 *	4.0	**7.5 ± 1.1**	pCi/L	02/21/14 07:49	02/27/14 10:40	2967034
13982-63-3	Radium-226	7500-Ra B	3 *	1.00	0.62 ± 0.31	pCi/L	02/18/14 09:45	02/24/14 10:13	2967035
15262-20-1	Radium-228	7500-Ra D	2 *	1.0	-0.08 ± 0.51	pCi/L	02/18/14 09:45	02/26/14 16:02	2967035
---	Combined Radium	calc.	5 *	1.0	0.54 ± 0.60	pCi/L	02/18/14 09:45	02/26/14 16:02	2967035

** Detection Limit (DL) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Reference Lab Tests

Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	UL ID #
1746-01-6	Dioxin	1613	30 *	5	< 5	pg/L	03/03/14 00:00	03/04/14 14:10	2967033
---	Strontium-90	905.0	8 *	2.00	**0.090 ± 1.070**	pCi/L	---	02/20/14 11:39	2967032

† UL has demonstrated it can achieve these report limits in reagent water, but can not document them in all sample matrices.

Reg Limit Type:	MCL	SMCL	AL
Symbol:	*	^	!

Lab Definitions

Continuing Calibration Check Standard (CCC) / Continuing Calibration Verification (CCV) / Initial Calibration Verification Standard (ICV) / Initial Performance Check (IPC) - is a standard containing one or more of the target analytes that is prepared from the same standards used to calibrate the instrument. This standard is used to verify the calibration curve at the beginning of each analytical sequence, and may also be analyzed throughout and at the end of the sequence. The concentration of continuing standards may be varied, when prescribed by the reference method, so that the range of the calibration curve is verified on a regular basis.

Internal Standards (IS) - are pure compounds with properties similar to the analytes of interest, which are added to field samples or extracts, calibration standards, and quality control standards at a known concentration. They are used to measure the relative responses of the analytes of interest and surrogates in the sample, calibration standard or quality control standard.

Laboratory Duplicate (LD) - is a field sample aliquot taken from the same sample container in the laboratory and analyzed separately using identical procedures. Analysis of laboratory duplicates provides a measure of the precision of the laboratory procedures.

Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS) - is an aliquot of reagent water to which known concentrations of the analytes of interest are added. The LFB is analyzed exactly the same as the field samples. LFBs are used to determine whether the method is in control.

Laboratory Method Blank (LMB) / Laboratory Reagent Blank (LRB) - is a sample of reagent water included in the sample batch analyzed in the same way as the associated field samples. The LMB is used to determine if method analytes or other background contamination have been introduced during the preparation or analytical procedure. The LMB is analyzed exactly the same as the field samples.

Laboratory Trip Blank (LTB) / Field Reagent Blank (FRB) - is a sample of laboratory reagent water placed in a sample container in the laboratory and treated as a field sample, including storage, preservation, and all analytical procedures. The FRB/LTB container follows the collection bottles to and from the collection site, but the FRB/LTB is not opened at any time during the trip. The FRB/LTB is primarily a travel blank used to verify that the samples were not contaminated during shipment.

Matrix Spike Duplicate Sample (MSD) / Laboratory Fortified Sample Matrix Duplicate (LFSMD) - is a sample aliquot taken from the same field sample source as the Matrix Spike Sample to which known quantities of the analytes of interest are added in the laboratory. The MSD is analyzed exactly the same as the field samples. Analysis of the MSD provides a measure of the precision of the laboratory procedures in a specific matrix.

Matrix Spike Sample (MS) / Laboratory Fortified Sample Matrix (LFSM) - is a sample aliquot taken from field sample source to which known quantities of the analytes of interest are added in the laboratory. The MS is analyzed exactly the same as the field samples. The purpose is to demonstrate recovery of the analytes from a sample matrix to determine if the specific matrix contributes bias to the analytical results.

Quality Control Standard (QCS) / Second Source Calibration Verification (SSCV) - is a solution containing known concentrations of the analytes of interest prepared from a source different from the source of the calibration standards. The solution is obtained from a second manufacturer or lot if the lot can be demonstrated by the manufacturer as prepared independently from other lots. The QCS sample is analyzed using the same procedures as field samples. The QCS is used as a check on the calibration standards used in the method on a routine basis.

Reporting Limit Check (RLC) / Initial Calibration Check Standard (ICCS) - is a procedural standard that is analyzed each day to evaluate instrument performance at or below the minimum reporting limit (MRL).

Surrogate Standard (SS) / Surrogate Analyte (SUR) - is a pure compound with properties similar to the analytes of interest, which is highly unlikely to be found in any field sample, that is added to the field samples, calibration standards, blanks and quality control standards before sample preparation. The SS is used to evaluate the efficiency of the sample preparation process.

ISOTECH

ISOTECH LABORATORIES INC

ANALYSIS REPORT

Water Analysis

Lab Number: 410664 Job Number: 24232 IS-69368

Sample Name: MRWPCA MW-1

Company Lab #:

Company Job #:

Company: Alpha Analytical, Inc.

API/Well:

Field or Site: WO 14A1643

Location:

Depth/Formation:

Container Type: 1 Liter Plastic Bottle

Date Sampled: 1/29/2014 Date Received 2/05/2014 Date Reported: 2/26/2014

δD of water	----------	na
$\delta^{18}O$ of water	----------	na
Tritium content of water	----------	< 1.00 TU
$\delta^{13}C$ of DIC	----------	na
^{14}C content of DIC	----------	na
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na

Remarks:

David S. Pingatore
Project Manager
Alpha Analytical Laboratories, Inc.
208 Mason Street
Ukiah, CA 95482
Tel: 707.468.0401
Fax: 707.468.5267
Project: 14A1643
Email: david @ alpha.com

Dr. Yi Wang
Director of ZymaX Forensics Isotope
Senior Environmental Geochemist, PACE
600 S. Andreasen Dr., Suite B
Escondido, CA 92029
Tel: 760.781.3338 ext 202
Fax: 760.781.3339
Cell: 609.721.2843
Email: yi.wang@zymaxusa.com

REPORT OF ENVIRONMENTAL FORENSICS ISOTOPE ANALYSES

Date Received: February 5th, 2014
Date Reported: March 20th, 2014

Sample from Alpha Analytical Labs for $\delta^{15}N$ (‰ Air), $\delta^{18}O$ and δD (‰ VSMOW) stable isotope analysis

ZymaX ID	Client ID/Sample Description	$\delta^{18}O_{H2O}$	δD_{H2O}	$\delta^{15}N_{NO3}$	$\delta^{18}O_{NO3}$
43449-1	14A1643-01 MRWPCA MW-1	-6.56	-43.87	8.9	4.4
	Analytical precision (1σ)	0.06	0.32	0.2	0.4

ZymaX ID	$\delta^{18}O_{H2O}$	δD_{H2O}	$\delta^{15}N_{NO3}$	$\delta^{18}O_{NO3}$
QC-01	-5.89	-41.12	4.5	25.3
QC-02	-5.98	-41.57	4.8	25.9
Mean	-5.94	-41.35	4.7	25.6
Analytical Precision (1σ)	0.06	0.32	0.2	0.4

ZymaX Forensics Isotope Services

Product or Dissolved Organics: Chlorinated Solvents, Oil, Extract, Fraction and Kerogen
3D-CSIA of ^{13}C, ^{37}Cl, and ^{2}H for PCE, TCE, DCE, MTBE, BTEX, PAHs, Pesticides, Alkanes, Gasoline and Oil; Bulk ^{13}C, ^{2}H, ^{18}O, ^{34}S, and ^{15}N
Gas Sample
Gas Composition and 2D-CSIA of ^{13}C and ^{2}H of C1 to C5; ^{13}C of CO_2; ^{14}C of C1 and CO_2; ^{34}S of H_2S; ^{15}N and ^{18}O of N_2O gas
Water and Dissolved Inorganics
^{2}H, ^{3}H and ^{18}O; ^{34}S and ^{18}O of dissolved sulfate; ^{34}S of dissolved H_2S
^{15}N and ^{18}O of dissolved Nitrate; ^{15}N of Ammonia; ^{13}C of dissolved CO_2 and Carbonate/Bicarbonate
Soil and Minerals
^{13}C, ^{18}O, ^{15}N, ^{34}S, D/H; ^{14}C of carbonate or organics
Post-Analysis Forensic Isotope Data Interpretation

NEW CLIENT

Laboratory Order - Summary

analytical chemistry for a better environment

Report To:	David S. Pingatore Alpha Analytical Laboratories, Inc. 208 Mason St. Ukiah, CA. 95482	Date Received: Date Due: Project:	02/05/2014 9:05AM 04/30/2014 9:05AM 14A1643
Phone: Fax:	(707) 468-0401 (707) 468-5267	Project Number:	

Lab Number	Description	Analysis	Dept
43449-1	14A1643-01 MRWPCA MW-1	d15N and d18O of NO3	M6
		d18O+dD of H2O	M6

Notes/Special Instructions	SC Login/Computer Login CY/CY	DPRA PM: YW

ZymaX FORENSICS

Condition Upon Reciept

Lab Number: 43449 Client: AAL

Sample Temprature (should be 2-6 degrees C): 1.9°C

Do the sample descriptions on the containers match the discriptions on the COC? ☒ Yes ☐ No

Do the sample dates on the containers match the sample dates on the COC? ☒ Yes ☐ No

Are the samples within holding time for each analysis at time of reciapt? ☒ Yes ☐ No ☐ N/A

Do the number of containers received match the number listed on the COC, and are all of the necessary containers for the required analysis available? ☒ Yes ☐ No ☐ N/A

Does the preservation of the samples match the notation on the COC, and is the preservation correct for requested analysis? ☐ Yes ☐ No ☐ N/A ☒ Zymax

Are all of the samples intact with no headspace, if required for analysis? ☒ Yes ☐ No

Did samples arrive with custody seal intact? ☒ Yes ☐ No ☐ N/A

Sample Control Signature: [signature] Date: 2/5/14 Time: 9:05

Client Discrepancies

Contacted: _____ Date: _____ Sample Control Initials: _____

Discrepancy: _____

Solution: _____

Contacted: _____ Date: _____ Sample Control Initials: _____

Discrepancy: _____

Solution: _____

Contacted: _____ Date: _____ Sample Control Initials: _____

Discrepancy: _____

Solution: _____

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com

Laboratory & Corporate: 208 Mason Street, Ukiah, CA 95482
707-468-0401 Fax: 707-468-5267

Service Center & Micro Lab: 6398 Dougherty Rd, Ste 35, Dublin, CA 94568
925-828-6226 Fax: 925-828-6309

Chain of Custody Record

Reports and Invoices will be delivered by email in .pdf format.

Lab No. 14A1643

Report to:
Company: Todd Engineers
Attn: Dr. Bill Motzer
Address: 2490 Mariner Square Loop, Suite 215, Alameda, CA 94501
Phone/Fax: 510.747.6920 / 510.747.6921
Email Address: bmotzer@toddengineers.com

Invoice to (if different):
Company:
Attn:
Address:
Phone/Fax:
Email Address:

Project Info for Report:
Project ID: Groundwater Reuse Project
Project No: Project # 60408
PO/Reference :

Signature below authorizes work under terms stated on reverse side.

TAT: 10 days ● / RUSH: 5 days ○ / 48 hours ○ / Other: ___ days ○

Lab Approval Required For Rush TATs

Sample Notes (lab use only): Temperature: 4 deg. C; Shipment Method:; Custody Seals: Y / N

Samplers Signature:
Print:

Sample Identification	Sampled: Date	Sampled: Time	Container: 40ml VOA	Poly	Amber glass	Soil jar		Preservative: HCL	HNO3	H2SO4	Other	None	Matrix: Water	Soil		Total Number of Containers	8330B Explosives (sub ALS)	PPCP Hormones 1694M (sub Weck)	PPCP Negative Pharmas 1694M (sub Weck)	PPCP Positive Pharmas 1694M (sub Weck)	Nitrosamines LL 1625M (sub Weck)	Gross A & B, R226 &R228, Sr 90 (sub UL)	Bromate 300.1, Chlorite 300.0 (sub UL)	Tritium, Enriched (sub Isotech)	Oxygen 18 Isotope (sub Zymax)	N and O Isotopes of NO3 (sub Zymax)	j-flag MDL reporting + Standard excel EDD	Sample Notes or CDPH Source Numbers:
MRWPCA MW-1	1-29-14	1415			x							x	x			2	x										x	
					x						x		x			2		x	x	x								
					x							x	x			2					x							
				x					x				x			4						x						
				x							x		x			2							x					
				x								x	x			1								x				
				x								x	x			1									x			
				x								x	x			1										x		

Relinquished by:	Received by:	Date:	Time:
[signature]	[signature]	1-29-14	1525
[signature] Witzi	[signature] Witzi	1-29-14	1650
Witzi	LAB [signature]	1-29-14	1115

CDPH Write On EDT Transmission? ○ Yes ○ No

State System Number:

If "Y" please enter the Source Number(s) in the column above

CA Geotracker EDF Report? ○ Yes ○ No

Global ID: Sampling Company Log Code:

EDF to (Email Address):

Travel and Site Time: Mileage: Misc. Supplies:

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com
Corporate: 208 Mason St., Ukiah, CA 95482 • Phone: (707) 468-0401 • Fax: (707) 468-5267
Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

ELAP Certificate Numbers 1551 and 2728

18 February 2014

Todd Groundwater
Attn: Dr. Bill Motzer
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501
RE: Groundwater Reuse Project
Work Order: 14A1635

Enclosed are the results of analyses for samples received by the laboratory on 01/29/14 21:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jeanette Poplin

Jeanette L. Poplin For David S. Pingatore
Project Manager

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com
Corporate: 208 Mason St., Ukiah, CA 95482 • Phone: (707) 468-0401 • Fax: (707) 468-5267
Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Project: Project Number:	Dr. Bill Motzer Groundwater Reuse Project 60408	Reported: 02/18/14 10:55

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
PRTIW (At Mission Memorial)	14A1635-01	Water	01/29/14 14:57	01/29/14 21:15
Trip Blank	14A1635-02	Water	01/29/14 00:00	01/29/14 21:15

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com
Corporate: 208 Mason St., Ukiah, CA 95482 • Phone: (707) 468-0401 • Fax: (707) 468-5267
Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Metals (Drinking Water) by EPA 200 Series Methods
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
Mercury	ND	0.060	1.0	ug/l	1	AA43136	02/05/14 09:00	02/05/14 13:35	EPA 245.1	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Metals by EPA 200 Series Methods
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
Calcium	**37**	0.010	1.0	mg/l	1	AA43133	01/31/14 14:45	02/05/14 13:43	EPA 200.7	
Magnesium	**10**	0.0080	1.0	"	"	"	"	"	"	
Potassium	**3.1**	0.0080	1.0	"	"	"	"	"	"	
Sodium	**64**	0.020	1.0	"	"	"	"	"	"	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Metals by EPA Method 200.8 ICP/MS
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
Aluminum	**4.3**	2.0	50	ug/l	1	AA43114	01/31/14 09:29	02/06/14 17:06	EPA 200.8	J
Antimony	**0.033**	0.020	6.0	"	"	"	"	"	"	J
Arsenic	**1.6**	0.070	2.0	"	"	"	"	"	"	J
Barium	**59**	0.030	100	"	"	"	"	"	"	J
Beryllium	ND	0.020	1.0	"	"	"	"	"	"	U
Boron	**32**	6.0	50	"	"	"	"	"	"	J
Cadmium	**0.10**	0.020	1.0	"	"	"	"	"	"	J
Chromium	**3.4**	0.080	10	"	"	"	"	"	"	J
Copper	**1.9**	0.040	0.50	"	"	"	"	"	"	
Iron	**67**	1.8	50	"	"	"	"	"	"	
Lead	**0.061**	0.020	5.0	"	"	"	"	"	"	J
Manganese	**1.1**	0.030	5.0	"	"	"	"	"	"	J
Nickel	**1.3**	0.060	10	"	"	"	"	"	"	J
Selenium	**2.2**	0.070	5.0	"	"	"	"	"	"	J
Silver	ND	0.020	0.10	"	"	"	"	"	"	U
Thallium	**0.045**	0.020	1.0	"	"	"	"	"	"	J
Uranium	**0.20**	0.020	1.0	pCi/l	"	"	"	"	"	J
Vanadium	**1.6**	0.30	1.0	ug/l	"	"	"	"	"	
Zinc	**75**	0.50	5.0	"	"	"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Conventional Chemistry Parameters by APHA/EPA Methods
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
Bicarbonate	**130**	0.060	5.0	mg/l	1	AA43121	02/11/14 10:19	02/11/14 17:00	SM2320B	
Color	**6.0**	3.0	5.0	Color Units	"	AA42421	01/31/14 07:40	01/31/14 07:40	SM2120B	
MBAS, calculated as LAS, mw 340	ND	0.030	0.050	mg/l	"	AA43107	01/31/14 07:27	02/04/14 16:00	SM5540C	U
Odor	ND		1.0	T.O.N.	"	AA42421	01/30/14 13:32	01/30/14 13:32	EPA 140.1	U
Perchlorate	**1.1**	0.90	4.0	ug/l	"	AB41141	02/11/14 09:49	02/11/14 12:09	EPA 314.0	J
Specific Conductance (EC)	**440**	1.0	20	umhos/cm	"	AA43044	01/30/14 13:00	01/30/14 17:00	SM2510B	
Total Dissolved Solids	**350**	5.0	10	mg/l	"	AB40322	02/03/14 09:00	02/05/14 08:30	SM2540C	
Turbidity	**0.98**	0.040	0.10	NTU	"	AA43044	01/30/14 13:00	01/30/14 17:00	SM2130B	
Nitrate + Nitrite as N	**2.4**	0.0086	0.40	mg/l	"	AB41339	02/13/14 10:39	02/13/14 11:18	EPA 300.0	
Total Organic Carbon	**0.519**	0.100	0.300	"	"	AA43131	01/31/14 13:10	01/31/14 19:57	SM5310C	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Miscellaneous Physical/Conventional Chemistry Parameters
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
Cyanide (total)	ND	0.0020	0.10	mg/l	1	AB40428	02/04/14 09:46	02/05/14 15:17	10-204-00-1X	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Anions by EPA Method 300.0
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
Nitrate as NO3	**11**	0.20	2.0	mg/l	1	AA43037	01/30/14 11:23	01/30/14 21:12	EPA 300.0	
Chloride	**86**	0.30	5.0	"	10	"	"	01/30/14 20:56	"	
Fluoride	ND	0.070	0.10	"	1	"	"	01/30/14 21:12	"	U
Nitrite as N	ND	0.020	0.40	"	"	"	"	"	"	U
Sulfate as SO4	**39**	0.90	5.0	"	10	"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
Acetone	ND	0.80	5.0	ug/l	1	AB40523	02/03/14 09:12	02/04/14 15:45	EPA 524.2	U
Acrylonitrile	ND	0.20	5.0	"	"	"	"	"	"	U
Benzene	ND	0.20	0.30	"	"	"	"	"	"	U
Bromobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Bromochloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Bromodichloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
Bromoform	ND	0.50	0.50	"	"	"	"	"	"	U
Bromomethane	ND	0.20	0.50	"	"	"	"	"	"	U
n-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
sec-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
tert-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Carbon disulfide	ND	0.20	0.50	"	"	"	"	"	"	U
Carbon tetrachloride	ND	0.30	0.50	"	"	"	"	"	"	U
Chlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Chloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
Chloroform	**1.2**	0.50	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
2-Chlorotoluene	ND	0.20	0.50	"	"	"	"	"	"	U
4-Chlorotoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Dibromochloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
1,2-Dibromo-3-chloropropane	ND	0.36	0.50	"	"	"	"	"	"	U
1,2-Dibromoethane (EDB)	ND	0.14	0.50	"	"	"	"	"	"	U
Dibromomethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,2-Dichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,4-Dichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
trans-1,4-Dichloro-2-butene	ND	0.095	5.0	"	"	"	"	"	"	U
Dichlorodifluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
1,2-Dichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethene	ND	0.10	0.30	"	"	"	"	"	"	U
cis-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
1,2-Dichloropropane	ND	0.20	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
1,3-Dichloropropane	ND	0.20	0.50	ug/l	1	AB40523	02/03/14 09:12	02/04/14 15:45	EPA 524.2	U
2,2-Dichloropropane	ND	0.10	0.50	"	"	"	"	"	"	U
1,1-Dichloropropene	ND	0.10	0.50	"	"	"	"	"	"	U
cis-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichloropropene (total)	ND	0.20	0.50	"	"	"	"	"	"	U
2-Hexanone	ND	0.097	5.0	"	"	"	"	"	"	U
Ethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Hexachlorobutadiene	ND	0.30	0.50	"	"	"	"	"	"	U
Isopropylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
p-Isopropyltoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Methyl ethyl ketone	ND	0.40	1.0	"	"	"	"	"	"	U
Methyl iodide	ND	0.12	2.0	"	"	"	"	"	"	U
Methyl isobutyl ketone	ND	0.30	1.0	"	"	"	"	"	"	U
Methylene chloride	ND	0.40	0.50	"	"	"	"	"	"	U
Naphthalene	ND	0.20	0.50	"	"	"	"	"	"	U
n-Propylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Styrene	ND	0.10	0.50	"	"	"	"	"	"	U
1,1,1,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Tetrachloroethene	**0.20**	0.20	0.50	"	"	"	"	"	"	J
Toluene	ND	0.10	0.50	"	"	"	"	"	"	U
1,2,3-Trichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
1,2,4-Trichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,1-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorofluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorotrifluoroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,2,3-Trichloropropane	ND	0.13	0.50	"	"	"	"	"	"	U
1,2,4-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
1,3,5-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Vinyl chloride	ND	0.10	0.50	"	"	"	"	"	"	U
m,p-Xylene	ND	0.20	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
o-Xylene	ND	0.10	0.50	ug/l	1	AB40523	02/03/14 09:12	02/04/14 15:45	EPA 524.2	U
Xylenes (total)	ND	0.20	0.50	"	"	"	"	"	"	U
Trihalomethanes (total)	**1.2**	0.50	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	0.50	0.50	"	"	"	"	"	"	U
Ethyl tert-butyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Tert-amyl methyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Surrogate: Bromofluorobenzene		*98.8 %*	*70-130*			"	"	"	"	
Surrogate: Dibromofluoromethane		*94.8 %*	*70-130*			"	"	"	"	
Surrogate: Toluene-d8		*101 %*	*70-130*			"	"	"	"	
Trip Blank (14A1635-02) Water Sampled: 01/29/14 00:00 Received: 01/29/14 21:15										
Acetone	ND	0.80	5.0	ug/l	1	AB40523	02/03/14 09:12	02/04/14 16:20	EPA 524.2	U
Acrylonitrile	ND	0.20	5.0	"	"	"	"	"	"	U
Benzene	ND	0.20	0.30	"	"	"	"	"	"	U
Bromobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Bromochloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Bromodichloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
Bromoform	ND	0.50	0.50	"	"	"	"	"	"	U
Bromomethane	ND	0.20	0.50	"	"	"	"	"	"	U
n-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
sec-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
tert-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Carbon disulfide	ND	0.20	0.50	"	"	"	"	"	"	U
Carbon tetrachloride	ND	0.30	0.50	"	"	"	"	"	"	U
Chlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Chloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
Chloroform	ND	0.50	0.50	"	"	"	"	"	"	U
Chloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
2-Chlorotoluene	ND	0.20	0.50	"	"	"	"	"	"	U
4-Chlorotoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Dibromochloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
1,2-Dibromo-3-chloropropane	ND	0.36	0.50	"	"	"	"	"	"	U
1,2-Dibromoethane (EDB)	ND	0.14	0.50	"	"	"	"	"	"	U
Dibromomethane	ND	0.20	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Trip Blank (14A1635-02) Water Sampled: 01/29/14 00:00 Received: 01/29/14 21:15										
1,2-Dichlorobenzene	ND	0.20	0.50	ug/l	1	AB40523	02/03/14 09:12	02/04/14 16:20	EPA 524.2	U
1,3-Dichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,4-Dichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
trans-1,4-Dichloro-2-butene	ND	0.095	5.0	"	"	"	"	"	"	U
Dichlorodifluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
1,2-Dichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethene	ND	0.10	0.30	"	"	"	"	"	"	U
cis-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
1,2-Dichloropropane	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichloropropane	ND	0.20	0.50	"	"	"	"	"	"	U
2,2-Dichloropropane	ND	0.10	0.50	"	"	"	"	"	"	U
1,1-Dichloropropene	ND	0.10	0.50	"	"	"	"	"	"	U
cis-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichloropropene (total)	ND	0.20	0.50	"	"	"	"	"	"	U
2-Hexanone	ND	0.097	5.0	"	"	"	"	"	"	U
Ethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Hexachlorobutadiene	ND	0.30	0.50	"	"	"	"	"	"	U
Isopropylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
p-Isopropyltoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Methyl ethyl ketone	ND	0.40	1.0	"	"	"	"	"	"	U
Methyl iodide	ND	0.12	2.0	"	"	"	"	"	"	U
Methyl isobutyl ketone	ND	0.30	1.0	"	"	"	"	"	"	U
Methylene chloride	ND	0.40	0.50	"	"	"	"	"	"	U
Naphthalene	ND	0.20	0.50	"	"	"	"	"	"	U
n-Propylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Styrene	ND	0.10	0.50	"	"	"	"	"	"	U
1,1,1,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Tetrachloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Toluene	ND	0.10	0.50	"	"	"	"	"	"	U
1,2,3-Trichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Trip Blank (14A1635-02) Water Sampled: 01/29/14 00:00 Received: 01/29/14 21:15										
1,2,4-Trichlorobenzene	ND	0.20	0.50	ug/l	1	AB40523	02/03/14 09:12	02/04/14 16:20	EPA 524.2	U
1,1,1-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorofluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorotrifluoroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,2,3-Trichloropropane	ND	0.13	0.50	"	"	"	"	"	"	U
1,2,4-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
1,3,5-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Vinyl chloride	ND	0.10	0.50	"	"	"	"	"	"	U
m,p-Xylene	ND	0.20	0.50	"	"	"	"	"	"	U
o-Xylene	ND	0.10	0.50	"	"	"	"	"	"	U
Xylenes (total)	ND	0.20	0.50	"	"	"	"	"	"	U
Trihalomethanes (total)	ND	0.50	0.50	"	"	"	"	"	"	U
Methyl tert-butyl ether	ND	0.50	0.50	"	"	"	"	"	"	U
Ethyl tert-butyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Tert-amyl methyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Surrogate: Bromofluorobenzene		*97.9 %*	*70-130*			"	"	"	"	
Surrogate: Dibromofluoromethane		*94.6 %*	*70-130*			"	"	"	"	
Surrogate: Toluene-d8		*99.7 %*	*70-130*			"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Chlorinated Pesticides and PCBs by EPA Method 508
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
Aldrin	ND	0.010	0.050	ug/l	1	AA43038	01/30/14 11:31	02/01/14 02:08	EPA 508	U
Chloroneb	ND	0.20	0.50	"	"	"	"	"	"	U
Chlorobenzilate	ND	2.0	5.0	"	"	"	"	"	"	U
Chlorothalonil	ND	0.030	0.10	"	"	"	"	"	"	U
DCPA	ND	0.020	0.040	"	"	"	"	"	"	U
4,4´-DDD	ND	0.020	0.050	"	"	"	"	"	"	U
4,4´-DDE	ND	0.020	0.050	"	"	"	"	"	"	U
4,4´-DDT	ND	0.020	0.020	"	"	"	"	"	"	U
Dieldrin	ND	0.010	0.010	"	"	"	"	"	"	U
Endosulfan I	ND	0.020	0.050	"	"	"	"	"	"	U
Endosulfan II	ND	0.020	0.050	"	"	"	"	"	"	U
Endosulfan sulfate	ND	0.020	0.020	"	"	"	"	"	"	U
Endrin	ND	0.030	0.10	"	"	"	"	"	"	U
Endrin aldehyde	ND	0.020	0.050	"	"	"	"	"	"	U
HCH-alpha	ND	0.010	0.050	"	"	"	"	"	"	U
HCH-beta	ND	0.020	0.050	"	"	"	"	"	"	U
HCH-delta	ND	0.030	0.050	"	"	"	"	"	"	U
HCH-gamma (Lindane)	ND	0.010	0.010	"	"	"	"	"	"	U
Heptachlor	ND	0.010	0.010	"	"	"	"	"	"	U
Heptachlor epoxide	ND	0.010	0.010	"	"	"	"	"	"	U
Hexachlorobenzene	ND	0.010	0.040	"	"	"	"	"	"	U
Hexachlorocyclopentadiene	ND	0.040	0.40	"	"	"	"	"	"	U
Methoxychlor	ND	0.020	0.020	"	"	"	"	"	"	U
cis-Permethrin	ND	0.070	0.20	"	"	"	"	"	"	U
trans-Permethrin	ND	0.090	0.20	"	"	"	"	"	"	U
Propachlor	ND	0.070	0.20	"	"	"	"	"	"	U
Trifluralin	ND	0.020	0.040	"	"	"	"	"	"	U
PCB-1016	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1221	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1232	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1242	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1248	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1254	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1260	ND	0.030	0.50	"	"	"	"	"	"	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Chlorinated Pesticides and PCBs by EPA Method 508
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
Total PCBs	ND	0.30	0.50	ug/l	1	AA43038	01/30/14 11:31	02/01/14 02:08	EPA 508	U
Toxaphene	ND	0.40	0.50	"	"	"	"	"	"	U
Chlordane (tech)	ND	0.030	0.050	"	"	"	"	"	"	U
Surrogate: Dibutylchlorendate		*93.6 %*	*70-130*			"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Nitrogen- and Phosphorus- Pesticides by EPA Method 507
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
Alachlor	ND	0.50	0.50	ug/l	1	AB40730	02/08/14 15:03	02/11/14 06:25	EPA 507	U
Atrazine	ND	0.30	0.50	"	"	"	"	"	"	U
Bromacil	ND	0.50	5.0	"	"	"	"	"	"	U
Butachlor	ND	0.40	0.50	"	"	"	"	"	"	U
Dimethoate	ND	0.20	1.0	"	"	"	"	"	"	U
Metolachlor	ND	0.30	0.50	"	"	"	"	"	"	U
Metribuzin	ND	0.40	0.50	"	"	"	"	"	"	U
Molinate	ND	0.20	0.50	"	"	"	"	"	"	U
Prometryn	ND	0.50	0.50	"	"	"	"	"	"	U
Propachlor	ND	0.30	0.50	"	"	"	"	"	"	U
Simazine	ND	0.30	0.50	"	"	"	"	"	"	U
Thiobencarb	ND	0.20	1.0	"	"	"	"	"	"	U
Surrogate: 1,3-Dimethyl-2-nitrobenzene		*119 %*	*70-130*			*"*	*"*	*"*	*"*	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Organic Analytes by EPA Method 504.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
1,2-Dibromo-3-chloropropane	ND	0.0040	0.010	ug/l	1	AB40359	02/04/14 10:00	02/05/14 01:10	EPA 504.1	U
1,2-Dibromoethane (EDB)	ND	0.0050	0.020	"	"	"	"	"	"	U
Trip Blank (14A1635-02) Water Sampled: 01/29/14 00:00 Received: 01/29/14 21:15										
1,2-Dibromo-3-chloropropane	ND	0.0040	0.010	ug/l	1	AB40359	02/04/14 10:00	02/05/14 01:45	EPA 504.1	U
1,2-Dibromoethane (EDB)	ND	0.0050	0.020	"	"	"	"	"	"	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Chlorinated Acids by EPA Method 515.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
Acifluorfen	ND	0.50	1.0	ug/l	1	AB40536	02/06/14 14:29	02/08/14 02:51	EPA 515.1	U
Bentazon	ND	0.40	0.40	"	"	"	"	"	"	U
2,4-D	ND	0.80	1.0	"	"	"	"	"	"	U
Dalapon	ND	6.0	6.0	"	"	"	"	"	"	U
2,4-DB	ND	4.0	5.0	"	"	"	"	"	"	U
Dicamba	ND	0.40	0.40	"	"	"	"	"	"	U
Dichlorprop	ND	1.0	1.0	"	"	"	"	"	"	U
Dinoseb	ND	0.80	1.0	"	"	"	"	"	"	U
4-Nitrophenol	ND	0.70	1.0	"	"	"	"	"	"	U
Pentachlorophenol	ND	0.20	0.20	"	"	"	"	"	"	U
Picloram	ND	0.50	1.0	"	"	"	"	"	"	U
2,4,5-T	ND	0.40	0.50	"	"	"	"	"	"	U
2,4,5-TP (Silvex)	ND	0.50	0.50	"	"	"	"	"	"	U
Surrogate: DCAA		*92.8 %*	*70-130*			*"*	*"*	*"*	*"*	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Carbamates by EPA Method 531.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
Aldicarb	ND	0.70	3.0	ug/l	1	AA42932	01/30/14 09:25	01/31/14 01:00	EPA 531.1	U
Aldicarb sulfone	ND	0.70	4.0	"	"	"	"	"	"	U
Aldicarb sulfoxide	ND	0.80	3.0	"	"	"	"	"	"	U
Carbaryl	ND	0.70	5.0	"	"	"	"	"	"	U
Carbofuran	ND	2.0	5.0	"	"	"	"	"	"	U
3-Hydroxycarbofuran	ND	0.90	3.0	"	"	"	"	"	"	U
Methiocarb	ND	2.0	5.0	"	"	"	"	"	"	U
Methomyl	ND	2.0	2.0	"	"	"	"	"	"	U
Oxamyl	ND	0.80	20	"	"	"	"	"	"	U
Propoxur	ND	2.0	5.0	"	"	"	"	"	"	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Endothall by EPA Method 548.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
Endothall	ND	2.0	45	ug/l	1	AB40357	02/04/14 14:37	02/06/14 14:44	EPA 548.1	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Glyphosate by EPA Method 547
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
Glyphosate	ND	3.0	10	ug/l	1	AB40427	02/04/14 09:22	02/04/14 22:56	EPA 547	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Diquat by EPA Method 549.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
Diquat	ND	2.0	2.0	ug/l	1	AA43118	02/03/14 09:48	02/10/14 20:37	EPA 549.2	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Haloacetic Acids by EPA Method 552.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
Monobromoacetic Acid	ND	0.8	1.0	ug/l	1	AB40444	02/05/14 13:05	02/07/14 18:14	EPA 552.2	U
Monochloroacetic Acid	ND	1.1	2.0	"	"	"	"	"	"	U
Dibromoacetic Acid	ND	0.8	1.0	"	"	"	"	"	"	U
Dichloroacetic Acid	ND	1.0	1.0	"	"	"	"	"	"	U
Trichloroacetic Acid	ND	1.0	1.0	"	"	"	"	"	"	U
Total Haloacetic Acids (HAA5)	ND	1.0	1.0	"	"	"	"	"	"	U
Surrogate: 2,3-Dibromopropionic Acid		*122 %*	*70-130*			*"*	*"*	*"*	*"*	
Surrogate: 2-Bromopropionic Acid		*95.5 %*	*70-130*			*"*	*"*	*"*	*"*	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Semivolatile Organic Compounds by EPA Method 525.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PRTIW (At Mission Memorial) (14A1635-01) Water Sampled: 01/29/14 14:57 Received: 01/29/14 21:15										
Benzo (a) pyrene	ND	0.080	0.10	ug/l	1	AB40727	02/08/14 13:35	02/13/14 17:28	EPA 525.2	U
Di(2-ethylhexyl)adipate	ND	0.40	5.0	"	"	"	"	"	"	U
Di(2-ethylhexyl)phthalate	ND	0.20	3.0	"	"	"	"	"	"	U
Surrogate: 1,3-Dimethyl-2-nitrobenzene		*104 %*	*70-130*			"	"	"	"	
Surrogate: Perylene-d12		*79.0 %*	*70-130*			"	"	"	"	
Surrogate: Triphenyl phosphate		*105 %*	*70-130*			"	"	"	"	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Metals (Drinking Water) by EPA 200 Series Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43136 - EPA 245.1 Hg Water											
Blank (AA43136-BLK1)					Prepared & Analyzed: 02/05/14						
Mercury	ND	0.060	1.0	ug/l							U
LCS (AA43136-BS1)					Prepared & Analyzed: 02/05/14						
Mercury	2.30	0.060	1.0	ug/l	2.50		92.0	80-120			
Duplicate (AA43136-DUP1)		**Source: 14A1575-02**			Prepared & Analyzed: 02/05/14						
Mercury	ND	0.060	1.0	ug/l		ND				20	U
Matrix Spike (AA43136-MS1)		**Source: 14A1575-02**			Prepared & Analyzed: 02/05/14						
Mercury	2.26	0.060	1.0	ug/l	2.50	ND	90.4	60-140			
Matrix Spike (AA43136-MS2)		**Source: 14B0218-01**			Prepared & Analyzed: 02/05/14						
Mercury	2.32	0.060	1.0	ug/l	2.50	0.0600	90.4	60-140			
Matrix Spike Dup (AA43136-MSD1)		**Source: 14A1575-02**			Prepared & Analyzed: 02/05/14						
Mercury	2.29	0.060	1.0	ug/l	2.50	ND	91.6	60-140	1.32	20	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Metals by EPA 200 Series Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43133 - Metals Digest											
Blank (AA43133-BLK1)					Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	ND	0.010	1.0	mg/l							U
Magnesium	ND	0.0080	1.0	"							U
Potassium	ND	0.0080	1.0	"							U
Sodium	ND	0.020	1.0	"							U
LCS (AA43133-BS1)					Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	5.36	0.010	1.0	mg/l	5.88		91.2	85-115			
Magnesium	7.09	0.0080	1.0	"	8.00		88.6	85-115			
Potassium	7.97	0.0080	1.0	"	8.00		99.6	85-115			
Sodium	7.75	0.020	1.0	"	8.00		96.8	85-115			
Duplicate (AA43133-DUP1)		**Source: 14A1643-01**			Prepared: 01/31/14 Analyzed: 02/12/14						
Calcium	18.2	0.010	1.0	mg/l		16.5			9.76	20	
Magnesium	6.86	0.0080	1.0	"		6.53			4.91	20	
Potassium	3.66	0.0080	1.0	"		3.35			8.82	20	
Sodium	52.8	0.020	1.0	"		50.2			5.03	20	
Matrix Spike (AA43133-MS1)		**Source: 14A1643-01**			Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	22.4	0.010	1.0	mg/l	5.88	16.5	100	70-130			
Magnesium	13.0	0.0080	1.0	"	8.00	6.53	81.3	70-130			
Potassium	10.8	0.0080	1.0	"	8.00	3.35	92.8	70-130			
Sodium	58.8	0.020	1.0	"	8.00	50.2	107	70-130			
Matrix Spike (AA43133-MS2)		**Source: 14A1713-01**			Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	35.4	0.010	1.0	mg/l	5.88	28.8	112	70-130			
Magnesium	11.0	0.0080	1.0	"	8.00	3.85	89.5	70-130			
Potassium	11.1	0.0080	1.0	"	8.00	3.56	94.7	70-130			
Sodium	47.2	0.020	1.0	"	8.00	38.1	114	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Metals by EPA 200 Series Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43133 - Metals Digest											
Matrix Spike Dup (AA43133-MSD1)		**Source: 14A1643-01**			Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	23.2	0.010	1.0	mg/l	5.88	16.5	113	70-130	3.39	20	
Magnesium	14.3	0.0080	1.0	"	8.00	6.53	97.1	70-130	9.24	20	
Potassium	11.0	0.0080	1.0	"	8.00	3.35	95.8	70-130	2.21	20	
Sodium	60.3	0.020	1.0	"	8.00	50.2	126	70-130	2.49	20	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43114 - EPA 200.8											
Blank (AA43114-BLK1)					Prepared: 01/31/14 Analyzed: 02/06/14						
Aluminum	ND	2.0	50	ug/l							U
Antimony	ND	0.020	6.0	"							U
Arsenic	ND	0.070	2.0	"							U
Barium	ND	0.030	100	"							U
Beryllium	ND	0.020	1.0	"							U
Boron	15.2	6.0	50	"							J
Cadmium	ND	0.020	1.0	"							U
Chromium	ND	0.080	10	"							U
Copper	ND	0.040	0.50	"							U
Iron	ND	1.8	50	"							U
Lead	ND	0.020	5.0	"							U
Manganese	ND	0.030	5.0	"							U
Nickel	ND	0.060	10	"							U
Selenium	ND	0.070	5.0	"							U
Silver	ND	0.020	0.10	"							U
Thallium	ND	0.020	1.0	"							U
Uranium	ND	0.020	1.0	pCi/l							U
Vanadium	ND	0.30	1.0	ug/l							U
Zinc	1.06	0.50	5.0	"							J
LCS (AA43114-BS1)					Prepared: 01/31/14 Analyzed: 02/06/14						
Aluminum	499	2.0	50	ug/l	520		96.0	85-115			
Antimony	20.0	0.020	6.0	"	20.0		99.9	85-115			
Arsenic	19.9	0.070	2.0	"	20.0		99.5	85-115			
Barium	18.6	0.030	100	"	20.0		92.8	85-115			J
Beryllium	20.0	0.020	1.0	"	20.0		99.8	85-115			
Boron	112	6.0	50	"	100		112	85-115			
Cadmium	19.8	0.020	1.0	"	20.0		98.8	85-115			
Chromium	19.5	0.080	10	"	20.0		97.6	85-115			
Copper	19.4	0.040	0.50	"	20.0		97.2	85-115			
Iron	506	1.8	50	"	520		97.4	85-115			
Lead	19.2	0.020	5.0	"	20.0		95.8	85-115			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43114 - EPA 200.8											
LCS (AA43114-BS1)					Prepared: 01/31/14 Analyzed: 02/06/14						
Manganese	19.8	0.030	5.0	ug/l	20.0		99.1	85-115			
Nickel	19.7	0.060	10	"	20.0		98.6	85-115			
Selenium	20.1	0.070	5.0	"	20.0		100	85-115			
Silver	19.0	0.020	0.10	"	20.0		94.9	85-115			
Thallium	18.8	0.020	1.0	"	20.0		94.1	85-115			
Uranium	12.8	0.020	1.0	pCi/l	13.4		95.4	85-115			
Vanadium	19.8	0.30	1.0	ug/l	20.0		99.1	85-115			
Zinc	104	0.50	5.0	"	100		104	85-115			
Duplicate (AA43114-DUP1)		**Source: 14A1635-01**			Prepared: 01/31/14 Analyzed: 02/06/14						
Aluminum	4.47	2.0	50	ug/l		4.30			3.91	20	J
Antimony	0.0425	0.020	6.0	"		0.0326			26.3	20	J
Arsenic	1.36	0.070	2.0	"		1.56			13.8	20	J
Barium	58.6	0.030	100	"		59.4			1.25	20	J
Beryllium	ND	0.020	1.0	"		ND				20	U
Boron	20.9	6.0	50	"		32.3			42.7	20	J
Cadmium	0.0918	0.020	1.0	"		0.104			12.4	20	J
Chromium	3.32	0.080	10	"		3.42			2.88	20	J
Copper	1.89	0.040	0.50	"		1.86			1.52	20	
Iron	65.6	1.8	50	"		67.0			2.11	20	
Lead	0.0883	0.020	5.0	"		0.0610			36.6	20	J
Manganese	1.21	0.030	5.0	"		1.14			5.66	20	J
Nickel	1.39	0.060	10	"		1.32			4.69	20	J
Selenium	2.08	0.070	5.0	"		2.20			5.62	20	J
Silver	ND	0.020	0.10	"		ND				20	U
Thallium	0.123	0.020	1.0	"		0.0449			93.1	20	J
Uranium	0.196	0.020	1.0	pCi/l		0.199			1.36	20	J
Vanadium	1.62	0.30	1.0	ug/l		1.61			0.912	20	
Zinc	72.5	0.50	5.0	"		75.4			3.81	20	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43114 - EPA 200.8											
Matrix Spike (AA43114-MS1)		**Source: 14A1635-01**			Prepared: 01/31/14 Analyzed: 02/06/14						
Aluminum	436	2.0	50	ug/l	520	4.30	83.0	70-130			
Antimony	19.7	0.020	6.0	"	20.0	0.0326	98.5	70-130			
Arsenic	21.0	0.070	2.0	"	20.0	1.56	97.3	70-130			
Barium	76.2	0.030	100	"	20.0	59.4	84.0	70-130			J
Beryllium	19.8	0.020	1.0	"	20.0	ND	99.1	70-130			
Boron	124	6.0	50	"	100	32.3	92.2	70-130			
Cadmium	19.1	0.020	1.0	"	20.0	0.104	94.9	70-130			
Chromium	20.8	0.080	10	"	20.0	3.42	86.8	70-130			
Copper	19.6	0.040	0.50	"	20.0	1.86	88.6	70-130			
Iron	504	1.8	50	"	520	67.0	84.1	70-130			
Lead	17.9	0.020	5.0	"	20.0	0.0610	89.4	70-130			
Manganese	18.5	0.030	5.0	"	20.0	1.14	87.0	70-130			
Nickel	18.5	0.060	10	"	20.0	1.32	85.7	70-130			
Selenium	20.8	0.070	5.0	"	20.0	2.20	93.2	70-130			
Silver	17.8	0.020	0.10	"	20.0	ND	89.1	70-130			
Thallium	17.0	0.020	1.0	"	20.0	0.0449	85.0	70-130			
Uranium	12.7	0.020	1.0	pCi/l	13.4	0.199	93.3	70-130			
Vanadium	19.9	0.30	1.0	ug/l	20.0	1.61	91.4	70-130			
Zinc	181	0.50	5.0	"	100	75.4	106	70-130			
Matrix Spike (AA43114-MS2)		**Source: 14A1588-02**			Prepared: 01/31/14 Analyzed: 02/06/14						
Aluminum	469	2.0	50	ug/l	520	6.54	89.0	70-130			
Antimony	20.1	0.020	6.0	"	20.0	0.126	99.6	70-130			
Arsenic	20.4	0.070	2.0	"	20.0	0.632	98.8	70-130			
Barium	81.8	0.030	100	"	20.0	64.1	88.8	70-130			J
Beryllium	19.4	0.020	1.0	"	20.0	ND	97.1	70-130			
Cadmium	19.0	0.020	1.0	"	20.0	ND	95.2	70-130			
Chromium	18.8	0.080	10	"	20.0	ND	94.1	70-130			
Copper	19.0	0.040	0.50	"	20.0	0.653	91.7	70-130			
Iron	467	1.8	50	"	520	ND	89.7	70-130			
Lead	18.1	0.020	5.0	"	20.0	0.0253	90.6	70-130			
Manganese	18.9	0.030	5.0	"	20.0	0.390	92.3	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43114 - EPA 200.8											
Matrix Spike (AA43114-MS2)		**Source: 14A1588-02**			Prepared: 01/31/14 Analyzed: 02/06/14						
Nickel	19.4	0.060	10	ug/l	20.0	1.19	91.2	70-130			
Selenium	19.5	0.070	5.0	"	20.0	ND	97.6	70-130			
Silver	18.3	0.020	0.10	"	20.0	ND	91.4	70-130			
Thallium	18.1	0.020	1.0	"	20.0	0.0225	90.2	70-130			
Uranium	12.5	0.020	1.0	pCi/l	13.4	ND	93.0	70-130			
Vanadium	19.5	0.30	1.0	ug/l	20.0	ND	97.6	70-130			
Zinc	115	0.50	5.0	"	100	3.79	111	70-130			
Matrix Spike Dup (AA43114-MSD1)		**Source: 14A1635-01**			Prepared: 01/31/14 Analyzed: 02/06/14						
Aluminum	446	2.0	50	ug/l	520	4.30	84.9	70-130	2.18	20	
Antimony	20.5	0.020	6.0	"	20.0	0.0326	102	70-130	3.70	20	
Arsenic	21.4	0.070	2.0	"	20.0	1.56	99.3	70-130	1.81	20	
Barium	77.2	0.030	100	"	20.0	59.4	89.5	70-130	1.42	20	J
Beryllium	19.7	0.020	1.0	"	20.0	ND	98.7	70-130	0.391	20	
Boron	122	6.0	50	"	100	32.3	90.2	70-130	1.62	20	
Cadmium	19.5	0.020	1.0	"	20.0	0.104	96.9	70-130	2.06	20	
Chromium	21.5	0.080	10	"	20.0	3.42	90.4	70-130	3.40	20	
Copper	20.3	0.040	0.50	"	20.0	1.86	92.3	70-130	3.66	20	
Iron	531	1.8	50	"	520	67.0	89.3	70-130	5.25	20	
Lead	18.9	0.020	5.0	"	20.0	0.0610	94.0	70-130	5.02	20	
Manganese	19.4	0.030	5.0	"	20.0	1.14	91.4	70-130	4.65	20	
Nickel	18.8	0.060	10	"	20.0	1.32	87.3	70-130	1.73	20	
Selenium	20.8	0.070	5.0	"	20.0	2.20	92.9	70-130	0.349	20	
Silver	18.4	0.020	0.10	"	20.0	ND	91.8	70-130	3.06	20	
Thallium	18.4	0.020	1.0	"	20.0	0.0449	91.9	70-130	7.76	20	
Uranium	13.2	0.020	1.0	pCi/l	13.4	0.199	97.0	70-130	3.79	20	
Vanadium	20.4	0.30	1.0	ug/l	20.0	1.61	94.0	70-130	2.55	20	
Zinc	167	0.50	5.0	"	100	75.4	91.5	70-130	8.30	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43044 - General Preparation											
Duplicate (AA43044-DUP1)		**Source: 14A1628-02**			Prepared & Analyzed: 01/30/14						
Specific Conductance (EC)	360	1.0	20	umhos/cm		384			6.45	10	
Batch AA43107 - General Preparation											
Blank (AA43107-BLK1)					Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	ND	0.030	0.050	mg/l							U
LCS (AA43107-BS1)					Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	0.205	0.030	0.050	mg/l	0.200		103	80-120			
Duplicate (AA43107-DUP1)		**Source: 14A1588-02**			Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	ND	0.030	0.050	mg/l		ND				20	U
Matrix Spike (AA43107-MS1)		**Source: 14A1588-02**			Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	0.208	0.030	0.050	mg/l	0.200	ND	104	80-120			
Matrix Spike Dup (AA43107-MSD1)		**Source: 14A1588-02**			Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	0.210	0.030	0.050	mg/l	0.200	ND	105	80-120	0.826	20	
Batch AA43121 - General Preparation											
Duplicate (AA43121-DUP1)		**Source: 14B0229-03**			Prepared: 02/01/14 Analyzed: 02/11/14						
Bicarbonate	42.7	0.060	5.0	mg/l		42.7			0.00	20	
Batch AA43131 - General Prep											
Blank (AA43131-BLK1)					Prepared & Analyzed: 01/31/14						
Total Organic Carbon	0.142	0.100	0.300	mg/l							J

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43131 - General Prep											
LCS (AA43131-BS1)					Prepared & Analyzed: 01/31/14						
Total Organic Carbon	10.9	0.100	0.300	mg/l	10.0		109	85-115			
LCS Dup (AA43131-BSD1)					Prepared & Analyzed: 01/31/14						
Total Organic Carbon	10.4	0.100	0.300	mg/l	10.0		104	85-115	4.47	20	
Duplicate (AA43131-DUP1)		**Source: 14A1101-01**			Prepared & Analyzed: 01/31/14						
Total Organic Carbon	0.853	0.100	0.300	mg/l		0.895			4.80	20	
Matrix Spike (AA43131-MS1)		**Source: 14A1101-02**			Prepared & Analyzed: 01/31/14						
Total Organic Carbon	21.5	0.200	0.600	mg/l	20.0	0.789	103	70-130			
Matrix Spike Dup (AA43131-MSD1)		**Source: 14A1101-02**			Prepared & Analyzed: 01/31/14						
Total Organic Carbon	21.8	0.200	0.600	mg/l	20.0	0.789	105	70-130	1.81	20	
Batch AB40322 - General Preparation											
Blank (AB40322-BLK1)					Prepared: 02/03/14 Analyzed: 02/05/14						
Total Dissolved Solids	ND	5.0	10	mg/l							U
Duplicate (AB40322-DUP1)		**Source: 14A1635-01**			Prepared: 02/03/14 Analyzed: 02/05/14						
Total Dissolved Solids	361	5.0	10	mg/l		352			2.52	30	
Duplicate (AB40322-DUP2)		**Source: 14A1730-01**			Prepared: 02/03/14 Analyzed: 02/05/14						
Total Dissolved Solids	1010	5.0	10	mg/l		964			4.46	30	
Batch AB41141 - General Preparation											
Blank (AB41141-BLK1)					Prepared & Analyzed: 02/11/14						
Perchlorate	0.967	0.90	4.0	ug/l							J

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41141 - General Preparation											
LCS (AB41141-BS1)					Prepared & Analyzed: 02/11/14						
Perchlorate	23.9	0.90	4.0	ug/l	25.0		95.5	85-115			
Duplicate (AB41141-DUP1)		**Source: 14A1643-01**			Prepared & Analyzed: 02/11/14						
Perchlorate	ND	0.90	4.0	ug/l		ND				15	U
Matrix Spike (AB41141-MS1)		**Source: 14A1643-01**			Prepared & Analyzed: 02/11/14						
Perchlorate	25.9	0.90	4.0	ug/l	25.0	ND	104	70-130			
Matrix Spike Dup (AB41141-MSD1)		**Source: 14A1643-01**			Prepared & Analyzed: 02/11/14						
Perchlorate	25.9	0.90	4.0	ug/l	25.0	ND	104	70-130	0.00386	15	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Miscellaneous Physical/Conventional Chemistry Parameters - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40428 - General Preparation											
Blank (AB40428-BLK1)					Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	ND	0.0020	0.10	mg/l							U
LCS (AB40428-BS1)					Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.202	0.0020	0.10	mg/l	0.200		101	85-115			
Duplicate (AB40428-DUP1)		**Source: 14A1492-02**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	ND	0.0020	0.10	mg/l		ND				25	U
Matrix Spike (AB40428-MS1)		**Source: 14A1492-02**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.188	0.0020	0.10	mg/l	0.200	ND	93.9	85-115			
Matrix Spike (AB40428-MS2)		**Source: 14A1635-01**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.220	0.0020	0.10	mg/l	0.200	ND	110	85-115			
Matrix Spike Dup (AB40428-MSD1)		**Source: 14A1492-02**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.186	0.0020	0.10	mg/l	0.200	ND	92.8	85-115	1.23	25	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Anions by EPA Method 300.0 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43037 - General Preparation											
Blank (AA43037-BLK1)					Prepared & Analyzed: 01/30/14						
Nitrate as NO3	ND	0.20	2.0	mg/l							U
Fluoride	ND	0.070	0.10	"							U
Chloride	ND	0.030	0.50	"							U
Nitrite as N	ND	0.020	0.40	"							U
Sulfate as SO4	ND	0.090	0.50	"							U
LCS (AA43037-BS1)					Prepared & Analyzed: 01/30/14						
Nitrate as NO3	22	0.20	2.0	mg/l	22.2		100	90-110			
Sulfate as SO4	20.0	0.090	0.50	"	20.0		99.8	90-110			
Fluoride	5.17	0.070	0.10	"	5.00		103	90-110			
Nitrite as N	5.18	0.020	0.40	"	5.00		104	90-110			
Chloride	10.1	0.030	0.50	"	10.0		101	90-110			
Duplicate (AA43037-DUP1)		**Source: 14A1612-01**			Prepared: 01/30/14 Analyzed: 01/31/14						
Nitrate as NO3	76	1.0	10	mg/l		76			0.434	20	
Chloride	49.3	0.15	2.5	"		48.5			1.72	20	
Sulfate as SO4	13.1	0.090	0.50	"		13.2			0.396	20	
Fluoride	ND	0.070	0.10	"		ND				20	U
Nitrite as N	ND	0.020	0.40	"		ND				20	U
Matrix Spike (AA43037-MS1)		**Source: 14A1612-01**			Prepared: 01/30/14 Analyzed: 01/31/14						
Nitrate as NO3	100	1.0	10	mg/l	24.7	76	98.0	80-120			
Fluoride	4.96	0.35	0.50	"	5.56	ND	89.3	80-120			
Chloride	59.9	0.15	2.5	"	11.1	48.5	103	80-120			
Nitrite as N	5.37	0.10	2.0	"	5.56	ND	96.6	80-120			
Sulfate as SO4	33.9	0.45	2.5	"	22.2	13.2	93.5	80-120			
Matrix Spike (AA43037-MS2)		**Source: 14A1643-01**			Prepared: 01/30/14 Analyzed: 01/31/14						
Nitrate as NO3	27	1.0	10	mg/l	24.7	2.7	97.4	80-120			
Sulfate as SO4	31.5	0.45	2.5	"	22.2	9.88	97.4	80-120			
Fluoride	5.13	0.35	0.50	"	5.56	ND	92.4	80-120			
Nitrite as N	5.55	0.10	2.0	"	5.56	ND	99.9	80-120			
Chloride	90.7	0.15	2.5	"	11.1	78.6	108	80-120			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Anions by EPA Method 300.0 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43037 - General Preparation											
Matrix Spike Dup (AA43037-MSD1)		**Source: 14A1612-01**			Prepared: 01/30/14 Analyzed: 01/31/14						
Nitrate as NO3	100	1.0	10	mg/l	24.7	76	98.4	80-120	0.116	20	
Sulfate as SO4	34.1	0.45	2.5	"	22.2	13.2	94.2	80-120	0.425	20	
Fluoride	5.01	0.35	0.50	"	5.56	ND	90.2	80-120	1.00	20	
Chloride	60.0	0.15	2.5	"	11.1	48.5	103	80-120	0.102	20	
Nitrite as N	5.39	0.10	2.0	"	5.56	ND	97.1	80-120	0.516	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
Blank (AB40523-BLK1)					Prepared & Analyzed: 02/03/14						
Acetone	ND	0.80	5.0	ug/l							U
Acrylonitrile	ND	0.20	5.0	"							U
Benzene	ND	0.20	0.30	"							U
Bromobenzene	ND	0.10	0.50	"							U
Bromochloromethane	ND	0.20	0.50	"							U
Bromodichloromethane	ND	0.50	0.50	"							U
Bromoform	ND	0.50	0.50	"							U
Bromomethane	ND	0.20	0.50	"							U
n-Butylbenzene	ND	0.10	0.50	"							U
sec-Butylbenzene	ND	0.10	0.50	"							U
tert-Butylbenzene	ND	0.10	0.50	"							U
Carbon disulfide	ND	0.20	0.50	"							U
Carbon tetrachloride	ND	0.30	0.50	"							U
Chlorobenzene	ND	0.20	0.50	"							U
Chloroethane	ND	0.10	0.50	"							U
Chloroform	ND	0.50	0.50	"							U
Chloromethane	ND	0.20	0.50	"							U
2-Chlorotoluene	ND	0.20	0.50	"							U
4-Chlorotoluene	ND	0.10	0.50	"							U
Dibromochloromethane	ND	0.50	0.50	"							U
1,2-Dibromo-3-chloropropane	ND	0.36	0.50	"							U
1,2-Dibromoethane (EDB)	ND	0.14	0.50	"							U
Dibromomethane	ND	0.20	0.50	"							U
1,2-Dichlorobenzene	ND	0.20	0.50	"							U
1,3-Dichlorobenzene	ND	0.20	0.50	"							U
trans-1,4-Dichloro-2-butene	ND	0.095	5.0	"							U
1,4-Dichlorobenzene	ND	0.10	0.50	"							U
Dichlorodifluoromethane	ND	0.20	0.50	"							U
1,1-Dichloroethane	ND	0.10	0.50	"							U
1,2-Dichloroethane	ND	0.20	0.50	"							U
1,1-Dichloroethene	ND	0.10	0.30	"							U
cis-1,2-Dichloroethene	ND	0.20	0.50	"							U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
Blank (AB40523-BLK1)					Prepared & Analyzed: 02/03/14						
trans-1,2-Dichloroethene	ND	0.20	0.50	ug/l							U
1,2-Dichloropropane	ND	0.20	0.50	"							U
1,3-Dichloropropane	ND	0.20	0.50	"							U
2,2-Dichloropropane	ND	0.10	0.50	"							U
1,1-Dichloropropene	ND	0.10	0.50	"							U
cis-1,3-Dichloropropene	ND	0.20	0.50	"							U
trans-1,3-Dichloropropene	ND	0.20	0.50	"							U
1,3-Dichloropropene (total)	ND	0.20	0.50	"							U
2-Hexanone	ND	0.097	5.0	"							U
Ethylbenzene	ND	0.10	0.50	"							U
Hexachlorobutadiene	ND	0.30	0.50	"							U
Isopropylbenzene	ND	0.20	0.50	"							U
p-Isopropyltoluene	ND	0.10	0.50	"							U
Methyl ethyl ketone	ND	0.40	1.0	"							U
Methyl iodide	ND	0.12	2.0	"							U
Methyl isobutyl ketone	ND	0.30	1.0	"							U
Methylene chloride	ND	0.40	0.50	"							U
Naphthalene	ND	0.20	0.50	"							U
n-Propylbenzene	ND	0.20	0.50	"							U
Styrene	ND	0.10	0.50	"							U
1,1,1,2-Tetrachloroethane	ND	0.20	0.50	"							U
1,1,2,2-Tetrachloroethane	ND	0.20	0.50	"							U
Tetrachloroethene	ND	0.20	0.50	"							U
Toluene	ND	0.10	0.50	"							U
1,2,3-Trichlorobenzene	ND	0.10	0.50	"							U
1,2,4-Trichlorobenzene	ND	0.20	0.50	"							U
1,1,1-Trichloroethane	ND	0.20	0.50	"							U
1,1,2-Trichloroethane	ND	0.20	0.50	"							U
Trichloroethene	ND	0.20	0.50	"							U
Trichlorofluoromethane	ND	0.20	0.50	"							U
Trichlorotrifluoroethane	ND	0.20	0.50	"							U
1,2,3-Trichloropropane	ND	0.13	0.50	"							U

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2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
Blank (AB40523-BLK1)					Prepared & Analyzed: 02/03/14						
1,2,4-Trimethylbenzene	ND	0.10	0.50	ug/l							U
1,3,5-Trimethylbenzene	ND	0.10	0.50	"							U
Vinyl chloride	ND	0.10	0.50	"							U
m,p-Xylene	ND	0.20	0.50	"							U
o-Xylene	ND	0.10	0.50	"							U
Xylenes (total)	ND	0.20	0.50	"							U
Trihalomethanes (total)	ND	0.50	0.50	"							U
Methyl tert-butyl ether	ND	0.50	0.50	"							U
Ethyl tert-butyl ether	ND	0.20	0.50	"							U
Tert-amyl methyl ether	ND	0.20	0.50	"							U
Surrogate: Bromofluorobenzene	*24.6*			*"*	*25.0*		*98.3*	*70-130*			
Surrogate: Dibromofluoromethane	*23.4*			*"*	*25.0*		*93.4*	*70-130*			
Surrogate: Toluene-d8	*24.8*			*"*	*25.0*		*99.3*	*70-130*			
LCS (AB40523-BS1)					Prepared & Analyzed: 02/03/14						
Acetone	21.8	0.80	5.0	ug/l	20.0		109	70-130			
Acrylonitrile	5.49	0.20	5.0	"	5.00		110	70-130			
Benzene	4.86	0.20	0.30	"	5.00		97.2	70-130			
Bromobenzene	4.87	0.10	0.50	"	5.00		97.4	70-130			
Bromochloromethane	4.99	0.20	0.50	"	5.00		99.8	70-130			
Bromodichloromethane	4.76	0.50	0.50	"	5.00		95.2	70-130			
Bromoform	4.54	0.50	0.50	"	5.00		90.8	70-130			
Bromomethane	5.21	0.20	0.50	"	5.00		104	70-130			
n-Butylbenzene	4.94	0.10	0.50	"	5.00		98.8	70-130			
sec-Butylbenzene	4.94	0.10	0.50	"	5.00		98.8	70-130			
tert-Butylbenzene	5.07	0.10	0.50	"	5.00		101	70-130			
Carbon disulfide	4.99	0.20	0.50	"	5.00		99.8	70-130			
Carbon tetrachloride	4.48	0.30	0.50	"	5.00		89.6	70-130			
Chlorobenzene	4.94	0.20	0.50	"	5.00		98.8	70-130			
Chloroethane	5.47	0.10	0.50	"	5.00		109	70-130			
Chloroform	5.06	0.50	0.50	"	5.00		101	70-130			
Chloromethane	5.63	0.20	0.50	"	5.00		113	70-130			

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2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
LCS (AB40523-BS1)					Prepared & Analyzed: 02/03/14						
2-Chlorotoluene	4.97	0.20	0.50	ug/l	5.00		99.4	70-130			
4-Chlorotoluene	5.04	0.10	0.50	"	5.00		101	70-130			
Dibromochloromethane	4.79	0.50	0.50	"	5.00		95.8	70-130			
1,2-Dibromo-3-chloropropane	5.46	0.36	0.50	"	5.00		109	70-130			
1,2-Dibromoethane (EDB)	4.99	0.14	0.50	"	5.00		99.8	70-130			
Dibromomethane	4.96	0.20	0.50	"	5.00		99.2	70-130			
1,2-Dichlorobenzene	4.92	0.20	0.50	"	5.00		98.4	70-130			
1,3-Dichlorobenzene	4.84	0.20	0.50	"	5.00		96.8	70-130			
1,4-Dichlorobenzene	4.86	0.10	0.50	"	5.00		97.2	70-130			
trans-1,4-Dichloro-2-butene	4.54	0.095	5.0	"	5.00		90.8	70-130			J
Dichlorodifluoromethane	5.94	0.20	0.50	"	5.00		119	70-130			
1,1-Dichloroethane	5.26	0.10	0.50	"	5.00		105	70-130			
1,2-Dichloroethane	5.05	0.20	0.50	"	5.00		101	70-130			
1,1-Dichloroethene	4.85	0.10	0.30	"	5.00		97.0	70-130			
cis-1,2-Dichloroethene	5.17	0.20	0.50	"	5.00		103	70-130			
trans-1,2-Dichloroethene	4.90	0.20	0.50	"	5.00		98.0	70-130			
1,2-Dichloropropane	5.01	0.20	0.50	"	5.00		100	70-130			
1,3-Dichloropropane	5.18	0.20	0.50	"	5.00		104	70-130			
2,2-Dichloropropane	4.34	0.10	0.50	"	5.00		86.8	70-130			
1,1-Dichloropropene	4.74	0.10	0.50	"	5.00		94.8	70-130			
cis-1,3-Dichloropropene	5.42	0.20	0.50	"	5.00		108	70-130			
trans-1,3-Dichloropropene	4.43	0.20	0.50	"	5.00		88.6	70-130			
Ethylbenzene	4.99	0.10	0.50	"	5.00		99.8	70-130			
2-Hexanone	5.00	0.097	5.0	"	5.00		100	70-130			
Hexachlorobutadiene	4.57	0.30	0.50	"	5.00		91.4	70-130			
Isopropylbenzene	5.14	0.20	0.50	"	5.00		103	70-130			
p-Isopropyltoluene	4.96	0.10	0.50	"	5.00		99.2	70-130			
Methyl ethyl ketone	10.9	0.40	1.0	"	10.0		109	70-130			
Methyl iodide	5.04	0.12	2.0	"	5.00		101	70-130			
Methyl isobutyl ketone	10.2	0.30	1.0	"	10.0		102	70-130			
Methylene chloride	4.68	0.40	0.50	"	5.00		93.6	70-130			
Naphthalene	5.61	0.20	0.50	"	5.00		112	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
LCS (AB40523-BS1)					Prepared & Analyzed: 02/03/14						
n-Propylbenzene	5.19	0.20	0.50	ug/l	5.00		104	70-130			
Styrene	5.23	0.10	0.50	"	5.00		105	70-130			
1,1,1,2-Tetrachloroethane	4.54	0.20	0.50	"	5.00		90.8	70-130			
1,1,2,2-Tetrachloroethane	5.08	0.20	0.50	"	5.00		102	70-130			
Tetrachloroethene	4.76	0.20	0.50	"	5.00		95.2	70-130			
Toluene	4.96	0.10	0.50	"	5.00		99.2	70-130			
1,2,3-Trichlorobenzene	5.54	0.10	0.50	"	5.00		111	70-130			
1,2,4-Trichlorobenzene	5.06	0.20	0.50	"	5.00		101	70-130			
1,1,1-Trichloroethane	4.85	0.20	0.50	"	5.00		97.0	70-130			
1,1,2-Trichloroethane	5.08	0.20	0.50	"	5.00		102	70-130			
Trichloroethene	4.77	0.20	0.50	"	5.00		95.4	70-130			
Trichlorofluoromethane	5.34	0.20	0.50	"	5.00		107	70-130			
Trichlorotrifluoroethane	5.42	0.20	0.50	"	5.00		108	70-130			
1,2,3-Trichloropropane	5.07	0.13	0.50	"	5.00		101	70-130			
1,2,4-Trimethylbenzene	5.17	0.10	0.50	"	5.00		103	70-130			
1,3,5-Trimethylbenzene	5.00	0.10	0.50	"	5.00		100	70-130			
Vinyl chloride	5.10	0.10	0.50	"	5.00		102	70-130			
m,p-Xylene	9.81	0.20	0.50	"	10.0		98.1	70-130			
o-Xylene	5.07	0.10	0.50	"	5.00		101	70-130			
Xylenes (total)	14.9	0.20	0.50	"	15.0		99.2	70-130			
Methyl tert-butyl ether	5.00	0.50	0.50	"	5.00		100	70-130			
Ethyl tert-butyl ether	5.28	0.20	0.50	"	5.00		106	70-130			
Tert-amyl methyl ether	5.25	0.20	0.50	"	5.00		105	70-130			
Surrogate: Bromofluorobenzene	*24.8*			*"*	*25.0*		*99.4*	*70-130*			
Surrogate: Dibromofluoromethane	*23.9*			*"*	*25.0*		*95.4*	*70-130*			
Surrogate: Toluene-d8	*25.1*			*"*	*25.0*		*101*	*70-130*			
LCS Dup (AB40523-BSD1)					Prepared & Analyzed: 02/03/14						
Acetone	21.6	0.80	5.0	ug/l	20.0		108	70-130	1.06	30	
Acrylonitrile	5.42	0.20	5.0	"	5.00		108	70-130	1.28	30	
Benzene	4.79	0.20	0.30	"	5.00		95.8	70-130	1.45	30	
Bromobenzene	4.90	0.10	0.50	"	5.00		98.0	70-130	0.614	30	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
LCS Dup (AB40523-BSD1)					Prepared & Analyzed: 02/03/14						
Bromochloromethane	4.89	0.20	0.50	ug/l	5.00		97.8	70-130	2.02	30	
Bromodichloromethane	4.86	0.50	0.50	"	5.00		97.2	70-130	2.08	30	
Bromoform	4.50	0.50	0.50	"	5.00		90.0	70-130	0.885	30	
Bromomethane	5.26	0.20	0.50	"	5.00		105	70-130	0.955	30	
n-Butylbenzene	4.86	0.10	0.50	"	5.00		97.2	70-130	1.63	30	
sec-Butylbenzene	4.84	0.10	0.50	"	5.00		96.8	70-130	2.04	30	
tert-Butylbenzene	4.96	0.10	0.50	"	5.00		99.2	70-130	2.19	30	
Carbon disulfide	4.96	0.20	0.50	"	5.00		99.2	70-130	0.603	30	
Carbon tetrachloride	4.42	0.30	0.50	"	5.00		88.4	70-130	1.35	30	
Chlorobenzene	4.78	0.20	0.50	"	5.00		95.6	70-130	3.29	30	
Chloroethane	5.51	0.10	0.50	"	5.00		110	70-130	0.729	30	
Chloroform	4.98	0.50	0.50	"	5.00		99.6	70-130	1.59	30	
Chloromethane	5.75	0.20	0.50	"	5.00		115	70-130	2.11	30	
2-Chlorotoluene	4.88	0.20	0.50	"	5.00		97.6	70-130	1.83	30	
4-Chlorotoluene	4.90	0.10	0.50	"	5.00		98.0	70-130	2.82	30	
Dibromochloromethane	4.77	0.50	0.50	"	5.00		95.4	70-130	0.418	30	
1,2-Dibromo-3-chloropropane	5.48	0.36	0.50	"	5.00		110	70-130	0.366	25	
1,2-Dibromoethane (EDB)	4.91	0.14	0.50	"	5.00		98.2	70-130	1.62	25	
Dibromomethane	4.90	0.20	0.50	"	5.00		98.0	70-130	1.22	30	
1,2-Dichlorobenzene	4.81	0.20	0.50	"	5.00		96.2	70-130	2.26	30	
1,3-Dichlorobenzene	4.78	0.20	0.50	"	5.00		95.6	70-130	1.25	30	
trans-1,4-Dichloro-2-butene	4.70	0.095	5.0	"	5.00		94.0	70-130	3.46	25	J
1,4-Dichlorobenzene	4.72	0.10	0.50	"	5.00		94.4	70-130	2.92	30	
Dichlorodifluoromethane	5.79	0.20	0.50	"	5.00		116	70-130	2.56	30	
1,1-Dichloroethane	5.24	0.10	0.50	"	5.00		105	70-130	0.381	30	
1,2-Dichloroethane	4.96	0.20	0.50	"	5.00		99.2	70-130	1.80	30	
1,1-Dichloroethene	4.89	0.10	0.30	"	5.00		97.8	70-130	0.821	30	
cis-1,2-Dichloroethene	5.01	0.20	0.50	"	5.00		100	70-130	3.14	30	
trans-1,2-Dichloroethene	4.82	0.20	0.50	"	5.00		96.4	70-130	1.65	30	
1,2-Dichloropropane	4.92	0.20	0.50	"	5.00		98.4	70-130	1.81	30	
1,3-Dichloropropane	4.98	0.20	0.50	"	5.00		99.6	70-130	3.94	30	
2,2-Dichloropropane	4.24	0.10	0.50	"	5.00		84.8	70-130	2.33	30	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
LCS Dup (AB40523-BSD1)					Prepared & Analyzed: 02/03/14						
1,1-Dichloropropene	4.64	0.10	0.50	ug/l	5.00		92.8	70-130	2.13	30	
cis-1,3-Dichloropropene	5.41	0.20	0.50	"	5.00		108	70-130	0.185	30	
trans-1,3-Dichloropropene	4.43	0.20	0.50	"	5.00		88.6	70-130	0.00	30	
2-Hexanone	4.97	0.097	5.0	"	5.00		99.4	70-130	0.602	25	J
Ethylbenzene	4.92	0.10	0.50	"	5.00		98.4	70-130	1.41	30	
Hexachlorobutadiene	4.70	0.30	0.50	"	5.00		94.0	70-130	2.80	30	
Isopropylbenzene	5.06	0.20	0.50	"	5.00		101	70-130	1.57	30	
p-Isopropyltoluene	4.91	0.10	0.50	"	5.00		98.2	70-130	1.01	30	
Methyl ethyl ketone	10.5	0.40	1.0	"	10.0		105	70-130	3.73	30	
Methyl iodide	4.98	0.12	2.0	"	5.00		99.6	70-130	1.20	25	
Methyl isobutyl ketone	9.94	0.30	1.0	"	10.0		99.4	70-130	3.07	30	
Methylene chloride	4.78	0.40	0.50	"	5.00		95.6	70-130	2.11	30	
Naphthalene	5.65	0.20	0.50	"	5.00		113	70-130	0.710	30	
n-Propylbenzene	5.14	0.20	0.50	"	5.00		103	70-130	0.968	30	
Styrene	5.18	0.10	0.50	"	5.00		104	70-130	0.961	30	
1,1,1,2-Tetrachloroethane	4.49	0.20	0.50	"	5.00		89.8	70-130	1.11	30	
1,1,2,2-Tetrachloroethane	4.96	0.20	0.50	"	5.00		99.2	70-130	2.39	30	
Tetrachloroethene	4.50	0.20	0.50	"	5.00		90.0	70-130	5.62	30	
Toluene	4.83	0.10	0.50	"	5.00		96.6	70-130	2.66	30	
1,2,3-Trichlorobenzene	5.52	0.10	0.50	"	5.00		110	70-130	0.362	30	
1,2,4-Trichlorobenzene	5.08	0.20	0.50	"	5.00		102	70-130	0.394	30	
1,1,1-Trichloroethane	4.87	0.20	0.50	"	5.00		97.4	70-130	0.412	30	
1,1,2-Trichloroethane	4.99	0.20	0.50	"	5.00		99.8	70-130	1.79	30	
Trichloroethene	4.78	0.20	0.50	"	5.00		95.6	70-130	0.209	30	
Trichlorofluoromethane	5.36	0.20	0.50	"	5.00		107	70-130	0.374	30	
Trichlorotrifluoroethane	5.24	0.20	0.50	"	5.00		105	70-130	3.38	30	
1,2,3-Trichloropropane	4.89	0.13	0.50	"	5.00		97.8	70-130	3.61	25	
1,2,4-Trimethylbenzene	5.11	0.10	0.50	"	5.00		102	70-130	1.17	30	
1,3,5-Trimethylbenzene	4.90	0.10	0.50	"	5.00		98.0	70-130	2.02	30	
Vinyl chloride	5.01	0.10	0.50	"	5.00		100	70-130	1.78	30	
m,p-Xylene	9.61	0.20	0.50	"	10.0		96.1	70-130	2.06	30	
o-Xylene	4.88	0.10	0.50	"	5.00		97.6	70-130	3.82	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
LCS Dup (AB40523-BSD1)					Prepared & Analyzed: 02/03/14						
Xylenes (total)	14.5	0.20	0.50	ug/l	15.0		96.6	70-130	2.66	30	
Methyl tert-butyl ether	4.92	0.50	0.50	"	5.00		98.4	70-130	1.61	30	
Ethyl tert-butyl ether	5.35	0.20	0.50	"	5.00		107	70-130	1.32	30	
Tert-amyl methyl ether	5.20	0.20	0.50	"	5.00		104	70-130	0.957	30	
Surrogate: Bromofluorobenzene	*25.0*			*"*	*25.0*		*99.9*	*70-130*			
Surrogate: Dibromofluoromethane	*23.9*			*"*	*25.0*		*95.6*	*70-130*			
Surrogate: Toluene-d8	*25.0*			*"*	*25.0*		*99.9*	*70-130*			
Matrix Spike (AB40523-MS1)		**Source: 14A1588-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
Acetone	21.5	0.80	5.0	ug/l	20.0	ND	108	70-130			
Acrylonitrile	5.26	0.20	5.0	"	5.00	ND	105	70-130			
Benzene	4.79	0.20	0.30	"	5.00	ND	95.8	70-130			
Bromobenzene	5.11	0.10	0.50	"	5.00	ND	102	70-130			
Bromochloromethane	5.11	0.20	0.50	"	5.00	ND	102	70-130			
Bromodichloromethane	4.76	0.50	0.50	"	5.00	ND	95.2	70-130			
Bromoform	4.59	0.50	0.50	"	5.00	ND	91.8	70-130			
Bromomethane	5.15	0.20	0.50	"	5.00	ND	103	70-130			
n-Butylbenzene	4.59	0.10	0.50	"	5.00	ND	91.8	70-130			
sec-Butylbenzene	4.98	0.10	0.50	"	5.00	ND	99.6	70-130			
tert-Butylbenzene	5.24	0.10	0.50	"	5.00	ND	105	70-130			
Carbon disulfide	4.96	0.20	0.50	"	5.00	ND	99.2	70-130			
Carbon tetrachloride	4.66	0.30	0.50	"	5.00	ND	93.2	70-130			
Chlorobenzene	4.99	0.20	0.50	"	5.00	ND	99.8	70-130			
Chloroethane	5.32	0.10	0.50	"	5.00	ND	106	70-130			
Chloroform	5.17	0.50	0.50	"	5.00	ND	103	70-130			
Chloromethane	5.63	0.20	0.50	"	5.00	ND	113	70-130			
2-Chlorotoluene	5.16	0.20	0.50	"	5.00	ND	103	70-130			
4-Chlorotoluene	4.98	0.10	0.50	"	5.00	ND	99.6	70-130			
Dibromochloromethane	4.86	0.50	0.50	"	5.00	ND	97.2	70-130			
1,2-Dibromo-3-chloropropane	5.18	0.36	0.50	"	5.00	ND	104	70-130			
1,2-Dibromoethane (EDB)	4.84	0.14	0.50	"	5.00	ND	96.8	70-130			
Dibromomethane	5.02	0.20	0.50	"	5.00	ND	100	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
Matrix Spike (AB40523-MS1)		**Source: 14A1588-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
1,2-Dichlorobenzene	4.78	0.20	0.50	ug/l	5.00	ND	95.6	70-130			
1,3-Dichlorobenzene	4.99	0.20	0.50	"	5.00	ND	99.8	70-130			
trans-1,4-Dichloro-2-butene	3.95	0.095	5.0	"	5.00	ND	79.0	70-130			J
1,4-Dichlorobenzene	4.65	0.10	0.50	"	5.00	ND	93.0	70-130			
Dichlorodifluoromethane	5.90	0.20	0.50	"	5.00	ND	118	70-130			
1,1-Dichloroethane	5.27	0.10	0.50	"	5.00	ND	105	70-130			
1,2-Dichloroethane	5.05	0.20	0.50	"	5.00	ND	101	70-130			
1,1-Dichloroethene	5.18	0.10	0.30	"	5.00	ND	104	70-130			
cis-1,2-Dichloroethene	5.19	0.20	0.50	"	5.00	ND	104	70-130			
trans-1,2-Dichloroethene	5.01	0.20	0.50	"	5.00	ND	100	70-130			
1,2-Dichloropropane	4.78	0.20	0.50	"	5.00	ND	95.6	70-130			
1,3-Dichloropropane	4.94	0.20	0.50	"	5.00	ND	98.8	70-130			
2,2-Dichloropropane	4.69	0.10	0.50	"	5.00	ND	93.8	70-130			
1,1-Dichloropropene	4.67	0.10	0.50	"	5.00	ND	93.4	70-130			
cis-1,3-Dichloropropene	5.25	0.20	0.50	"	5.00	ND	105	70-130			
trans-1,3-Dichloropropene	4.29	0.20	0.50	"	5.00	ND	85.8	70-130			
Ethylbenzene	5.04	0.10	0.50	"	5.00	ND	101	70-130			
2-Hexanone	4.68	0.097	5.0	"	5.00	ND	93.6	70-130			J
Hexachlorobutadiene	4.29	0.30	0.50	"	5.00	ND	85.8	70-130			
Isopropylbenzene	5.29	0.20	0.50	"	5.00	ND	106	70-130			
p-Isopropyltoluene	5.08	0.10	0.50	"	5.00	ND	102	70-130			
Methyl ethyl ketone	10.3	0.40	1.0	"	10.0	ND	103	70-130			
Methyl iodide	5.38	0.12	2.0	"	5.00	ND	108	70-130			
Methyl isobutyl ketone	9.45	0.30	1.0	"	10.0	ND	94.5	70-130			
Methylene chloride	4.31	0.40	0.50	"	5.00	ND	86.2	70-130			
Naphthalene	5.17	0.20	0.50	"	5.00	ND	103	70-130			
n-Propylbenzene	5.36	0.20	0.50	"	5.00	ND	107	70-130			
Styrene	5.27	0.10	0.50	"	5.00	ND	105	70-130			
1,1,1,2-Tetrachloroethane	4.70	0.20	0.50	"	5.00	ND	94.0	70-130			
1,1,2,2-Tetrachloroethane	4.89	0.20	0.50	"	5.00	ND	97.8	70-130			
Tetrachloroethene	4.92	0.20	0.50	"	5.00	ND	98.4	70-130			
Toluene	5.00	0.10	0.50	"	5.00	ND	100	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
Matrix Spike (AB40523-MS1)		**Source: 14A1588-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
1,2,3-Trichlorobenzene	5.13	0.10	0.50	ug/l	5.00	ND	103	70-130			
1,2,4-Trichlorobenzene	4.71	0.20	0.50	"	5.00	ND	94.2	70-130			
1,1,1-Trichloroethane	5.10	0.20	0.50	"	5.00	ND	102	70-130			
1,1,2-Trichloroethane	5.02	0.20	0.50	"	5.00	ND	100	70-130			
Trichloroethene	4.98	0.20	0.50	"	5.00	ND	99.6	70-130			
Trichlorofluoromethane	5.44	0.20	0.50	"	5.00	ND	109	70-130			
Trichlorotrifluoroethane	5.40	0.20	0.50	"	5.00	ND	108	70-130			
1,2,3-Trichloropropane	5.05	0.13	0.50	"	5.00	ND	101	70-130			
1,2,4-Trimethylbenzene	5.29	0.10	0.50	"	5.00	ND	106	70-130			
1,3,5-Trimethylbenzene	5.08	0.10	0.50	"	5.00	ND	102	70-130			
Vinyl chloride	5.05	0.10	0.50	"	5.00	ND	101	70-130			
m,p-Xylene	9.97	0.20	0.50	"	10.0	ND	99.7	70-130			
o-Xylene	5.12	0.10	0.50	"	5.00	ND	102	70-130			
Xylenes (total)	15.1	0.20	0.50	"	15.0	ND	101	70-130			
Methyl tert-butyl ether	4.49	0.50	0.50	"	5.00	ND	89.8	70-130			
Ethyl tert-butyl ether	4.96	0.20	0.50	"	5.00	ND	99.2	70-130			
Tert-amyl methyl ether	4.80	0.20	0.50	"	5.00	ND	96.0	70-130			
Surrogate: Bromofluorobenzene	*24.6*			*"*	*25.0*		*98.3*	*70-130*			
Surrogate: Dibromofluoromethane	*23.8*			*"*	*25.0*		*95.4*	*70-130*			
Surrogate: Toluene-d8	*24.6*			*"*	*25.0*		*98.5*	*70-130*			
Matrix Spike Dup (AB40523-MSD1)		**Source: 14A1588-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
Acetone	21.7	0.80	5.0	ug/l	20.0	ND	109	70-130	0.971	30	
Acrylonitrile	5.22	0.20	5.0	"	5.00	ND	104	70-130	0.763	30	
Benzene	4.68	0.20	0.30	"	5.00	ND	93.6	70-130	2.32	30	
Bromobenzene	4.78	0.10	0.50	"	5.00	ND	95.6	70-130	6.67	30	
Bromochloromethane	5.02	0.20	0.50	"	5.00	ND	100	70-130	1.78	30	
Bromodichloromethane	4.78	0.50	0.50	"	5.00	ND	95.6	70-130	0.419	30	
Bromoform	4.59	0.50	0.50	"	5.00	ND	91.8	70-130	0.00	30	
Bromomethane	5.01	0.20	0.50	"	5.00	ND	100	70-130	2.76	30	
n-Butylbenzene	4.08	0.10	0.50	"	5.00	ND	81.6	70-130	11.8	30	
sec-Butylbenzene	4.45	0.10	0.50	"	5.00	ND	89.0	70-130	11.2	30	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
Matrix Spike Dup (AB40523-MSD1)		**Source: 14A1588-01**		Prepared: 02/03/14 Analyzed: 02/04/14							
tert-Butylbenzene	4.78	0.10	0.50	ug/l	5.00	ND	95.6	70-130	9.18	30	
Carbon disulfide	4.67	0.20	0.50	"	5.00	ND	93.4	70-130	6.02	30	
Carbon tetrachloride	4.57	0.30	0.50	"	5.00	ND	91.4	70-130	1.95	30	
Chlorobenzene	4.71	0.20	0.50	"	5.00	ND	94.2	70-130	5.77	30	
Chloroethane	5.25	0.10	0.50	"	5.00	ND	105	70-130	1.32	30	
Chloroform	5.07	0.50	0.50	"	5.00	ND	101	70-130	1.95	30	
Chloromethane	5.41	0.20	0.50	"	5.00	ND	108	70-130	3.99	30	
2-Chlorotoluene	4.63	0.20	0.50	"	5.00	ND	92.6	70-130	10.8	30	
4-Chlorotoluene	4.54	0.10	0.50	"	5.00	ND	90.8	70-130	9.24	30	
Dibromochloromethane	4.71	0.50	0.50	"	5.00	ND	94.2	70-130	3.13	30	
1,2-Dibromo-3-chloropropane	5.18	0.36	0.50	"	5.00	ND	104	70-130	0.00	25	
1,2-Dibromoethane (EDB)	4.80	0.14	0.50	"	5.00	ND	96.0	70-130	0.830	25	
Dibromomethane	4.88	0.20	0.50	"	5.00	ND	97.6	70-130	2.83	30	
1,2-Dichlorobenzene	4.52	0.20	0.50	"	5.00	ND	90.4	70-130	5.59	30	
1,3-Dichlorobenzene	4.52	0.20	0.50	"	5.00	ND	90.4	70-130	9.88	30	
1,4-Dichlorobenzene	4.33	0.10	0.50	"	5.00	ND	86.6	70-130	7.13	30	
trans-1,4-Dichloro-2-butene	3.99	0.095	5.0	"	5.00	ND	79.8	70-130	1.01	25	J
Dichlorodifluoromethane	5.39	0.20	0.50	"	5.00	ND	108	70-130	9.03	30	
1,1-Dichloroethane	5.24	0.10	0.50	"	5.00	ND	105	70-130	0.571	30	
1,2-Dichloroethane	4.94	0.20	0.50	"	5.00	ND	98.8	70-130	2.20	30	
1,1-Dichloroethene	4.91	0.10	0.30	"	5.00	ND	98.2	70-130	5.35	30	
cis-1,2-Dichloroethene	5.13	0.20	0.50	"	5.00	ND	103	70-130	1.16	30	
trans-1,2-Dichloroethene	4.73	0.20	0.50	"	5.00	ND	94.6	70-130	5.75	30	
1,2-Dichloropropane	4.78	0.20	0.50	"	5.00	ND	95.6	70-130	0.00	30	
1,3-Dichloropropane	4.86	0.20	0.50	"	5.00	ND	97.2	70-130	1.63	30	
2,2-Dichloropropane	4.67	0.10	0.50	"	5.00	ND	93.4	70-130	0.427	30	
1,1-Dichloropropene	4.38	0.10	0.50	"	5.00	ND	87.6	70-130	6.41	30	
cis-1,3-Dichloropropene	5.17	0.20	0.50	"	5.00	ND	103	70-130	1.54	30	
trans-1,3-Dichloropropene	4.23	0.20	0.50	"	5.00	ND	84.6	70-130	1.41	30	
Ethylbenzene	4.69	0.10	0.50	"	5.00	ND	93.8	70-130	7.19	30	
2-Hexanone	4.63	0.097	5.0	"	5.00	ND	92.6	70-130	1.07	25	J
Hexachlorobutadiene	4.09	0.30	0.50	"	5.00	ND	81.8	70-130	4.77	30	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
Matrix Spike Dup (AB40523-MSD1)		**Source: 14A1588-01**		Prepared: 02/03/14 Analyzed: 02/04/14							
Isopropylbenzene	4.79	0.20	0.50	ug/l	5.00	ND	95.8	70-130	9.92	30	
p-Isopropyltoluene	4.42	0.10	0.50	"	5.00	ND	88.4	70-130	13.9	30	
Methyl ethyl ketone	10.2	0.40	1.0	"	10.0	ND	102	70-130	1.56	30	
Methyl iodide	5.32	0.12	2.0	"	5.00	ND	106	70-130	1.12	25	
Methyl isobutyl ketone	9.31	0.30	1.0	"	10.0	ND	93.1	70-130	1.49	30	
Methylene chloride	4.17	0.40	0.50	"	5.00	ND	83.4	70-130	3.30	30	
Naphthalene	5.24	0.20	0.50	"	5.00	ND	105	70-130	1.34	30	
n-Propylbenzene	4.69	0.20	0.50	"	5.00	ND	93.8	70-130	13.3	30	
Styrene	4.91	0.10	0.50	"	5.00	ND	98.2	70-130	7.07	30	
1,1,1,2-Tetrachloroethane	4.58	0.20	0.50	"	5.00	ND	91.6	70-130	2.59	30	
1,1,2,2-Tetrachloroethane	4.78	0.20	0.50	"	5.00	ND	95.6	70-130	2.28	30	
Tetrachloroethene	4.32	0.20	0.50	"	5.00	ND	86.4	70-130	13.0	30	
Toluene	4.75	0.10	0.50	"	5.00	ND	95.0	70-130	5.13	30	
1,2,3-Trichlorobenzene	5.01	0.10	0.50	"	5.00	ND	100	70-130	2.37	30	
1,2,4-Trichlorobenzene	4.41	0.20	0.50	"	5.00	ND	88.2	70-130	6.58	30	
1,1,1-Trichloroethane	5.04	0.20	0.50	"	5.00	ND	101	70-130	1.18	30	
1,1,2-Trichloroethane	4.88	0.20	0.50	"	5.00	ND	97.6	70-130	2.83	30	
Trichloroethene	4.70	0.20	0.50	"	5.00	ND	94.0	70-130	5.79	30	
Trichlorofluoromethane	5.05	0.20	0.50	"	5.00	ND	101	70-130	7.44	30	
Trichlorotrifluoroethane	4.83	0.20	0.50	"	5.00	ND	96.6	70-130	11.1	30	
1,2,3-Trichloropropane	4.84	0.13	0.50	"	5.00	ND	96.8	70-130	4.25	25	
1,2,4-Trimethylbenzene	4.73	0.10	0.50	"	5.00	ND	94.6	70-130	11.2	30	
1,3,5-Trimethylbenzene	4.58	0.10	0.50	"	5.00	ND	91.6	70-130	10.4	30	
Vinyl chloride	4.75	0.10	0.50	"	5.00	ND	95.0	70-130	6.12	30	
m,p-Xylene	9.08	0.20	0.50	"	10.0	ND	90.8	70-130	9.34	30	
o-Xylene	4.80	0.10	0.50	"	5.00	ND	96.0	70-130	6.45	30	
Xylenes (total)	13.9	0.20	0.50	"	15.0	ND	92.5	70-130	8.35	30	
Methyl tert-butyl ether	4.48	0.50	0.50	"	5.00	ND	89.6	70-130	0.223	30	
Ethyl tert-butyl ether	4.97	0.20	0.50	"	5.00	ND	99.4	70-130	0.201	30	
Tert-amyl methyl ether	4.86	0.20	0.50	"	5.00	ND	97.2	70-130	1.24	30	
Surrogate: Bromofluorobenzene	*24.6*			*"*	*25.0*		*98.6*	*70-130*			
Surrogate: Dibromofluoromethane	*24.0*			*"*	*25.0*		*96.0*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40523 - VOAs in Water GCMS											
Matrix Spike Dup (AB40523-MSD1)		**Source: 14A1588-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
Surrogate: Toluene-d8	*24.4*			*ug/l*	*25.0*		*97.4*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43038 - SVOAs in Water GC											
Blank (AA43038-BLK1)					Prepared: 01/30/14 Analyzed: 01/31/14						
Aldrin	ND	0.010	0.050	ug/l							U
Chloroneb	ND	0.20	0.50	"							U
Chlorobenzilate	ND	2.0	5.0	"							U
Chlorothalonil	ND	0.030	0.10	"							U
DCPA	ND	0.020	0.040	"							U
4,4´-DDD	ND	0.020	0.050	"							U
4,4´-DDE	ND	0.020	0.050	"							U
4,4´-DDT	ND	0.020	0.020	"							U
Dieldrin	ND	0.010	0.010	"							U
Endosulfan I	ND	0.020	0.050	"							U
Endosulfan II	ND	0.020	0.050	"							U
Endosulfan sulfate	ND	0.020	0.020	"							U
Endrin	ND	0.030	0.10	"							U
Endrin aldehyde	ND	0.020	0.050	"							U
HCH-alpha	ND	0.010	0.050	"							U
HCH-beta	ND	0.020	0.050	"							U
HCH-delta	ND	0.030	0.050	"							U
HCH-gamma (Lindane)	ND	0.010	0.010	"							U
Heptachlor	ND	0.010	0.010	"							U
Heptachlor epoxide	ND	0.010	0.010	"							U
Hexachlorobenzene	ND	0.010	0.040	"							U
Hexachlorocyclopentadiene	ND	0.040	0.40	"							U
Methoxychlor	ND	0.020	0.020	"							U
cis-Permethrin	ND	0.070	0.20	"							U
trans-Permethrin	ND	0.090	0.20	"							U
Propachlor	ND	0.070	0.20	"							U
Trifluralin	ND	0.020	0.040	"							U
PCB-1016	ND	0.030	0.50	"							U
PCB-1221	ND	0.030	0.50	"							U
PCB-1232	ND	0.030	0.50	"							U
PCB-1242	ND	0.030	0.50	"							U
PCB-1248	ND	0.030	0.50	"							U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43038 - SVOAs in Water GC											
Blank (AA43038-BLK1)					Prepared: 01/30/14 Analyzed: 01/31/14						
PCB-1254	ND	0.030	0.50	ug/l							U
PCB-1260	ND	0.030	0.50	"							U
Total PCBs	ND	0.30	0.50	"							U
Toxaphene	ND	0.40	0.50	"							U
Chlordane (tech)	ND	0.030	0.050	"							U
Surrogate: Dibutylchlorendate	*0.959*			*"*	*0.952*		*101*	*70-130*			
LCS (AA43038-BS1)					Prepared: 01/30/14 Analyzed: 02/01/14						
Aldrin	0.258	0.010	0.050	ug/l	0.280		92.3	70-130			
Chloroneb	2.60	0.20	0.50	"	2.80		92.8	70-130			
Chlorobenzilate	3.09	2.0	5.0	"	2.80		110	70-130			J
Chlorothalonil	0.299	0.030	0.10	"	0.280		107	70-130			
DCPA	0.284	0.020	0.040	"	0.280		101	70-130			
4,4´-DDD	0.202	0.020	0.050	"	0.280		72.2	70-130			
4,4´-DDE	0.274	0.020	0.050	"	0.280		98.0	70-130			
4,4´-DDT	0.275	0.020	0.020	"	0.280		98.1	70-130			
Dieldrin	0.278	0.010	0.010	"	0.280		99.4	70-130			
Endosulfan I	0.280	0.020	0.050	"	0.280		99.9	70-130			
Endosulfan II	0.273	0.020	0.050	"	0.280		97.6	70-130			
Endosulfan sulfate	0.287	0.020	0.020	"	0.280		102	70-130			
Endrin	0.303	0.030	0.10	"	0.280		108	70-130			
Endrin aldehyde	0.284	0.020	0.050	"	0.280		101	70-130			
HCH-alpha	0.259	0.010	0.050	"	0.280		92.6	70-130			
HCH-beta	0.272	0.020	0.050	"	0.280		97.0	70-130			
HCH-delta	0.276	0.030	0.050	"	0.280		98.7	70-130			
HCH-gamma (Lindane)	0.267	0.010	0.010	"	0.280		95.3	70-130			
Heptachlor	0.264	0.010	0.010	"	0.280		94.3	70-130			
Heptachlor epoxide	0.269	0.010	0.010	"	0.280		96.1	70-130			
Hexachlorocyclopentadiene	0.325	0.040	0.40	"	0.560		58.0	15-90			J
Hexachlorobenzene	0.227	0.010	0.040	"	0.280		81.0	70-130			
Methoxychlor	0.283	0.020	0.020	"	0.280		101	70-130			
cis-Permethrin	1.50	0.070	0.20	"	1.40		107	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43038 - SVOAs in Water GC											
LCS (AA43038-BS1)					Prepared: 01/30/14 Analyzed: 02/01/14						
trans-Permethrin	1.53	0.090	0.20	ug/l	1.40		109	70-130			
Propachlor	0.290	0.070	0.20	"	0.280		104	70-130			
Trifluralin	0.411	0.020	0.040	"	0.420		97.8	70-130			
Surrogate: Dibutylchlorendate	*0.912*			*"*	*0.952*		*95.8*	*70-130*			
LCS Dup (AA43038-BSD1)					Prepared: 01/30/14 Analyzed: 02/01/14						
Aldrin	0.268	0.010	0.050	ug/l	0.280		95.7	70-130	3.62	25	
Chloroneb	2.71	0.20	0.50	"	2.80		96.7	70-130	4.09	25	
Chlorobenzilate	3.24	2.0	5.0	"	2.80		116	70-130	4.70	25	J
Chlorothalonil	0.311	0.030	0.10	"	0.280		111	70-130	4.00	25	
DCPA	0.294	0.020	0.040	"	0.280		105	70-130	3.49	25	
4,4´-DDD	0.210	0.020	0.050	"	0.280		75.2	70-130	3.96	25	
4,4´-DDE	0.286	0.020	0.050	"	0.280		102	70-130	4.27	25	
4,4´-DDT	0.288	0.020	0.020	"	0.280		103	70-130	4.76	25	
Dieldrin	0.290	0.010	0.010	"	0.280		104	70-130	4.19	25	
Endosulfan I	0.291	0.020	0.050	"	0.280		104	70-130	4.03	25	
Endosulfan II	0.283	0.020	0.050	"	0.280		101	70-130	3.55	25	
Endosulfan sulfate	0.301	0.020	0.020	"	0.280		107	70-130	4.76	25	
Endrin	0.316	0.030	0.10	"	0.280		113	70-130	4.19	25	
Endrin aldehyde	0.296	0.020	0.050	"	0.280		106	70-130	4.05	25	
HCH-alpha	0.272	0.010	0.050	"	0.280		97.3	70-130	4.91	25	
HCH-beta	0.282	0.020	0.050	"	0.280		101	70-130	3.61	25	
HCH-delta	0.288	0.030	0.050	"	0.280		103	70-130	4.18	25	
HCH-gamma (Lindane)	0.279	0.010	0.010	"	0.280		99.7	70-130	4.50	25	
Heptachlor	0.273	0.010	0.010	"	0.280		97.7	70-130	3.56	25	
Heptachlor epoxide	0.281	0.010	0.010	"	0.280		100	70-130	4.42	25	
Hexachlorocyclopentadiene	0.345	0.040	0.40	"	0.560		61.7	15-90	6.10	50	J
Hexachlorobenzene	0.240	0.010	0.040	"	0.280		85.6	70-130	5.53	25	
Methoxychlor	0.298	0.020	0.020	"	0.280		106	70-130	5.01	25	
cis-Permethrin	1.58	0.070	0.20	"	1.40		113	70-130	5.41	25	
trans-Permethrin	1.62	0.090	0.20	"	1.40		116	70-130	5.91	25	
Propachlor	0.301	0.070	0.20	"	0.280		108	70-130	3.83	25	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43038 - SVOAs in Water GC											
LCS Dup (AA43038-BSD1)					Prepared: 01/30/14 Analyzed: 02/01/14						
Trifluralin	0.427	0.020	0.040	ug/l	0.420		102	70-130	3.96	25	
Surrogate: Dibutylchlorendate	*0.941*			*"*	*0.952*		*98.8*	*70-130*			
Matrix Spike (AA43038-MS1)		**Source: 14A1635-01**			Prepared: 01/30/14 Analyzed: 02/01/14						
Aldrin	0.255	0.010	0.050	ug/l	0.280	ND	91.2	70-130			
Chloroneb	2.50	0.20	0.50	"	2.80	ND	89.2	70-130			
Chlorobenzilate	3.12	2.0	5.0	"	2.80	ND	111	70-130			J
Chlorothalonil	0.299	0.030	0.10	"	0.280	ND	107	70-130			
DCPA	0.285	0.020	0.040	"	0.280	ND	102	70-130			
4,4´-DDD	0.222	0.020	0.050	"	0.280	ND	79.3	70-130			
4,4´-DDE	0.280	0.020	0.050	"	0.280	ND	100	70-130			
4,4´-DDT	0.281	0.020	0.020	"	0.280	ND	100	70-130			
Dieldrin	0.284	0.010	0.010	"	0.280	ND	102	70-130			
Endosulfan I	0.280	0.020	0.050	"	0.280	ND	100	70-130			
Endosulfan II	0.283	0.020	0.050	"	0.280	ND	101	70-130			
Endosulfan sulfate	0.292	0.020	0.020	"	0.280	ND	104	70-130			
Endrin	0.306	0.030	0.10	"	0.280	ND	109	70-130			
Endrin aldehyde	0.284	0.020	0.050	"	0.280	ND	102	70-130			
HCH-alpha	0.257	0.010	0.050	"	0.280	ND	91.9	70-130			
HCH-beta	0.273	0.020	0.050	"	0.280	ND	97.5	70-130			
HCH-delta	0.279	0.030	0.050	"	0.280	ND	99.8	70-130			
HCH-gamma (Lindane)	0.267	0.010	0.010	"	0.280	ND	95.3	70-130			
Heptachlor	0.261	0.010	0.010	"	0.280	ND	93.2	70-130			
Heptachlor epoxide	0.277	0.010	0.010	"	0.280	ND	98.8	70-130			
Hexachlorocyclopentadiene	0.358	0.040	0.40	"	0.560	ND	63.9	15-90			J
Hexachlorobenzene	0.225	0.010	0.040	"	0.280	ND	80.4	70-130			
Methoxychlor	0.297	0.020	0.020	"	0.280	ND	106	70-130			
cis-Permethrin	1.40	0.070	0.20	"	1.40	ND	100	70-130			
trans-Permethrin	1.44	0.090	0.20	"	1.40	ND	103	70-130			
Propachlor	0.285	0.070	0.20	"	0.280	ND	102	70-130			
Trifluralin	0.414	0.020	0.040	"	0.420	ND	98.6	70-130			
Surrogate: Dibutylchlorendate	*0.934*			*"*	*0.952*		*98.1*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43038 - SVOAs in Water GC											
Matrix Spike Dup (AA43038-MSD1)		**Source: 14A1635-01**		Prepared: 01/30/14 Analyzed: 02/01/14							
Aldrin	0.255	0.010	0.050	ug/l	0.280	ND	91.1	70-130	0.148	25	
Chloroneb	2.55	0.20	0.50	"	2.80	ND	91.2	70-130	2.25	25	
Chlorobenzilate	3.18	2.0	5.0	"	2.80	ND	114	70-130	2.03	25	J
Chlorothalonil	0.302	0.030	0.10	"	0.280	ND	108	70-130	0.907	25	
DCPA	0.288	0.020	0.040	"	0.280	ND	103	70-130	1.15	25	
4,4´-DDD	0.223	0.020	0.050	"	0.280	ND	79.8	70-130	0.557	25	
4,4´-DDE	0.280	0.020	0.050	"	0.280	ND	100	70-130	0.148	25	
4,4´-DDT	0.284	0.020	0.020	"	0.280	ND	102	70-130	1.18	25	
Dieldrin	0.286	0.010	0.010	"	0.280	ND	102	70-130	0.667	25	
Endosulfan I	0.285	0.020	0.050	"	0.280	ND	102	70-130	1.64	25	
Endosulfan II	0.283	0.020	0.050	"	0.280	ND	101	70-130	0.0502	25	
Endosulfan sulfate	0.296	0.020	0.020	"	0.280	ND	106	70-130	1.20	25	
Endrin	0.310	0.030	0.10	"	0.280	ND	111	70-130	1.51	25	
Endrin aldehyde	0.290	0.020	0.050	"	0.280	ND	103	70-130	1.83	25	
HCH-alpha	0.261	0.010	0.050	"	0.280	ND	93.3	70-130	1.48	25	
HCH-beta	0.276	0.020	0.050	"	0.280	ND	98.7	70-130	1.17	25	
HCH-delta	0.283	0.030	0.050	"	0.280	ND	101	70-130	1.39	25	
HCH-gamma (Lindane)	0.270	0.010	0.010	"	0.280	ND	96.4	70-130	1.15	25	
Heptachlor	0.263	0.010	0.010	"	0.280	ND	94.0	70-130	0.878	25	
Heptachlor epoxide	0.277	0.010	0.010	"	0.280	ND	98.8	70-130	0.00397	25	
Hexachlorocyclopentadiene	0.366	0.040	0.40	"	0.560	ND	65.4	15-90	2.41	50	J
Hexachlorobenzene	0.229	0.010	0.040	"	0.280	ND	81.8	70-130	1.71	25	
Methoxychlor	0.299	0.020	0.020	"	0.280	ND	107	70-130	0.522	25	
cis-Permethrin	1.37	0.070	0.20	"	1.40	ND	97.6	70-130	2.67	25	
trans-Permethrin	1.41	0.090	0.20	"	1.40	ND	101	70-130	1.64	25	
Propachlor	0.297	0.070	0.20	"	0.280	ND	106	70-130	4.07	25	
Trifluralin	0.416	0.020	0.040	"	0.420	ND	99.0	70-130	0.441	25	
Surrogate: Dibutylchlorendate	*0.955*			*"*	*0.952*		*100*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40730 - SVOAs in Water GC											
Blank (AB40730-BLK1)					Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	ND	0.50	0.50	ug/l							U
Atrazine	ND	0.30	0.50	"							U
Bromacil	ND	0.50	5.0	"							U
Butachlor	ND	0.40	0.50	"							U
Dimethoate	ND	0.20	1.0	"							U
Metolachlor	ND	0.30	0.50	"							U
Metribuzin	ND	0.40	0.50	"							U
Molinate	ND	0.20	0.50	"							U
Prometryn	ND	0.50	0.50	"							U
Propachlor	ND	0.30	0.50	"							U
Simazine	ND	0.30	0.50	"							U
Thiobencarb	ND	0.20	1.0	"							U
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.69*			*"*	*2.00*		*84.3*	*70-130*			
LCS (AB40730-BS1)					Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	1.88	0.50	0.50	ug/l	2.00		94.2	62-128			
Atrazine	1.92	0.30	0.50	"	2.00		96.1	62-122			
Bromacil	1.94	0.50	5.0	"	2.00		96.9	61-121			J
Butachlor	1.99	0.40	0.50	"	2.00		99.3	66-126			
Dimethoate	1.97	0.20	1.0	"	2.00		98.3	67-127			
Metolachlor	1.93	0.30	0.50	"	2.00		96.6	63-123			
Metribuzin	1.91	0.40	0.50	"	2.00		95.4	71-131			
Molinate	1.95	0.20	0.50	"	2.00		97.4	44-137			
Prometryn	1.95	0.50	0.50	"	2.00		97.6	63-123			
Propachlor	1.95	0.30	0.50	"	2.00		97.3	66-126			
Simazine	1.94	0.30	0.50	"	2.00		96.9	70-130			
Thiobencarb	2.01	0.20	1.0	"	2.00		100	69-129			
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.80*			*"*	*2.00*		*89.8*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40730 - SVOAs in Water GC											
LCS Dup (AB40730-BSD1)					Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	2.02	0.50	0.50	ug/l	2.00		101	62-128	6.95	30	
Atrazine	2.01	0.30	0.50	"	2.00		100	62-122	4.47	30	
Bromacil	2.14	0.50	5.0	"	2.00		107	61-121	10.0	30	J
Butachlor	2.09	0.40	0.50	"	2.00		105	66-126	5.23	30	
Dimethoate	2.17	0.20	1.0	"	2.00		108	67-127	9.82	30	
Metolachlor	2.02	0.30	0.50	"	2.00		101	63-123	4.37	30	
Metribuzin	2.04	0.40	0.50	"	2.00		102	71-131	6.92	30	
Molinate	1.94	0.20	0.50	"	2.00		96.8	44-137	0.569	30	
Prometryn	2.07	0.50	0.50	"	2.00		103	63-123	5.75	30	
Propachlor	2.00	0.30	0.50	"	2.00		100	66-126	2.80	30	
Simazine	2.09	0.30	0.50	"	2.00		105	70-130	7.61	30	
Thiobencarb	2.19	0.20	1.0	"	2.00		109	69-129	8.57	30	
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.85*			*"*	*2.00*		*92.6*	*70-130*			
Matrix Spike (AB40730-MS1)		**Source: 14A1588-01**			Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	1.81	0.50	0.50	ug/l	2.00	ND	90.7	62-128			
Atrazine	1.79	0.30	0.50	"	2.00	ND	89.7	62-122			
Bromacil	1.75	0.50	5.0	"	2.00	ND	87.5	61-121			J
Butachlor	1.85	0.40	0.50	"	2.00	ND	92.6	66-126			
Dimethoate	1.70	0.20	1.0	"	2.00	ND	84.9	67-127			
Metolachlor	1.82	0.30	0.50	"	2.00	ND	91.2	63-123			
Metribuzin	1.78	0.40	0.50	"	2.00	ND	89.2	71-131			
Molinate	1.87	0.20	0.50	"	2.00	ND	93.4	44-137			
Prometryn	1.68	0.50	0.50	"	2.00	ND	83.9	63-123			
Propachlor	1.93	0.30	0.50	"	2.00	ND	96.6	66-126			
Simazine	1.85	0.30	0.50	"	2.00	ND	92.5	70-130			
Thiobencarb	1.90	0.20	1.0	"	2.00	ND	95.2	69-129			
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.51*			*"*	*2.00*		*75.3*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40730 - SVOAs in Water GC											
Matrix Spike Dup (AB40730-MSD1)		**Source: 14A1588-01**		Prepared: 02/08/14 Analyzed: 02/11/14							
Alachlor	1.91	0.50	0.50	ug/l	2.00	ND	95.3	62-128	4.97	30	
Atrazine	1.96	0.30	0.50	"	2.00	ND	98.2	62-122	9.04	30	
Bromacil	2.13	0.50	5.0	"	2.00	ND	107	61-121	19.7	30	J
Butachlor	2.02	0.40	0.50	"	2.00	ND	101	66-126	8.67	30	
Dimethoate	2.14	0.20	1.0	"	2.00	ND	107	67-127	23.0	30	
Metolachlor	1.96	0.30	0.50	"	2.00	ND	97.9	63-123	7.12	30	
Metribuzin	2.02	0.40	0.50	"	2.00	ND	101	71-131	12.3	30	
Molinate	1.79	0.20	0.50	"	2.00	ND	89.6	44-137	4.16	30	
Prometryn	2.02	0.50	0.50	"	2.00	ND	101	63-123	18.4	30	
Propachlor	1.93	0.30	0.50	"	2.00	ND	96.4	66-126	0.171	30	
Simazine	2.07	0.30	0.50	"	2.00	ND	104	70-130	11.3	30	
Thiobencarb	1.96	0.20	1.0	"	2.00	ND	97.8	69-129	2.64	30	
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.60*			*"*	*2.00*		*79.9*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Organic Analytes by EPA Method 504.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40359 - EPA 504.1											
Blank (AB40359-BLK1)					Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	ND	0.0040	0.010	ug/l							U
1,2-Dibromoethane (EDB)	ND	0.0050	0.020	"							U
LCS (AB40359-BS1)					Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	0.262	0.0040	0.010	ug/l	0.250		105	70-130			
1,2-Dibromoethane (EDB)	0.255	0.0050	0.020	"	0.250		102	70-130			
LCS Dup (AB40359-BSD1)					Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	0.273	0.0040	0.010	ug/l	0.250		109	70-130	4.17	25	
1,2-Dibromoethane (EDB)	0.270	0.0050	0.020	"	0.250		108	70-130	5.47	25	
Matrix Spike (AB40359-MS1)		**Source: 14A1588-01**			Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	0.212	0.0040	0.010	ug/l	0.250	ND	84.8	70-130			
1,2-Dibromoethane (EDB)	0.214	0.0050	0.020	"	0.250	ND	85.5	70-130			
Matrix Spike Dup (AB40359-MSD1)		**Source: 14A1588-01**			Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	0.211	0.0040	0.010	ug/l	0.250	ND	84.2	70-130	0.698	25	
1,2-Dibromoethane (EDB)	0.212	0.0050	0.020	"	0.250	ND	84.8	70-130	0.771	25	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Chlorinated Acids by EPA Method 515.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40536 - EPA 515.1											
Blank (AB40536-BLK1)					Prepared: 02/06/14 Analyzed: 02/07/14						
Acifluorfen	ND	0.50	1.0	ug/l							U
Bentazon	ND	0.40	0.40	"							U
2,4-D	ND	0.80	1.0	"							U
Dalapon	ND	6.0	6.0	"							U
2,4-DB	ND	4.0	5.0	"							U
Dicamba	ND	0.40	0.40	"							U
Dichlorprop	ND	1.0	1.0	"							U
Dinoseb	ND	0.80	1.0	"							U
4-Nitrophenol	ND	0.70	1.0	"							U
Pentachlorophenol	ND	0.20	0.20	"							U
Picloram	ND	0.50	1.0	"							U
2,4,5-T	ND	0.40	0.50	"							U
2,4,5-TP (Silvex)	ND	0.50	0.50	"							U
Surrogate: DCAA	*13.2*			*"*	*14.2*		*93.2*	*70-130*			
LCS (AB40536-BS1)					Prepared: 02/06/14 Analyzed: 02/07/14						
Acifluorfen	1.04	0.50	1.0	ug/l	0.960		109	70-130			
Bentazon	1.48	0.40	0.40	"	1.92		76.9	70-130			
2,4-D	1.68	0.80	1.0	"	1.92		87.8	48-124			
Dalapon	11.3	6.0	6.0	"	12.5		90.3	40-112			
2,4-DB	7.11	4.0	5.0	"	7.68		92.6	54-123			
Dicamba	0.876	0.40	0.40	"	0.960		91.3	70-130			
Dichlorprop	2.70	1.0	1.0	"	2.88		93.7	54-106			
Dinoseb	5.59	0.80	1.0	"	6.42		87.1	20-105			
4-Nitrophenol	1.13	0.70	1.0	"	0.960		117	60-202			
Pentachlorophenol	0.840	0.20	0.20	"	0.960		87.5	70-130			
Picloram	1.07	0.50	1.0	"	0.960		111	70-130			
2,4,5-T	0.892	0.40	0.50	"	0.960		93.0	68-166			
2,4,5-TP (Silvex)	0.900	0.50	0.50	"	0.960		93.7	70-130			
Surrogate: DCAA	*14.5*			*"*	*14.2*		*102*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Chlorinated Acids by EPA Method 515.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40536 - EPA 515.1											
LCS Dup (AB40536-BSD1)					Prepared: 02/06/14 Analyzed: 02/07/14						
Acifluorfen	1.03	0.50	1.0	ug/l	0.960		108	70-130	0.944	50	
Bentazon	1.63	0.40	0.40	"	1.92		84.8	70-130	9.86	50	
2,4-D	1.69	0.80	1.0	"	1.92		88.0	48-124	0.327	50	
Dalapon	11.4	6.0	6.0	"	12.5		91.2	40-112	0.968	50	
2,4-DB	7.24	4.0	5.0	"	7.68		94.3	54-123	1.84	50	
Dicamba	0.877	0.40	0.40	"	0.960		91.4	70-130	0.0891	50	
Dichlorprop	2.69	1.0	1.0	"	2.88		93.5	54-106	0.220	50	
Dinoseb	5.77	0.80	1.0	"	6.42		89.9	20-105	3.18	50	
4-Nitrophenol	0.901	0.70	1.0	"	0.960		93.8	60-202	22.3	50	J
Pentachlorophenol	0.841	0.20	0.20	"	0.960		87.6	70-130	0.0986	50	
Picloram	0.964	0.50	1.0	"	0.960		100	70-130	10.5	50	J
2,4,5-T	0.931	0.40	0.50	"	0.960		96.9	68-166	4.18	50	
2,4,5-TP (Silvex)	0.964	0.50	0.50	"	0.960		100	70-130	6.85	50	
Surrogate: DCAA	*14.2*			*"*	*14.2*		*99.8*	*70-130*			
Matrix Spike (AB40536-MS1)		**Source: 14A1588-01**			Prepared: 02/06/14 Analyzed: 02/08/14						
Acifluorfen	0.696	0.50	1.0	ug/l	0.960	ND	72.5	70-130			J
Bentazon	1.79	0.40	0.40	"	1.92	ND	93.0	70-130			
2,4-D	1.50	0.80	1.0	"	1.92	ND	78.3	48-124			
Dalapon	11.1	6.0	6.0	"	12.5	ND	88.8	40-112			
2,4-DB	7.08	4.0	5.0	"	7.68	ND	92.2	54-123			
Dicamba	0.867	0.40	0.40	"	0.960	ND	90.3	70-130			
Dichlorprop	2.75	1.0	1.0	"	2.88	ND	95.6	54-106			
Dinoseb	5.23	0.80	1.0	"	6.42	ND	81.4	20-105			
4-Nitrophenol	0.969	0.70	1.0	"	0.960	ND	101	60-202			J
Pentachlorophenol	0.642	0.20	0.20	"	0.960	ND	66.9	70-130			QM-07
Picloram	0.973	0.50	1.0	"	0.960	ND	101	70-130			J
2,4,5-T	0.862	0.40	0.50	"	0.960	ND	89.8	68-166			
2,4,5-TP (Silvex)	0.911	0.50	0.50	"	0.960	ND	94.9	70-130			
Surrogate: DCAA	*13.8*			*"*	*14.2*		*97.5*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Chlorinated Acids by EPA Method 515.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40536 - EPA 515.1											
Matrix Spike Dup (AB40536-MSD1)		**Source: 14A1588-01**			Prepared: 02/06/14 Analyzed: 02/08/14						
Acifluorfen	0.926	0.50	1.0	ug/l	0.960	ND	96.5	70-130	28.3	50	J
Bentazon	1.79	0.40	0.40	"	1.92	ND	93.5	70-130	0.474	50	
2,4-D	1.64	0.80	1.0	"	1.92	ND	85.2	48-124	8.45	50	
Dalapon	11.5	6.0	6.0	"	12.5	ND	92.3	40-112	3.86	50	
2,4-DB	7.32	4.0	5.0	"	7.68	ND	95.4	54-123	3.40	50	
Dicamba	0.910	0.40	0.40	"	0.960	ND	94.8	70-130	4.86	50	
Dichlorprop	2.90	1.0	1.0	"	2.88	ND	101	54-106	5.12	50	
Dinoseb	5.49	0.80	1.0	"	6.42	ND	85.5	20-105	4.84	50	
4-Nitrophenol	1.04	0.70	1.0	"	0.960	ND	108	60-202	6.64	50	
Pentachlorophenol	0.721	0.20	0.20	"	0.960	ND	75.1	70-130	11.5	50	
Picloram	1.16	0.50	1.0	"	0.960	ND	121	70-130	17.4	50	
2,4,5-T	0.945	0.40	0.50	"	0.960	ND	98.4	68-166	9.12	50	
2,4,5-TP (Silvex)	0.967	0.50	0.50	"	0.960	ND	101	70-130	5.94	50	
Surrogate: DCAA	*14.5*			*"*	*14.2*		*102*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Carbamates by EPA Method 531.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA42932 - HPLC											
Blank (AA42932-BLK1)					Prepared & Analyzed: 01/30/14						
Aldicarb	ND	0.70	3.0	ug/l							U
Aldicarb sulfone	ND	0.70	4.0	"							U
Aldicarb sulfoxide	ND	0.80	3.0	"							U
Carbaryl	ND	0.70	5.0	"							U
Carbofuran	ND	2.0	5.0	"							U
3-Hydroxycarbofuran	ND	0.90	3.0	"							U
Methiocarb	ND	2.0	5.0	"							U
Methomyl	ND	2.0	2.0	"							U
Oxamyl	ND	0.80	20	"							U
Propoxur	ND	2.0	5.0	"							U
LCS (AA42932-BS1)					Prepared & Analyzed: 01/30/14						
Aldicarb	20.2	0.70	3.0	ug/l	20.0		101	80-120			
Aldicarb sulfone	19.4	0.70	4.0	"	19.0		102	80-120			
Aldicarb sulfoxide	19.6	0.80	3.0	"	19.8		98.9	80-120			
Carbaryl	19.3	0.70	5.0	"	20.0		96.4	80-120			
Carbofuran	20.4	2.0	5.0	"	20.0		102	80-120			
3-Hydroxycarbofuran	20.7	0.90	3.0	"	20.0		104	80-120			
Methiocarb	20.4	2.0	5.0	"	20.0		102	80-120			
Methomyl	20.5	2.0	2.0	"	20.0		102	80-120			
Oxamyl	19.3	0.80	20	"	20.0		96.5	80-120			J
Propoxur	20.5	2.0	5.0	"	20.0		103	80-120			
LCS Dup (AA42932-BSD1)					Prepared & Analyzed: 01/30/14						
Aldicarb	19.9	0.70	3.0	ug/l	20.0		99.3	80-120	1.91	20	
Aldicarb sulfone	20.1	0.70	4.0	"	19.0		106	80-120	3.52	20	
Aldicarb sulfoxide	19.8	0.80	3.0	"	19.8		99.8	80-120	0.858	20	
Carbaryl	20.7	0.70	5.0	"	20.0		104	80-120	7.36	20	
Carbofuran	21.9	2.0	5.0	"	20.0		109	80-120	6.80	20	
3-Hydroxycarbofuran	20.3	0.90	3.0	"	20.0		102	80-120	1.87	20	
Methiocarb	19.1	2.0	5.0	"	20.0		95.3	80-120	6.64	20	
Methomyl	20.4	2.0	2.0	"	20.0		102	80-120	0.165	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Carbamates by EPA Method 531.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA42932 - HPLC											
LCS Dup (AA42932-BSD1)					Prepared & Analyzed: 01/30/14						
Oxamyl	19.5	0.80	20	ug/l	20.0		97.5	80-120	1.06	20	J
Propoxur	21.3	2.0	5.0	"	20.0		106	80-120	3.46	20	
Matrix Spike (AA42932-MS1)		**Source: 14A1643-01**			Prepared: 01/30/14 Analyzed: 01/31/14						
Aldicarb	19.4	0.70	3.0	ug/l	20.0	ND	97.2	80-120			
Aldicarb sulfone	19.6	0.70	4.0	"	19.0	ND	103	80-120			
Aldicarb sulfoxide	19.5	0.80	3.0	"	19.8	ND	98.6	80-120			
Carbaryl	20.0	0.70	5.0	"	20.0	ND	99.9	80-120			
Carbofuran	19.7	2.0	5.0	"	20.0	ND	98.4	80-120			
3-Hydroxycarbofuran	19.8	0.90	3.0	"	20.0	ND	98.9	80-120			
Methiocarb	19.1	2.0	5.0	"	20.0	ND	95.3	80-120			
Methomyl	20.3	2.0	2.0	"	20.0	ND	101	80-120			
Oxamyl	19.9	0.80	20	"	20.0	ND	99.7	80-120			J
Propoxur	19.8	2.0	5.0	"	20.0	ND	99.0	80-120			
Matrix Spike Dup (AA42932-MSD1)		**Source: 14A1643-01**			Prepared: 01/30/14 Analyzed: 01/31/14						
Aldicarb	18.6	0.70	3.0	ug/l	20.0	ND	92.9	80-120	4.53	20	
Aldicarb sulfone	19.0	0.70	4.0	"	19.0	ND	100	80-120	3.38	20	
Aldicarb sulfoxide	19.0	0.80	3.0	"	19.8	ND	96.1	80-120	2.58	20	
Carbaryl	19.3	0.70	5.0	"	20.0	ND	96.7	80-120	3.24	20	
Carbofuran	18.8	2.0	5.0	"	20.0	ND	94.1	80-120	4.43	20	
3-Hydroxycarbofuran	20.9	0.90	3.0	"	20.0	ND	104	80-120	5.39	20	
Methiocarb	18.4	2.0	5.0	"	20.0	ND	92.1	80-120	3.43	20	
Methomyl	19.6	2.0	2.0	"	20.0	ND	97.8	80-120	3.62	20	
Oxamyl	18.7	0.80	20	"	20.0	ND	93.3	80-120	6.68	20	J
Propoxur	19.5	2.0	5.0	"	20.0	ND	97.6	80-120	1.47	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Endothall by EPA Method 548.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40357 - EPA 548.1											
Blank (AB40357-BLK1)					Prepared: 02/04/14 Analyzed: 02/06/14						
Endothall	ND	2.0	45	ug/l							U
LCS (AB40357-BS1)					Prepared: 02/04/14 Analyzed: 02/06/14						
Endothall	209	2.0	45	ug/l	200		104	80-120			
LCS Dup (AB40357-BSD1)					Prepared: 02/04/14 Analyzed: 02/06/14						
Endothall	217	2.0	45	ug/l	200		108	80-120	3.75	30	
Matrix Spike (AB40357-MS1)		**Source: 14A1588-01**			Prepared: 02/04/14 Analyzed: 02/06/14						
Endothall	187	2.0	45	ug/l	200	ND	93.7	80-120			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Glyphosate by EPA Method 547 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40427 - HPLC											
Blank (AB40427-BLK1)					Prepared & Analyzed: 02/04/14						
Glyphosate	ND	3.0	10	ug/l							U
LCS (AB40427-BS1)					Prepared & Analyzed: 02/04/14						
Glyphosate	111	3.0	10	ug/l	120		92.7	66-126			
LCS Dup (AB40427-BSD1)					Prepared & Analyzed: 02/04/14						
Glyphosate	112	3.0	10	ug/l	120		93.7	66-126	1.08	30	
Matrix Spike (AB40427-MS1)		**Source: 14B0093-01**			Prepared: 02/04/14 Analyzed: 02/05/14						
Glyphosate	111	3.0	10	ug/l	120	ND	92.7	66-126			
Matrix Spike Dup (AB40427-MSD1)		**Source: 14B0093-01**			Prepared: 02/04/14 Analyzed: 02/05/14						
Glyphosate	110	3.0	10	ug/l	120	ND	92.0	66-126	0.801	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Diquat by EPA Method 549.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43118 - HPLC											
Blank (AA43118-BLK1)					Prepared: 02/03/14 Analyzed: 02/10/14						
Diquat	ND	2.0	2.0	ug/l							U
LCS (AA43118-BS1)					Prepared: 02/03/14 Analyzed: 02/10/14						
Diquat	16.5	2.0	2.0	ug/l	19.8		83.3	70-130			
LCS Dup (AA43118-BSD1)					Prepared: 02/03/14 Analyzed: 02/10/14						
Diquat	16.2	2.0	2.0	ug/l	19.8		81.6	70-130	2.03	25	
Matrix Spike (AA43118-MS1)		**Source: 14A1755-01**			Prepared: 02/03/14 Analyzed: 02/10/14						
Diquat	8.63	2.0	2.0	ug/l	19.8	ND	43.5	70-130			QM-05

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Haloacetic Acids by EPA Method 552.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40444 - EPA 552.2											
Blank (AB40444-BLK1)					Prepared: 02/05/14 Analyzed: 02/07/14						
Monobromoacetic Acid	ND	0.8	1.0	ug/l							U
Monochloroacetic Acid	ND	1.1	2.0	"							U
Dibromoacetic Acid	ND	0.8	1.0	"							U
Dichloroacetic Acid	ND	1.0	1.0	"							U
Trichloroacetic Acid	ND	1.0	1.0	"							U
Total Haloacetic Acids (HAA5)	ND	1.0	1.0	"							U
Surrogate: 2,3-Dibromopropionic Acid	*8.41*			*"*	*10.0*		*83.8*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*10.5*			*"*	*10.0*		*105*	*70-130*			
LCS (AB40444-BS1)					Prepared: 02/05/14 Analyzed: 02/07/14						
Monobromoacetic Acid	22.8	0.8	1.0	ug/l	25.0		91.1	70-130			
Monochloroacetic Acid	25.3	1.1	2.0	"	25.0		101	70-130			
Dibromoacetic Acid	22.8	0.8	1.0	"	25.0		91.0	70-130			
Dichloroacetic Acid	23.2	1.0	1.0	"	25.0		93.0	70-130			
Trichloroacetic Acid	21.8	1.0	1.0	"	25.0		87.2	70-130			
Surrogate: 2,3-Dibromopropionic Acid	*8.18*			*"*	*10.0*		*81.6*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*8.36*			*"*	*10.0*		*83.6*	*70-130*			
Matrix Spike (AB40444-MS1)		**Source: 14A1572-01**			Prepared: 02/05/14 Analyzed: 02/08/14						
Monobromoacetic Acid	26.0	0.8	1.0	ug/l	25.0	ND	104	70-130			
Monochloroacetic Acid	26.4	1.1	2.0	"	25.0	ND	106	70-130			
Dibromoacetic Acid	33.8	0.8	1.0	"	25.0	1.60	129	70-130			
Dichloroacetic Acid	25.3	1.0	1.0	"	25.0	ND	101	70-130			
Trichloroacetic Acid	25.6	1.0	1.0	"	25.0	1.23	97.4	70-130			
Surrogate: 2,3-Dibromopropionic Acid	*12.4*			*"*	*10.0*		*124*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*11.4*			*"*	*10.0*		*114*	*70-130*			
Matrix Spike (AB40444-MS2)		**Source: 14A1702-01**			Prepared: 02/05/14 Analyzed: 02/08/14						
Monobromoacetic Acid	23.4	0.8	1.0	ug/l	25.0	ND	93.6	70-130			
Monochloroacetic Acid	25.5	1.1	2.0	"	25.0	ND	102	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 10:55

Haloacetic Acids by EPA Method 552.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40444 - EPA 552.2											
Matrix Spike (AB40444-MS2)		**Source: 14A1702-01**			Prepared: 02/05/14 Analyzed: 02/08/14						
Dibromoacetic Acid	31.1	0.8	1.0	ug/l	25.0	ND	124	70-130			
Dichloroacetic Acid	36.3	1.0	1.0	"	25.0	12.8	94.3	70-130			
Trichloroacetic Acid	34.6	1.0	1.0	"	25.0	12.2	89.6	70-130			
Surrogate: 2,3-Dibromopropionic Acid	*12.7*			*"*	*10.0*		*127*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*9.49*			*"*	*10.0*		*94.9*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Semivolatile Organic Compounds by EPA Method 525.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40727 - EPA 525.2											
Blank (AB40727-BLK1)					Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	ND	0.080	0.10	ug/l							U
Di(2-ethylhexyl)adipate	ND	0.40	5.0	"							U
Di(2-ethylhexyl)phthalate	ND	0.20	3.0	"							U
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.23*			*"*	*5.00*		*105*	*70-130*			
Surrogate: Perylene-d12	*3.73*			*"*	*5.00*		*74.6*	*70-130*			
Surrogate: Triphenyl phosphate	*4.72*			*"*	*5.00*		*94.4*	*70-130*			
LCS (AB40727-BS1)					Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	2.13	0.080	0.10	ug/l	3.00		71.0	70-130			
Di(2-ethylhexyl)adipate	2.49	0.40	5.0	"	3.00		83.0	70-130			J
Di(2-ethylhexyl)phthalate	2.40	0.20	3.0	"	3.00		80.0	70-130			J
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.36*			*"*	*5.00*		*107*	*70-130*			
Surrogate: Perylene-d12	*4.65*			*"*	*5.00*		*93.0*	*70-130*			
Surrogate: Triphenyl phosphate	*5.36*			*"*	*5.00*		*107*	*70-130*			
LCS Dup (AB40727-BSD1)					Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	2.40	0.080	0.10	ug/l	3.00		80.0	70-130	11.9	20	
Di(2-ethylhexyl)adipate	2.70	0.40	5.0	"	3.00		90.0	70-130	8.09	20	J
Di(2-ethylhexyl)phthalate	2.57	0.20	3.0	"	3.00		85.7	70-130	6.84	20	J
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.39*			*"*	*5.00*		*108*	*70-130*			
Surrogate: Perylene-d12	*4.84*			*"*	*5.00*		*96.8*	*70-130*			
Surrogate: Triphenyl phosphate	*5.47*			*"*	*5.00*		*109*	*70-130*			
Matrix Spike (AB40727-MS1)		**Source: 14A1714-01**			Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	2.79	0.080	0.10	ug/l	3.00	ND	93.0	70-130			
Di(2-ethylhexyl)adipate	3.11	0.40	5.0	"	3.00	ND	104	70-130			J
Di(2-ethylhexyl)phthalate	2.79	0.20	3.0	"	3.00	ND	93.0	70-130			J
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.27*			*"*	*5.00*		*105*	*70-130*			
Surrogate: Perylene-d12	*5.52*			*"*	*5.00*		*110*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 10:55

Semivolatile Organic Compounds by EPA Method 525.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40727 - EPA 525.2											
Matrix Spike (AB40727-MS1)		**Source: 14A1714-01**			Prepared: 02/08/14 Analyzed: 02/13/14						
Surrogate: Triphenyl phosphate	*5.65*			*ug/l*	*5.00*		*113*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Project: Project Number:	Dr. Bill Motzer Groundwater Reuse Project 60408	Reported: 02/18/14 10:55

Notes and Definitions

J	Detected but below the Reporting Limit; therefore, result is an estimated concentration, detected but not quantified (DNQ).
QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
U	Analyte included in analysis, but not detected at or above MDL.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

ASBESTOS TEM LABORATORIES, INC.

EPA 600/4-83 Drinking Water
Transmission Electron Microscopy
Analytical Report

Laboratory Job # 1288-00569

630 Bancroft Way
Berkeley, CA 94710
(510) 704-8930
FAX (510) 704-8429

ASBESTOS TEM LABORATORIES, INC

Certified by
CA DPH ELAP
Lab No. 1866

Feb/07/2014

David Pingatore
Alpha Analytical Laboratories, Inc.
208 Mason Street
Ukiah, CA 95482

RE: LABORATORY JOB # 1288-00569
Transmission electron microscopy analytical results for 1 water sample(s).
Job Site: PRTIW (at Mission Memorial)
Job No.: 14A1635

Enclosed please find results for the TEM analysis of one or more water samples. The analytical procedures were performed according to EPA Method 100.2 for the analysis of asbestos in drinking water.

Prior to analysis, samples are checked for damage, disruption of any chain-of-custody seals, and completeness of accompanying paperwork. If no problems are found, samples are then logged-in, each given a unique laboratory number, and a hard copy containing all pertinent information is generated. This, and all other relevant paper work are kept with each sample throughout the analytical procedures to assure proper analysis.

Preparation of water samples is performed within a HEPA filtered, Class 100 air, laminar flow clean bench environment. Prior to filtration, water sample containers are ultrasonicated, and the exterior surfaces cleaned. An aliquot of water is drawn from the sample container and drawn through a special filtration apparatus and collected onto a mixed cellulose ester (MCE) or polycarbonate (PC) filter. The filters are removed from the apparatus and dried. A portion of each sample filter is sectioned, placed onto a glass microscope slide, and carbon coated. The filters are further sectioned and placed carbon side up onto 200-mesh copper TEM sample grids in a solvent bath until all filter material is dissolved. The TEM grids are removed and placed into labeled grid storage boxes.

TEM analysis is performed on a Philips EM-300 or CM-12 transmission electron microscope operating at 80 or 100 kV. Initially, the grid is scanned at low and medium magnification to insure proper sample loading, and coherence of the carbon support film. Then TEM grid openings are analyzed at a magnification of 10,000X. All fibers >10 um in length and exhibiting an aspect ratio >3:1 are analyzed. Scanning continues until either 100 asbestiform fibers >10um in length are counted, or an analytical sensitivity of 0.2 million fibers per liter (MFL) is achieved. Analyzed fibers are subjected to detailed morphological and selected area diffraction (SAED) analysis. Fibers indicated as asbestos, or potentially asbestos, are further analyzed by energy dispersive X-ray (EDX) analysis as needed. The number of asbestos fibers detected, and other analytical parameters, are then used to calculate the concentration of asbestos in MFL. The results are entered into a standard report format and reviewed by the analyst and the laboratory manager before release to the client.

Sincerely Yours,

Laboratory Manager
ASBESTOS TEM LABORATORIES, INC.

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www.asbestostemlabs.com *With Offices in Reno, NV (775) 359-3377*

TRANSMISSION ELECTRON MICROSCOPY ANALYTICAL REPORT

Contact:	David Pingatore		
Address:	Alpha Analytical Laboratories, Inc. 208 Mason Street Ukiah, CA 95482	Report No.:	**323834**
		Date:	Feb-07-14
		Total Samples Analyzed:	1
Job Site / No.	PRTIW (at Mission Memorial) 14A1635	Sample Collector:	

CLIENT SAMPLE # **14A1635-01**

Laboratory Sample # 1288-00569-001

SAMPLE LOCATION/DESCRIPTION

WATER SAMPLE DATA

Date/Time Collected	Jan-29-14 / 2:57 pm	Volume Submitted (ml)	1000
Date/Time Lab Received	Jan-30-14 / 4:40 pm	Volume Filtered (ml)	15
Date/Time Filtered	Jan-30-14 / 7:40 pm	Filter & Pore Size	MCE 0.22
Date/Time Analyzed	Feb-07-14 / 9:00 am	UV/Ozone Treated:	NO

IDENTIFIED STRUCTURES (>10um)			
ASBESTOS		OTHER	
CHRYS	AMPH	AMBIG	NON-ASB
NSD	NSD	NSD	NSD

CALCULATED ASBESTOS STRUCTURE CONCENTRATION (>10um)		
CHRYS	AMPH	TOTAL
< 0.1 MFL	< 0.1 MFL	< 0.1 MFL

COMMENTS

No asbestos detected

Filter Loading: MODERATE

SAED Photo ID Nos.

TEM / ANALYTICAL PARAMETERS

Grid Openings Scanned at 10,000X	8	Analytical Sensitivity	0.1 MFL
Grid Opening Area (mm2)	0.0094	95% UCL	0.33 MFL
Scan Area (mm2)	0.0752	95% LCL	0 MFL

WATER SAMPLE LAB BLANK RESULTS

Lab ID#	Blank 9459	Analytical Sensitivity	0.01 MFL
Grid Openings Scanned at 10,000X	8	Asbestos Structure Concentration	<0.01 MFL
Volume Filtered (ml)	300		

NOTATION KEY

Chrys. - Chrysotile Asbestos
Amph. - Amphibole Asbestos
NSD - No Structures Detected
1 mm = 1 millimeter

1 um = 1 micron = 0.001 mm
MFL = Millions of Fibers per Liter
UCL = Upper Confidence Level
LCL = Lower Confidence Level

ANALYST SIGNATURE

Stephanie Dunn

LAB QC REVIEWER SIGNATURE

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1401905

Report Created for: Alpha Analytical Laboratories
208 Mason Street
Ukiah, CA 95482

Project Contact: David S. Pingatore
Project P.O.:
Project Name: #14A1635

Project Received: 01/31/2014

Analytical Report reviewed & approved for release on 02/06/2014 by:

Question about your data?

Click here to email McCampbell

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Glossary of Terms & Qualifier Definitions

Client: Alpha Analytical Laboratories
Project: #14A1635
WorkOrder: 1401905

Glossary Abbreviation	Description
95% Interval	95% Confident Interval
DF	Dilution Factor
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not detected at or above the indicated MDL or RL
NR	Matrix interferences, or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix; or sample diluted due to high matrix or analyte content.
RD	Relative Difference
RL	Reporting Limit
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
TEQ	Toxicity Equivalence

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Analytical Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	1401905
Project:	#14A1635	**Extraction Method**	E218.6
Date Received:	1/31/14 12:18	**Analytical Method:**	E218.6
Date Prepared:	1/31/14	**Unit:**	µg/L

Hexachrome by IC

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
PRTIW (at Mission Merorial)	**1401905-001A**	**Water**	**01/29/2014 14:57**	**IC2**	**86616**

Analytes	Result	RL	DF	Date Analyzed
Hexachrome	**1.6**	0.050	1	01/31/2014 16:52

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Quality Control Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	1401905
Date Prepared:	1/31/14	**BatchID:**	86616
Date Analyzed:	1/31/14	**Extraction Method**	E218.6
Instrument:	IC2	**Analytical Method:**	E218.6
Matrix:	Water	**Unit:**	µg/L
Project:	#14A1635	**Sample ID:**	MB/LCS-86616 1401905-001AMS/MSD

QC Summary Report for E218.6

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Hexachrome	ND	25.38	0.050	25	-	102	90-110

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Hexachrome	24.94	25.03	25	1.560	93.5	93.9	90-110	0.360	10

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1401905 **ClientCode: ALPU**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
David S. Pingatore
Alpha Analytical Laboratories
208 Mason Street
Ukiah, CA 95482
(707) 468-0401 FAX: (707) 468-5267

Email: sspeaks@alpha-labs.com;david@alpha-lab
cc:
PO:
ProjectNo: #14A1635

Bill to:
Accounts Payable
Alpha Analytical Laboratories
208 Mason Street
Ukiah, CA 95482

Requested TAT: 5 days

Date Received: 01/31/2014
Date Printed: 01/31/2014

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
1401905-001	PRTIW (at Mission Merorial)	Water	1/29/2014 14:57	☐	A											

Test Legend:

1	218_6_DW	2		3		4		5	
6		7		8		9		10	
11		12							

Prepared by: Maria Venegas

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

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WORK ORDER SUMMARY

Client Name: ALPHA ANALYTICAL LABORATORIES
QC Level: LEVEL 2
Work Order: 1401905
Project: #14A1635
Client Contact: David S. Pingatore
Date Received: 1/31/2014
Comments:
Contact's Email: sspeaks@alpha-labs.com;david@alpha-labs.com

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Number of Containers	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1401905-001A	PRTIW (at Mission Merorial)	Water	E218.6 (Hexachrome)	1	250mL HDPE w/ (NH4)2SO4	☐	1/29/2014 14:57	5 days	Trace	☐	

*** NOTE: STLC and TCLP extractions require 48 hrs to complete; therefore, all TATs begin after the extraction is completed (i.e., 24hr TAT yields results in 72 hrs from sample submission).**

Bottle Legend:

250mL HDPE w/ (NH4)2SO4 = 250mL HDPE Bottle w/ Ammonium Sulfate

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

1401905

14A1635

SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: David S. Pingatore

RECEIVING LABORATORY:

McCampbell Analytical
1534 Willowpass Rd.
Pittsburg, CA 94565
Phone :(925) 252-9262
Fax: (925) 252-9269
Terms: Net 30

Analysis	Due	Expires	Comments
14A1635-01 PRTIW (At Mission Memorial) [Water] Sampled 01/29/14 14:57			
Pacific			
Cr6 218.6 DW	02/13/14 12:00	02/03/14 14:57	
Containers Supplied:			
250ml Poly - (NH4)2SO4 (A			

☐ *Report to State*

System Name: _____ **Employed by:** _____

User ID: _____ **Sampler:** _____

System Number: _____

NO

ICE/t° 3.2
GOOD CONDITION_____ APPROPRIATE CONTAINERS_____
HEAD SPACE ABSENT_____
DECHLORINATED IN LAB_____ PRESERVED IN LAB_____

PRESERVATION	VOAS	O&G	METALS	OTHER

Released By	Date	Received By	Date
	01/31/14		1/31/14
	1/31/14		1/31/14 1150

Page 1 of 1

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"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Sample Receipt Checklist

Client Name: **Alpha Analytical Laboratories**

Date and Time Received: **1/31/2014 12:18:34 PM**

Project Name: **#14A1635**

LogIn Reviewed by: Maria Venegas

WorkOrder N°: **1401905** Matrix: Water

Carrier: Client Drop-In

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐
Chain of custody signed when relinquished and received?	Yes ☑	No ☐
Chain of custody agrees with sample labels?	Yes ☑	No ☐
Sample IDs noted by Client on COC?	Yes ☑	No ☐
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐
Sampler's name noted on COC?	Yes ☐	No ☑

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp: 3.2°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	NA ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☑	No ☐	

(Ice Type: BLUE ICE)

** NOTE: If the "No" box is checked, see comments below.*

Comments:

ALS Environmental
ALS Group USA, Corp.
1317 South 13th Avenue
Kelso, WA 98626
T: +1 360 577 7222
F: +1 360 636 1068
www.alsglobal.com

February 21, 2014 Analytical Report for Service Request No: K1400991

David Pingatore
Alpha Analytical Laboratories, Inc.
6398 Dougherty Road, Suite 35
Dublin, CA 94568

RE: 14A1635

Dear David:

Enclosed are the results of the sample submitted to our laboratory on January 31, 2014. For your reference, these analyses have been assigned our service request number K1400991.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3293. You may also contact me via Email at Shar.Samy@alsglobal.com.

Respectfully submitted,

ALS Group USA Corp. dba ALS Environmental

Shar Samy, Ph.D.
Project Manager

SS/mj

RIGHT SOLUTIONS | RIGHT PARTNER

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2286
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L12-28
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Georgia DNR	http://www.gaepd.org/Documents/techguide_pcb.html#cel	881
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
Indiana DOH	http://www.in.gov/isdh/24859.htm	C-WA-01
ISO 17025	http://www.pjlabs.com/	L12-27
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	3016
Maine DHS	Not available	WA0035
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-368
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA35
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA200001
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	4704427-08-TX
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C1203
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.caslab.com or at the accreditation bodies web site

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

ALS ENVIRONMENTAL

Client:	Alpha Analytical Laboratories, Inc.	**Service Request No.:**	K1400991
Project:	14A1635	**Date Received:**	01/31/14
Sample Matrix:	Water		

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Matrix/Duplicate Matrix Spike (MS/DMS), and Laboratory Control Sample (LCS).

Sample Receipt

One water sample was received for analysis at ALS Environmental on 01/31/14. The sample was received in good condition and consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4ºC upon receipt at the laboratory.

Explosives by EPA Method 8330

Elevated Detection Limits:
The detection limit was elevated for 3,5-Dinitroaniline in sample 14A1635-01. The chromatogram indicated the presence of non-target background components. The matrix interference prevented adequate resolution of the target compound at the normal limit. No further corrective action was appropriate.

Sample Notes and Discussion:
Insufficient sample volume was received to perform a Matrix Spike/Matrix Spike Duplicate (MS/MSD). A Laboratory Control Sample/Duplicate Laboratory Control Sample (LCS/DLCS) was analyzed and reported in lieu of the MS/MSD.

No other anomalies associated with the analysis of this sample were observed.

Approved by_____

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

14A1643 K1400990

SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: David S. Pingatore

RECEIVING LABORATORY:

ALS Environmental - Kelso
1317 S. 13th Ave
Kelso, WA 98626
Phone :(360) 577-7222
Fax: -
Terms: Net 30

Analysis	Due	Expires	Comments
14A1643-01 MRWPCA MW-1 [Water] Sampled 01/29/14 14:15 Pacific			
8330B Explosives Water	02/13/14 12:00	02/05/14 14:15	
Containers Supplied:			
1L Amber- Unpres. (AD) 1L Amber- Unpres. (AE)			

☐ *Report to State*

System Name: _____ **Employed by:** _____

User ID: _____ **Sampler:** _____

System Number: _____

+QC

Released By	Date	Received By	Date
	1-30-14	ALS	1/31/14 1020

ALS

PC SHAK

Cooler Receipt and Preservation Form

Client / Project: Alpha Analytical Service Request K14 00991

Received: 1/31/14 Opened: 1/31/14 By: UL Unloaded: 1/31/14 By: UL

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? _____

   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
-0.1	-0.3	—	—	-0.2	337	14A1643/14A1635	1289425001489639 52	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

Page ____ *of* ____

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Alpha Analytical Laboratories, Inc. (Uki	**Service Request:**	K1400991
Project:	14A1635	**Date Collected:**	01/29/2014
Sample Matrix:	Water	**Date Received:**	01/31/2014

Nitroaromatics and Nitramines (Explosives)

Sample Name:	14A1635-01	**Units:**	ug/L
Lab Code:	K1400991-001	**Basis:**	NA
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	8330B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
HMX	ND	U	0.099	0.010	1	02/04/14	02/08/14	KWG1400907	
RDX	ND	U	0.099	0.017	1	02/04/14	02/08/14	KWG1400907	
1,3,5-Trinitrobenzene	ND	U	0.20	0.050	1	02/04/14	02/08/14	KWG1400907	
1,3-Dinitrobenzene	ND	U	0.099	0.0085	1	02/04/14	02/08/14	KWG1400907	
3,5-Dinitroaniline	ND	Ui	0.099	0.053	1	02/04/14	02/08/14	KWG1400907	
TETRYL	ND	U	0.10	0.042	1	02/04/14	02/08/14	KWG1400907	
Nitrobenzene	ND	U	0.099	0.013	1	02/04/14	02/08/14	KWG1400907	
4-Amino-2,6-dinitrotoluene	ND	U	0.099	0.016	1	02/04/14	02/08/14	KWG1400907	
2-Amino-4,6-dinitrotoluene	ND	U	0.099	0.0089	1	02/04/14	02/08/14	KWG1400907	
2,4,6-Trinitrotoluene	ND	U	0.099	0.026	1	02/04/14	02/08/14	KWG1400907	
2,6-Dinitrotoluene	ND	U	0.20	0.054	1	02/04/14	02/08/14	KWG1400907	
2,4-Dinitrotoluene	ND	U	0.099	0.0091	1	02/04/14	02/08/14	KWG1400907	
2-Nitrotoluene	ND	U	0.10	0.032	1	02/04/14	02/08/14	KWG1400907	
4-Nitrotoluene	ND	U	0.099	0.019	1	02/04/14	02/08/14	KWG1400907	
3-Nitrotoluene	ND	U	0.099	0.0064	1	02/04/14	02/08/14	KWG1400907	
Nitroglycerin	ND	U	0.99	0.39	1	02/04/14	02/08/14	KWG1400907	
Pentaerythritol Tetranitrate	ND	U	0.50	0.18	1	02/04/14	02/08/14	KWG1400907	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1-Chloro-3-nitrobenzene	87	23-98	02/08/14	Acceptable

Comments:

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Alpha Analytical Laboratories, Inc. (Uki	**Service Request:**	K1400991
Project:	14A1635	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Nitroaromatics and Nitramines (Explosives)

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG1400907-3	**Basis:**	NA
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	8330B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
HMX	ND	U	0.099	0.010	1	02/04/14	02/08/14	KWG1400907	
RDX	ND	U	0.099	0.017	1	02/04/14	02/08/14	KWG1400907	
1,3,5-Trinitrobenzene	ND	U	0.20	0.050	1	02/04/14	02/08/14	KWG1400907	
1,3-Dinitrobenzene	ND	U	0.099	0.0085	1	02/04/14	02/08/14	KWG1400907	
3,5-Dinitroaniline	ND	U	0.099	0.013	1	02/04/14	02/08/14	KWG1400907	
TETRYL	ND	U	0.10	0.042	1	02/04/14	02/08/14	KWG1400907	
Nitrobenzene	ND	U	0.099	0.013	1	02/04/14	02/08/14	KWG1400907	
4-Amino-2,6-dinitrotoluene	ND	U	0.099	0.016	1	02/04/14	02/08/14	KWG1400907	
2-Amino-4,6-dinitrotoluene	ND	U	0.099	0.0089	1	02/04/14	02/08/14	KWG1400907	
2,4,6-Trinitrotoluene	ND	U	0.099	0.026	1	02/04/14	02/08/14	KWG1400907	
2,6-Dinitrotoluene	ND	U	0.20	0.054	1	02/04/14	02/08/14	KWG1400907	
2,4-Dinitrotoluene	ND	U	0.099	0.0091	1	02/04/14	02/08/14	KWG1400907	
2-Nitrotoluene	ND	U	0.10	0.032	1	02/04/14	02/08/14	KWG1400907	
4-Nitrotoluene	ND	U	0.099	0.019	1	02/04/14	02/08/14	KWG1400907	
3-Nitrotoluene	ND	U	0.099	0.0064	1	02/04/14	02/08/14	KWG1400907	
Nitroglycerin	ND	U	0.99	0.39	1	02/04/14	02/08/14	KWG1400907	
Pentaerythritol Tetranitrate	ND	U	0.50	0.18	1	02/04/14	02/08/14	KWG1400907	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1-Chloro-3-nitrobenzene	68	23-98	02/08/14	Acceptable

Comments:

Client: Alpha Analytical Laboratories, Inc. (Uki
Service Request: K1400991
Project: 14A1635
Sample Matrix: Water

Surrogate Recovery Summary
Nitroaromatics and Nitramines (Explosives)

Extraction Method: METHOD
Units: Percent
Analysis Method: 8330B
Level: Low

Sample Name	Lab Code	Sur1
14A1635-01	K1400991-001	87
Method Blank	KWG1400907-3	68
Lab Control Sample	KWG1400907-1	70
Duplicate Lab Control Sample	KWG1400907-2	69

Surrogate Recovery Control Limits (%)

Sur1 = 1-Chloro-3-nitrobenzene 23-98

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	Alpha Analytical Laboratories, Inc. (Uki	**Service Request:**	K1400991
Project:	14A1635	**Date Extracted:**	02/04/2014
Sample Matrix:	Water	**Date Analyzed:**	02/08/2014

Lab Control Spike/Duplicate Lab Control Spike Summary
Nitroaromatics and Nitramines (Explosives)

Extraction Method:	METHOD	**Units:**	ug/L
Analysis Method:	8330B	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG1400907

	Lab Control Sample KWG1400907-1 Lab Control Spike			Duplicate Lab Control Sample KWG1400907-2 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
HMX	6.40	8.00	80	6.33	8.00	79	11-147	1	30
RDX	6.20	8.00	77	6.17	8.00	77	10-142	0	30
1,3,5-Trinitrobenzene	5.95	8.00	74	5.93	8.00	74	16-137	0	30
1,3-Dinitrobenzene	6.03	8.00	75	6.01	8.00	75	26-125	0	30
3,5-Dinitroaniline	5.95	8.00	74	5.91	8.00	74	30-133	1	30
TETRYL	6.12	8.00	77	6.00	8.00	75	29-123	2	30
Nitrobenzene	5.92	8.00	74	5.88	8.00	74	10-116	1	30
4-Amino-2,6-dinitrotoluene	6.09	8.00	76	6.08	8.00	76	55-117	0	30
2-Amino-4,6-dinitrotoluene	5.98	8.00	75	5.95	8.00	74	54-116	0	30
2,4,6-Trinitrotoluene	5.93	8.00	74	5.90	8.00	74	47-118	1	30
2,6-Dinitrotoluene	5.98	8.00	75	5.95	8.00	74	40-108	1	30
2,4-Dinitrotoluene	5.89	8.00	74	5.85	8.00	73	50-111	1	30
2-Nitrotoluene	5.64	8.00	70	5.58	8.00	70	12-110	1	30
4-Nitrotoluene	5.64	8.00	71	5.57	8.00	70	16-113	1	30
3-Nitrotoluene	5.92	8.00	74	5.84	8.00	73	13-109	1	30
Nitroglycerin	6.30	8.00	79	6.13	8.00	77	15-136	3	30
Pentaerythritol Tetranitrate	6.19	8.00	77	6.18	8.00	77	66-103	0	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

WECK LABORATORIES, INC.
Analytical Laboratory Service - Since 1964

Certificate of Analysis

Report Date: 02/24/14 10:55
Received Date: 01/31/14 10:20
Turnaround Time: Normal

Project: 14A1635

Phones: (925) 872-9637
Fax: (707) 468-5267

P.O. #:

Attn: David S. Pingatore

Client: Alpha Analytical Laboratories - Ukiah
208 Mason St
Ukiah, CA 95482

Dear David S. Pingatore :

Enclosed are the results of analyses for samples received 1/31/2014 with the Chain of Custody document. The samples were received in good condition, at 2.4 °C and on ice. All analysis met the method criteria except as noted below or in the report with data qualifiers.

Lab Sample ID: 4A31033-01 **Sample ID: 14A1635-01** **Matrix:** Water
Sampled by: Client **Sampled: 01/29/14 14:57** **Sample Note: PRTIW (At Mission Memorial)**

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
N-Nitrosodiethylamine	ND		2.0	ng/l	1	EPA 1625M	2/3/14	2/5/14 2:37	W4B0023	
N-Nitrosodimethylamine	**5.4**		2.0	ng/l	1	EPA 1625M	2/3/14	2/5/14 2:37	W4B0023	
N-Nitrosodi-n-butylamine	ND		2.0	ng/l	1	EPA 1625M	2/3/14	2/5/14 2:37	W4B0023	
N-Nitrosodi-n-propylamine	ND		2.0	ng/l	1	EPA 1625M	2/3/14	2/5/14 2:37	W4B0023	
N-Nitrosomethylethylamine	ND		2.0	ng/l	1	EPA 1625M	2/3/14	2/5/14 2:37	W4B0023	
N-Nitrosomorpholine	ND		2.0	ng/l	1	EPA 1625M	2/3/14	2/5/14 2:37	W4B0023	
N-Nitrosopiperidine	ND		2.0	ng/l	1	EPA 1625M	2/3/14	2/5/14 2:37	W4B0023	
N-Nitrosopyrrolidine	ND		2.0	ng/l	1	EPA 1625M	2/3/14	2/5/14 2:37	W4B0023	
17-a-Ethynylestradiol	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 18:22	W4B0281	
17-b-Estradiol	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 18:22	W4B0281	
Estrone	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 18:22	W4B0281	
Progesterone	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 18:22	W4B0281	
Testosterone	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 18:22	W4B0281	
Bisphenol A	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 23:20	W4B0283	
Gemfibrozil	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 23:20	W4B0283	
Ibuprofen	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 23:20	W4B0283	
Iopromide	ND		5.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 23:20	W4B0283	
Naproxen	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 23:20	W4B0283	
Salicylic Acid	ND		50	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 23:20	W4B0283	
Triclosan	ND		2.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 23:20	W4B0283	

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Lab Sample ID: 4A31033-01 **Sample ID:** 14A1635-01 **Matrix:** Water
Sampled by: Client **Sampled:** 01/29/14 14:57 **Sample Note:** PRTIW (At Mission Memorial)

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
Acetaminophen	ND		20	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
Amoxicillin	ND		10	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
Atenolol	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
Atorvastatin	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
Azithromycin	ND		10	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
Caffeine	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
Carbamazepine	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
Ciprofloxacin	ND		5.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
Cotinine	ND		2.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
DEET	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
Diazepam	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
Fluoxetine	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
Meprobamate	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
Methadone	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
Oxybenzone	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
Phenytoin	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
Primidone	ND		10	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	R-01
Sucralose	ND		5.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
Sulfamethoxazole	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
TCEP	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
TCPP	**3.2**		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	B
TDCPP	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	
Trimethoprim	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/18/14 23:49	W4B0282	

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Quality Control Section

Nitrosamines by isotopic dilution GC/MS CI Mode - Quality Control

Batch W4B0023 - EPA 1625M

Blank (W4B0023-BLK1) — **Prepared: 02/03/14 Analyzed: 02/04/14 21:48**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine		ND		ng/l					
N-Nitrosomethylethylamine		ND		ng/l					
N-Nitrosodiethylamine		ND		ng/l					
N-Nitrosodi-n-propylamine		ND		ng/l					
N-Nitrosomorpholine		ND		ng/l					
N-Nitrosopyrrolidine		ND		ng/l					
N-Nitrosopiperidine		ND		ng/l					
N-Nitrosodi-n-butylamine		ND		ng/l					

Blank (W4B0023-BLK2) — **Prepared: 02/03/14 Analyzed: 02/05/14 14:48**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine		ND	QC-2	ng/l					
N-Nitrosomethylethylamine		ND	QC-2	ng/l					
N-Nitrosodiethylamine		ND	QC-2	ng/l					
N-Nitrosodi-n-propylamine		ND	QC-2	ng/l					
N-Nitrosomorpholine		ND	QC-2	ng/l					
N-Nitrosopyrrolidine		ND	QC-2	ng/l					
N-Nitrosopiperidine		ND	QC-2	ng/l					
N-Nitrosodi-n-butylamine		ND	QC-2	ng/l					

LCS (W4B0023-BS1) — **Prepared: 02/03/14 Analyzed: 02/04/14 22:17**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine		3.47		ng/l	3.00	116	50-150		
N-Nitrosomethylethylamine		2.67		ng/l	3.00	89	50-150		
N-Nitrosodiethylamine		2.79		ng/l	3.00	93	50-150		
N-Nitrosodi-n-propylamine		1.94		ng/l	3.00	65	50-150		
N-Nitrosomorpholine		2.50		ng/l	3.00	83	50-150		
N-Nitrosopyrrolidine		2.91		ng/l	3.00	97	50-150		
N-Nitrosopiperidine		2.83		ng/l	3.00	94	50-150		
N-Nitrosodi-n-butylamine		3.49		ng/l	3.00	116	50-150		

LCS (W4B0023-BS2) — **Prepared: 02/03/14 Analyzed: 02/05/14 13:23**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine		3.61	QC-2	ng/l	3.00	120	50-150		
N-Nitrosomethylethylamine		2.65	QC-2	ng/l	3.00	88	50-150		
N-Nitrosodiethylamine		2.20	QC-2	ng/l	3.00	73	50-150		
N-Nitrosodi-n-propylamine		1.95	QC-2	ng/l	3.00	65	50-150		
N-Nitrosomorpholine		3.06	QC-2	ng/l	3.00	102	50-150		
N-Nitrosopyrrolidine		2.94	QC-2	ng/l	3.00	98	50-150		
N-Nitrosopiperidine		3.14	QC-2	ng/l	3.00	105	50-150		
N-Nitrosodi-n-butylamine		4.29	QC-2	ng/l	3.00	143	50-150		

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Nitrosamines by isotopic dilution GC/MS CI Mode - Quality Control

Batch W4B0023 - EPA 1625M

Matrix Spike (W4B0023-MS1) **Source: 4A31028-01** **Prepared: 02/03/14** **Analyzed: 02/04/14 23:15**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine	ND	2.69		ng/l	3.00	90	50-150		
N-Nitrosomethylethylamine	ND	2.88		ng/l	3.00	96	50-150		
N-Nitrosodiethylamine	ND	3.34		ng/l	3.00	111	50-150		
N-Nitrosodi-n-propylamine	ND	2.40		ng/l	3.00	80	50-150		
N-Nitrosomorpholine	ND	2.95		ng/l	3.00	98	50-150		
N-Nitrosopyrrolidine	ND	3.14		ng/l	3.00	105	50-150		
N-Nitrosopiperidine	ND	2.87		ng/l	3.00	96	50-150		
N-Nitrosodi-n-butylamine	ND	3.46		ng/l	3.00	115	50-150		

Matrix Spike Dup (W4B0023-MSD1) **Source: 4A31028-01** **Prepared: 02/03/14** **Analyzed: 02/04/14 22:46**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine	ND	2.76		ng/l	3.00	92	50-150	3	30
N-Nitrosomethylethylamine	ND	2.78		ng/l	3.00	93	50-150	4	30
N-Nitrosodiethylamine	ND	4.40		ng/l	3.00	147	50-150	27	30
N-Nitrosodi-n-propylamine	ND	3.11		ng/l	3.00	104	50-150	26	30
N-Nitrosomorpholine	ND	2.92		ng/l	3.00	97	50-150	1	30
N-Nitrosopyrrolidine	ND	3.14		ng/l	3.00	105	50-150	0.3	30
N-Nitrosopiperidine	ND	3.28		ng/l	3.00	109	50-150	14	30
N-Nitrosodi-n-butylamine	ND	4.74	MS-05	ng/l	3.00	158	50-150	31	30

PPCPs - Pharmaceuticals by LC/MSMS-ESI+ - Quality Control

Batch W4B0282 - EPA 1694M-ESI+

Blank (W4B0282-BLK1) **Prepared: 02/07/14** **Analyzed: 02/18/14 22:39**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Acetaminophen		ND		ng/l					
Caffeine		ND		ng/l					
Sulfamethoxazole		ND		ng/l					
Trimethoprim		ND		ng/l					
Azithromycin		ND		ng/l					
Cotinine		ND		ng/l					
Atenolol		ND		ng/l					
Ciprofloxacin		ND		ng/l					
Carbamazepine		ND		ng/l					
DEET		ND		ng/l					
Fluoxetine		ND		ng/l					
Atorvastatin		ND		ng/l					
Methadone		ND		ng/l					
Primidone		ND		ng/l					
Diazepam		ND		ng/l					
TCPP		2.23	B	ng/l					
TCEP		ND		ng/l					
TDCPP		ND		ng/l					
Phenytoin		ND		ng/l					

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PPCPs - Pharmaceuticals by LC/MSMS-ESI+ - Quality Control

Batch W4B0282 - EPA 1694M-ESI+

Blank (W4B0282-BLK1) — **Prepared: 02/07/14 Analyzed: 02/18/14 22:39**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Amoxicillin		ND		ng/l					
Meprobamate		ND		ng/l					
Sucralose		ND		ng/l					
Oxybenzone		ND		ng/l					

LCS (W4B0282-BS1) — **Prepared: 02/07/14 Analyzed: 02/18/14 22:53**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Acetaminophen		435		ng/l	400	109	66-156		
Caffeine		17.4		ng/l	20.0	87	55-152		
Sulfamethoxazole		17.6		ng/l	20.0	88	60-133		
Trimethoprim		18.6		ng/l	20.0	93	67-139		
Azithromycin		199		ng/l	200	100	52-166		
Cotinine		22.6		ng/l	20.0	113	68-155		
Atenolol		21.0		ng/l	20.0	105	56-164		
Ciprofloxacin		83.8		ng/l	100	84	51-168		
Carbamazepine		19.3		ng/l	20.0	96	60-135		
DEET		15.5		ng/l	20.0	78	45-135		
Fluoxetine		23.8		ng/l	20.0	119	55-150		
Atorvastatin		16.3		ng/l	20.0	82	0.1-173		
Methadone		19.0		ng/l	20.0	95	62-137		
Primidone		17.1		ng/l	20.0	86	54-147		
Diazepam		18.3		ng/l	20.0	92	58-127		
TCPP		18.1		ng/l	20.0	90	24-149		
TCEP		17.5		ng/l	20.0	88	25-149		
TDCPP		17.7		ng/l	20.0	88	20-158		
Phenytoin		18.2		ng/l	20.0	91	69-138		
Amoxicillin		164		ng/l	200	82	14-167		
Meprobamate		20.5		ng/l	20.0	102	11-166		
Sucralose		95.7		ng/l	100	96	50-150		
Oxybenzone		15.4		ng/l	20.0	77	50-150		

LCS Dup (W4B0282-BSD1) — **Prepared: 02/07/14 Analyzed: 02/18/14 23:07**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Acetaminophen		499		ng/l	400	125	66-156	14	30
Caffeine		18.2		ng/l	20.0	91	55-152	4	30
Sulfamethoxazole		19.4		ng/l	20.0	97	60-133	10	30
Trimethoprim		18.4		ng/l	20.0	92	67-139	1	30
Azithromycin		206		ng/l	200	103	52-166	3	30
Cotinine		26.7		ng/l	20.0	134	68-155	17	30
Atenolol		23.0		ng/l	20.0	115	56-164	9	30
Ciprofloxacin		83.4		ng/l	100	83	51-168	0.5	30
Carbamazepine		19.7		ng/l	20.0	98	60-135	2	30
DEET		16.4		ng/l	20.0	82	45-135	6	30
Fluoxetine		22.8		ng/l	20.0	114	55-150	4	30

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PPCPs - Pharmaceuticals by LC/MSMS-ESI+ - Quality Control

Batch W4B0282 - EPA 1694M-ESI+

LCS Dup (W4B0282-BSD1) — **Prepared: 02/07/14 Analyzed: 02/18/14 23:07**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Atorvastatin		15.1		ng/l	20.0	76	0.1-173	8	30
Methadone		19.1		ng/l	20.0	96	62-137	0.5	30
Primidone		16.2		ng/l	20.0	81	54-147	5	30
Diazepam		18.9		ng/l	20.0	94	58-127	3	30
TCPP		21.0		ng/l	20.0	105	24-149	15	30
TCEP		20.6		ng/l	20.0	103	25-149	16	30
TDCPP		18.9		ng/l	20.0	94	20-158	7	30
Phenytoin		18.4		ng/l	20.0	92	69-138	1	30
Amoxicillin		164		ng/l	200	82	14-167	0	30
Meprobamate		20.6		ng/l	20.0	103	11-166	0.5	30
Sucralose		93.0		ng/l	100	93	50-150	3	30
Oxybenzone		18.3		ng/l	20.0	92	50-150	17	30

PPCPs - Pharmaceuticals by LC/MSMS-ESI- - Quality Control

Batch W4B0283 - EPA 1694M-ESI-

Blank (W4B0283-BLK1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:08**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Bisphenol A		1.99	B	ng/l					
Gemfibrozil		ND		ng/l					
Ibuprofen		ND		ng/l					
Naproxen		ND		ng/l					
Salicylic Acid		ND		ng/l					
Triclosan		ND		ng/l					
Iopromide		ND		ng/l					

LCS (W4B0283-BS1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:22**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Bisphenol A		19.5		ng/l	20.0	98	53-168		
Gemfibrozil		18.0		ng/l	20.0	90	76-122		
Ibuprofen		17.7		ng/l	20.0	88	67-139		
Naproxen		17.3		ng/l	20.0	86	64-138		
Salicylic Acid		171		ng/l	200	86	56-229		
Triclosan		38.9		ng/l	40.0	97	76-139		
Iopromide		114		ng/l	100	114	0.1-163		

LCS Dup (W4B0283-BSD1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:37**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Bisphenol A		18.4		ng/l	20.0	92	53-168	6	30
Gemfibrozil		18.3		ng/l	20.0	92	76-122	2	30
Ibuprofen		19.8		ng/l	20.0	99	67-139	11	30
Naproxen		19.1		ng/l	20.0	96	64-138	10	30
Salicylic Acid		183		ng/l	200	92	56-229	7	30
Triclosan		40.5		ng/l	40.0	101	76-139	4	30

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PPCPs - Pharmaceuticals by LC/MSMS-ESI- - Quality Control

Batch W4B0283 - EPA 1694M-ESI-

LCS Dup (W4B0283-BSD1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:37**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Iopromide		104		ng/l	100	104	0.1-163	9	30

PPCPs - Hormones by LC/MSMS-APCI - Quality Control

Batch W4B0281 - EPA 1694M-APCI

Blank (W4B0281-BLK1) — **Prepared: 02/07/14 Analyzed: 02/19/14 16:58**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
17-a-Ethynylestradiol		ND		ng/l					
17-b-Estradiol		ND		ng/l					
Estrone		ND		ng/l					
Progesterone		ND		ng/l					
Testosterone		ND		ng/l					

LCS (W4B0281-BS1) — **Prepared: 02/07/14 Analyzed: 02/19/14 17:15**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
17-a-Ethynylestradiol		19.1		ng/l	20.0	96	68-159		
17-b-Estradiol		18.0		ng/l	20.0	90	65-146		
Estrone		17.6		ng/l	20.0	88	59-141		
Progesterone		17.8		ng/l	20.0	89	58-154		
Testosterone		24.8		ng/l	20.0	124	60-172		

LCS Dup (W4B0281-BSD1) — **Prepared: 02/07/14 Analyzed: 02/19/14 17:31**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
17-a-Ethynylestradiol		18.9		ng/l	20.0	94	68-159	1	30
17-b-Estradiol		18.4		ng/l	20.0	92	65-146	2	30
Estrone		18.3		ng/l	20.0	92	59-141	4	30
Progesterone		18.1		ng/l	20.0	90	58-154	2	30
Testosterone		26.0		ng/l	20.0	130	60-172	5	30

Weck Laboratories, Inc 14859 East Clark Avenue, City of Industry, California 91745-1396 (626) 336-2139 FAX (626) 336-2634
www.wecklabs.com

Certificate of Analysis

Notes:
The Chain of Custody document is part of the analytical report.
Any remaining sample(s) for testing will be disposed of one month from the final report date unless other arrangements are made in advance.
All results are expressed on wet weight basis unless otherwise specified.

An Absence of Total Coliform meets the drinking water standards as established by the State of California Department of Health Services.
The Reporting Limit (RL) is referenced as laboratory's Practical Quantitation Limit (PQL).
For Potable water analysis, the Reporting Limit (RL) is referenced as Detection Limit for reporting purposes (DLRs) defined by EPA.

If sample collected by Weck Laboratories, sampled in accordance to lab SOP MIS002

Authorized Signature
Contact: Kim G Tu
(Project Manager)

ELAP # 1132
LACSD # 10143
NELAC # 04229CA

The results in this report apply to the samples analyzed in accordance with the chain of custody document. Weck Laboratories certifies that the test results meet all requirements of NELAC unless noted in the Case Narrative. This analytical report must be reproduced in its entirety.

Flags for Data Qualifiers:

B	Blank contamination. The analyte was found in the associated blank as well as in the sample.
MS-05	The spike recovery and/or RPD were outside acceptance limits for the MS and/or MSD due to possible matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
QC-2	This QC sample was reanalyzed to complement samples that require re-analysis on different date. See analysis date.
R-01	The Reporting Limit for this analyte has been raised to account for matrix interference.
ND	NOT DETECTED at or above the Reporting Limit. If J-value reported, then NOT DETECTED at or above the Method Detection Limit (MDL).
Sub	Subcontracted analysis, original report enclosed.
DL	Method Detection Limit
RL	Method Reporting Limit
MDA	Minimum Detectable Activity
NR	Not Reportable

Weck Laboratories, Inc 14859 East Clark Avenue, City of Industry, California 91745-1396 (626) 336-2139 FAX (626) 336-2634
www.wecklabs.com

ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Water Analysis

Lab Number: 410665 Job Number: 24232 IS-69368

Sample Name: PRTIW (AT MISSION MEMORIAL)

Company Lab #:

Company Job #:

Company: Alpha Analytical, Inc.

API/Well:

Field or Site: WO 14A1635

Location:

Depth/Formation:

Container Type: 1 Liter Plastic Bottle

Date Sampled: 1/29/2014 Date Received 2/05/2014 Date Reported: 2/26/2014

δD of water	----------	na
$\delta^{18}O$ of water	----------	na
Tritium content of water	----------	0.75 ± 0.16 TU
$\delta^{13}C$ of DIC	----------	na
^{14}C content of DIC	----------	na
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na

Remarks:

LABORATORY REPORT

This report contains ___7___ pages.
(including the cover page)

If you have any questions concerning this report, please do not hesitate to call us at (800) 332-4345 or (574) 233-4777.

This report may not be reproduced, except in full, without written approval from UL.

UL LLC
110 S. Hill St., South Bend, IN 46617-2702 USA
T: 800.332.4345 / F: 574.233.8207 / W: UL.com

NELAC NARRATIVE PAGE

Client: Alpha Analytical Report #: 310986NP

Underwriters Laboratories is a NELAP accredited laboratory. All reported results meet the requirements of the NELAC standards, unless otherwise noted.

UL contact person: James Van Fleit

NELAP requires complete reporting of deviations from method requirements, regardless of the suspected impact on the data. Quality control failures not reported within the report summary are noted here.

There were no quality control failures.

Note: This report may not be reproduced, except in full, without written approval from UL. UL is accredited by the National Environmental Laboratory Accreditation Program (NELAP).

Authorized Signature Title Date

UL LLC
110 S. Hill St., South Bend, IN 46617-2702 USA
T: 800.332.4345 / F: 574.233.8207 / W: UL.com

Laboratory Report

Client:	Alpha Analytical	Report:	310986
Attn:	David Pingatore 6398 Dougherty Road, Suite 35 Dublin, CA 94568	Priority:	Standard Written
		Status:	Final
		PWS ID:	Not Supplied
Copies to:	None		

Sample Information

UL ID #	Client ID	Method	Collected Date / Time	Collected By:	Received Date / Time
2967024	14A1635-01	905.0	01/29/14 14:57	Client	02/04/14 11:45
2967025	14A1635-01	7500-Ra B	01/29/14 14:57	Client	02/04/14 11:45
2967025	14A1635-01	7500-Ra D	01/29/14 14:57	Client	02/04/14 11:45
2967026	14A1635-01	7110 B	01/29/14 14:57	Client	02/04/14 11:45
2967027	14A1635-01	1613	01/29/14 14:57	Client	02/04/14 11:45
2967028	14A1635-01	300.0	01/29/14 14:57	Client	02/04/14 11:45
2967029	14A1635-01	300.1	01/29/14 14:57	Client	02/04/14 11:45

Report Summary

Note: See attached page for additional comments.

Note: Sample containers were provided by the client except for Methods 300.0 and 300.1.

Note: Strontium-90 analysis was performed by GEL Laboratories, Charleston, SC.

Detailed quantitative results are presented on the following pages. The results presented relate only to the samples provided for analysis.

We appreciate the opportunity to provide you with this analysis. If you have any questions concerning this report, please do not hesitate to call James Van Fleit at (574) 233-4777.

Note: This report may not be reproduced, except in full, without written approval from UL. UL is accredited by the National Environmental Laboratory Accreditation Program (NELAP).

Authorized Signature | Title | Date

Client Name: Alpha Analytical
Report #: 310986

UL LLC
110 S. Hill St., South Bend, IN 46617-2702 USA
T: 800.332.4345 / F: 574.233.8207 / W: UL.com

Client Name: Alpha Analytical

Report #: 310986

Sampling Point: 14A1635-01

PWS ID: Not Supplied

General Chemistry

Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	UL ID #
14998-27-7	Chlorite	300.0	1000 *	20	< 20	ug/L	---	02/06/14 23:12	2967028
15541-45-4	Bromate	300.1	10 *	5.0	< 5.0	ug/L	---	02/05/14 02:43	2967029

Radionuclides

Analyte ID #	Analyte	Method	Reg Limit	DL**	Result	Units	Preparation Date	Analyzed	UL ID #
---	Gross Alpha	7110 B	15 *	3.0	2.8 ± 1.1	pCi/L	02/21/14 07:49	02/27/14 10:40	2967026
---	Gross Beta	7110 B	50 *	4.0	**5.6 ± 1.0**	pCi/L	02/21/14 07:49	02/27/14 10:40	2967026
13982-63-3	Radium-226	7500-Ra B	3 *	1.00	0.73 ± 0.42	pCi/L	02/18/14 09:45	02/24/14 10:13	2967025
15262-20-1	Radium-228	7500-Ra D	2 *	1.00	0.45 ± 0.45	pCi/L	02/18/14 09:45	02/26/14 16:02	2967025
---	Combined Radium	calc.	5 *	1.00	**1.18 ± 0.62**	pCi/L	02/18/14 09:45	02/26/14 16:02	2967025

** Detection Limit (DL) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Semi-volatile Organic Chemicals

Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	UL ID #
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-Dioxin	1613	30 *	5.0	< 5.0	pg/L	02/12/14 07:40	02/13/14 19:58	2967027

Reference Lab Tests

Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	UL ID #
---	Strontium-90	905.0	8 *	2.00	**-0.863 ± 0.948**	pCi/L	---	02/20/14 11:39	2967024

† UL has demonstrated it can achieve these report limits in reagent water, but can not document them in all sample matrices.

Reg Limit Type:	MCL	SMCL	AL
Symbol:	*	^	!

Lab Definitions

Continuing Calibration Check Standard (CCC) / Continuing Calibration Verification (CCV) / Initial Calibration Verification Standard (ICV) / Initial Performance Check (IPC) - is a standard containing one or more of the target analytes that is prepared from the same standards used to calibrate the instrument. This standard is used to verify the calibration curve at the beginning of each analytical sequence, and may also be analyzed throughout and at the end of the sequence. The concentration of continuing standards may be varied, when prescribed by the reference method, so that the range of the calibration curve is verified on a regular basis.

Internal Standards (IS) - are pure compounds with properties similar to the analytes of interest, which are added to field samples or extracts, calibration standards, and quality control standards at a known concentration. They are used to measure the relative responses of the analytes of interest and surrogates in the sample, calibration standard or quality control standard.

Laboratory Duplicate (LD) - is a field sample aliquot taken from the same sample container in the laboratory and analyzed separately using identical procedures. Analysis of laboratory duplicates provides a measure of the precision of the laboratory procedures.

Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS) - is an aliquot of reagent water to which known concentrations of the analytes of interest are added. The LFB is analyzed exactly the same as the field samples. LFBs are used to determine whether the method is in control.

Laboratory Method Blank (LMB) / Laboratory Reagent Blank (LRB) - is a sample of reagent water included in the sample batch analyzed in the same way as the associated field samples. The LMB is used to determine if method analytes or other background contamination have been introduced during the preparation or analytical procedure. The LMB is analyzed exactly the same as the field samples.

Laboratory Trip Blank (LTB) / Field Reagent Blank (FRB) - is a sample of laboratory reagent water placed in a sample container in the laboratory and treated as a field sample, including storage, preservation, and all analytical procedures. The FRB/LTB container follows the collection bottles to and from the collection site, but the FRB/LTB is not opened at any time during the trip. The FRB/LTB is primarily a travel blank used to verify that the samples were not contaminated during shipment.

Matrix Spike Duplicate Sample (MSD) / Laboratory Fortified Sample Matrix Duplicate (LFSMD) - is a sample aliquot taken from the same field sample source as the Matrix Spike Sample to which known quantities of the analytes of interest are added in the laboratory. The MSD is analyzed exactly the same as the field samples. Analysis of the MSD provides a measure of the precision of the laboratory procedures in a specific matrix.

Matrix Spike Sample (MS) / Laboratory Fortified Sample Matrix (LFSM) - is a sample aliquot taken from field sample source to which known quantities of the analytes of interest are added in the laboratory. The MS is analyzed exactly the same as the field samples. The purpose is to demonstrate recovery of the analytes from a sample matrix to determine if the specific matrix contributes bias to the analytical results.

Quality Control Standard (QCS) / Second Source Calibration Verification (SSCV) - is a solution containing known concentrations of the analytes of interest prepared from a source different from the source of the calibration standards. The solution is obtained from a second manufacturer or lot if the lot can be demonstrated by the manufacturer as prepared independently from other lots. The QCS sample is analyzed using the same procedures as field samples. The QCS is used as a check on the calibration standards used in the method on a routine basis.

Reporting Limit Check (RLC) / Initial Calibration Check Standard (ICCS) - is a procedural standard that is analyzed each day to evaluate instrument performance at or below the minimum reporting limit (MRL).

Surrogate Standard (SS) / Surrogate Analyte (SUR) - is a pure compound with properties similar to the analytes of interest, which is highly unlikely to be found in any field sample, that is added to the field samples, calibration standards, blanks and quality control standards before sample preparation. The SS is used to evaluate the efficiency of the sample preparation process.

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

14A1635

SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: David S. Pingatore

RECEIVING LABORATORY:

Zymax
600 S. Andreasen Drive, Suite B
Escondido, CA 92029
Phone :(760) 781-3338
Fax: (760) 781-3339
Terms: Net 30

Analysis	Due	Expires	Comments
14A1635-01 PRTIW (At Mission Memorial) [Water] Sampled 01/29/14 14:57 Pacific			43450-1
Oxygen 18 - Isotope / Hydroger	02/13/14 12:00	07/28/14 14:57	
N and O Isotopes of Nitrate	02/13/14 12:00	02/05/14 14:57	

Containers Supplied:

250 mL Poly Unpres (AQ` 250 mL Poly Unpres (AR)

☐ *Report to State*

System Name: _____ **Employed by:** _____

User ID: _____ **Sampler:** _____

System Number: _____

+QC

Released By	Date	Received By	Date
	1-30-14		2/5/14 9:05
Released By	Date	Received By	Date

David S. Pingatore
Project Manager
Alpha Analytical Laboratories, Inc.
208 Mason Street
Ukiah, CA 95482
Tel: 707.468.0401
Fax: 707.468.5267
Project: 14A1635
Email: david @ alpha.com

Dr. Yi Wang
Director of ZymaX Forensics Isotope
Senior Environmental Geochemist, PACE
600 S. Andreasen Dr., Suite B
Escondido, CA 92029
Tel: 760.781.3338 ext 202
Fax: 760.781.3339
Cell: 609.721.2843
Email: yi.wang@zymaxusa.com

REPORT OF ENVIRONMENTAL FORENSICS ISOTOPE ANALYSES

Date Received: February 5th, 2014
Date Reported: March 20th, 2014

Sample from Alpha Analytical Labs for $\delta^{15}N$ (‰ Air), $\delta^{18}O$ and δD (‰ VSMOW) stable isotope analysis

ZymaX ID	Client ID/Sample Description	$\delta^{18}O_{H2O}$	δD_{H2O}	$\delta^{15}N_{NO3}$	$\delta^{18}O_{NO3}$
43450-1	14A1635-01 PRTIW @ Mission Memorial	-6.14	-40.68	2.5	1.3
	Analytical precision (1σ)	0.06	0.32	0.2	0.4

ZymaX ID	$\delta^{18}O_{H2O}$	δD_{H2O}	$\delta^{15}N_{NO3}$	$\delta^{18}O_{NO3}$
QC-01	-5.89	-41.12	4.5	25.3
QC-02	-5.98	-41.57	4.8	25.9
Mean	-5.94	-41.35	4.7	25.6
Analytical Precision (1σ)	0.06	0.32	0.2	0.4

ZymaX Forensics Isotope Services

Product or Dissolved Organics: Chlorinated Solvents, Oil, Extract, Fraction and Kerogen
3D-CSIA of ^{13}C, ^{37}Cl, and ^{2}H for PCE, TCE, DCE, MTBE, BTEX, PAHs, Pesticides, Alkanes, Gasoline and Oil; Bulk ^{13}C, ^{2}H, ^{18}O, ^{34}S, and ^{15}N
Gas Sample
Gas Composition and 2D-CSIA of ^{13}C and ^{2}H of C1 to C5; ^{13}C of CO_2; ^{14}C of C1 and CO_2; ^{34}S of H_2S; ^{15}N and ^{18}O of N_2O gas
Water and Dissolved Inorganics
^{2}H, ^{3}H and ^{18}O; ^{34}S and ^{18}O of dissolved sulfate; ^{34}S of dissolved H_2S
^{15}N and ^{18}O of dissolved Nitrate; ^{15}N of Ammonia; ^{13}C of dissolved CO_2 and Carbonate/Bicarbonate
Soil and Minerals
^{13}C, ^{18}O, ^{15}N, ^{34}S, D/H; ^{14}C of carbonate or organics
Post-Analysis Forensic Isotope Data Interpretation

Laboratory Order - Summary

analytical chemistry for a better environment

Report To:	David S. Pingatore Alpha Analytical Laboratories, Inc. 208 Mason St. Ukiah, CA. 95482	Date Received: Date Due: Project:	02/05/2014 9:05AM 04/23/2014 12:00AM 14A1635
Phone: Fax:	(707) 468-0401 (707) 468-5267	Project Number:	

Lab Number	Description	Analysis	Dept
43450-1	14A1635-01 PRTIW	d15N and d18O of NO3	M6
		d18O+dD of H2O	M6

Notes/Special Instructions	SC Login/Computer Login CY/CY	DPRA PM: YW

ZymaX FORENSICS

Condition Upon Reciept

Lab Number: 43450 Client: AAL

Sample Temprature (should be 2-6 degrees C): 1.9°C

Do the sample descriptions on the containers match the discriptions on the COC?	☒ Yes	☐ No	
Do the sample dates on the containers match the sample dates on the COC?	☒ Yes	☐ No	
Are the samples within holding time for each analysis at time of reciept?	☒ Yes	☐ No	☐ N/A
Do the number of containers received match the number listed on the COC, and are all of the necessary containers for the required analysis available?	☒ Yes	☐ No	☐ N/A
Does the preservation of the samples match the notation on the COC, and is the preservation correct for requested analysis?	☐ Yes ☒ Zymax	☐ No	☐ N/A
Are all of the samples intact with no headspace, if required for analysis?	☒ Yes	☐ No	
Did samples arrive with custody seal intact?	☒ Yes	☐ No	☐ N/A

Sample Control Signature: [signature] Date: 2/5/14 Time: 9:05

Client Discrepancies

Contacted: _____ Date: _____ Sample Control Initials: _____

Discrepancy: _____

Solution: _____

Contacted: _____ Date: _____ Sample Control Initials: _____

Discrepancy: _____

Solution: _____

Contacted: _____ Date: _____ Sample Control Initials: _____

Discrepancy: _____

Solution: _____

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com

Laboratory & Corporate: 208 Mason Street, Ukiah, CA 95482
707-468-0401 Fax: 707-468-5267

Service Center & Micro Lab: 6398 Dougherty Rd, Ste 35, Dublin, CA 94568
925-828-6226 Fax: 925-828-6309

Chain of Custody Record

Reports and Invoices will be delivered by email in .pdf format.

Lab No. 14A1635

Signature below authorizes work under terms stated on reverse side.

Report to:
Company: Todd Engineers
Attn: Dr. Bill Motzer
Address: 2490 Mariner Square Loop, Suite 215, Alameda, CA 94501
Phone/Fax: 510.747.6920 / 510.747.6921
Email Address: bmotzer@toddengineers.com

Invoice to (if different):
Company:
Attn:
Address:
Phone/Fax:
Email Address:

Project Info for Report:
Project ID: Groundwater Reuse Project
Project No: Project # 60408
PO/Reference :

Samplers Signature:
Print: DOUG WHICHARD

TAT: 10 days ● RUSH: 5 days ○ 48 hours ○ Other: ___days ○
Lab Approval Required For Rush TATs
Sample Notes (lab use only)
Temperature: DU 4.8/4.6 deg. C
Shipment Method:
Custody Seals: Y / N

Sample Identification	Sampled: Date	Sampled: Time	40ml VOA	Poly	Amber glass	Soil jar		NaOH	HNO3	H2SO4	Other	None	Water	Soil		Total Number of Containers	Inorganics Scan, DU-General Physical Scan	200.7 - Ca, K, Mg, Na	200.8 - Ag, B, Cu, Fe, Mn, Ni, V, Zn	Bicarbonate, Chloride, Conductivity	MBAS, Perchlorate, TDS, Sulfate	HAA5, TOC	507, 508, 515, 525 DHS, 531, 547, 548, 549	504.1, 524.2 Sample Traps scan	Asbestos DW (sub TEM Lab)	Cr6 218.6 DW (sub MAI)	Dioxin 2,3,7,8 TCDD DW (sub UL)	Sample Notes or CDPH Source Numbers:
PRTIW (at Mission Memorial)	1/29/14	1457		x	x			x	x			x	x			4	x	x	x	x	x							
			x		x						x		x			3						x						
				x	x						x	x	x			10							x					(507/508/515.1 = one 1L BRA ea)
			x								x		x			7								x				
					x							x	x			2									x			
				x							x		x			1										x		
					x							x	x			2											x	
Trip blank ($0.00 analysis)			x								x	x	x			2							x					

Relinquished by:	Received by:	Date:	Time:
[signature]	[signature]	1/29/14	15:26
[signature]	Rodney Santillan	1/29/14	1745
Rodney Santillan	[signature]	1-29-14	1850
[signature]	[signature]	1-29-14	2115

CDPH Write On EDT Transmission? ○ Yes ○ No
State System Number:
If "Y" please enter the Source Number(s) in the column above

CA Geotracker EDF Report? ○ Yes ○ No
Global ID:
Sampling Company Log Code:
EDF to (Email Address):

Travel and Site Time:
Mileage:
Misc. Supplies:

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com

Laboratory & Corporate: 208 Mason Street, Ukiah, CA 95482
707-468-0401 Fax: 707-468-5267

Service Center & Micro Lab: 6398 Dougherty Rd, Ste 35, Dublin, CA 94568
925-828-6226 Fax: 925-828-6309

Chain of Custody Record

Reports and Invoices will be delivered by email in .pdf format.

Lab No. 14A1635

Signature below authorizes work under terms stated on reverse side.

Report to:	Invoice to (if different):	Project Info for Report:
Company: Todd Engineers	Company:	Project ID: Groundwater Reuse Project
Attn: Dr. Bill Motzer	Attn:	
Address: 2490 Mariner Square Loop, Suite 215 Alameda, CA 94501	Address:	Project No: Project # 60408
Phone/Fax: 510.747.6920 / 510.747.6921	Phone/Fax:	PO/Reference :
Email Address: bmotzer@toddengineers.com	Email Address:	

Samplers Signature: [signature]

Print: DOUG WHICHARD

TAT: 10 days ● RUSH: 5 days ○ 48 hours ○ Other: ___ days ○

Lab Approval Required For Rush TATs

Sample Notes (lab use only)

Temperature: 4° deg. C

Shipment Method:

Custody Seals: Y / N

Sample Identification	Sampled: Date	Sampled: Time	Container: 40ml VOA	Poly	Amber glass	Soil jar		Preservative: HCL	HNO3	H2SO4	Other	None	Matrix: Water	Soil		Total Number of Containers	8330B Explosives (sub ALS)	PPCP Hormones 1694M (sub Weck)	PPCP Negative Pharmas 1694M (sub Weck)	PPCP Positive Pharmas 1694M (sub Weck)	Nitrosamines LL 1625M (sub Weck)	Gross A & B, R226 &R228, Sr 90 (sub UL)	Bromate 300.1, Chlorite 300.0 (sub UL)	Tritium, Enriched (sub Isotech)	Oxygen 18 Isotope (sub Zymax)	N and O Isotopes of NO3 (sub Zymax)	J-flag MDL reporting + Standard excel EDD	Sample Notes or CDPH Source Numbers:
PRTIW (at Mission Memorial)	1/29/14	1457			x							x	x			2	x										x	
					x						x		x			2		x	x	x								
					x							x	x			2					x							
				x					x				x			4						x						
				x							x		x			2							x					
				x								x	x			1								x				
				x								x	x			1									x			
				x								x	x			1										x		

Relinquished by:	Received by:	Date:	Time:
[signature]	[signature]	1/29/14	15:26
[signature]	[signature]	1-29-14	1830
[signature]	LAB [signature]	1-29-14	2115

CDPH Write On EDT Transmission? ○ Yes ○ No

State System Number: _____

If "Y" please enter the Source Number(s) in the column above

CA Geotracker EDF Report? ○ Yes ○ No

Global ID: Sampling Company Log Code:

EDF to (Email Address):

Travel and Site Time: Mileage: Misc. Supplies:

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com
Corporate: 208 Mason St., Ukiah, CA 95482 • Phone: (707) 468-0401 • Fax: (707) 468-5267
Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

ELAP Certificate Numbers 1551 and 2728

18 February 2014

Todd Groundwater
Attn: Dr. Bill Motzer
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501
RE: Groundwater Reuse Project
Work Order: 14A1713

Enclosed are the results of analyses for samples received by the laboratory on 01/30/14 21:25. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jeanette Poplin

Jeanette L. Poplin For David S. Pingatore
Project Manager

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com
Corporate: 208 Mason St., Ukiah, CA 95482 • Phone: (707) 468-0401 • Fax: (707) 468-5267
Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Project: Project Number:	Dr. Bill Motzer Groundwater Reuse Project 60408	Reported: 02/18/14 11:14

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
FO-07 (Shallow)	14A1713-01	Water	01/30/14 13:40	01/30/14 21:25
Trip Blank	14A1713-02	Water	01/30/14 13:40	01/30/14 21:25

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com
Corporate: 208 Mason St., Ukiah, CA 95482 • Phone: (707) 468-0401 • Fax: (707) 468-5267
Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Metals (Drinking Water) by EPA 200 Series Methods
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
Mercury	**0.11**	0.060	1.0	ug/l	1	AA43136	02/05/14 09:00	02/05/14 13:39	EPA 245.1	J

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Metals by EPA 200 Series Methods
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
Calcium	**29**	0.010	1.0	mg/l	1	AA43133	01/31/14 14:45	02/05/14 13:07	EPA 200.7	
Magnesium	**3.8**	0.0080	1.0	"	"	"	"	"	"	
Potassium	**3.6**	0.0080	1.0	"	"	"	"	"	"	
Sodium	**38**	0.020	1.0	"	"	"	"	"	"	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Metals by EPA Method 200.8 ICP/MS
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
Aluminum	**3700**	20	500	ug/l	10	AB40328	02/03/14 09:47	02/11/14 16:59	EPA 200.8	
Antimony	**3.7**	0.020	6.0	"	1	"	"	02/05/14 14:42	"	J
Arsenic	**210**	0.70	20	"	10	"	"	02/11/14 16:59	"	
Barium	**1200**	0.30	1000	"	"	"	"	"	"	
Beryllium	**0.68**	0.020	1.0	"	1	"	"	02/05/14 14:42	"	J
Boron	**25**	6.0	50	"	"	"	"	"	"	J
Cadmium	**3.3**	0.020	1.0	"	"	"	"	"	"	
Chromium	**790**	8.0	100	"	100	"	"	02/11/14 16:53	"	
Copper	**14**	0.40	5.0	"	10	"	"	02/11/14 16:59	"	
Iron	**80000**	180	5000	"	100	"	"	02/11/14 16:53	"	
Lead	**42**	0.020	5.0	"	1	"	"	02/05/14 14:42	"	
Manganese	**20000**	3.0	500	"	100	"	"	02/11/14 16:53	"	
Nickel	**26**	0.060	10	"	1	"	"	02/05/14 14:42	"	
Selenium	**1.3**	0.70	50	"	10	"	"	02/11/14 16:59	"	R-01, J
Silver	**0.11**	0.020	0.10	"	1	"	"	02/05/14 14:42	"	
Thallium	**0.19**	0.020	1.0	"	"	"	"	"	"	J
Uranium	**0.62**	0.020	1.0	pCi/l	"	"	"	"	"	J
Vanadium	**34**	0.30	1.0	ug/l	"	"	"	"	"	
Zinc	**300**	5.0	50	"	10	"	"	02/11/14 16:59	"	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Conventional Chemistry Parameters by APHA/EPA Methods
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
Bicarbonate	**68**	0.060	5.0	mg/l	1	AA43121	02/11/14 10:19	02/11/14 17:00	SM2320B	
Color	**1700**	300	500	Color Units	100	AA43128	01/30/14 18:00	01/30/14 18:00	SM2120B	A-01a
Color	**4.0**	3.0	5.0	"	1	AA42421	02/05/14 11:15	02/05/14 11:15	"	A-01b, J
MBAS, calculated as LAS, mw 340	ND	0.030	0.050	mg/l	"	AA43107	01/31/14 14:45	02/04/14 16:00	SM5540C	U
Odor	ND		1.0	T.O.N.	"	AA43128	01/30/14 18:00	01/30/14 18:00	EPA 140.1	U
Perchlorate	ND	0.90	4.0	ug/l	"	AB41141	02/11/14 09:49	02/11/14 13:31	EPA 314.0	U
Specific Conductance (EC)	**280**	1.0	20	umhos/cm	"	AA43147	01/31/14 17:00	01/31/14 17:00	SM2510B	
Total Dissolved Solids	**190**	5.0	10	mg/l	"	AB40322	02/03/14 09:00	02/05/14 08:30	SM2540C	
Turbidity	**550**	0.040	0.10	NTU	"	AA43129	01/30/14 18:00	01/30/14 18:00	SM2130B	
Nitrate + Nitrite as N	**0.55**	0.0086	0.40	mg/l	"	AB41339	02/13/14 10:39	02/13/14 11:18	EPA 300.0	
Total Organic Carbon	**0.768**	0.100	0.300	"	"	AB40803	02/08/14 12:46	02/08/14 22:25	SM5310C	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Miscellaneous Physical/Conventional Chemistry Parameters
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
Cyanide (total)	ND	0.0020	0.10	mg/l	1	AB40428	02/04/14 09:46	02/05/14 15:19	10-204-00-1X	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Anions by EPA Method 300.0
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
Nitrate as NO3	**2.4**	0.20	2.0	mg/l	1	AA43111	01/31/14 12:28	01/31/14 18:28	EPA 300.0	
Chloride	**44**	0.15	2.5	"	5	"	"	"	"	
Fluoride	ND	0.070	0.10	"	1	"	"	"	"	U
Nitrite as N	ND	0.020	0.40	"	"	"	"	"	"	U
Sulfate as SO4	**13**	0.090	0.50	"	"	"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
Acetone	**2.0**	0.80	5.0	ug/l	1	AB40725	02/04/14 11:57	02/06/14 14:12	EPA 524.2	J
Acrylonitrile	ND	0.20	5.0	"	"	"	"	"	"	U
Benzene	ND	0.20	0.30	"	"	"	"	"	"	U
Bromobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Bromochloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Bromodichloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
Bromoform	ND	0.50	0.50	"	"	"	"	"	"	U
Bromomethane	ND	0.20	0.50	"	"	"	"	"	"	U
n-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
sec-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
tert-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Carbon disulfide	ND	0.20	0.50	"	"	"	"	"	"	U
Carbon tetrachloride	ND	0.30	0.50	"	"	"	"	"	"	U
Chlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Chloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
Chloroform	ND	0.50	0.50	"	"	"	"	"	"	U
Chloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
2-Chlorotoluene	ND	0.20	0.50	"	"	"	"	"	"	U
4-Chlorotoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Dibromochloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
1,2-Dibromo-3-chloropropane	ND	0.36	0.50	"	"	"	"	"	"	U
1,2-Dibromoethane (EDB)	ND	0.14	0.50	"	"	"	"	"	"	U
Dibromomethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,2-Dichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,4-Dichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
trans-1,4-Dichloro-2-butene	ND	0.095	5.0	"	"	"	"	"	"	U
Dichlorodifluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
1,2-Dichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethene	ND	0.10	0.30	"	"	"	"	"	"	U
cis-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
1,2-Dichloropropane	ND	0.20	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
1,3-Dichloropropane	ND	0.20	0.50	ug/l	1	AB40725	02/04/14 11:57	02/06/14 14:12	EPA 524.2	U
2,2-Dichloropropane	ND	0.10	0.50	"	"	"	"	"	"	U
1,1-Dichloropropene	ND	0.10	0.50	"	"	"	"	"	"	U
cis-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichloropropene (total)	ND	0.20	0.50	"	"	"	"	"	"	U
2-Hexanone	ND	0.097	5.0	"	"	"	"	"	"	U
Ethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Hexachlorobutadiene	ND	0.30	0.50	"	"	"	"	"	"	U
Isopropylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
p-Isopropyltoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Methyl ethyl ketone	ND	0.40	1.0	"	"	"	"	"	"	U
Methyl iodide	ND	0.12	2.0	"	"	"	"	"	"	U
Methyl isobutyl ketone	ND	0.30	1.0	"	"	"	"	"	"	U
Methylene chloride	ND	0.40	0.50	"	"	"	"	"	"	U
Naphthalene	ND	0.20	0.50	"	"	"	"	"	"	U
n-Propylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Styrene	ND	0.10	0.50	"	"	"	"	"	"	U
1,1,1,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Tetrachloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Toluene	ND	0.10	0.50	"	"	"	"	"	"	U
1,2,3-Trichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
1,2,4-Trichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,1-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorofluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorotrifluoroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,2,3-Trichloropropane	ND	0.13	0.50	"	"	"	"	"	"	U
1,2,4-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
1,3,5-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Vinyl chloride	ND	0.10	0.50	"	"	"	"	"	"	U
m,p-Xylene	ND	0.20	0.50	"	"	"	"	"	"	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
o-Xylene	ND	0.10	0.50	ug/l	1	AB40725	02/04/14 11:57	02/06/14 14:12	EPA 524.2	U
Xylenes (total)	ND	0.20	0.50	"	"	"	"	"	"	U
Trihalomethanes (total)	ND	0.50	0.50	"	"	"	"	"	"	U
Methyl tert-butyl ether	ND	0.50	0.50	"	"	"	"	"	"	U
Ethyl tert-butyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Tert-amyl methyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Surrogate: Bromofluorobenzene		*101 %*	*70-130*			"	"	"	"	
Surrogate: Dibromofluoromethane		*103 %*	*70-130*			"	"	"	"	
Surrogate: Toluene-d8		*104 %*	*70-130*			"	"	"	"	
Trip Blank (14A1713-02) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
Acetone	ND	0.80	5.0	ug/l	1	AB40725	02/04/14 11:57	02/06/14 14:49	EPA 524.2	U
Acrylonitrile	ND	0.20	5.0	"	"	"	"	"	"	U
Benzene	ND	0.20	0.30	"	"	"	"	"	"	U
Bromobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Bromochloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Bromodichloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
Bromoform	ND	0.50	0.50	"	"	"	"	"	"	U
Bromomethane	ND	0.20	0.50	"	"	"	"	"	"	U
n-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
sec-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
tert-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Carbon disulfide	ND	0.20	0.50	"	"	"	"	"	"	U
Carbon tetrachloride	ND	0.30	0.50	"	"	"	"	"	"	U
Chlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Chloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
Chloroform	ND	0.50	0.50	"	"	"	"	"	"	U
Chloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
2-Chlorotoluene	ND	0.20	0.50	"	"	"	"	"	"	U
4-Chlorotoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Dibromochloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
1,2-Dibromo-3-chloropropane	ND	0.36	0.50	"	"	"	"	"	"	U
1,2-Dibromoethane (EDB)	ND	0.14	0.50	"	"	"	"	"	"	U
Dibromomethane	ND	0.20	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Trip Blank (14A1713-02) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
1,2-Dichlorobenzene	ND	0.20	0.50	ug/l	1	AB40725	02/04/14 11:57	02/06/14 14:49	EPA 524.2	U
1,3-Dichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,4-Dichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
trans-1,4-Dichloro-2-butene	ND	0.095	5.0	"	"	"	"	"	"	U
Dichlorodifluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
1,2-Dichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethene	ND	0.10	0.30	"	"	"	"	"	"	U
cis-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
1,2-Dichloropropane	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichloropropane	ND	0.20	0.50	"	"	"	"	"	"	U
2,2-Dichloropropane	ND	0.10	0.50	"	"	"	"	"	"	U
1,1-Dichloropropene	ND	0.10	0.50	"	"	"	"	"	"	U
cis-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichloropropene (total)	ND	0.20	0.50	"	"	"	"	"	"	U
2-Hexanone	ND	0.097	5.0	"	"	"	"	"	"	U
Ethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Hexachlorobutadiene	ND	0.30	0.50	"	"	"	"	"	"	U
Isopropylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
p-Isopropyltoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Methyl ethyl ketone	ND	0.40	1.0	"	"	"	"	"	"	U
Methyl iodide	ND	0.12	2.0	"	"	"	"	"	"	U
Methyl isobutyl ketone	ND	0.30	1.0	"	"	"	"	"	"	U
Methylene chloride	ND	0.40	0.50	"	"	"	"	"	"	U
Naphthalene	ND	0.20	0.50	"	"	"	"	"	"	U
n-Propylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Styrene	ND	0.10	0.50	"	"	"	"	"	"	U
1,1,1,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Tetrachloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Toluene	ND	0.10	0.50	"	"	"	"	"	"	U
1,2,3-Trichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Trip Blank (14A1713-02) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
1,2,4-Trichlorobenzene	ND	0.20	0.50	ug/l	1	AB40725	02/04/14 11:57	02/06/14 14:49	EPA 524.2	U
1,1,1-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorofluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorotrifluoroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,2,3-Trichloropropane	ND	0.13	0.50	"	"	"	"	"	"	U
1,2,4-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
1,3,5-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Vinyl chloride	ND	0.10	0.50	"	"	"	"	"	"	U
m,p-Xylene	ND	0.20	0.50	"	"	"	"	"	"	U
o-Xylene	ND	0.10	0.50	"	"	"	"	"	"	U
Xylenes (total)	ND	0.20	0.50	"	"	"	"	"	"	U
Trihalomethanes (total)	ND	0.50	0.50	"	"	"	"	"	"	U
Methyl tert-butyl ether	ND	0.50	0.50	"	"	"	"	"	"	U
Ethyl tert-butyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Tert-amyl methyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Surrogate: Bromofluorobenzene		*99.8 %*	*70-130*			"	"	"	"	
Surrogate: Dibromofluoromethane		*97.0 %*	*70-130*			"	"	"	"	
Surrogate: Toluene-d8		*102 %*	*70-130*			"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Chlorinated Pesticides and PCBs by EPA Method 508
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
Aldrin	ND	0.010	0.050	ug/l	1	AB40514	02/05/14 08:08	02/11/14 23:27	EPA 508	U
Chloroneb	ND	0.20	0.50	"	"	"	"	"	"	U
Chlorobenzilate	ND	2.0	5.0	"	"	"	"	"	"	U
Chlorothalonil	ND	0.030	0.10	"	"	"	"	"	"	U
DCPA	ND	0.020	0.040	"	"	"	"	"	"	U
4,4´-DDD	ND	0.020	0.050	"	"	"	"	"	"	U
4,4´-DDE	ND	0.020	0.050	"	"	"	"	"	"	U
4,4´-DDT	ND	0.020	0.020	"	"	"	"	"	"	U
Dieldrin	ND	0.010	0.010	"	"	"	"	"	"	U
Endosulfan I	ND	0.020	0.050	"	"	"	"	"	"	U
Endosulfan II	ND	0.020	0.050	"	"	"	"	"	"	U
Endosulfan sulfate	ND	0.020	0.020	"	"	"	"	"	"	U
Endrin	ND	0.030	0.10	"	"	"	"	"	"	U
Endrin aldehyde	ND	0.020	0.050	"	"	"	"	"	"	U
HCH-alpha	ND	0.010	0.050	"	"	"	"	"	"	U
HCH-beta	ND	0.020	0.050	"	"	"	"	"	"	U
HCH-delta	ND	0.030	0.050	"	"	"	"	"	"	U
HCH-gamma (Lindane)	ND	0.010	0.010	"	"	"	"	"	"	U
Heptachlor	ND	0.010	0.010	"	"	"	"	"	"	U
Heptachlor epoxide	ND	0.010	0.010	"	"	"	"	"	"	U
Hexachlorobenzene	ND	0.010	0.040	"	"	"	"	"	"	U
Hexachlorocyclopentadiene	ND	0.040	0.40	"	"	"	"	"	"	U
Methoxychlor	ND	0.020	0.020	"	"	"	"	"	"	U
cis-Permethrin	ND	0.070	0.20	"	"	"	"	"	"	U
trans-Permethrin	ND	0.090	0.20	"	"	"	"	"	"	U
Propachlor	ND	0.070	0.20	"	"	"	"	"	"	U
Trifluralin	ND	0.020	0.040	"	"	"	"	"	"	U
PCB-1016	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1221	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1232	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1242	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1248	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1254	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1260	ND	0.030	0.50	"	"	"	"	"	"	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Chlorinated Pesticides and PCBs by EPA Method 508
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
Total PCBs	ND	0.30	0.50	ug/l	1	AB40514	02/05/14 08:08	02/11/14 23:27	EPA 508	U
Toxaphene	ND	0.40	0.50	"	"	"	"	"	"	U
Chlordane (tech)	ND	0.030	0.050	"	"	"	"	"	"	U
Surrogate: Dibutylchlorendate		*98.0 %*	*70-130*			"	"	"	"	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Nitrogen- and Phosphorus- Pesticides by EPA Method 507
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
Alachlor	ND	0.50	0.50	ug/l	1	AB40730	02/08/14 15:03	02/11/14 08:20	EPA 507	U
Atrazine	ND	0.30	0.50	"	"	"	"	"	"	U
Bromacil	ND	0.50	5.0	"	"	"	"	"	"	U
Butachlor	ND	0.40	0.50	"	"	"	"	"	"	U
Dimethoate	ND	0.20	1.0	"	"	"	"	"	"	U
Metolachlor	ND	0.30	0.50	"	"	"	"	"	"	U
Metribuzin	ND	0.40	0.50	"	"	"	"	"	"	U
Molinate	ND	0.20	0.50	"	"	"	"	"	"	U
Prometryn	ND	0.50	0.50	"	"	"	"	"	"	U
Propachlor	ND	0.30	0.50	"	"	"	"	"	"	U
Simazine	ND	0.30	0.50	"	"	"	"	"	"	U
Thiobencarb	ND	0.20	1.0	"	"	"	"	"	"	U
Surrogate: 1,3-Dimethyl-2-nitrobenzene		*97.8 %*	*70-130*			*"*	*"*	*"*	*"*	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Organic Analytes by EPA Method 504.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
1,2-Dibromo-3-chloropropane	ND	0.0040	0.010	ug/l	1	AB40359	02/04/14 10:00	02/05/14 03:32	EPA 504.1	U
1,2-Dibromoethane (EDB)	ND	0.0050	0.020	"	"	"	"	"	"	U
Trip Blank (14A1713-02) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
1,2-Dibromo-3-chloropropane	ND	0.0040	0.010	ug/l	1	AB40359	02/04/14 10:00	02/05/14 04:07	EPA 504.1	U
1,2-Dibromoethane (EDB)	ND	0.0050	0.020	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Chlorinated Acids by EPA Method 515.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
Acifluorfen	ND	0.50	1.0	ug/l	1	AB40536	02/06/14 14:29	02/08/14 05:03	EPA 515.1	U
Bentazon	ND	0.40	0.40	"	"	"	"	"	"	U
2,4-D	ND	0.80	1.0	"	"	"	"	"	"	U
Dalapon	ND	6.0	6.0	"	"	"	"	"	"	U
2,4-DB	ND	4.0	5.0	"	"	"	"	"	"	U
Dicamba	ND	0.40	0.40	"	"	"	"	"	"	U
Dichlorprop	ND	1.0	1.0	"	"	"	"	"	"	U
Dinoseb	ND	0.80	1.0	"	"	"	"	"	"	U
4-Nitrophenol	ND	0.70	1.0	"	"	"	"	"	"	U
Pentachlorophenol	ND	0.20	0.20	"	"	"	"	"	"	U
Picloram	ND	0.50	1.0	"	"	"	"	"	"	U
2,4,5-T	ND	0.40	0.50	"	"	"	"	"	"	U
2,4,5-TP (Silvex)	ND	0.50	0.50	"	"	"	"	"	"	U
Surrogate: DCAA		*94.4 %*	*70-130*			*"*	*"*	*"*	*"*	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Carbamates by EPA Method 531.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
Aldicarb	ND	0.70	3.0	ug/l	1	AB41142	02/11/14 10:07	02/12/14 11:18	EPA 531.1	U
Aldicarb sulfone	ND	0.70	4.0	"	"	"	"	"	"	U
Aldicarb sulfoxide	ND	0.80	3.0	"	"	"	"	"	"	U
Carbaryl	ND	0.70	5.0	"	"	"	"	"	"	U
Carbofuran	ND	2.0	5.0	"	"	"	"	"	"	U
3-Hydroxycarbofuran	ND	0.90	3.0	"	"	"	"	"	"	U
Methiocarb	ND	2.0	5.0	"	"	"	"	"	"	U
Methomyl	ND	2.0	2.0	"	"	"	"	"	"	U
Oxamyl	ND	0.80	20	"	"	"	"	"	"	U
Propoxur	ND	2.0	5.0	"	"	"	"	"	"	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Endothall by EPA Method 548.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
Endothall	ND	2.0	45	ug/l	1	AB40357	02/04/14 14:37	02/06/14 15:42	EPA 548.1	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Glyphosate by EPA Method 547
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
Glyphosate	ND	3.0	10	ug/l	1	AB40427	02/04/14 09:22	02/05/14 00:02	EPA 547	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Diquat by EPA Method 549.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
Diquat	ND	4.6	4.6	ug/l	2.3	AA43118	02/03/14 09:48	02/10/14 21:29	EPA 549.2	R-01, U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Haloacetic Acids by EPA Method 552.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										
Monobromoacetic Acid	ND	0.8	1.0	ug/l	1	AB41050	02/11/14 13:22	02/12/14 16:07	EPA 552.2	U
Monochloroacetic Acid	ND	1.1	2.0	"	"	"	"	"	"	U
Dibromoacetic Acid	ND	0.8	1.0	"	"	"	"	"	"	U
Dichloroacetic Acid	ND	1.0	1.0	"	"	"	"	"	"	U
Trichloroacetic Acid	ND	1.0	1.0	"	"	"	"	"	"	U
Total Haloacetic Acids (HAA5)	ND	1.0	1.0	"	"	"	"	"	"	U
Surrogate: 2,3-Dibromopropionic Acid		*74.7 %*	*70-130*			"	"	"	"	
Surrogate: 2-Bromopropionic Acid		*82.4 %*	*70-130*			"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Semivolatile Organic Compounds by EPA Method 525.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Shallow) (14A1713-01) Water Sampled: 01/30/14 13:40 Received: 01/30/14 21:25										**A-01**
Benzo (a) pyrene	ND	0.80	1.0	ug/l	10	AB40727	02/08/14 13:35	02/13/14 18:29	EPA 525.2	U
Di(2-ethylhexyl)adipate	ND	4.0	50	"	"	"	"	"	"	U
Di(2-ethylhexyl)phthalate	ND	2.0	30	"	"	"	"	"	"	U
Surrogate: 1,3-Dimethyl-2-nitrobenzene		*105 %*	*70-130*			"	"	"	"	
Surrogate: Perylene-d12		*81.4 %*	*70-130*			"	"	"	"	
Surrogate: Triphenyl phosphate		*101 %*	*70-130*			"	"	"	"	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Metals (Drinking Water) by EPA 200 Series Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43136 - EPA 245.1 Hg Water											
Blank (AA43136-BLK1)					Prepared & Analyzed: 02/05/14						
Mercury	ND	0.060	1.0	ug/l							U
LCS (AA43136-BS1)					Prepared & Analyzed: 02/05/14						
Mercury	2.30	0.060	1.0	ug/l	2.50		92.0	80-120			
Duplicate (AA43136-DUP1)		**Source: 14A1575-02**			Prepared & Analyzed: 02/05/14						
Mercury	ND	0.060	1.0	ug/l		ND				20	U
Matrix Spike (AA43136-MS1)		**Source: 14A1575-02**			Prepared & Analyzed: 02/05/14						
Mercury	2.26	0.060	1.0	ug/l	2.50	ND	90.4	60-140			
Matrix Spike (AA43136-MS2)		**Source: 14B0218-01**			Prepared & Analyzed: 02/05/14						
Mercury	2.32	0.060	1.0	ug/l	2.50	0.0600	90.4	60-140			
Matrix Spike Dup (AA43136-MSD1)		**Source: 14A1575-02**			Prepared & Analyzed: 02/05/14						
Mercury	2.29	0.060	1.0	ug/l	2.50	ND	91.6	60-140	1.32	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Metals by EPA 200 Series Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43133 - Metals Digest											
Blank (AA43133-BLK1)					Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	ND	0.010	1.0	mg/l							U
Magnesium	ND	0.0080	1.0	"							U
Potassium	ND	0.0080	1.0	"							U
Sodium	ND	0.020	1.0	"							U
LCS (AA43133-BS1)					Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	5.36	0.010	1.0	mg/l	5.88		91.2	85-115			
Magnesium	7.09	0.0080	1.0	"	8.00		88.6	85-115			
Potassium	7.97	0.0080	1.0	"	8.00		99.6	85-115			
Sodium	7.75	0.020	1.0	"	8.00		96.8	85-115			
Duplicate (AA43133-DUP1)		**Source: 14A1643-01**			Prepared: 01/31/14 Analyzed: 02/12/14						
Calcium	18.2	0.010	1.0	mg/l		16.5			9.76	20	
Magnesium	6.86	0.0080	1.0	"		6.53			4.91	20	
Potassium	3.66	0.0080	1.0	"		3.35			8.82	20	
Sodium	52.8	0.020	1.0	"		50.2			5.03	20	
Matrix Spike (AA43133-MS1)		**Source: 14A1643-01**			Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	22.4	0.010	1.0	mg/l	5.88	16.5	100	70-130			
Magnesium	13.0	0.0080	1.0	"	8.00	6.53	81.3	70-130			
Potassium	10.8	0.0080	1.0	"	8.00	3.35	92.8	70-130			
Sodium	58.8	0.020	1.0	"	8.00	50.2	107	70-130			
Matrix Spike (AA43133-MS2)		**Source: 14A1713-01**			Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	35.4	0.010	1.0	mg/l	5.88	28.8	112	70-130			
Magnesium	11.0	0.0080	1.0	"	8.00	3.85	89.5	70-130			
Potassium	11.1	0.0080	1.0	"	8.00	3.56	94.7	70-130			
Sodium	47.2	0.020	1.0	"	8.00	38.1	114	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Metals by EPA 200 Series Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43133 - Metals Digest											
Matrix Spike Dup (AA43133-MSD1)		**Source: 14A1643-01**			Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	23.2	0.010	1.0	mg/l	5.88	16.5	113	70-130	3.39	20	
Magnesium	14.3	0.0080	1.0	"	8.00	6.53	97.1	70-130	9.24	20	
Potassium	11.0	0.0080	1.0	"	8.00	3.35	95.8	70-130	2.21	20	
Sodium	60.3	0.020	1.0	"	8.00	50.2	126	70-130	2.49	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40328 - EPA 200.8											
Blank (AB40328-BLK1)					Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	ND	2.0	50	ug/l							U
Antimony	ND	0.020	6.0	"							U
Arsenic	ND	0.070	2.0	"							U
Barium	ND	0.030	100	"							U
Beryllium	ND	0.020	1.0	"							U
Boron	17.8	6.0	50	"							J
Cadmium	ND	0.020	1.0	"							U
Chromium	ND	0.080	10	"							U
Copper	ND	0.040	0.50	"							U
Iron	ND	1.8	50	"							U
Lead	ND	0.020	5.0	"							U
Manganese	ND	0.030	5.0	"							U
Nickel	ND	0.060	10	"							U
Selenium	0.0754	0.070	5.0	"							J
Silver	ND	0.020	0.10	"							U
Thallium	ND	0.020	1.0	"							U
Uranium	ND	0.020	1.0	pCi/l							U
Vanadium	ND	0.30	1.0	ug/l							U
Zinc	1.13	0.50	5.0	"							J
LCS (AB40328-BS1)					Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	483	2.0	50	ug/l	520		92.8	85-115			
Antimony	20.1	0.020	6.0	"	20.0		100	85-115			
Arsenic	19.7	0.070	2.0	"	20.0		98.7	85-115			
Barium	19.1	0.030	100	"	20.0		95.4	85-115			J
Beryllium	18.8	0.020	1.0	"	20.0		94.1	85-115			
Boron	110	6.0	50	"	100		110	85-115			
Cadmium	18.8	0.020	1.0	"	20.0		94.0	85-115			
Chromium	19.3	0.080	10	"	20.0		96.6	85-115			
Copper	19.0	0.040	0.50	"	20.0		95.1	85-115			
Iron	502	1.8	50	"	520		96.6	85-115			
Lead	17.5	0.020	5.0	"	20.0		87.5	85-115			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40328 - EPA 200.8											
LCS (AB40328-BS1)					Prepared: 02/03/14 Analyzed: 02/04/14						
Manganese	18.8	0.030	5.0	ug/l	20.0		94.2	85-115			
Nickel	19.3	0.060	10	"	20.0		96.6	85-115			
Selenium	20.1	0.070	5.0	"	20.0		100	85-115			
Silver	18.1	0.020	0.10	"	20.0		90.4	85-115			
Thallium	17.1	0.020	1.0	"	20.0		85.6	85-115			
Uranium	11.5	0.020	1.0	pCi/l	13.4		85.5	85-115			
Vanadium	19.8	0.30	1.0	ug/l	20.0		99.0	85-115			
Zinc	98.6	0.50	5.0	"	100		98.6	85-115			
Duplicate (AB40328-DUP1)		**Source: 14A1755-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	1120	2.0	50	ug/l		1150			1.98	20	
Antimony	0.0754	0.020	6.0	"		0.0744			1.34	20	J
Arsenic	1.08	0.070	2.0	"		1.15			6.89	20	J
Barium	70.3	0.030	100	"		68.3			2.85	20	J
Beryllium	0.0788	0.020	1.0	"		0.0838			6.24	20	J
Boron	37.9	6.0	50	"		36.2			4.75	20	J
Cadmium	0.0848	0.020	1.0	"		0.0857			1.11	20	J
Chromium	0.470	0.080	10	"		0.382			20.5	20	J
Copper	12.8	0.040	0.50	"		12.3			3.69	20	
Iron	412	1.8	50	"		408			0.910	20	
Lead	1.06	0.020	5.0	"		1.12			4.92	20	J
Manganese	6.46	0.030	5.0	"		7.23			11.3	20	
Nickel	1.21	0.060	10	"		1.20			1.54	20	J
Selenium	0.159	0.070	5.0	"		0.171			7.50	20	J
Silver	0.0362	0.020	0.10	"		0.0220			48.8	20	J
Thallium	0.105	0.020	1.0	"		0.0948			9.86	20	J
Uranium	0.249	0.020	1.0	pCi/l		0.265			6.25	20	J
Vanadium	1.52	0.30	1.0	ug/l		1.64			7.56	20	
Zinc	6.79	0.50	5.0	"		6.73			0.780	20	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40328 - EPA 200.8											
Matrix Spike (AB40328-MS1)		**Source: 14A1755-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	1570	2.0	50	ug/l	520	1150	81.5	70-130			
Antimony	18.9	0.020	6.0	"	20.0	0.0744	94.1	70-130			
Arsenic	19.9	0.070	2.0	"	20.0	1.15	93.5	70-130			
Barium	85.5	0.030	100	"	20.0	68.3	85.8	70-130			J
Beryllium	17.8	0.020	1.0	"	20.0	0.0838	88.5	70-130			
Boron	114	6.0	50	"	100	36.2	78.1	70-130			
Cadmium	18.7	0.020	1.0	"	20.0	0.0857	93.0	70-130			
Chromium	17.4	0.080	10	"	20.0	0.382	85.1	70-130			
Copper	29.6	0.040	0.50	"	20.0	12.3	86.4	70-130			
Iron	858	1.8	50	"	520	408	86.4	70-130			
Lead	19.8	0.020	5.0	"	20.0	1.12	93.4	70-130			
Manganese	23.4	0.030	5.0	"	20.0	7.23	80.7	70-130			
Nickel	18.2	0.060	10	"	20.0	1.20	85.0	70-130			
Selenium	18.7	0.070	5.0	"	20.0	0.171	92.7	70-130			
Silver	17.9	0.020	0.10	"	20.0	0.0220	89.3	70-130			
Thallium	18.5	0.020	1.0	"	20.0	0.0948	92.1	70-130			
Uranium	13.5	0.020	1.0	pCi/l	13.4	0.265	98.5	70-130			
Vanadium	19.1	0.30	1.0	ug/l	20.0	1.64	87.4	70-130			
Zinc	98.9	0.50	5.0	"	100	6.73	92.1	70-130			
Matrix Spike (AB40328-MS2)		**Source: 14B0124-02**			Prepared: 02/05/14 Analyzed: 02/06/14						
Aluminum	529	2.0	50	ug/l	520	70.3	88.1	70-130			
Antimony	20.4	0.020	6.0	"	20.0	0.0711	102	70-130			
Arsenic	21.4	0.070	2.0	"	20.0	2.13	96.2	70-130			
Barium	35.8	0.030	100	"	20.0	16.9	94.7	70-130			J
Beryllium	19.3	0.020	1.0	"	20.0	ND	96.4	70-130			
Boron	150	6.0	50	"	100	63.0	87.0	70-130			
Cadmium	19.4	0.020	1.0	"	20.0	ND	97.0	70-130			
Chromium	20.0	0.080	10	"	20.0	0.590	97.0	70-130			
Copper	19.6	0.040	0.50	"	20.0	1.39	90.9	70-130			
Iron	602	1.8	50	"	520	91.5	98.1	70-130			
Lead	20.2	0.020	5.0	"	20.0	0.0825	101	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40328 - EPA 200.8											
Matrix Spike (AB40328-MS2)		**Source: 14B0124-02**			Prepared: 02/05/14 Analyzed: 02/06/14						
Manganese	26.7	0.030	5.0	ug/l	20.0	7.07	98.0	70-130			
Nickel	19.5	0.060	10	"	20.0	0.983	92.8	70-130			
Selenium	19.2	0.070	5.0	"	20.0	0.207	95.2	70-130			
Silver	19.4	0.020	0.10	"	20.0	ND	97.2	70-130			
Thallium	19.8	0.020	1.0	"	20.0	ND	99.0	70-130			
Uranium	14.2	0.020	1.0	pCi/l	13.4	0.107	105	70-130			
Vanadium	24.6	0.30	1.0	ug/l	20.0	5.40	95.9	70-130			
Zinc	99.9	0.50	5.0	"	100	3.69	96.2	70-130			
Matrix Spike Dup (AB40328-MSD1)		**Source: 14A1755-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	1580	2.0	50	ug/l	520	1150	83.4	70-130	0.635	20	
Antimony	19.7	0.020	6.0	"	20.0	0.0744	98.1	70-130	4.13	20	
Arsenic	20.5	0.070	2.0	"	20.0	1.15	96.6	70-130	3.05	20	
Barium	88.4	0.030	100	"	20.0	68.3	100	70-130	3.29	20	J
Beryllium	19.1	0.020	1.0	"	20.0	0.0838	95.3	70-130	7.32	20	
Boron	125	6.0	50	"	100	36.2	88.8	70-130	8.99	20	
Cadmium	19.7	0.020	1.0	"	20.0	0.0857	98.0	70-130	5.25	20	
Chromium	18.0	0.080	10	"	20.0	0.382	88.1	70-130	3.40	20	
Copper	30.7	0.040	0.50	"	20.0	12.3	91.9	70-130	3.64	20	
Iron	860	1.8	50	"	520	408	86.8	70-130	0.291	20	
Lead	21.5	0.020	5.0	"	20.0	1.12	102	70-130	8.35	20	
Manganese	23.8	0.030	5.0	"	20.0	7.23	83.1	70-130	2.03	20	
Nickel	18.6	0.060	10	"	20.0	1.20	87.2	70-130	2.36	20	
Selenium	19.1	0.070	5.0	"	20.0	0.171	94.8	70-130	2.29	20	
Silver	19.1	0.020	0.10	"	20.0	0.0220	95.5	70-130	6.75	20	
Thallium	20.0	0.020	1.0	"	20.0	0.0948	99.5	70-130	7.72	20	
Uranium	14.5	0.020	1.0	pCi/l	13.4	0.265	107	70-130	7.74	20	
Vanadium	19.8	0.30	1.0	ug/l	20.0	1.64	91.0	70-130	3.68	20	
Zinc	105	0.50	5.0	"	100	6.73	97.9	70-130	5.71	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43107 - General Preparation											
Blank (AA43107-BLK1)					Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	ND	0.030	0.050	mg/l							U
LCS (AA43107-BS1)					Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	0.205	0.030	0.050	mg/l	0.200		103	80-120			
Duplicate (AA43107-DUP1)		**Source: 14A1588-02**			Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	ND	0.030	0.050	mg/l		ND				20	U
Matrix Spike (AA43107-MS1)		**Source: 14A1588-02**			Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	0.208	0.030	0.050	mg/l	0.200	ND	104	80-120			
Matrix Spike Dup (AA43107-MSD1)		**Source: 14A1588-02**			Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	0.210	0.030	0.050	mg/l	0.200	ND	105	80-120	0.826	20	
Batch AA43121 - General Preparation											
Duplicate (AA43121-DUP1)		**Source: 14B0229-03**			Prepared: 02/01/14 Analyzed: 02/11/14						
Bicarbonate	42.7	0.060	5.0	mg/l		42.7			0.00	20	
Batch AA43129 - General Preparation											
Blank (AA43129-BLK1)					Prepared & Analyzed: 01/30/14						
Turbidity	ND	0.040	0.10	NTU							U
Duplicate (AA43129-DUP1)		**Source: 14A1722-01**			Prepared & Analyzed: 01/30/14						
Turbidity	2.48	0.040	0.10	NTU		2.48			0.00	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43147 - General Preparation											
Duplicate (AA43147-DUP1)		**Source: 14A1739-01**			Prepared & Analyzed: 01/31/14						
Specific Conductance (EC)	143	1.0	20	umhos/cm		144			0.697	10	
Batch AB40322 - General Preparation											
Blank (AB40322-BLK1)					Prepared: 02/03/14 Analyzed: 02/05/14						
Total Dissolved Solids	ND	5.0	10	mg/l							U
Duplicate (AB40322-DUP1)		**Source: 14A1635-01**			Prepared: 02/03/14 Analyzed: 02/05/14						
Total Dissolved Solids	361	5.0	10	mg/l		352			2.52	30	
Duplicate (AB40322-DUP2)		**Source: 14A1730-01**			Prepared: 02/03/14 Analyzed: 02/05/14						
Total Dissolved Solids	1010	5.0	10	mg/l		964			4.46	30	
Batch AB40803 - General Prep											
Blank (AB40803-BLK1)					Prepared & Analyzed: 02/08/14						
Total Organic Carbon	ND	0.100	0.300	mg/l							U
LCS (AB40803-BS1)					Prepared & Analyzed: 02/08/14						
Total Organic Carbon	10.6	0.100	0.300	mg/l	10.0		106	85-115			
LCS Dup (AB40803-BSD1)					Prepared & Analyzed: 02/08/14						
Total Organic Carbon	10.5	0.100	0.300	mg/l	10.0		105	85-115	1.20	20	
Duplicate (AB40803-DUP1)		**Source: 14B0427-01**			Prepared & Analyzed: 02/08/14						
Total Organic Carbon	ND	0.100	0.300	mg/l		0.112				20	U

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2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40803 - General Prep											
Matrix Spike (AB40803-MS1)		**Source: 14B0427-01**			Prepared & Analyzed: 02/08/14						
Total Organic Carbon	10.7	0.100	0.300	mg/l	10.0	0.112	106	70-130			
Matrix Spike Dup (AB40803-MSD1)		**Source: 14B0427-01**			Prepared & Analyzed: 02/08/14						
Total Organic Carbon	10.4	0.100	0.300	mg/l	10.0	0.112	102	70-130	3.54	20	
Batch AB41141 - General Preparation											
Blank (AB41141-BLK1)					Prepared & Analyzed: 02/11/14						
Perchlorate	0.967	0.90	4.0	ug/l							J
LCS (AB41141-BS1)					Prepared & Analyzed: 02/11/14						
Perchlorate	23.9	0.90	4.0	ug/l	25.0		95.5	85-115			
Duplicate (AB41141-DUP1)		**Source: 14A1643-01**			Prepared & Analyzed: 02/11/14						
Perchlorate	ND	0.90	4.0	ug/l		ND				15	U
Matrix Spike (AB41141-MS1)		**Source: 14A1643-01**			Prepared & Analyzed: 02/11/14						
Perchlorate	25.9	0.90	4.0	ug/l	25.0	ND	104	70-130			
Matrix Spike Dup (AB41141-MSD1)		**Source: 14A1643-01**			Prepared & Analyzed: 02/11/14						
Perchlorate	25.9	0.90	4.0	ug/l	25.0	ND	104	70-130	0.00386	15	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Miscellaneous Physical/Conventional Chemistry Parameters - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40428 - General Preparation											
Blank (AB40428-BLK1)					Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	ND	0.0020	0.10	mg/l							U
LCS (AB40428-BS1)					Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.202	0.0020	0.10	mg/l	0.200		101	85-115			
Duplicate (AB40428-DUP1)		**Source: 14A1492-02**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	ND	0.0020	0.10	mg/l		ND				25	U
Matrix Spike (AB40428-MS1)		**Source: 14A1492-02**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.188	0.0020	0.10	mg/l	0.200	ND	93.9	85-115			
Matrix Spike (AB40428-MS2)		**Source: 14A1635-01**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.220	0.0020	0.10	mg/l	0.200	ND	110	85-115			
Matrix Spike Dup (AB40428-MSD1)		**Source: 14A1492-02**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.186	0.0020	0.10	mg/l	0.200	ND	92.8	85-115	1.23	25	

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2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Anions by EPA Method 300.0 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43111 - General Preparation											
Blank (AA43111-BLK1)					Prepared & Analyzed: 01/31/14						
Nitrate as NO3	ND	0.20	2.0	mg/l							U
Nitrite as N	ND	0.020	0.40	"							U
Sulfate as SO4	ND	0.090	0.50	"							U
Fluoride	ND	0.070	0.10	"							U
Chloride	ND	0.030	0.50	"							U
LCS (AA43111-BS1)					Prepared & Analyzed: 01/31/14						
Nitrate as NO3	22	0.20	2.0	mg/l	22.2		101	90-110			
Chloride	10.2	0.030	0.50	"	10.0		102	90-110			
Sulfate as SO4	20.0	0.090	0.50	"	20.0		100	90-110			
Fluoride	5.25	0.070	0.10	"	5.00		105	90-110			
Nitrite as N	5.21	0.020	0.40	"	5.00		104	90-110			
Duplicate (AA43111-DUP1)		**Source: 14A1704-01**			Prepared & Analyzed: 01/31/14						
Nitrate as NO3	0.43	0.20	2.0	mg/l		0.43			1.40	20	J
Nitrite as N	ND	0.020	0.40	"		ND				20	U
Chloride	2.62	0.030	0.50	"		2.61			0.0765	20	
Sulfate as SO4	9.21	0.090	0.50	"		9.36			1.61	20	
Fluoride	ND	0.070	0.10	"		ND				20	U
Matrix Spike (AA43111-MS1)		**Source: 14A1704-01**			Prepared & Analyzed: 01/31/14						
Nitrate as NO3	25	0.20	2.0	mg/l	24.7	0.43	99.8	80-120			
Nitrite as N	5.79	0.020	0.40	"	5.56	ND	104	80-120			
Chloride	14.2	0.030	0.50	"	11.1	2.61	104	80-120			
Sulfate as SO4	32.0	0.090	0.50	"	22.2	9.36	102	80-120			
Fluoride	5.68	0.070	0.10	"	5.56	ND	102	80-120			
Matrix Spike (AA43111-MS2)		**Source: 14A1713-01**			Prepared & Analyzed: 01/31/14						
Nitrate as NO3	26	1.0	10	mg/l	24.7	2.4	96.0	80-120			
Fluoride	4.85	0.35	0.50	"	5.56	ND	87.3	80-120			
Chloride	54.8	0.15	2.5	"	11.1	43.7	100	80-120			
Nitrite as N	5.44	0.10	2.0	"	5.56	ND	98.0	80-120			
Sulfate as SO4	34.3	0.45	2.5	"	22.2	13.3	94.2	80-120			

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2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Anions by EPA Method 300.0 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43111 - General Preparation											
Matrix Spike Dup (AA43111-MSD1)		**Source: 14A1704-01**		Prepared & Analyzed: 01/31/14							
Nitrate as NO3	25	0.20	2.0	mg/l	24.7	0.43	99.9	80-120	0.124	20	
Chloride	14.2	0.030	0.50	"	11.1	2.61	104	80-120	0.133	20	
Nitrite as N	5.79	0.020	0.40	"	5.56	ND	104	80-120	0.0768	20	
Sulfate as SO4	32.0	0.090	0.50	"	22.2	9.36	102	80-120	0.149	20	
Fluoride	5.69	0.070	0.10	"	5.56	ND	102	80-120	0.235	20	

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2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Blank (AB40725-BLK1)					Prepared & Analyzed: 02/04/14						
Acetone	ND	0.80	5.0	ug/l							U
Acrylonitrile	ND	0.20	5.0	"							U
Benzene	ND	0.20	0.30	"							U
Bromobenzene	ND	0.10	0.50	"							U
Bromochloromethane	ND	0.20	0.50	"							U
Bromodichloromethane	ND	0.50	0.50	"							U
Bromoform	ND	0.50	0.50	"							U
Bromomethane	ND	0.20	0.50	"							U
n-Butylbenzene	ND	0.10	0.50	"							U
sec-Butylbenzene	ND	0.10	0.50	"							U
tert-Butylbenzene	ND	0.10	0.50	"							U
Carbon disulfide	ND	0.20	0.50	"							U
Carbon tetrachloride	ND	0.30	0.50	"							U
Chlorobenzene	ND	0.20	0.50	"							U
Chloroethane	ND	0.10	0.50	"							U
Chloroform	ND	0.50	0.50	"							U
Chloromethane	ND	0.20	0.50	"							U
2-Chlorotoluene	ND	0.20	0.50	"							U
4-Chlorotoluene	ND	0.10	0.50	"							U
Dibromochloromethane	ND	0.50	0.50	"							U
1,2-Dibromo-3-chloropropane	ND	0.36	0.50	"							U
1,2-Dibromoethane (EDB)	ND	0.14	0.50	"							U
Dibromomethane	ND	0.20	0.50	"							U
1,2-Dichlorobenzene	ND	0.20	0.50	"							U
1,3-Dichlorobenzene	ND	0.20	0.50	"							U
1,4-Dichlorobenzene	ND	0.10	0.50	"							U
trans-1,4-Dichloro-2-butene	ND	0.095	5.0	"							U
Dichlorodifluoromethane	ND	0.20	0.50	"							U
1,1-Dichloroethane	ND	0.10	0.50	"							U
1,2-Dichloroethane	ND	0.20	0.50	"							U
1,1-Dichloroethene	ND	0.10	0.30	"							U
cis-1,2-Dichloroethene	ND	0.20	0.50	"							U

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2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Blank (AB40725-BLK1)					Prepared & Analyzed: 02/04/14						
trans-1,2-Dichloroethene	ND	0.20	0.50	ug/l							U
1,2-Dichloropropane	ND	0.20	0.50	"							U
1,3-Dichloropropane	ND	0.20	0.50	"							U
2,2-Dichloropropane	ND	0.10	0.50	"							U
1,1-Dichloropropene	ND	0.10	0.50	"							U
cis-1,3-Dichloropropene	ND	0.20	0.50	"							U
trans-1,3-Dichloropropene	ND	0.20	0.50	"							U
2-Hexanone	ND	0.097	5.0	"							U
1,3-Dichloropropene (total)	ND	0.20	0.50	"							U
Ethylbenzene	ND	0.10	0.50	"							U
Hexachlorobutadiene	ND	0.30	0.50	"							U
Isopropylbenzene	ND	0.20	0.50	"							U
p-Isopropyltoluene	ND	0.10	0.50	"							U
Methyl ethyl ketone	ND	0.40	1.0	"							U
Methyl iodide	ND	0.12	2.0	"							U
Methyl isobutyl ketone	ND	0.30	1.0	"							U
Methylene chloride	ND	0.40	0.50	"							U
Naphthalene	ND	0.20	0.50	"							U
n-Propylbenzene	ND	0.20	0.50	"							U
Styrene	ND	0.10	0.50	"							U
1,1,1,2-Tetrachloroethane	ND	0.20	0.50	"							U
1,1,2,2-Tetrachloroethane	ND	0.20	0.50	"							U
Tetrachloroethene	ND	0.20	0.50	"							U
Toluene	ND	0.10	0.50	"							U
1,2,3-Trichlorobenzene	ND	0.10	0.50	"							U
1,2,4-Trichlorobenzene	ND	0.20	0.50	"							U
1,1,1-Trichloroethane	ND	0.20	0.50	"							U
1,1,2-Trichloroethane	ND	0.20	0.50	"							U
Trichloroethene	ND	0.20	0.50	"							U
Trichlorofluoromethane	ND	0.20	0.50	"							U
Trichlorotrifluoroethane	ND	0.20	0.50	"							U
1,2,3-Trichloropropane	ND	0.13	0.50	"							U

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Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Blank (AB40725-BLK1)					Prepared & Analyzed: 02/04/14						
1,2,4-Trimethylbenzene	ND	0.10	0.50	ug/l							U
1,3,5-Trimethylbenzene	ND	0.10	0.50	"							U
Vinyl chloride	ND	0.10	0.50	"							U
m,p-Xylene	ND	0.20	0.50	"							U
o-Xylene	ND	0.10	0.50	"							U
Xylenes (total)	ND	0.20	0.50	"							U
Trihalomethanes (total)	ND	0.50	0.50	"							U
Methyl tert-butyl ether	ND	0.50	0.50	"							U
Ethyl tert-butyl ether	ND	0.20	0.50	"							U
Tert-amyl methyl ether	ND	0.20	0.50	"							U
Surrogate: Bromofluorobenzene	*25.0*			*"*	*25.0*		*99.8*	*70-130*			
Surrogate: Dibromofluoromethane	*24.0*			*"*	*25.0*		*95.9*	*70-130*			
Surrogate: Toluene-d8	*25.4*			*"*	*25.0*		*102*	*70-130*			
LCS (AB40725-BS1)					Prepared & Analyzed: 02/04/14						
Acetone	24.1	0.80	5.0	ug/l	20.0		120	70-130			
Acrylonitrile	5.73	0.20	5.0	"	5.00		115	70-130			
Benzene	4.88	0.20	0.30	"	5.00		97.6	70-130			
Bromobenzene	5.19	0.10	0.50	"	5.00		104	70-130			
Bromochloromethane	5.11	0.20	0.50	"	5.00		102	70-130			
Bromodichloromethane	4.65	0.50	0.50	"	5.00		93.0	70-130			
Bromoform	4.58	0.50	0.50	"	5.00		91.6	70-130			
Bromomethane	5.43	0.20	0.50	"	5.00		109	70-130			
n-Butylbenzene	5.09	0.10	0.50	"	5.00		102	70-130			
sec-Butylbenzene	5.06	0.10	0.50	"	5.00		101	70-130			
tert-Butylbenzene	5.24	0.10	0.50	"	5.00		105	70-130			
Carbon disulfide	4.99	0.20	0.50	"	5.00		99.8	70-130			
Carbon tetrachloride	4.76	0.30	0.50	"	5.00		95.2	70-130			
Chlorobenzene	5.07	0.20	0.50	"	5.00		101	70-130			
Chloroethane	5.33	0.10	0.50	"	5.00		107	70-130			
Chloroform	4.92	0.50	0.50	"	5.00		98.4	70-130			
Chloromethane	6.12	0.20	0.50	"	5.00		122	70-130			

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Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS (AB40725-BS1)					Prepared & Analyzed: 02/04/14						
2-Chlorotoluene	5.26	0.20	0.50	ug/l	5.00		105	70-130			
4-Chlorotoluene	4.99	0.10	0.50	"	5.00		99.8	70-130			
Dibromochloromethane	4.81	0.50	0.50	"	5.00		96.2	70-130			
1,2-Dibromo-3-chloropropane	4.94	0.36	0.50	"	5.00		98.8	70-130			
1,2-Dibromoethane (EDB)	5.23	0.14	0.50	"	5.00		105	70-130			
Dibromomethane	4.94	0.20	0.50	"	5.00		98.8	70-130			
1,2-Dichlorobenzene	4.86	0.20	0.50	"	5.00		97.2	70-130			
1,3-Dichlorobenzene	5.18	0.20	0.50	"	5.00		104	70-130			
trans-1,4-Dichloro-2-butene	4.74	0.095	5.0	"	5.00		94.8	70-130			J
1,4-Dichlorobenzene	4.96	0.10	0.50	"	5.00		99.2	70-130			
Dichlorodifluoromethane	6.14	0.20	0.50	"	5.00		123	70-130			
1,1-Dichloroethane	5.10	0.10	0.50	"	5.00		102	70-130			
1,2-Dichloroethane	4.93	0.20	0.50	"	5.00		98.6	70-130			
1,1-Dichloroethene	4.96	0.10	0.30	"	5.00		99.2	70-130			
cis-1,2-Dichloroethene	5.01	0.20	0.50	"	5.00		100	70-130			
trans-1,2-Dichloroethene	4.99	0.20	0.50	"	5.00		99.8	70-130			
1,2-Dichloropropane	4.83	0.20	0.50	"	5.00		96.6	70-130			
1,3-Dichloropropane	5.09	0.20	0.50	"	5.00		102	70-130			
2,2-Dichloropropane	4.57	0.10	0.50	"	5.00		91.4	70-130			
1,1-Dichloropropene	4.65	0.10	0.50	"	5.00		93.0	70-130			
cis-1,3-Dichloropropene	4.66	0.20	0.50	"	5.00		93.2	70-130			
trans-1,3-Dichloropropene	4.58	0.20	0.50	"	5.00		91.6	70-130			
2-Hexanone	5.38	0.097	5.0	"	5.00		108	70-130			
Ethylbenzene	5.06	0.10	0.50	"	5.00		101	70-130			
Hexachlorobutadiene	4.93	0.30	0.50	"	5.00		98.6	70-130			
Isopropylbenzene	5.33	0.20	0.50	"	5.00		107	70-130			
p-Isopropyltoluene	5.25	0.10	0.50	"	5.00		105	70-130			
Methyl ethyl ketone	10.5	0.40	1.0	"	10.0		105	70-130			
Methyl iodide	5.04	0.12	2.0	"	5.00		101	70-130			
Methyl isobutyl ketone	10.3	0.30	1.0	"	10.0		103	70-130			
Methylene chloride	4.10	0.40	0.50	"	5.00		82.0	70-130			
Naphthalene	5.01	0.20	0.50	"	5.00		100	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS (AB40725-BS1)					Prepared & Analyzed: 02/04/14						
n-Propylbenzene	5.43	0.20	0.50	ug/l	5.00		109	70-130			
Styrene	5.32	0.10	0.50	"	5.00		106	70-130			
1,1,1,2-Tetrachloroethane	4.86	0.20	0.50	"	5.00		97.2	70-130			
1,1,2,2-Tetrachloroethane	5.08	0.20	0.50	"	5.00		102	70-130			
Tetrachloroethene	5.11	0.20	0.50	"	5.00		102	70-130			
Toluene	5.21	0.10	0.50	"	5.00		104	70-130			
1,2,3-Trichlorobenzene	5.08	0.10	0.50	"	5.00		102	70-130			
1,2,4-Trichlorobenzene	5.00	0.20	0.50	"	5.00		100	70-130			
1,1,1-Trichloroethane	4.89	0.20	0.50	"	5.00		97.8	70-130			
1,1,2-Trichloroethane	5.09	0.20	0.50	"	5.00		102	70-130			
Trichloroethene	4.93	0.20	0.50	"	5.00		98.6	70-130			
Trichlorofluoromethane	5.14	0.20	0.50	"	5.00		103	70-130			
Trichlorotrifluoroethane	5.56	0.20	0.50	"	5.00		111	70-130			
1,2,3-Trichloropropane	5.03	0.13	0.50	"	5.00		101	70-130			
1,2,4-Trimethylbenzene	5.36	0.10	0.50	"	5.00		107	70-130			
1,3,5-Trimethylbenzene	5.36	0.10	0.50	"	5.00		107	70-130			
Vinyl chloride	5.40	0.10	0.50	"	5.00		108	70-130			
m,p-Xylene	10.2	0.20	0.50	"	10.0		102	70-130			
o-Xylene	5.24	0.10	0.50	"	5.00		105	70-130			
Xylenes (total)	15.4	0.20	0.50	"	15.0		103	70-130			
Methyl tert-butyl ether	4.89	0.50	0.50	"	5.00		97.8	70-130			
Ethyl tert-butyl ether	4.85	0.20	0.50	"	5.00		97.0	70-130			
Tert-amyl methyl ether	4.93	0.20	0.50	"	5.00		98.6	70-130			
Surrogate: Bromofluorobenzene	*25.6*			*"*	*25.0*		*102*	*70-130*			
Surrogate: Dibromofluoromethane	*24.7*			*"*	*25.0*		*98.7*	*70-130*			
Surrogate: Toluene-d8	*25.3*			*"*	*25.0*		*101*	*70-130*			
LCS Dup (AB40725-BSD1)					Prepared & Analyzed: 02/04/14						
Acetone	22.4	0.80	5.0	ug/l	20.0		112	70-130	7.28	30	
Acrylonitrile	5.77	0.20	5.0	"	5.00		115	70-130	0.696	30	
Benzene	4.70	0.20	0.30	"	5.00		94.0	70-130	3.76	30	
Bromobenzene	5.09	0.10	0.50	"	5.00		102	70-130	1.95	30	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS Dup (AB40725-BSD1)					Prepared & Analyzed: 02/04/14						
Bromochloromethane	4.92	0.20	0.50	ug/l	5.00		98.4	70-130	3.79	30	
Bromodichloromethane	4.56	0.50	0.50	"	5.00		91.2	70-130	1.95	30	
Bromoform	4.71	0.50	0.50	"	5.00		94.2	70-130	2.80	30	
Bromomethane	5.46	0.20	0.50	"	5.00		109	70-130	0.551	30	
n-Butylbenzene	4.88	0.10	0.50	"	5.00		97.6	70-130	4.21	30	
sec-Butylbenzene	5.00	0.10	0.50	"	5.00		100	70-130	1.19	30	
tert-Butylbenzene	5.15	0.10	0.50	"	5.00		103	70-130	1.73	30	
Carbon disulfide	4.83	0.20	0.50	"	5.00		96.6	70-130	3.26	30	
Carbon tetrachloride	4.64	0.30	0.50	"	5.00		92.8	70-130	2.55	30	
Chlorobenzene	5.01	0.20	0.50	"	5.00		100	70-130	1.19	30	
Chloroethane	5.12	0.10	0.50	"	5.00		102	70-130	4.02	30	
Chloroform	4.84	0.50	0.50	"	5.00		96.8	70-130	1.64	30	
Chloromethane	5.86	0.20	0.50	"	5.00		117	70-130	4.34	30	
2-Chlorotoluene	5.27	0.20	0.50	"	5.00		105	70-130	0.190	30	
4-Chlorotoluene	5.07	0.10	0.50	"	5.00		101	70-130	1.59	30	
Dibromochloromethane	4.72	0.50	0.50	"	5.00		94.4	70-130	1.89	30	
1,2-Dibromo-3-chloropropane	4.95	0.36	0.50	"	5.00		99.0	70-130	0.202	25	
1,2-Dibromoethane (EDB)	5.17	0.14	0.50	"	5.00		103	70-130	1.15	25	
Dibromomethane	5.07	0.20	0.50	"	5.00		101	70-130	2.60	30	
1,2-Dichlorobenzene	4.70	0.20	0.50	"	5.00		94.0	70-130	3.35	30	
1,3-Dichlorobenzene	5.10	0.20	0.50	"	5.00		102	70-130	1.56	30	
trans-1,4-Dichloro-2-butene	4.90	0.095	5.0	"	5.00		98.0	70-130	3.32	25	J
1,4-Dichlorobenzene	4.87	0.10	0.50	"	5.00		97.4	70-130	1.83	30	
Dichlorodifluoromethane	5.94	0.20	0.50	"	5.00		119	70-130	3.31	30	
1,1-Dichloroethane	4.86	0.10	0.50	"	5.00		97.2	70-130	4.82	30	
1,2-Dichloroethane	4.84	0.20	0.50	"	5.00		96.8	70-130	1.84	30	
1,1-Dichloroethene	4.67	0.10	0.30	"	5.00		93.4	70-130	6.02	30	
cis-1,2-Dichloroethene	4.85	0.20	0.50	"	5.00		97.0	70-130	3.25	30	
trans-1,2-Dichloroethene	4.78	0.20	0.50	"	5.00		95.6	70-130	4.30	30	
1,2-Dichloropropane	4.88	0.20	0.50	"	5.00		97.6	70-130	1.03	30	
1,3-Dichloropropane	5.07	0.20	0.50	"	5.00		101	70-130	0.394	30	
2,2-Dichloropropane	4.36	0.10	0.50	"	5.00		87.2	70-130	4.70	30	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS Dup (AB40725-BSD1)					Prepared & Analyzed: 02/04/14						
1,1-Dichloropropene	4.56	0.10	0.50	ug/l	5.00		91.2	70-130	1.95	30	
cis-1,3-Dichloropropene	4.68	0.20	0.50	"	5.00		93.6	70-130	0.428	30	
trans-1,3-Dichloropropene	4.74	0.20	0.50	"	5.00		94.8	70-130	3.43	30	
Ethylbenzene	4.96	0.10	0.50	"	5.00		99.2	70-130	2.00	30	
2-Hexanone	5.44	0.097	5.0	"	5.00		109	70-130	1.11	25	
Hexachlorobutadiene	4.64	0.30	0.50	"	5.00		92.8	70-130	6.06	30	
Isopropylbenzene	5.24	0.20	0.50	"	5.00		105	70-130	1.70	30	
p-Isopropyltoluene	5.08	0.10	0.50	"	5.00		102	70-130	3.29	30	
Methyl ethyl ketone	11.0	0.40	1.0	"	10.0		110	70-130	4.74	30	
Methyl iodide	4.90	0.12	2.0	"	5.00		98.0	70-130	2.82	25	
Methyl isobutyl ketone	10.4	0.30	1.0	"	10.0		104	70-130	0.679	30	
Methylene chloride	4.06	0.40	0.50	"	5.00		81.2	70-130	0.980	30	
Naphthalene	4.96	0.20	0.50	"	5.00		99.2	70-130	1.00	30	
n-Propylbenzene	5.47	0.20	0.50	"	5.00		109	70-130	0.734	30	
Styrene	5.28	0.10	0.50	"	5.00		106	70-130	0.755	30	
1,1,1,2-Tetrachloroethane	4.77	0.20	0.50	"	5.00		95.4	70-130	1.87	30	
1,1,2,2-Tetrachloroethane	5.14	0.20	0.50	"	5.00		103	70-130	1.17	30	
Tetrachloroethene	4.82	0.20	0.50	"	5.00		96.4	70-130	5.84	30	
Toluene	5.15	0.10	0.50	"	5.00		103	70-130	1.16	30	
1,2,3-Trichlorobenzene	4.99	0.10	0.50	"	5.00		99.8	70-130	1.79	30	
1,2,4-Trichlorobenzene	4.83	0.20	0.50	"	5.00		96.6	70-130	3.46	30	
1,1,1-Trichloroethane	4.70	0.20	0.50	"	5.00		94.0	70-130	3.96	30	
1,1,2-Trichloroethane	5.20	0.20	0.50	"	5.00		104	70-130	2.14	30	
Trichloroethene	4.67	0.20	0.50	"	5.00		93.4	70-130	5.42	30	
Trichlorofluoromethane	5.01	0.20	0.50	"	5.00		100	70-130	2.56	30	
Trichlorotrifluoroethane	5.29	0.20	0.50	"	5.00		106	70-130	4.98	30	
1,2,3-Trichloropropane	5.09	0.13	0.50	"	5.00		102	70-130	1.19	25	
1,2,4-Trimethylbenzene	5.28	0.10	0.50	"	5.00		106	70-130	1.50	30	
1,3,5-Trimethylbenzene	5.28	0.10	0.50	"	5.00		106	70-130	1.50	30	
Vinyl chloride	5.27	0.10	0.50	"	5.00		105	70-130	2.44	30	
m,p-Xylene	10.1	0.20	0.50	"	10.0		101	70-130	0.888	30	
o-Xylene	5.11	0.10	0.50	"	5.00		102	70-130	2.51	30	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS Dup (AB40725-BSD1)					Prepared & Analyzed: 02/04/14						
Xylenes (total)	15.2	0.20	0.50	ug/l	15.0		101	70-130	1.44	30	
Methyl tert-butyl ether	4.81	0.50	0.50	"	5.00		96.2	70-130	1.65	30	
Ethyl tert-butyl ether	5.20	0.20	0.50	"	5.00		104	70-130	6.97	30	
Tert-amyl methyl ether	4.85	0.20	0.50	"	5.00		97.0	70-130	1.64	30	
Surrogate: Bromofluorobenzene	*25.4*			*"*	*25.0*		*102*	*70-130*			
Surrogate: Dibromofluoromethane	*24.0*			*"*	*25.0*		*96.1*	*70-130*			
Surrogate: Toluene-d8	*25.2*			*"*	*25.0*		*101*	*70-130*			
Matrix Spike (AB40725-MS1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
Acetone	26.9	0.80	5.0	ug/l	20.0	1.79	126	70-130			
Acrylonitrile	5.81	0.20	5.0	"	5.00	ND	116	70-130			
Benzene	5.43	0.20	0.30	"	5.00	ND	109	70-130			
Bromobenzene	5.48	0.10	0.50	"	5.00	ND	110	70-130			
Bromochloromethane	5.55	0.20	0.50	"	5.00	ND	111	70-130			
Bromodichloromethane	10.0	0.50	0.50	"	5.00	4.42	112	70-130			
Bromoform	4.44	0.50	0.50	"	5.00	ND	88.8	70-130			
Bromomethane	6.20	0.20	0.50	"	5.00	ND	124	70-130			
n-Butylbenzene	5.03	0.10	0.50	"	5.00	ND	101	70-130			
sec-Butylbenzene	5.41	0.10	0.50	"	5.00	ND	108	70-130			
tert-Butylbenzene	5.60	0.10	0.50	"	5.00	ND	112	70-130			
Carbon disulfide	5.36	0.20	0.50	"	5.00	ND	107	70-130			
Carbon tetrachloride	4.97	0.30	0.50	"	5.00	ND	99.4	70-130			
Chlorobenzene	5.35	0.20	0.50	"	5.00	ND	107	70-130			
Chloroethane	6.00	0.10	0.50	"	5.00	ND	120	70-130			
Chloroform	35.3	0.50	0.50	"	5.00	31.5	76.2	70-130			
Chloromethane	6.60	0.20	0.50	"	5.00	ND	132	70-130			QM-05
2-Chlorotoluene	5.65	0.20	0.50	"	5.00	ND	113	70-130			
4-Chlorotoluene	5.61	0.10	0.50	"	5.00	ND	112	70-130			
Dibromochloromethane	4.80	0.50	0.50	"	5.00	ND	96.0	70-130			
1,2-Dibromo-3-chloropropane	4.62	0.36	0.50	"	5.00	ND	92.4	70-130			
1,2-Dibromoethane (EDB)	5.29	0.14	0.50	"	5.00	ND	106	70-130			
Dibromomethane	5.47	0.20	0.50	"	5.00	ND	109	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike (AB40725-MS1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
1,2-Dichlorobenzene	4.95	0.20	0.50	ug/l	5.00	ND	99.0	70-130			
1,3-Dichlorobenzene	5.47	0.20	0.50	"	5.00	ND	109	70-130			
trans-1,4-Dichloro-2-butene	5.53	0.095	5.0	"	5.00	ND	111	70-130			
1,4-Dichlorobenzene	5.16	0.10	0.50	"	5.00	ND	103	70-130			
Dichlorodifluoromethane	6.69	0.20	0.50	"	5.00	ND	134	70-130			QM-05
1,1-Dichloroethane	5.61	0.10	0.50	"	5.00	ND	112	70-130			
1,2-Dichloroethane	5.51	0.20	0.50	"	5.00	ND	110	70-130			
1,1-Dichloroethene	5.37	0.10	0.30	"	5.00	ND	107	70-130			
cis-1,2-Dichloroethene	5.51	0.20	0.50	"	5.00	ND	110	70-130			
trans-1,2-Dichloroethene	5.31	0.20	0.50	"	5.00	ND	106	70-130			
1,2-Dichloropropane	5.29	0.20	0.50	"	5.00	ND	106	70-130			
1,3-Dichloropropane	5.45	0.20	0.50	"	5.00	ND	109	70-130			
2,2-Dichloropropane	4.58	0.10	0.50	"	5.00	ND	91.6	70-130			
1,1-Dichloropropene	5.13	0.10	0.50	"	5.00	ND	103	70-130			
cis-1,3-Dichloropropene	4.84	0.20	0.50	"	5.00	ND	96.8	70-130			
trans-1,3-Dichloropropene	4.50	0.20	0.50	"	5.00	ND	90.0	70-130			
Ethylbenzene	5.30	0.10	0.50	"	5.00	ND	106	70-130			
2-Hexanone	5.62	0.097	5.0	"	5.00	ND	112	70-130			
Hexachlorobutadiene	4.84	0.30	0.50	"	5.00	ND	96.8	70-130			
Isopropylbenzene	5.74	0.20	0.50	"	5.00	ND	115	70-130			
p-Isopropyltoluene	5.59	0.10	0.50	"	5.00	ND	112	70-130			
Methyl ethyl ketone	12.3	0.40	1.0	"	10.0	ND	123	70-130			
Methyl iodide	5.66	0.12	2.0	"	5.00	ND	113	70-130			
Methyl isobutyl ketone	10.7	0.30	1.0	"	10.0	ND	107	70-130			
Methylene chloride	4.34	0.40	0.50	"	5.00	ND	86.8	70-130			
Naphthalene	5.02	0.20	0.50	"	5.00	ND	100	70-130			
n-Propylbenzene	5.74	0.20	0.50	"	5.00	ND	115	70-130			
Styrene	5.53	0.10	0.50	"	5.00	ND	111	70-130			
1,1,1,2-Tetrachloroethane	4.62	0.20	0.50	"	5.00	ND	92.4	70-130			
1,1,2,2-Tetrachloroethane	5.37	0.20	0.50	"	5.00	ND	107	70-130			
Tetrachloroethene	5.41	0.20	0.50	"	5.00	ND	108	70-130			
Toluene	5.51	0.10	0.50	"	5.00	ND	110	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike (AB40725-MS1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
1,2,3-Trichlorobenzene	5.07	0.10	0.50	ug/l	5.00	ND	101	70-130			
1,2,4-Trichlorobenzene	4.77	0.20	0.50	"	5.00	ND	95.4	70-130			
1,1,1-Trichloroethane	5.12	0.20	0.50	"	5.00	ND	102	70-130			
1,1,2-Trichloroethane	5.46	0.20	0.50	"	5.00	ND	109	70-130			
Trichloroethene	5.13	0.20	0.50	"	5.00	ND	103	70-130			
Trichlorofluoromethane	5.52	0.20	0.50	"	5.00	ND	110	70-130			
Trichlorotrifluoroethane	6.04	0.20	0.50	"	5.00	ND	121	70-130			
1,2,3-Trichloropropane	5.35	0.13	0.50	"	5.00	ND	107	70-130			
1,2,4-Trimethylbenzene	5.57	0.10	0.50	"	5.00	ND	111	70-130			
1,3,5-Trimethylbenzene	5.57	0.10	0.50	"	5.00	ND	111	70-130			
Vinyl chloride	6.10	0.10	0.50	"	5.00	ND	122	70-130			
m,p-Xylene	11.0	0.20	0.50	"	10.0	ND	110	70-130			
o-Xylene	5.54	0.10	0.50	"	5.00	ND	111	70-130			
Xylenes (total)	16.6	0.20	0.50	"	15.0	ND	110	70-130			
Methyl tert-butyl ether	4.80	0.50	0.50	"	5.00	ND	96.0	70-130			
Ethyl tert-butyl ether	5.52	0.20	0.50	"	5.00	ND	110	70-130			
Tert-amyl methyl ether	4.93	0.20	0.50	"	5.00	ND	98.6	70-130			
Surrogate: Bromofluorobenzene	*25.3*			*"*	*25.0*		*101*	*70-130*			
Surrogate: Dibromofluoromethane	*24.5*			*"*	*25.0*		*98.1*	*70-130*			
Surrogate: Toluene-d8	*25.0*			*"*	*25.0*		*99.9*	*70-130*			
Matrix Spike Dup (AB40725-MSD1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
Acetone	26.1	0.80	5.0	ug/l	20.0	1.79	122	70-130	2.87	30	
Acrylonitrile	5.35	0.20	5.0	"	5.00	ND	107	70-130	8.24	30	
Benzene	4.92	0.20	0.30	"	5.00	ND	98.4	70-130	9.86	30	
Bromobenzene	5.04	0.10	0.50	"	5.00	ND	101	70-130	8.37	30	
Bromochloromethane	5.02	0.20	0.50	"	5.00	ND	100	70-130	10.0	30	
Bromodichloromethane	9.77	0.50	0.50	"	5.00	4.42	107	70-130	2.43	30	
Bromoform	4.34	0.50	0.50	"	5.00	ND	86.8	70-130	2.28	30	
Bromomethane	5.65	0.20	0.50	"	5.00	ND	113	70-130	9.28	30	
n-Butylbenzene	4.55	0.10	0.50	"	5.00	ND	91.0	70-130	10.0	30	
sec-Butylbenzene	5.00	0.10	0.50	"	5.00	ND	100	70-130	7.88	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike Dup (AB40725-MSD1)		**Source: 14B0115-02**		Prepared: 02/04/14 Analyzed: 02/06/14							
tert-Butylbenzene	5.08	0.10	0.50	ug/l	5.00	ND	102	70-130	9.74	30	
Carbon disulfide	4.92	0.20	0.50	"	5.00	ND	98.4	70-130	8.56	30	
Carbon tetrachloride	4.66	0.30	0.50	"	5.00	ND	93.2	70-130	6.44	30	
Chlorobenzene	5.02	0.20	0.50	"	5.00	ND	100	70-130	6.36	30	
Chloroethane	5.44	0.10	0.50	"	5.00	ND	109	70-130	9.79	30	
Chloroform	35.4	0.50	0.50	"	5.00	31.5	77.4	70-130	0.170	30	
Chloromethane	6.07	0.20	0.50	"	5.00	ND	121	70-130	8.37	30	
2-Chlorotoluene	5.19	0.20	0.50	"	5.00	ND	104	70-130	8.49	30	
4-Chlorotoluene	4.85	0.10	0.50	"	5.00	ND	97.0	70-130	14.5	30	
Dibromochloromethane	4.76	0.50	0.50	"	5.00	ND	95.2	70-130	0.837	30	
1,2-Dibromo-3-chloropropane	4.49	0.36	0.50	"	5.00	ND	89.8	70-130	2.85	25	
1,2-Dibromoethane (EDB)	4.82	0.14	0.50	"	5.00	ND	96.4	70-130	9.30	25	
Dibromomethane	5.04	0.20	0.50	"	5.00	ND	101	70-130	8.18	30	
1,2-Dichlorobenzene	4.59	0.20	0.50	"	5.00	ND	91.8	70-130	7.55	30	
1,3-Dichlorobenzene	5.02	0.20	0.50	"	5.00	ND	100	70-130	8.58	30	
1,4-Dichlorobenzene	4.76	0.10	0.50	"	5.00	ND	95.2	70-130	8.06	30	
trans-1,4-Dichloro-2-butene	5.09	0.095	5.0	"	5.00	ND	102	70-130	8.29	25	
Dichlorodifluoromethane	6.09	0.20	0.50	"	5.00	ND	122	70-130	9.39	30	
1,1-Dichloroethane	5.17	0.10	0.50	"	5.00	ND	103	70-130	8.16	30	
1,2-Dichloroethane	5.08	0.20	0.50	"	5.00	ND	102	70-130	8.12	30	
1,1-Dichloroethene	4.99	0.10	0.30	"	5.00	ND	99.8	70-130	7.34	30	
cis-1,2-Dichloroethene	5.09	0.20	0.50	"	5.00	ND	102	70-130	7.92	30	
trans-1,2-Dichloroethene	4.93	0.20	0.50	"	5.00	ND	98.6	70-130	7.42	30	
1,2-Dichloropropane	4.86	0.20	0.50	"	5.00	ND	97.2	70-130	8.47	30	
1,3-Dichloropropane	5.15	0.20	0.50	"	5.00	ND	103	70-130	5.66	30	
2,2-Dichloropropane	4.28	0.10	0.50	"	5.00	ND	85.6	70-130	6.77	30	
1,1-Dichloropropene	4.75	0.10	0.50	"	5.00	ND	95.0	70-130	7.69	30	
cis-1,3-Dichloropropene	4.62	0.20	0.50	"	5.00	ND	92.4	70-130	4.65	30	
trans-1,3-Dichloropropene	4.22	0.20	0.50	"	5.00	ND	84.4	70-130	6.42	30	
2-Hexanone	5.28	0.097	5.0	"	5.00	ND	106	70-130	6.24	25	
Ethylbenzene	4.83	0.10	0.50	"	5.00	ND	96.6	70-130	9.28	30	
Hexachlorobutadiene	4.48	0.30	0.50	"	5.00	ND	89.6	70-130	7.73	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike Dup (AB40725-MSD1)		**Source: 14B0115-02**		Prepared: 02/04/14 Analyzed: 02/06/14							
Isopropylbenzene	5.21	0.20	0.50	ug/l	5.00	ND	104	70-130	9.68	30	
p-Isopropyltoluene	4.91	0.10	0.50	"	5.00	ND	98.2	70-130	13.0	30	
Methyl ethyl ketone	11.8	0.40	1.0	"	10.0	ND	118	70-130	3.89	30	
Methyl iodide	5.13	0.12	2.0	"	5.00	ND	103	70-130	9.82	25	
Methyl isobutyl ketone	9.80	0.30	1.0	"	10.0	ND	98.0	70-130	8.69	30	
Methylene chloride	3.66	0.40	0.50	"	5.00	ND	73.2	70-130	17.0	30	
Naphthalene	4.66	0.20	0.50	"	5.00	ND	93.2	70-130	7.44	30	
n-Propylbenzene	5.17	0.20	0.50	"	5.00	ND	103	70-130	10.4	30	
Styrene	5.04	0.10	0.50	"	5.00	ND	101	70-130	9.27	30	
1,1,1,2-Tetrachloroethane	4.34	0.20	0.50	"	5.00	ND	86.8	70-130	6.25	30	
1,1,2,2-Tetrachloroethane	4.95	0.20	0.50	"	5.00	ND	99.0	70-130	8.14	30	
Tetrachloroethene	4.90	0.20	0.50	"	5.00	ND	98.0	70-130	9.89	30	
Toluene	5.03	0.10	0.50	"	5.00	ND	101	70-130	9.11	30	
1,2,3-Trichlorobenzene	4.89	0.10	0.50	"	5.00	ND	97.8	70-130	3.61	30	
1,2,4-Trichlorobenzene	4.38	0.20	0.50	"	5.00	ND	87.6	70-130	8.52	30	
1,1,1-Trichloroethane	4.75	0.20	0.50	"	5.00	ND	95.0	70-130	7.50	30	
1,1,2-Trichloroethane	5.07	0.20	0.50	"	5.00	ND	101	70-130	7.41	30	
Trichloroethene	4.86	0.20	0.50	"	5.00	ND	97.2	70-130	5.41	30	
Trichlorofluoromethane	4.90	0.20	0.50	"	5.00	ND	98.0	70-130	11.9	30	
Trichlorotrifluoroethane	5.57	0.20	0.50	"	5.00	ND	111	70-130	8.10	30	
1,2,3-Trichloropropane	4.93	0.13	0.50	"	5.00	ND	98.6	70-130	8.17	25	
1,2,4-Trimethylbenzene	5.11	0.10	0.50	"	5.00	ND	102	70-130	8.61	30	
1,3,5-Trimethylbenzene	5.11	0.10	0.50	"	5.00	ND	102	70-130	8.61	30	
Vinyl chloride	5.41	0.10	0.50	"	5.00	ND	108	70-130	12.0	30	
m,p-Xylene	9.99	0.20	0.50	"	10.0	ND	99.9	70-130	9.71	30	
o-Xylene	5.07	0.10	0.50	"	5.00	ND	101	70-130	8.86	30	
Xylenes (total)	15.1	0.20	0.50	"	15.0	ND	100	70-130	9.43	30	
Methyl tert-butyl ether	4.31	0.50	0.50	"	5.00	ND	86.2	70-130	10.8	30	
Ethyl tert-butyl ether	5.09	0.20	0.50	"	5.00	ND	102	70-130	8.11	30	
Tert-amyl methyl ether	4.48	0.20	0.50	"	5.00	ND	89.6	70-130	9.56	30	
Surrogate: Bromofluorobenzene	*25.4*			*"*	*25.0*		*101*	*70-130*			
Surrogate: Dibromofluoromethane	*24.2*			*"*	*25.0*		*97.0*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike Dup (AB40725-MSD1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
Surrogate: Toluene-d8	*24.8*			*ug/l*	*25.0*		*99.0*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
Blank (AB40514-BLK1)					Prepared: 02/05/14 Analyzed: 02/11/14						
Aldrin	ND	0.010	0.050	ug/l							U
Chloroneb	ND	0.20	0.50	"							U
Chlorobenzilate	ND	2.0	5.0	"							U
Chlorothalonil	ND	0.030	0.10	"							U
DCPA	ND	0.020	0.040	"							U
4,4´-DDD	ND	0.020	0.050	"							U
4,4´-DDE	ND	0.020	0.050	"							U
4,4´-DDT	ND	0.020	0.020	"							U
Dieldrin	ND	0.010	0.010	"							U
Endosulfan I	ND	0.020	0.050	"							U
Endosulfan II	ND	0.020	0.050	"							U
Endosulfan sulfate	ND	0.020	0.020	"							U
Endrin	ND	0.030	0.10	"							U
Endrin aldehyde	ND	0.020	0.050	"							U
HCH-alpha	ND	0.010	0.050	"							U
HCH-beta	ND	0.020	0.050	"							U
HCH-delta	ND	0.030	0.050	"							U
HCH-gamma (Lindane)	ND	0.010	0.010	"							U
Heptachlor	ND	0.010	0.010	"							U
Heptachlor epoxide	ND	0.010	0.010	"							U
Hexachlorocyclopentadiene	ND	0.040	0.40	"							U
Hexachlorobenzene	ND	0.010	0.040	"							U
Methoxychlor	ND	0.020	0.020	"							U
cis-Permethrin	ND	0.070	0.20	"							U
trans-Permethrin	ND	0.090	0.20	"							U
Propachlor	ND	0.070	0.20	"							U
Trifluralin	ND	0.020	0.040	"							U
PCB-1016	ND	0.030	0.50	"							U
PCB-1221	ND	0.030	0.50	"							U
PCB-1232	ND	0.030	0.50	"							U
PCB-1242	ND	0.030	0.50	"							U
PCB-1248	ND	0.030	0.50	"							U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
Blank (AB40514-BLK1)					Prepared: 02/05/14 Analyzed: 02/11/14						
PCB-1254	ND	0.030	0.50	ug/l							U
PCB-1260	ND	0.030	0.50	"							U
Total PCBs	ND	0.30	0.50	"							U
Toxaphene	ND	0.40	0.50	"							U
Chlordane (tech)	ND	0.030	0.050	"							U
Surrogate: Dibutylchlorendate	*1.05*			*"*	*0.952*		*110*	*70-130*			
LCS (AB40514-BS1)					Prepared: 02/05/14 Analyzed: 02/11/14						
Aldrin	0.263	0.010	0.050	ug/l	0.280		94.1	70-130			
Chloroneb	2.73	0.20	0.50	"	2.80		97.5	70-130			
Chlorobenzilate	3.29	2.0	5.0	"	2.80		117	70-130			J
Chlorothalonil	0.313	0.030	0.10	"	0.280		112	70-130			
DCPA	0.289	0.020	0.040	"	0.280		103	70-130			
4,4´-DDD	0.203	0.020	0.050	"	0.280		72.3	70-130			
4,4´-DDE	0.279	0.020	0.050	"	0.280		99.6	70-130			
4,4´-DDT	0.290	0.020	0.020	"	0.280		104	70-130			
Dieldrin	0.283	0.010	0.010	"	0.280		101	70-130			
Endosulfan I	0.285	0.020	0.050	"	0.280		102	70-130			
Endosulfan II	0.277	0.020	0.050	"	0.280		98.9	70-130			
Endosulfan sulfate	0.306	0.020	0.020	"	0.280		109	70-130			
Endrin	0.319	0.030	0.10	"	0.280		114	70-130			
Endrin aldehyde	0.267	0.020	0.050	"	0.280		95.3	70-130			
HCH-alpha	0.269	0.010	0.050	"	0.280		96.1	70-130			
HCH-beta	0.279	0.020	0.050	"	0.280		99.7	70-130			
HCH-delta	0.286	0.030	0.050	"	0.280		102	70-130			
HCH-gamma (Lindane)	0.273	0.010	0.010	"	0.280		97.7	70-130			
Heptachlor	0.273	0.010	0.010	"	0.280		97.6	70-130			
Heptachlor epoxide	0.279	0.010	0.010	"	0.280		99.5	70-130			
Hexachlorocyclopentadiene	0.409	0.040	0.40	"	0.560		73.1	15-90			
Hexachlorobenzene	0.237	0.010	0.040	"	0.280		84.7	70-130			
Methoxychlor	0.301	0.020	0.020	"	0.280		107	70-130			
cis-Permethrin	1.59	0.070	0.20	"	1.40		114	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
LCS (AB40514-BS1)					Prepared: 02/05/14 Analyzed: 02/11/14						
trans-Permethrin	1.60	0.090	0.20	ug/l	1.40		114	70-130			
Propachlor	0.306	0.070	0.20	"	0.280		109	70-130			
Trifluralin	0.416	0.020	0.040	"	0.420		99.0	70-130			
Surrogate: Dibutylchlorendate	*1.05*			*"*	*0.952*		*110*	*70-130*			
LCS Dup (AB40514-BSD1)					Prepared: 02/05/14 Analyzed: 02/11/14						
Aldrin	0.276	0.010	0.050	ug/l	0.280		98.7	70-130	4.77	25	
Chloroneb	2.84	0.20	0.50	"	2.80		101	70-130	3.76	25	
Chlorobenzilate	3.51	2.0	5.0	"	2.80		125	70-130	6.58	25	J
Chlorothalonil	0.334	0.030	0.10	"	0.280		119	70-130	6.41	25	
DCPA	0.304	0.020	0.040	"	0.280		109	70-130	5.05	25	
4,4´-DDD	0.208	0.020	0.050	"	0.280		74.3	70-130	2.71	25	
4,4´-DDE	0.299	0.020	0.050	"	0.280		107	70-130	7.17	25	
4,4´-DDT	0.307	0.020	0.020	"	0.280		109	70-130	5.49	25	
Dieldrin	0.301	0.010	0.010	"	0.280		108	70-130	6.30	25	
Endosulfan I	0.300	0.020	0.050	"	0.280		107	70-130	5.34	25	
Endosulfan II	0.287	0.020	0.050	"	0.280		103	70-130	3.69	25	
Endosulfan sulfate	0.324	0.020	0.020	"	0.280		116	70-130	5.53	25	
Endrin	0.336	0.030	0.10	"	0.280		120	70-130	5.28	25	
Endrin aldehyde	0.309	0.020	0.050	"	0.280		110	70-130	14.8	25	
HCH-alpha	0.280	0.010	0.050	"	0.280		99.9	70-130	3.84	25	
HCH-beta	0.294	0.020	0.050	"	0.280		105	70-130	5.16	25	
HCH-delta	0.303	0.030	0.050	"	0.280		108	70-130	5.61	25	
HCH-gamma (Lindane)	0.286	0.010	0.010	"	0.280		102	70-130	4.33	25	
Heptachlor	0.282	0.010	0.010	"	0.280		101	70-130	3.11	25	
Heptachlor epoxide	0.289	0.010	0.010	"	0.280		103	70-130	3.81	25	
Hexachlorobenzene	0.243	0.010	0.040	"	0.280		86.8	70-130	2.40	25	
Hexachlorocyclopentadiene	0.434	0.040	0.40	"	0.560		77.6	15-90	5.97	50	
Methoxychlor	0.326	0.020	0.020	"	0.280		116	70-130	8.17	25	
cis-Permethrin	1.62	0.070	0.20	"	1.40		116	70-130	1.95	25	
trans-Permethrin	1.67	0.090	0.20	"	1.40		119	70-130	4.72	25	
Propachlor	0.334	0.070	0.20	"	0.280		119	70-130	8.68	25	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
LCS Dup (AB40514-BSD1)					Prepared: 02/05/14 Analyzed: 02/11/14						
Trifluralin	0.437	0.020	0.040	ug/l	0.420		104	70-130	5.02	25	
Surrogate: Dibutylchlorendate	*1.07*			*"*	*0.952*		*112*	*70-130*			
Matrix Spike (AB40514-MS1)		**Source: 14A1713-01**			Prepared: 02/05/14 Analyzed: 02/12/14						
Aldrin	0.269	0.010	0.050	ug/l	0.280	ND	96.0	70-130			
Chloroneb	2.86	0.20	0.50	"	2.80	ND	102	70-130			
Chlorobenzilate	3.57	2.0	5.0	"	2.80	ND	127	70-130			J
Chlorothalonil	0.329	0.030	0.10	"	0.280	ND	117	70-130			
DCPA	0.303	0.020	0.040	"	0.280	ND	108	70-130			
4,4´-DDD	0.212	0.020	0.050	"	0.280	ND	75.7	70-130			
4,4´-DDE	0.288	0.020	0.050	"	0.280	ND	103	70-130			
4,4´-DDT	0.300	0.020	0.020	"	0.280	ND	107	70-130			
Dieldrin	0.295	0.010	0.010	"	0.280	ND	105	70-130			
Endosulfan I	0.298	0.020	0.050	"	0.280	ND	106	70-130			
Endosulfan II	0.298	0.020	0.050	"	0.280	ND	106	70-130			
Endosulfan sulfate	0.318	0.020	0.020	"	0.280	ND	113	70-130			
Endrin	0.354	0.030	0.10	"	0.280	ND	126	70-130			
Endrin aldehyde	0.299	0.020	0.050	"	0.280	ND	107	70-130			
HCH-alpha	0.285	0.010	0.050	"	0.280	ND	102	70-130			
HCH-beta	0.290	0.020	0.050	"	0.280	ND	104	70-130			
HCH-delta	0.300	0.030	0.050	"	0.280	ND	107	70-130			
HCH-gamma (Lindane)	0.291	0.010	0.010	"	0.280	ND	104	70-130			
Heptachlor	0.280	0.010	0.010	"	0.280	ND	100	70-130			
Heptachlor epoxide	0.286	0.010	0.010	"	0.280	ND	102	70-130			
Hexachlorobenzene	0.255	0.010	0.040	"	0.280	ND	91.0	70-130			
Hexachlorocyclopentadiene	0.486	0.040	0.40	"	0.560	ND	86.7	15-90			
Methoxychlor	0.323	0.020	0.020	"	0.280	ND	116	70-130			
cis-Permethrin	1.78	0.070	0.20	"	1.40	ND	127	70-130			
trans-Permethrin	1.78	0.090	0.20	"	1.40	ND	127	70-130			
Propachlor	0.336	0.070	0.20	"	0.280	ND	120	70-130			
Trifluralin	0.436	0.020	0.040	"	0.420	ND	104	70-130			
Surrogate: Dibutylchlorendate	*1.09*			*"*	*0.952*		*115*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
Matrix Spike Dup (AB40514-MSD1)		**Source: 14A1713-01**		Prepared: 02/05/14 Analyzed: 02/12/14							
Aldrin	0.260	0.010	0.050	ug/l	0.280	ND	92.8	70-130	3.40	25	
Chloroneb	2.76	0.20	0.50	"	2.80	ND	98.6	70-130	3.61	25	
Chlorobenzilate	3.40	2.0	5.0	"	2.80	ND	121	70-130	4.87	25	J
Chlorothalonil	0.313	0.030	0.10	"	0.280	ND	112	70-130	4.86	25	
DCPA	0.290	0.020	0.040	"	0.280	ND	103	70-130	4.52	25	
4,4´-DDD	0.210	0.020	0.050	"	0.280	ND	74.9	70-130	1.06	25	
4,4´-DDE	0.275	0.020	0.050	"	0.280	ND	98.1	70-130	4.80	25	
4,4´-DDT	0.289	0.020	0.020	"	0.280	ND	103	70-130	3.94	25	
Dieldrin	0.283	0.010	0.010	"	0.280	ND	101	70-130	4.34	25	
Endosulfan I	0.285	0.020	0.050	"	0.280	ND	102	70-130	4.19	25	
Endosulfan II	0.288	0.020	0.050	"	0.280	ND	103	70-130	3.14	25	
Endosulfan sulfate	0.302	0.020	0.020	"	0.280	ND	108	70-130	5.03	25	
Endrin	0.320	0.030	0.10	"	0.280	ND	114	70-130	10.1	25	
Endrin aldehyde	0.275	0.020	0.050	"	0.280	ND	98.2	70-130	8.56	25	
HCH-alpha	0.271	0.010	0.050	"	0.280	ND	96.8	70-130	4.94	25	
HCH-beta	0.282	0.020	0.050	"	0.280	ND	101	70-130	2.62	25	
HCH-delta	0.290	0.030	0.050	"	0.280	ND	104	70-130	3.17	25	
HCH-gamma (Lindane)	0.279	0.010	0.010	"	0.280	ND	99.5	70-130	4.43	25	
Heptachlor	0.267	0.010	0.010	"	0.280	ND	95.4	70-130	4.78	25	
Heptachlor epoxide	0.277	0.010	0.010	"	0.280	ND	99.0	70-130	3.09	25	
Hexachlorobenzene	0.238	0.010	0.040	"	0.280	ND	85.1	70-130	6.62	25	
Hexachlorocyclopentadiene	0.433	0.040	0.40	"	0.560	ND	77.3	15-90	11.5	50	
Methoxychlor	0.309	0.020	0.020	"	0.280	ND	110	70-130	4.66	25	
cis-Permethrin	1.72	0.070	0.20	"	1.40	ND	123	70-130	3.19	25	
trans-Permethrin	1.68	0.090	0.20	"	1.40	ND	120	70-130	5.53	25	
Propachlor	0.320	0.070	0.20	"	0.280	ND	114	70-130	4.81	25	
Trifluralin	0.420	0.020	0.040	"	0.420	ND	100	70-130	3.78	25	
Surrogate: Dibutylchlorendate	*1.03*			*"*	*0.952*		*108*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40730 - SVOAs in Water GC											
Blank (AB40730-BLK1)					Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	ND	0.50	0.50	ug/l							U
Atrazine	ND	0.30	0.50	"							U
Bromacil	ND	0.50	5.0	"							U
Butachlor	ND	0.40	0.50	"							U
Dimethoate	ND	0.20	1.0	"							U
Metolachlor	ND	0.30	0.50	"							U
Metribuzin	ND	0.40	0.50	"							U
Molinate	ND	0.20	0.50	"							U
Prometryn	ND	0.50	0.50	"							U
Propachlor	ND	0.30	0.50	"							U
Simazine	ND	0.30	0.50	"							U
Thiobencarb	ND	0.20	1.0	"							U
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.69*			*"*	*2.00*		*84.3*	*70-130*			
LCS (AB40730-BS1)					Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	1.88	0.50	0.50	ug/l	2.00		94.2	62-128			
Atrazine	1.92	0.30	0.50	"	2.00		96.1	62-122			
Bromacil	1.94	0.50	5.0	"	2.00		96.9	61-121			J
Butachlor	1.99	0.40	0.50	"	2.00		99.3	66-126			
Dimethoate	1.97	0.20	1.0	"	2.00		98.3	67-127			
Metolachlor	1.93	0.30	0.50	"	2.00		96.6	63-123			
Metribuzin	1.91	0.40	0.50	"	2.00		95.4	71-131			
Molinate	1.95	0.20	0.50	"	2.00		97.4	44-137			
Prometryn	1.95	0.50	0.50	"	2.00		97.6	63-123			
Propachlor	1.95	0.30	0.50	"	2.00		97.3	66-126			
Simazine	1.94	0.30	0.50	"	2.00		96.9	70-130			
Thiobencarb	2.01	0.20	1.0	"	2.00		100	69-129			
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.80*			*"*	*2.00*		*89.8*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40730 - SVOAs in Water GC											
LCS Dup (AB40730-BSD1)					Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	2.02	0.50	0.50	ug/l	2.00		101	62-128	6.95	30	
Atrazine	2.01	0.30	0.50	"	2.00		100	62-122	4.47	30	
Bromacil	2.14	0.50	5.0	"	2.00		107	61-121	10.0	30	J
Butachlor	2.09	0.40	0.50	"	2.00		105	66-126	5.23	30	
Dimethoate	2.17	0.20	1.0	"	2.00		108	67-127	9.82	30	
Metolachlor	2.02	0.30	0.50	"	2.00		101	63-123	4.37	30	
Metribuzin	2.04	0.40	0.50	"	2.00		102	71-131	6.92	30	
Molinate	1.94	0.20	0.50	"	2.00		96.8	44-137	0.569	30	
Prometryn	2.07	0.50	0.50	"	2.00		103	63-123	5.75	30	
Propachlor	2.00	0.30	0.50	"	2.00		100	66-126	2.80	30	
Simazine	2.09	0.30	0.50	"	2.00		105	70-130	7.61	30	
Thiobencarb	2.19	0.20	1.0	"	2.00		109	69-129	8.57	30	
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.85*			*"*	*2.00*		*92.6*	*70-130*			
Matrix Spike (AB40730-MS1)		**Source: 14A1588-01**			Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	1.81	0.50	0.50	ug/l	2.00	ND	90.7	62-128			
Atrazine	1.79	0.30	0.50	"	2.00	ND	89.7	62-122			
Bromacil	1.75	0.50	5.0	"	2.00	ND	87.5	61-121			J
Butachlor	1.85	0.40	0.50	"	2.00	ND	92.6	66-126			
Dimethoate	1.70	0.20	1.0	"	2.00	ND	84.9	67-127			
Metolachlor	1.82	0.30	0.50	"	2.00	ND	91.2	63-123			
Metribuzin	1.78	0.40	0.50	"	2.00	ND	89.2	71-131			
Molinate	1.87	0.20	0.50	"	2.00	ND	93.4	44-137			
Prometryn	1.68	0.50	0.50	"	2.00	ND	83.9	63-123			
Propachlor	1.93	0.30	0.50	"	2.00	ND	96.6	66-126			
Simazine	1.85	0.30	0.50	"	2.00	ND	92.5	70-130			
Thiobencarb	1.90	0.20	1.0	"	2.00	ND	95.2	69-129			
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.51*			*"*	*2.00*		*75.3*	*70-130*			

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Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40730 - SVOAs in Water GC											
Matrix Spike Dup (AB40730-MSD1)		**Source: 14A1588-01**		Prepared: 02/08/14 Analyzed: 02/11/14							
Alachlor	1.91	0.50	0.50	ug/l	2.00	ND	95.3	62-128	4.97	30	
Atrazine	1.96	0.30	0.50	"	2.00	ND	98.2	62-122	9.04	30	
Bromacil	2.13	0.50	5.0	"	2.00	ND	107	61-121	19.7	30	J
Butachlor	2.02	0.40	0.50	"	2.00	ND	101	66-126	8.67	30	
Dimethoate	2.14	0.20	1.0	"	2.00	ND	107	67-127	23.0	30	
Metolachlor	1.96	0.30	0.50	"	2.00	ND	97.9	63-123	7.12	30	
Metribuzin	2.02	0.40	0.50	"	2.00	ND	101	71-131	12.3	30	
Molinate	1.79	0.20	0.50	"	2.00	ND	89.6	44-137	4.16	30	
Prometryn	2.02	0.50	0.50	"	2.00	ND	101	63-123	18.4	30	
Propachlor	1.93	0.30	0.50	"	2.00	ND	96.4	66-126	0.171	30	
Simazine	2.07	0.30	0.50	"	2.00	ND	104	70-130	11.3	30	
Thiobencarb	1.96	0.20	1.0	"	2.00	ND	97.8	69-129	2.64	30	
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.60*			*"*	*2.00*		*79.9*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Organic Analytes by EPA Method 504.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40359 - EPA 504.1											
Blank (AB40359-BLK1)					Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	ND	0.0040	0.010	ug/l							U
1,2-Dibromoethane (EDB)	ND	0.0050	0.020	"							U
LCS (AB40359-BS1)					Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	0.262	0.0040	0.010	ug/l	0.250		105	70-130			
1,2-Dibromoethane (EDB)	0.255	0.0050	0.020	"	0.250		102	70-130			
LCS Dup (AB40359-BSD1)					Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	0.273	0.0040	0.010	ug/l	0.250		109	70-130	4.17	25	
1,2-Dibromoethane (EDB)	0.270	0.0050	0.020	"	0.250		108	70-130	5.47	25	
Matrix Spike (AB40359-MS1)		**Source: 14A1588-01**			Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	0.212	0.0040	0.010	ug/l	0.250	ND	84.8	70-130			
1,2-Dibromoethane (EDB)	0.214	0.0050	0.020	"	0.250	ND	85.5	70-130			
Matrix Spike Dup (AB40359-MSD1)		**Source: 14A1588-01**			Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	0.211	0.0040	0.010	ug/l	0.250	ND	84.2	70-130	0.698	25	
1,2-Dibromoethane (EDB)	0.212	0.0050	0.020	"	0.250	ND	84.8	70-130	0.771	25	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Chlorinated Acids by EPA Method 515.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40536 - EPA 515.1											
Blank (AB40536-BLK1)					Prepared: 02/06/14 Analyzed: 02/07/14						
Acifluorfen	ND	0.50	1.0	ug/l							U
Bentazon	ND	0.40	0.40	"							U
2,4-D	ND	0.80	1.0	"							U
Dalapon	ND	6.0	6.0	"							U
2,4-DB	ND	4.0	5.0	"							U
Dicamba	ND	0.40	0.40	"							U
Dichlorprop	ND	1.0	1.0	"							U
Dinoseb	ND	0.80	1.0	"							U
4-Nitrophenol	ND	0.70	1.0	"							U
Pentachlorophenol	ND	0.20	0.20	"							U
Picloram	ND	0.50	1.0	"							U
2,4,5-T	ND	0.40	0.50	"							U
2,4,5-TP (Silvex)	ND	0.50	0.50	"							U
Surrogate: DCAA	*13.2*			*"*	*14.2*		*93.2*	*70-130*			
LCS (AB40536-BS1)					Prepared: 02/06/14 Analyzed: 02/07/14						
Acifluorfen	1.04	0.50	1.0	ug/l	0.960		109	70-130			
Bentazon	1.48	0.40	0.40	"	1.92		76.9	70-130			
2,4-D	1.68	0.80	1.0	"	1.92		87.8	48-124			
Dalapon	11.3	6.0	6.0	"	12.5		90.3	40-112			
2,4-DB	7.11	4.0	5.0	"	7.68		92.6	54-123			
Dicamba	0.876	0.40	0.40	"	0.960		91.3	70-130			
Dichlorprop	2.70	1.0	1.0	"	2.88		93.7	54-106			
Dinoseb	5.59	0.80	1.0	"	6.42		87.1	20-105			
4-Nitrophenol	1.13	0.70	1.0	"	0.960		117	60-202			
Pentachlorophenol	0.840	0.20	0.20	"	0.960		87.5	70-130			
Picloram	1.07	0.50	1.0	"	0.960		111	70-130			
2,4,5-T	0.892	0.40	0.50	"	0.960		93.0	68-166			
2,4,5-TP (Silvex)	0.900	0.50	0.50	"	0.960		93.7	70-130			
Surrogate: DCAA	*14.5*			*"*	*14.2*		*102*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Chlorinated Acids by EPA Method 515.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40536 - EPA 515.1											
LCS Dup (AB40536-BSD1)					Prepared: 02/06/14 Analyzed: 02/07/14						
Acifluorfen	1.03	0.50	1.0	ug/l	0.960		108	70-130	0.944	50	
Bentazon	1.63	0.40	0.40	"	1.92		84.8	70-130	9.86	50	
2,4-D	1.69	0.80	1.0	"	1.92		88.0	48-124	0.327	50	
Dalapon	11.4	6.0	6.0	"	12.5		91.2	40-112	0.968	50	
2,4-DB	7.24	4.0	5.0	"	7.68		94.3	54-123	1.84	50	
Dicamba	0.877	0.40	0.40	"	0.960		91.4	70-130	0.0891	50	
Dichlorprop	2.69	1.0	1.0	"	2.88		93.5	54-106	0.220	50	
Dinoseb	5.77	0.80	1.0	"	6.42		89.9	20-105	3.18	50	
4-Nitrophenol	0.901	0.70	1.0	"	0.960		93.8	60-202	22.3	50	J
Pentachlorophenol	0.841	0.20	0.20	"	0.960		87.6	70-130	0.0986	50	
Picloram	0.964	0.50	1.0	"	0.960		100	70-130	10.5	50	J
2,4,5-T	0.931	0.40	0.50	"	0.960		96.9	68-166	4.18	50	
2,4,5-TP (Silvex)	0.964	0.50	0.50	"	0.960		100	70-130	6.85	50	
Surrogate: DCAA	*14.2*			*"*	*14.2*		*99.8*	*70-130*			
Matrix Spike (AB40536-MS1)		**Source: 14A1588-01**			Prepared: 02/06/14 Analyzed: 02/08/14						
Acifluorfen	0.696	0.50	1.0	ug/l	0.960	ND	72.5	70-130			J
Bentazon	1.79	0.40	0.40	"	1.92	ND	93.0	70-130			
2,4-D	1.50	0.80	1.0	"	1.92	ND	78.3	48-124			
Dalapon	11.1	6.0	6.0	"	12.5	ND	88.8	40-112			
2,4-DB	7.08	4.0	5.0	"	7.68	ND	92.2	54-123			
Dicamba	0.867	0.40	0.40	"	0.960	ND	90.3	70-130			
Dichlorprop	2.75	1.0	1.0	"	2.88	ND	95.6	54-106			
Dinoseb	5.23	0.80	1.0	"	6.42	ND	81.4	20-105			
4-Nitrophenol	0.969	0.70	1.0	"	0.960	ND	101	60-202			J
Pentachlorophenol	0.642	0.20	0.20	"	0.960	ND	66.9	70-130			QM-07
Picloram	0.973	0.50	1.0	"	0.960	ND	101	70-130			J
2,4,5-T	0.862	0.40	0.50	"	0.960	ND	89.8	68-166			
2,4,5-TP (Silvex)	0.911	0.50	0.50	"	0.960	ND	94.9	70-130			
Surrogate: DCAA	*13.8*			*"*	*14.2*		*97.5*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Chlorinated Acids by EPA Method 515.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40536 - EPA 515.1											
Matrix Spike Dup (AB40536-MSD1)		**Source: 14A1588-01**		Prepared: 02/06/14 Analyzed: 02/08/14							
Acifluorfen	0.926	0.50	1.0	ug/l	0.960	ND	96.5	70-130	28.3	50	J
Bentazon	1.79	0.40	0.40	"	1.92	ND	93.5	70-130	0.474	50	
2,4-D	1.64	0.80	1.0	"	1.92	ND	85.2	48-124	8.45	50	
Dalapon	11.5	6.0	6.0	"	12.5	ND	92.3	40-112	3.86	50	
2,4-DB	7.32	4.0	5.0	"	7.68	ND	95.4	54-123	3.40	50	
Dicamba	0.910	0.40	0.40	"	0.960	ND	94.8	70-130	4.86	50	
Dichlorprop	2.90	1.0	1.0	"	2.88	ND	101	54-106	5.12	50	
Dinoseb	5.49	0.80	1.0	"	6.42	ND	85.5	20-105	4.84	50	
4-Nitrophenol	1.04	0.70	1.0	"	0.960	ND	108	60-202	6.64	50	
Pentachlorophenol	0.721	0.20	0.20	"	0.960	ND	75.1	70-130	11.5	50	
Picloram	1.16	0.50	1.0	"	0.960	ND	121	70-130	17.4	50	
2,4,5-T	0.945	0.40	0.50	"	0.960	ND	98.4	68-166	9.12	50	
2,4,5-TP (Silvex)	0.967	0.50	0.50	"	0.960	ND	101	70-130	5.94	50	
Surrogate: DCAA	*14.5*			*"*	*14.2*		*102*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Carbamates by EPA Method 531.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41142 - HPLC											
Blank (AB41142-BLK1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	ND	0.70	3.0	ug/l							U
Aldicarb sulfone	ND	0.70	4.0	"							U
Aldicarb sulfoxide	ND	0.80	3.0	"							U
Carbaryl	ND	0.70	5.0	"							U
Carbofuran	ND	2.0	5.0	"							U
3-Hydroxycarbofuran	ND	0.90	3.0	"							U
Methiocarb	ND	2.0	5.0	"							U
Methomyl	ND	2.0	2.0	"							U
Oxamyl	ND	0.80	20	"							U
Propoxur	ND	2.0	5.0	"							U
LCS (AB41142-BS1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	20.0	0.70	3.0	ug/l	20.0		99.9	80-120			
Aldicarb sulfone	20.1	0.70	4.0	"	19.0		106	80-120			
Aldicarb sulfoxide	19.2	0.80	3.0	"	19.8		97.0	80-120			
Carbaryl	20.4	0.70	5.0	"	20.0		102	80-120			
Carbofuran	19.5	2.0	5.0	"	20.0		97.7	80-120			
3-Hydroxycarbofuran	20.7	0.90	3.0	"	20.0		103	80-120			
Methiocarb	18.6	2.0	5.0	"	20.0		93.2	80-120			
Methomyl	21.1	2.0	2.0	"	20.0		105	80-120			
Oxamyl	20.5	0.80	20	"	20.0		102	80-120			
Propoxur	20.2	2.0	5.0	"	20.0		101	80-120			
LCS Dup (AB41142-BSD1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	19.3	0.70	3.0	ug/l	20.0		96.6	80-120	3.34	20	
Aldicarb sulfone	19.3	0.70	4.0	"	19.0		102	80-120	3.93	20	
Aldicarb sulfoxide	18.6	0.80	3.0	"	19.8		93.7	80-120	3.45	20	
Carbaryl	18.8	0.70	5.0	"	20.0		94.1	80-120	8.11	20	
Carbofuran	19.4	2.0	5.0	"	20.0		97.1	80-120	0.645	20	
3-Hydroxycarbofuran	19.0	0.90	3.0	"	20.0		95.1	80-120	8.35	20	
Methiocarb	19.1	2.0	5.0	"	20.0		95.7	80-120	2.65	20	
Methomyl	19.5	2.0	2.0	"	20.0		97.7	80-120	7.69	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Carbamates by EPA Method 531.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41142 - HPLC											
LCS Dup (AB41142-BSD1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Oxamyl	19.2	0.80	20	ug/l	20.0		95.8	80-120	6.62	20	J
Propoxur	19.0	2.0	5.0	"	20.0		94.8	80-120	6.54	20	
Matrix Spike (AB41142-MS1)		**Source: 14B0426-01**			Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	18.7	0.70	3.0	ug/l	20.0	ND	93.3	80-120			
Aldicarb sulfone	20.1	0.70	4.0	"	19.0	ND	106	80-120			
Aldicarb sulfoxide	20.1	0.80	3.0	"	19.8	ND	102	80-120			
Carbaryl	20.0	0.70	5.0	"	20.0	ND	99.8	80-120			
Carbofuran	19.3	2.0	5.0	"	20.0	ND	96.6	80-120			
3-Hydroxycarbofuran	20.7	0.90	3.0	"	20.0	ND	103	80-120			
Methiocarb	18.2	2.0	5.0	"	20.0	ND	91.2	80-120			
Methomyl	21.0	2.0	2.0	"	20.0	ND	105	80-120			
Oxamyl	20.3	0.80	20	"	20.0	ND	102	80-120			
Propoxur	19.2	2.0	5.0	"	20.0	ND	95.9	80-120			
Matrix Spike Dup (AB41142-MSD1)		**Source: 14B0426-01**			Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	17.4	0.70	3.0	ug/l	20.0	ND	87.1	80-120	6.84	20	
Aldicarb sulfone	19.0	0.70	4.0	"	19.0	ND	100	80-120	5.57	20	
Aldicarb sulfoxide	18.8	0.80	3.0	"	19.8	ND	94.8	80-120	6.85	20	
Carbaryl	19.4	0.70	5.0	"	20.0	ND	97.1	80-120	2.76	20	
Carbofuran	19.4	2.0	5.0	"	20.0	ND	96.9	80-120	0.339	20	
3-Hydroxycarbofuran	19.8	0.90	3.0	"	20.0	ND	98.9	80-120	4.29	20	
Methiocarb	18.9	2.0	5.0	"	20.0	ND	94.6	80-120	3.68	20	
Methomyl	20.6	2.0	2.0	"	20.0	ND	103	80-120	1.83	20	
Oxamyl	19.2	0.80	20	"	20.0	ND	95.8	80-120	5.89	20	J
Propoxur	19.5	2.0	5.0	"	20.0	ND	97.3	80-120	1.47	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Endothall by EPA Method 548.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40357 - EPA 548.1											
Blank (AB40357-BLK1)					Prepared: 02/04/14 Analyzed: 02/06/14						
Endothall	ND	2.0	45	ug/l							U
LCS (AB40357-BS1)					Prepared: 02/04/14 Analyzed: 02/06/14						
Endothall	209	2.0	45	ug/l	200		104	80-120			
LCS Dup (AB40357-BSD1)					Prepared: 02/04/14 Analyzed: 02/06/14						
Endothall	217	2.0	45	ug/l	200		108	80-120	3.75	30	
Matrix Spike (AB40357-MS1)		**Source: 14A1588-01**			Prepared: 02/04/14 Analyzed: 02/06/14						
Endothall	187	2.0	45	ug/l	200	ND	93.7	80-120			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Glyphosate by EPA Method 547 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40427 - HPLC											
Blank (AB40427-BLK1)					Prepared & Analyzed: 02/04/14						
Glyphosate	ND	3.0	10	ug/l							U
LCS (AB40427-BS1)					Prepared & Analyzed: 02/04/14						
Glyphosate	111	3.0	10	ug/l	120		92.7	66-126			
LCS Dup (AB40427-BSD1)					Prepared & Analyzed: 02/04/14						
Glyphosate	112	3.0	10	ug/l	120		93.7	66-126	1.08	30	
Matrix Spike (AB40427-MS1)		**Source: 14B0093-01**			Prepared: 02/04/14 Analyzed: 02/05/14						
Glyphosate	111	3.0	10	ug/l	120	ND	92.7	66-126			
Matrix Spike Dup (AB40427-MSD1)		**Source: 14B0093-01**			Prepared: 02/04/14 Analyzed: 02/05/14						
Glyphosate	110	3.0	10	ug/l	120	ND	92.0	66-126	0.801	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Diquat by EPA Method 549.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43118 - HPLC											
Blank (AA43118-BLK1)					Prepared: 02/03/14 Analyzed: 02/10/14						
Diquat	ND	2.0	2.0	ug/l							U
LCS (AA43118-BS1)					Prepared: 02/03/14 Analyzed: 02/10/14						
Diquat	16.5	2.0	2.0	ug/l	19.8		83.3	70-130			
LCS Dup (AA43118-BSD1)					Prepared: 02/03/14 Analyzed: 02/10/14						
Diquat	16.2	2.0	2.0	ug/l	19.8		81.6	70-130	2.03	25	
Matrix Spike (AA43118-MS1)		**Source: 14A1755-01**			Prepared: 02/03/14 Analyzed: 02/10/14						
Diquat	8.63	2.0	2.0	ug/l	19.8	ND	43.5	70-130			QM-05

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Corporate: 208 Mason St., Ukiah, CA 95482 • Phone: (707) 468-0401 • Fax: (707) 468-5267
Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:14

Haloacetic Acids by EPA Method 552.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41050 - EPA 552.2											
Blank (AB41050-BLK1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Monobromoacetic Acid	ND	0.8	1.0	ug/l							U
Monochloroacetic Acid	ND	1.1	2.0	"							U
Dibromoacetic Acid	ND	0.8	1.0	"							U
Dichloroacetic Acid	ND	1.0	1.0	"							U
Trichloroacetic Acid	ND	1.0	1.0	"							U
Total Haloacetic Acids (HAA5)	ND	1.0	1.0	"							U
Surrogate: 2,3-Dibromopropionic Acid	*9.59*			*"*	*10.0*		*95.9*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*11.7*			*"*	*10.0*		*117*	*70-130*			
LCS (AB41050-BS1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Monobromoacetic Acid	25.5	0.8	1.0	ug/l	25.0		102	70-130			
Monochloroacetic Acid	26.9	1.1	2.0	"	25.0		107	70-130			
Dibromoacetic Acid	26.8	0.8	1.0	"	25.0		107	70-130			
Dichloroacetic Acid	26.0	1.0	1.0	"	25.0		104	70-130			
Trichloroacetic Acid	26.6	1.0	1.0	"	25.0		106	70-130			
Surrogate: 2,3-Dibromopropionic Acid	*11.0*			*"*	*10.0*		*110*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*10.1*			*"*	*10.0*		*101*	*70-130*			
MRL Check (AB41050-MRL1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Monobromoacetic Acid	1.07	0.8	1.0	ug/l	1.00		107	0-200			
Monochloroacetic Acid	ND	1.1	2.0	"	1.00			0-200			U
Dibromoacetic Acid	1.37	0.8	1.0	"	1.00		137	0-200			
Dichloroacetic Acid	ND	1.0	1.0	"	1.00			0-200			U
Trichloroacetic Acid	1.05	1.0	1.0	"	1.00		105	0-200			
Surrogate: 2,3-Dibromopropionic Acid	*1.40*			*"*	*1.00*		*140*	*0-200*			
Surrogate: 2-Bromopropionic Acid	*1.14*			*"*	*1.00*		*114*	*0-200*			
Matrix Spike (AB41050-MS1)		**Source: 14A1713-01**			Prepared: 02/11/14 Analyzed: 02/13/14						
Monobromoacetic Acid	24.9	0.8	1.0	ug/l	25.0	ND	99.7	70-130			
Monochloroacetic Acid	26.6	1.1	2.0	"	25.0	ND	106	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408		Reported: 02/18/14 11:14

Haloacetic Acids by EPA Method 552.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41050 - EPA 552.2											
Matrix Spike (AB41050-MS1)		**Source: 14A1713-01**			Prepared: 02/11/14 Analyzed: 02/13/14						
Dibromoacetic Acid	32.2	0.8	1.0	ug/l	25.0	ND	129	70-130			
Dichloroacetic Acid	25.1	1.0	1.0	"	25.0	ND	100	70-130			
Trichloroacetic Acid	29.9	1.0	1.0	"	25.0	ND	120	70-130			
Surrogate: 2,3-Dibromopropionic Acid	*12.1*			*"*	*10.0*		*121*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*9.42*			*"*	*10.0*		*94.2*	*70-130*			
Matrix Spike (AB41050-MS2)		**Source: 14B0089-01**			Prepared: 02/11/14 Analyzed: 02/13/14						
Monobromoacetic Acid	24.4	0.8	1.0	ug/l	25.0	ND	97.6	70-130			
Monochloroacetic Acid	25.3	1.1	2.0	"	25.0	ND	101	70-130			
Dibromoacetic Acid	31.9	0.8	1.0	"	25.0	ND	128	70-130			
Dichloroacetic Acid	24.0	1.0	1.0	"	25.0	ND	96.0	70-130			
Trichloroacetic Acid	31.1	1.0	1.0	"	25.0	ND	124	70-130			
Surrogate: 2,3-Dibromopropionic Acid	*13.9*			*"*	*10.0*		*139*	*70-130*			*S-GC*
Surrogate: 2-Bromopropionic Acid	*10.9*			*"*	*10.0*		*109*	*70-130*			
Reference (AB41050-SRM1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Monobromoacetic Acid	25.1	0.8	1.0	ug/l	25.0		100	0-200			
Monochloroacetic Acid	26.7	1.1	2.0	"	25.0		107	0-200			
Dibromoacetic Acid	25.6	0.8	1.0	"	25.0		103	0-200			
Dichloroacetic Acid	24.9	1.0	1.0	"	25.0		99.7	0-200			
Trichloroacetic Acid	25.8	1.0	1.0	"	25.0		103	0-200			
Surrogate: 2,3-Dibromopropionic Acid	*10.6*			*"*	*10.0*		*106*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*9.92*			*"*	*10.0*		*99.2*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Semivolatile Organic Compounds by EPA Method 525.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40727 - EPA 525.2											
Blank (AB40727-BLK1)					Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	ND	0.080	0.10	ug/l							U
Di(2-ethylhexyl)adipate	ND	0.40	5.0	"							U
Di(2-ethylhexyl)phthalate	ND	0.20	3.0	"							U
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.23*			*"*	*5.00*		*105*	*70-130*			
Surrogate: Perylene-d12	*3.73*			*"*	*5.00*		*74.6*	*70-130*			
Surrogate: Triphenyl phosphate	*4.72*			*"*	*5.00*		*94.4*	*70-130*			
LCS (AB40727-BS1)					Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	2.13	0.080	0.10	ug/l	3.00		71.0	70-130			
Di(2-ethylhexyl)adipate	2.49	0.40	5.0	"	3.00		83.0	70-130			J
Di(2-ethylhexyl)phthalate	2.40	0.20	3.0	"	3.00		80.0	70-130			J
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.36*			*"*	*5.00*		*107*	*70-130*			
Surrogate: Perylene-d12	*4.65*			*"*	*5.00*		*93.0*	*70-130*			
Surrogate: Triphenyl phosphate	*5.36*			*"*	*5.00*		*107*	*70-130*			
LCS Dup (AB40727-BSD1)					Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	2.40	0.080	0.10	ug/l	3.00		80.0	70-130	11.9	20	
Di(2-ethylhexyl)adipate	2.70	0.40	5.0	"	3.00		90.0	70-130	8.09	20	J
Di(2-ethylhexyl)phthalate	2.57	0.20	3.0	"	3.00		85.7	70-130	6.84	20	J
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.39*			*"*	*5.00*		*108*	*70-130*			
Surrogate: Perylene-d12	*4.84*			*"*	*5.00*		*96.8*	*70-130*			
Surrogate: Triphenyl phosphate	*5.47*			*"*	*5.00*		*109*	*70-130*			
Matrix Spike (AB40727-MS1)		**Source: 14A1714-01**			Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	2.79	0.080	0.10	ug/l	3.00	ND	93.0	70-130			
Di(2-ethylhexyl)adipate	3.11	0.40	5.0	"	3.00	ND	104	70-130			J
Di(2-ethylhexyl)phthalate	2.79	0.20	3.0	"	3.00	ND	93.0	70-130			J
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.27*			*"*	*5.00*		*105*	*70-130*			
Surrogate: Perylene-d12	*5.52*			*"*	*5.00*		*110*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:14

Semivolatile Organic Compounds by EPA Method 525.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40727 - EPA 525.2											
Matrix Spike (AB40727-MS1)		**Source: 14A1714-01**			Prepared: 02/08/14 Analyzed: 02/13/14						
Surrogate: Triphenyl phosphate	*5.65*			*ug/l*	*5.00*		*113*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Project: Project Number:	Dr. Bill Motzer Groundwater Reuse Project 60408	Reported: 02/18/14 11:14

Notes and Definitions

A-01	Dilution required due to high suspended solids. Client was notified.
A-01a	Sample analyzed within hold time but without filtration.
A-01b	Sample filtered but analyzed outside of EPA recommended 48-hour hold time.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration, detected but not quantified (DNQ).
QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
R-01	The Reporting Limit for this analyte has been raised to account for matrix interference.
S-GC	Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogates.
U	Analyte included in analysis, but not detected at or above MDL.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

ASBESTOS TEM LABORATORIES, INC.

EPA 600/4-83 Drinking Water
Transmission Electron Microscopy
Analytical Report

Laboratory Job # 1288-00571

630 Bancroft Way
Berkeley, CA 94710
(510) 704-8930
FAX (510) 704-8429

ASBESTOS TEM LABORATORIES, INC

Certified by
CA DPH ELAP
Lab No. 1866

Feb/10/2014

David S. Pingatore
Alpha Analytical Laboratories, Inc.
208 Mason Street
Ukiah, CA 95482

RE: LABORATORY JOB # 1288-00571
Transmission electron microscopy analytical results for 1 water sample(s).
Job Site:
Job No.: 14A1713

Enclosed please find results for the TEM analysis of one or more water samples. The analytical procedures were performed according to EPA Method 100.2 for the analysis of asbestos in drinking water.

Prior to analysis, samples are checked for damage, disruption of any chain-of-custody seals, and completeness of accompanying paperwork. If no problems are found, samples are then logged-in, each given a unique laboratory number, and a hard copy containing all pertinent information is generated. This, and all other relevant paper work are kept with each sample throughout the analytical procedures to assure proper analysis.

Preparation of water samples is performed within a HEPA filtered, Class 100 air, laminar flow clean bench environment. Prior to filtration, water sample containers are ultrasonicated, and the exterior surfaces cleaned. An aliquot of water is drawn from the sample container and drawn through a special filtration apparatus and collected onto a mixed cellulose ester (MCE) or polycarbonate (PC) filter. The filters are removed from the apparatus and dried. A portion of each sample filter is sectioned, placed onto a glass microscope slide, and carbon coated. The filters are further sectioned and placed carbon side up onto 200-mesh copper TEM sample grids in a solvent bath until all filter material is dissolved. The TEM grids are removed and placed into labeled grid storage boxes.

TEM analysis is performed on a Philips EM-300 or CM-12 transmission electron microscope operating at 80 or 100 kV. Initially, the grid is scanned at low and medium magnification to insure proper sample loading, and coherence of the carbon support film. Then TEM grid openings are analyzed at a magnification of 10,000X. All fibers >10 um in length and exhibiting an aspect ratio >3:1 are analyzed. Scanning continues until either 100 asbestiform fibers >10um in length are counted, or an analytical sensitivity of 0.2 million fibers per liter (MFL) is achieved. Analyzed fibers are subjected to detailed morphological and selected area diffraction (SAED) analysis. Fibers indicated as asbestos, or potentially asbestos, are further analyzed by energy dispersive X-ray (EDX) analysis as needed. The number of asbestos fibers detected, and other analytical parameters, are then used to calculate the concentration of asbestos in MFL. The results are entered into a standard report format and reviewed by the analyst and the laboratory manager before release to the client.

Sincerely Yours,

Laboratory Manager
ASBESTOS TEM LABORATORIES, INC.

--- These results relate only to the samples tested and must not be reproduced, except in full, with the approval of the laboratory. This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government. ---

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www.asbestostemlabs.com *With Offices in Reno, NV (775) 359-3377*

TRANSMISSION ELECTRON MICROSCOPY ANALYTICAL REPORT

Contact:	David S. Pingatore		
Address:	Alpha Analytical Laboratories, Inc. 208 Mason Street Ukiah, CA 95482	Report No.:	**323873**
		Date:	Feb-10-14
		Total Samples Analyzed:	1
Job Site / No.	14A1713	Sample Collector:	

CLIENT SAMPLE #	**14A1713-01**	**SAMPLE LOCATION/DESCRIPTION**	FO-07 (shallow)
Laboratory Sample #	1288-00571-001		

WATER SAMPLE DATA

Date/Time Collected	Jan-30-14 / 1:40 pm	Volume Submitted (ml)	1000
Date/Time Lab Received	Jan-30-14 / 3:55 pm	Volume Filtered (ml)	0.25
Date/Time Filtered	Feb-05-14 / 8:30 pm	Filter & Pore Size	MCE 0.22
Date/Time Analyzed	Feb-10-14 / 3:00 pm	UV/Ozone Treated:	YES

IDENTIFIED STRUCTURES (>10um)			
ASBESTOS		OTHER	
CHRYS	AMPH	AMBIG	NON-ASB
NSD	NSD	NSD	NSD

CALCULATED ASBESTOS STRUCTURE CONCENTRATION (>10um)		
CHRYS	AMPH	TOTAL
< 1.1 MFL	< 1.1 MFL	< 1.1 MFL

COMMENTS

No asbestos detected (heavy sample loading)

Filter Loading: HEAVY

SAED Photo ID Nos.

TEM / ANALYTICAL PARAMETERS

Grid Openings Scanned at 10,000X	40	Analytical Sensitivity	1.1 MFL
Grid Opening Area (mm2)	0.0094	95% UCL	4.00 MFL
Scan Area (mm2)	0.3760	95% LCL	0 MFL

WATER SAMPLE LAB BLANK RESULTS

Lab ID#	Blank 9477	Analytical Sensitivity	0.01 MFL
Grid Openings Scanned at 10,000X	8	Asbestos Structure Concentration	<0.01 MFL
Volume Filtered (ml)	300		

NOTATION KEY

Chrys. - Chrysotile Asbestos
Amph. - Amphibole Asbestos
NSD - No Structures Detected
1 mm = 1 millimeter

1 um = 1 micron = 0.001 mm
MFL = Millions of Fibers per Liter
UCL = Upper Confidence Level
LCL = Lower Confidence Level

ANALYST SIGNATURE

Stephanie Dunn
LAB QC REVIEWER SIGNATURE

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

14A1713

SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: David S. Pingatore

RECEIVING LABORATORY:

Asbestos TEM Laboratories, Inc.
630 Bancroft Way
Berkeley, CA 94710
Phone :(510) 704-8930
Fax: (510) 704-8429
Terms: Net 30

Analysis	Due	Expires	Comments
14A1713-01 FO-07 (Shallow) [Water] Sampled 01/30/14 13:40 Pacific			
Asbestos-DW SUB	02/14/14 12:00	02/01/14 13:40	
Containers Supplied:			
1L Amber- Unpres. (Y)	1L Amber- Unpres. (Z)		

☐ *Report to State*

System Name: _____ **Employed by:** _____

User ID: _____ **Sampler:** _____

System Number: _____

+2C

Released By	Date	Received By	Date
[signature]	1-31-14	[signature]	02-03-14 P03:55 IN

Page 1 of 1

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1401903

Report Created for: Alpha Analytical Laboratories
208 Mason Street
Ukiah, CA 95482

Project Contact: David S. Pingatore
Project P.O.:
Project Name: #14A1713

Project Received: 01/31/2014

Analytical Report reviewed & approved for release on 02/06/2014 by:

Question about your data?

Click here to email McCampbell

Angela Rydelius,
Laboratory Manager

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McCampbell Analytical, Inc.
"*When Quality Counts*"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Glossary of Terms & Qualifier Definitions

Client: Alpha Analytical Laboratories
Project: #14A1713
WorkOrder: 1401903

Glossary Abbreviation	Description
95% Interval	95% Confident Interval
DF	Dilution Factor
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not detected at or above the indicated MDL or RL
NR	Matrix interferences, or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix; or sample diluted due to high matrix or analyte content.
RD	Relative Difference
RL	Reporting Limit
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
TEQ	Toxicity Equivalence

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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Analytical Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	1401903
Project:	#14A1713	**Extraction Method**	E218.6
Date Received:	1/31/14 12:08	**Analytical Method:**	E218.6
Date Prepared:	1/31/14	**Unit:**	µg/L

Hexachrome by IC

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
FO-07 (Shallow)	**1401903-001A**	**Water**	**01/30/2014 13:40**	**IC2**	**86616**

Analytes	Result	RL	DF	Date Analyzed
Hexachrome	**1.7**	0.050	1	01/31/2014 17:50

McCampbell Analytical, Inc.
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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Quality Control Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	1401903
Date Prepared:	1/31/14	**BatchID:**	86616
Date Analyzed:	1/31/14	**Extraction Method**	E218.6
Instrument:	IC2	**Analytical Method:**	E218.6
Matrix:	Water	**Unit:**	µg/L
Project:	#14A1713	**Sample ID:**	MB/LCS-86616 1401905-001AMS/MSD

QC Summary Report for E218.6

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Hexachrome	ND	25.38	0.050	25	-	102	90-110

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Hexachrome	24.94	25.03	25	1.560	93.5	93.9	90-110	0.360	10

McCampbell Analytical, Inc.

1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1401903 **ClientCode: ALPU**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
David S. Pingatore
Alpha Analytical Laboratories
208 Mason Street
Ukiah, CA 95482
(707) 468-0401 FAX: (707) 468-5267

Email: sspeaks@alpha-labs.com;david@alpha-lab
cc:
PO:
ProjectNo: #14A1713

Bill to:
Accounts Payable
Alpha Analytical Laboratories
208 Mason Street
Ukiah, CA 95482

Requested TAT: 5 days

Date Received: 01/31/2014
Date Printed: 01/31/2014

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
1401903-001	FO-07 (Shallow)	Water	1/30/2014 13:40	☐	A											

Test Legend:

1	218_6_DW	2		3		4		5	
6		7		8		9		10	
11		12							

Prepared by: Maria Venegas

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.
"*When Quality Counts*"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

WORK ORDER SUMMARY

Client Name: ALPHA ANALYTICAL LABORATORIES
QC Level: LEVEL 2
Work Order: 1401903
Project: #14A1713
Client Contact: David S. Pingatore
Date Received: 1/31/2014
Comments:
Contact's Email: sspeaks@alpha-labs.com;david@alpha-labs.com

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Number of Containers	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1401903-001A	FO-07 (Shallow)	Water	E218.6 (Hexachrome)	1	250mL HDPE w/ (NH4)2SO4	☐	1/30/2014 13:40	5 days	Present	☐	

*** NOTE: STLC and TCLP extractions require 48 hrs to complete; therefore, all TATs begin after the extraction is completed (i.e., 24hr TAT yields results in 72 hrs from sample submission).**

Bottle Legend:

250mL HDPE w/ (NH4)2SO4 = 250mL HDPE Bottle w/ Ammonium Sulfate

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

1401903

14A1713

SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: David S. Pingatore

RECEIVING LABORATORY:

McCampbell Analytical
1534 Willowpass Rd.
Pittsburg, CA 94565
Phone :(925) 252-9262
Fax: (925) 252-9269
Terms: Net 30

Analysis	Due	Expires	Comments
14A1713-01 FO-07 (Shallow) [Water] Sampled 01/30/14 13:40 Pacific			
Cr6 218.6 DW	02/14/14 12:00	02/04/14 13:40	
Containers Supplied:			
250ml Poly - (NH4)2SO4 (A			

☐ *Report to State*

System Name: _____ **Employed by:** _____

User ID: _____ **Sampler:** _____

System Number: _____

NO

ICE/t° 3.2
GOOD CONDITION_____
HEAD SPACE ABSENT_____
DECHLORINATED IN LAB_____
APPROPRIATE CONTAINERS_____
PRESERVED IN LAB_____

PRESERVATION	VOAS	O&G	METALS	OTHER

Released By	Date	Received By	Date
	01/31/14		1/31/14
	1/31/14		1/31/14 1150

Page 1 of 1

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Sample Receipt Checklist

Client Name: **Alpha Analytical Laboratories**

Date and Time Received: **1/31/2014 12:08:44 PM**

Project Name: **#14A1713**

LogIn Reviewed by: Maria Venegas

WorkOrder N°: **1401903** Matrix: Water

Carrier: Client Drop-In

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐
Chain of custody signed when relinquished and received?	Yes ☑	No ☐
Chain of custody agrees with sample labels?	Yes ☑	No ☐
Sample IDs noted by Client on COC?	Yes ☑	No ☐
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐
Sampler's name noted on COC?	Yes ☐	No ☑

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp: 3.2°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	NA ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☑	No ☐	

(Ice Type: BLUE ICE)

** NOTE: If the "No" box is checked, see comments below.*

Comments:

ALS Environmental
ALS Group USA, Corp.
1317 South 13th Avenue
Kelso, WA 98626
T: +1 360 577 7222
F: +1 360 636 1068
www.alsglobal.com

February 21, 2014 Analytical Report for Service Request No: K1401154

David Pingatore
Alpha Analytical Laboratories, Inc.
6398 Dougherty Road, Suite 35
Dublin, CA 94568

RE: 14A1713

Dear David:

Enclosed are the results of the sample submitted to our laboratory on February 05, 2014. For your reference, these analyses have been assigned our service request number K1401154.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3293. You may also contact me via Email at Shar.Samy@alsglobal.com.

Respectfully submitted,

ALS Group USA Corp. dba ALS Environmental

Shar Samy, Ph.D.
Project Manager

SS/mj

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2286
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L12-28
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Georgia DNR	http://www.gaepd.org/Documents/techguide_pcb.html#cel	881
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
Indiana DOH	http://www.in.gov/isdh/24859.htm	C-WA-01
ISO 17025	http://www.pjlabs.com/	L12-27
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	3016
Maine DHS	Not available	WA0035
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-368
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA35
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA200001
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	4704427-08-TX
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C1203
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.caslab.com or at the accreditation bodies web site

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

ALS ENVIRONMENTAL

Client:	Alpha Analytical Laboratories, Inc.	**Service Request No.:**	K1401154
Project:	14A1713	**Date Received:**	02/05/14
Sample Matrix:	Water		

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Matrix/Duplicate Matrix Spike (MS/DMS), and Laboratory Control Sample (LCS).

Sample Receipt

One water sample was received for analysis at ALS Environmental on 02/05/14. The sample was received in good condition and consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4ºC upon receipt at the laboratory.

Explosives by EPA Method 8330

Sample Notes and Discussion:
Insufficient sample volume was received to perform a Matrix Spike/Matrix Spike Duplicate (MS/MSD). A Laboratory Control Sample/Duplicate Laboratory Control Sample (LCS/DLCS) was analyzed and reported in lieu of the MS/MSD.

No other anomalies associated with the analysis of this sample were observed.

Approved by_____

K1401154

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

14A1713

SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: David S. Pingatore

RECEIVING LABORATORY:

ALS Environmental - Kelso
1317 S. 13th Ave
Kelso, WA 98626
Phone :(360) 577-7222
Fax: -
Terms: Net 30

Analysis	Due	Expires	Comments
14A1713-01 FO-07 (Shallow) [Water] Sampled 01/30/14 13:40 Pacific			
8330B Explosives Water	02/14/14 12:00	02/06/14 13:40	
Containers Supplied:			
1L Amber- Unpres. (AD) 1L Amber- Unpres. (AE)			

☐ *Report to State*

System Name: _____ **Employed by:** _____

User ID: _____ **Sampler:** _____

System Number: _____

+QC

Released By	Date	Received By	Date
[signature]	1-31-14	[signature]	2/5/14 1020

PC Shar

Cooler Receipt and Preservation Form

Client / Project: Alpha Service Request K14 01154

Received: 2/5/14 Opened: 2/5/14 By: [illegible] Unloaded: 2/5/14 By: [illegible]

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? _____

   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
-0.9	-0.6	—	—	-0.1	308		1Z894250 01489473	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

Page ____ *of* ____

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Alpha Analytical Laboratories, Inc. (Uki	**Service Request:**	K1401154
Project:	14A1713	**Date Collected:**	01/30/2014
Sample Matrix:	Water	**Date Received:**	02/05/2014

Nitroaromatics and Nitramines (Explosives)

Sample Name:	14A1713-01 FO-07(Shallow)	**Units:**	ug/L
Lab Code:	K1401154-001	**Basis:**	NA
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	8330B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
HMX	ND	U	0.10	0.010	1	02/06/14	02/07/14	KWG1400979	
RDX	ND	U	0.10	0.017	1	02/06/14	02/07/14	KWG1400979	
1,3,5-Trinitrobenzene	ND	U	0.20	0.050	1	02/06/14	02/07/14	KWG1400979	
1,3-Dinitrobenzene	ND	U	0.10	0.0085	1	02/06/14	02/07/14	KWG1400979	
3,5-Dinitroaniline	ND	U	0.10	0.013	1	02/06/14	02/07/14	KWG1400979	
TETRYL	ND	U	0.10	0.042	1	02/06/14	02/07/14	KWG1400979	
Nitrobenzene	ND	U	0.10	0.013	1	02/06/14	02/07/14	KWG1400979	
4-Amino-2,6-dinitrotoluene	ND	U	0.10	0.016	1	02/06/14	02/07/14	KWG1400979	
2-Amino-4,6-dinitrotoluene	ND	U	0.10	0.0089	1	02/06/14	02/07/14	KWG1400979	
2,4,6-Trinitrotoluene	ND	U	0.10	0.026	1	02/06/14	02/07/14	KWG1400979	
2,6-Dinitrotoluene	**0.070**	JN	0.20	0.054	1	02/06/14	02/07/14	KWG1400979	
2,4-Dinitrotoluene	ND	U	0.10	0.0091	1	02/06/14	02/07/14	KWG1400979	
2-Nitrotoluene	ND	U	0.10	0.032	1	02/06/14	02/07/14	KWG1400979	
4-Nitrotoluene	ND	U	0.10	0.019	1	02/06/14	02/07/14	KWG1400979	
3-Nitrotoluene	ND	U	0.10	0.0064	1	02/06/14	02/07/14	KWG1400979	
Nitroglycerin	ND	U	1.0	0.39	1	02/06/14	02/07/14	KWG1400979	
Pentaerythritol Tetranitrate	ND	U	0.50	0.18	1	02/06/14	02/07/14	KWG1400979	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1-Chloro-3-nitrobenzene	77	23-98	02/07/14	Acceptable

Comments:

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Alpha Analytical Laboratories, Inc. (Uki	**Service Request:**	K1401154
Project:	14A1713	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Nitroaromatics and Nitramines (Explosives)

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG1400979-3	**Basis:**	NA
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	8330B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
HMX	ND	U	0.098	0.010	1	02/06/14	02/07/14	KWG1400979	
RDX	ND	U	0.098	0.017	1	02/06/14	02/07/14	KWG1400979	
1,3,5-Trinitrobenzene	ND	U	0.20	0.050	1	02/06/14	02/07/14	KWG1400979	
1,3-Dinitrobenzene	ND	U	0.098	0.0085	1	02/06/14	02/07/14	KWG1400979	
3,5-Dinitroaniline	ND	U	0.098	0.013	1	02/06/14	02/07/14	KWG1400979	
TETRYL	ND	U	0.10	0.042	1	02/06/14	02/07/14	KWG1400979	
Nitrobenzene	ND	U	0.098	0.013	1	02/06/14	02/07/14	KWG1400979	
4-Amino-2,6-dinitrotoluene	ND	U	0.098	0.016	1	02/06/14	02/07/14	KWG1400979	
2-Amino-4,6-dinitrotoluene	ND	U	0.098	0.0089	1	02/06/14	02/07/14	KWG1400979	
2,4,6-Trinitrotoluene	ND	U	0.098	0.026	1	02/06/14	02/07/14	KWG1400979	
2,6-Dinitrotoluene	**0.068**	JN	0.20	0.054	1	02/06/14	02/07/14	KWG1400979	
2,4-Dinitrotoluene	ND	U	0.098	0.0091	1	02/06/14	02/07/14	KWG1400979	
2-Nitrotoluene	ND	U	0.10	0.032	1	02/06/14	02/07/14	KWG1400979	
4-Nitrotoluene	ND	U	0.098	0.019	1	02/06/14	02/07/14	KWG1400979	
3-Nitrotoluene	ND	U	0.098	0.0064	1	02/06/14	02/07/14	KWG1400979	
Nitroglycerin	ND	U	0.98	0.39	1	02/06/14	02/07/14	KWG1400979	
Pentaerythritol Tetranitrate	ND	U	0.49	0.18	1	02/06/14	02/07/14	KWG1400979	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1-Chloro-3-nitrobenzene	75	23-98	02/07/14	Acceptable

Comments:

Client: Alpha Analytical Laboratories, Inc. (Uki
Service Request: K1401154
Project: 14A1713
Sample Matrix: Water

Surrogate Recovery Summary
Nitroaromatics and Nitramines (Explosives)

Extraction Method: METHOD
Units: Percent
Analysis Method: 8330B
Level: Low

Sample Name	Lab Code	Sur1
14A1713-01 FO-07(Shallow)	K1401154-001	77
Method Blank	KWG1400979-3	75
Duplicate Lab Control Sample	KWG1400979-1	82
Lab Control Sample	KWG1400979-2	91

Surrogate Recovery Control Limits (%)

Sur1 = 1-Chloro-3-nitrobenzene 23-98

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	Alpha Analytical Laboratories, Inc. (Uki	**Service Request:**	K1401154
Project:	14A1713	**Date Extracted:**	02/06/2014
Sample Matrix:	Water	**Date Analyzed:**	02/07/2014

Lab Control Spike/Duplicate Lab Control Spike Summary
Nitroaromatics and Nitramines (Explosives)

Extraction Method:	METHOD	**Units:**	ug/L
Analysis Method:	8330B	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG1400979

	Lab Control Sample KWG1400979-2 Lab Control Spike			Duplicate Lab Control Sample KWG1400979-1 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
HMX	7.75	8.00	97	7.46	8.00	93	11-147	4	30
RDX	7.53	8.00	94	7.26	8.00	91	10-142	4	30
1,3,5-Trinitrobenzene	7.54	8.00	94	7.01	8.00	88	16-137	7	30
1,3-Dinitrobenzene	7.51	8.00	94	7.03	8.00	88	26-125	7	30
3,5-Dinitroaniline	7.48	8.00	93	7.09	8.00	89	30-133	5	30
TETRYL	7.71	8.00	96	7.26	8.00	91	29-123	6	30
Nitrobenzene	7.43	8.00	93	6.93	8.00	87	10-116	7	30
4-Amino-2,6-dinitrotoluene	7.57	8.00	95	7.11	8.00	89	55-117	6	30
2-Amino-4,6-dinitrotoluene	7.47	8.00	93	7.00	8.00	88	54-116	6	30
2,4,6-Trinitrotoluene	7.53	8.00	94	6.93	8.00	87	47-118	8	30
2,6-Dinitrotoluene	7.57	8.00	95	6.95	8.00	87	40-108	9	30
2,4-Dinitrotoluene	7.46	8.00	93	6.83	8.00	85	50-111	9	30
2-Nitrotoluene	7.18	8.00	90	6.55	8.00	82	12-110	9	30
4-Nitrotoluene	7.21	8.00	90	6.58	8.00	82	16-113	9	30
3-Nitrotoluene	7.51	8.00	94	6.83	8.00	85	13-109	10	30
Nitroglycerin	7.71	8.00	96	7.43	8.00	93	15-136	4	30
Pentaerythritol Tetranitrate	7.81	8.00	98	7.35	8.00	92	66-103	6	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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Analytical Laboratory Service - Since 1964

Certificate of Analysis

Report Date: 02/24/14 15:32
Received Date: 02/05/14 08:30
Turnaround Time: Normal

Project: 14A1713

Phones: (925) 872-9637
Fax: (707) 468-5267

P.O. #:

Attn: David S. Pingatore

Client: Alpha Analytical Laboratories - Ukiah
208 Mason St
Ukiah, CA 95482

Dear David S. Pingatore :

Enclosed are the results of analyses for samples received 2/5/2014 with the Chain of Custody document. The samples were received in good condition, at 1.7 °C and on ice. All analysis met the method criteria except as noted below or in the report with data qualifiers.

Lab Sample ID: 4B05032-01 **Sample ID: 14A1713-01 FO-07 (Shallow)** **Matrix:** Water
Sampled by: Client **Sampled: 01/30/14 13:40**

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
17-a-Ethynylestradiol	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 18:55	W4B0281	
17-b-Estradiol	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 18:55	W4B0281	
Estrone	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 18:55	W4B0281	
Progesterone	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 18:55	W4B0281	
Testosterone	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 18:55	W4B0281	
Bisphenol A	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 23:35	W4B0283	
Gemfibrozil	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 23:35	W4B0283	
Ibuprofen	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 23:35	W4B0283	
Iopromide	ND		5.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 23:35	W4B0283	
Naproxen	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 23:35	W4B0283	
Salicylic Acid	ND		50	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 23:35	W4B0283	
Triclosan	ND		2.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/14/14 23:35	W4B0283	
Acetaminophen	ND		20	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
Amoxicillin	ND		10	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
Atenolol	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
Atorvastatin	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
Azithromycin	ND		10	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	

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Lab Sample ID: 4B05032-01 **Sample ID: 14A1713-01 FO-07 (Shallow)** **Matrix:** Water
Sampled by: Client **Sampled: 01/30/14 13:40**

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
Caffeine	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
Carbamazepine	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
Ciprofloxacin	ND		5.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
Cotinine	ND		2.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
DEET	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
Diazepam	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
Fluoxetine	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
Meprobamate	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
Methadone	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
Oxybenzone	**1.2**		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
Phenytoin	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
Primidone	ND		10	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	R-01
Sucralose	ND		5.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
Sulfamethoxazole	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
TCEP	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
TCPP	**2.6**		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	B
TDCPP	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	
Trimethoprim	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:03	W4B0282	

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Quality Control Section

PPCPs - Pharmaceuticals by LC/MSMS-ESI+ - Quality Control

Batch W4B0282 - EPA 1694M-ESI+

Blank (W4B0282-BLK1) — **Prepared: 02/07/14 Analyzed: 02/18/14 22:39**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Acetaminophen		ND		ng/l					
Caffeine		ND		ng/l					
Sulfamethoxazole		ND		ng/l					
Trimethoprim		ND		ng/l					
Azithromycin		ND		ng/l					
Cotinine		ND		ng/l					
Atenolol		ND		ng/l					
Ciprofloxacin		ND		ng/l					
Carbamazepine		ND		ng/l					
DEET		ND		ng/l					
Fluoxetine		ND		ng/l					
Atorvastatin		ND		ng/l					
Methadone		ND		ng/l					
Primidone		ND		ng/l					
Diazepam		ND		ng/l					
TCPP		2.23	B	ng/l					
TCEP		ND		ng/l					
TDCPP		ND		ng/l					
Phenytoin		ND		ng/l					
Amoxicillin		ND		ng/l					
Meprobamate		ND		ng/l					
Sucralose		ND		ng/l					
Oxybenzone		ND		ng/l					

LCS (W4B0282-BS1) — **Prepared: 02/07/14 Analyzed: 02/18/14 22:53**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Acetaminophen		435		ng/l	400	109	66-156		
Caffeine		17.4		ng/l	20.0	87	55-152		
Sulfamethoxazole		17.6		ng/l	20.0	88	60-133		
Trimethoprim		18.6		ng/l	20.0	93	67-139		
Azithromycin		199		ng/l	200	100	52-166		
Cotinine		22.6		ng/l	20.0	113	68-155		
Atenolol		21.0		ng/l	20.0	105	56-164		
Ciprofloxacin		83.8		ng/l	100	84	51-168		
Carbamazepine		19.3		ng/l	20.0	96	60-135		
DEET		15.5		ng/l	20.0	78	45-135		
Fluoxetine		23.8		ng/l	20.0	119	55-150		
Atorvastatin		16.3		ng/l	20.0	82	0.1-173		
Methadone		19.0		ng/l	20.0	95	62-137		
Primidone		17.1		ng/l	20.0	86	54-147		
Diazepam		18.3		ng/l	20.0	92	58-127		

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PPCPs - Pharmaceuticals by LC/MSMS-ESI+ - Quality Control

Batch W4B0282 - EPA 1694M-ESI+

LCS (W4B0282-BS1) — **Prepared: 02/07/14 Analyzed: 02/18/14 22:53**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
TCPP		18.1		ng/l	20.0	90	24-149		
TCEP		17.5		ng/l	20.0	88	25-149		
TDCPP		17.7		ng/l	20.0	88	20-158		
Phenytoin		18.2		ng/l	20.0	91	69-138		
Amoxicillin		164		ng/l	200	82	14-167		
Meprobamate		20.5		ng/l	20.0	102	11-166		
Sucralose		95.7		ng/l	100	96	50-150		
Oxybenzone		15.4		ng/l	20.0	77	50-150		

LCS Dup (W4B0282-BSD1) — **Prepared: 02/07/14 Analyzed: 02/18/14 23:07**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Acetaminophen		499		ng/l	400	125	66-156	14	30
Caffeine		18.2		ng/l	20.0	91	55-152	4	30
Sulfamethoxazole		19.4		ng/l	20.0	97	60-133	10	30
Trimethoprim		18.4		ng/l	20.0	92	67-139	1	30
Azithromycin		206		ng/l	200	103	52-166	3	30
Cotinine		26.7		ng/l	20.0	134	68-155	17	30
Atenolol		23.0		ng/l	20.0	115	56-164	9	30
Ciprofloxacin		83.4		ng/l	100	83	51-168	0.5	30
Carbamazepine		19.7		ng/l	20.0	98	60-135	2	30
DEET		16.4		ng/l	20.0	82	45-135	6	30
Fluoxetine		22.8		ng/l	20.0	114	55-150	4	30
Atorvastatin		15.1		ng/l	20.0	76	0.1-173	8	30
Methadone		19.1		ng/l	20.0	96	62-137	0.5	30
Primidone		16.2		ng/l	20.0	81	54-147	5	30
Diazepam		18.9		ng/l	20.0	94	58-127	3	30
TCPP		21.0		ng/l	20.0	105	24-149	15	30
TCEP		20.6		ng/l	20.0	103	25-149	16	30
TDCPP		18.9		ng/l	20.0	94	20-158	7	30
Phenytoin		18.4		ng/l	20.0	92	69-138	1	30
Amoxicillin		164		ng/l	200	82	14-167	0	30
Meprobamate		20.6		ng/l	20.0	103	11-166	0.5	30
Sucralose		93.0		ng/l	100	93	50-150	3	30
Oxybenzone		18.3		ng/l	20.0	92	50-150	17	30

PPCPs - Pharmaceuticals by LC/MSMS-ESI- - Quality Control

Batch W4B0283 - EPA 1694M-ESI-

Blank (W4B0283-BLK1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:08**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Bisphenol A		1.99	B	ng/l					
Gemfibrozil		ND		ng/l					
Ibuprofen		ND		ng/l					
Naproxen		ND		ng/l					

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PPCPs - Pharmaceuticals by LC/MSMS-ESI- - Quality Control

Batch W4B0283 - EPA 1694M-ESI-

Blank (W4B0283-BLK1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:08**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Salicylic Acid		ND		ng/l					
Triclosan		ND		ng/l					
Iopromide		ND		ng/l					

LCS (W4B0283-BS1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:22**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Bisphenol A		19.5		ng/l	20.0	98	53-168		
Gemfibrozil		18.0		ng/l	20.0	90	76-122		
Ibuprofen		17.7		ng/l	20.0	88	67-139		
Naproxen		17.3		ng/l	20.0	86	64-138		
Salicylic Acid		171		ng/l	200	86	56-229		
Triclosan		38.9		ng/l	40.0	97	76-139		
Iopromide		114		ng/l	100	114	0.1-163		

LCS Dup (W4B0283-BSD1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:37**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Bisphenol A		18.4		ng/l	20.0	92	53-168	6	30
Gemfibrozil		18.3		ng/l	20.0	92	76-122	2	30
Ibuprofen		19.8		ng/l	20.0	99	67-139	11	30
Naproxen		19.1		ng/l	20.0	96	64-138	10	30
Salicylic Acid		183		ng/l	200	92	56-229	7	30
Triclosan		40.5		ng/l	40.0	101	76-139	4	30
Iopromide		104		ng/l	100	104	0.1-163	9	30

PPCPs - Hormones by LC/MSMS-APCI - Quality Control

Batch W4B0281 - EPA 1694M-APCI

Blank (W4B0281-BLK1) — **Prepared: 02/07/14 Analyzed: 02/19/14 16:58**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
17-a-Ethynylestradiol		ND		ng/l					
17-b-Estradiol		ND		ng/l					
Estrone		ND		ng/l					
Progesterone		ND		ng/l					
Testosterone		ND		ng/l					

LCS (W4B0281-BS1) — **Prepared: 02/07/14 Analyzed: 02/19/14 17:15**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
17-a-Ethynylestradiol		19.1		ng/l	20.0	96	68-159		
17-b-Estradiol		18.0		ng/l	20.0	90	65-146		
Estrone		17.6		ng/l	20.0	88	59-141		
Progesterone		17.8		ng/l	20.0	89	58-154		
Testosterone		24.8		ng/l	20.0	124	60-172		

LCS Dup (W4B0281-BSD1) — **Prepared: 02/07/14 Analyzed: 02/19/14 17:31**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit

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PPCPs - Hormones by LC/MSMS-APCI - Quality Control

Batch W4B0281 - EPA 1694M-APCI

LCS Dup (W4B0281-BSD1) **Prepared: 02/07/14 Analyzed: 02/19/14 17:31**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
17-a-Ethynylestradiol		18.9		ng/l	20.0	94	68-159	1	30
17-b-Estradiol		18.4		ng/l	20.0	92	65-146	2	30
Estrone		18.3		ng/l	20.0	92	59-141	4	30
Progesterone		18.1		ng/l	20.0	90	58-154	2	30
Testosterone		26.0		ng/l	20.0	130	60-172	5	30

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Notes:
The Chain of Custody document is part of the analytical report.
Any remaining sample(s) for testing will be disposed of one month from the final report date unless other arrangements are made in advance.
All results are expressed on wet weight basis unless otherwise specified.

An Absence of Total Coliform meets the drinking water standards as established by the State of California Department of Health Services.
The Reporting Limit (RL) is referenced as laboratory's Practical Quantitation Limit (PQL).
For Potable water analysis, the Reporting Limit (RL) is referenced as Detection Limit for reporting purposes (DLRs) defined by EPA.

If sample collected by Weck Laboratories, sampled in accordance to lab SOP MIS002

Authorized Signature
Contact: Kim G Tu
(Project Manager)

ELAP # 1132
LACSD # 10143
NELAC # 04229CA

The results in this report apply to the samples analyzed in accordance with the chain of custody document. Weck Laboratories certifies that the test results meet all requirements of NELAC unless noted in the Case Narrative. This analytical report must be reproduced in its entirety.

Flags for Data Qualifiers:

B	Blank contamination. The analyte was found in the associated blank as well as in the sample.
R-01	The Reporting Limit for this analyte has been raised to account for matrix interference.
ND	NOT DETECTED at or above the Reporting Limit. If J-value reported, then NOT DETECTED at or above the Method Detection Limit (MDL).
Sub	Subcontracted analysis, original report enclosed.
DL	Method Detection Limit
RL	Method Reporting Limit
MDA	Minimum Detectable Activity
NR	Not Reportable

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ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Water Analysis

Lab Number: 410666 Job Number: 24232 IS-69368

Sample Name: FO-07 (SHALLOW)

Company Lab #:

Company Job #:

Company: Alpha Analytical, Inc.

API/Well:

Field or Site: WO 14A1713

Location:

Depth/Formation:

Container Type: 1 Liter Plastic Bottle

Date Sampled: 1/30/2014 Date Received 2/05/2014 Date Reported: 2/26/2014

δD of water	----------	na
$\delta^{18}O$ of water	----------	na
Tritium content of water	----------	< 1.00 TU
$\delta^{13}C$ of DIC	----------	na
^{14}C content of DIC	----------	na
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na

Remarks:

NELAC NARRATIVE PAGE

Client: Alpha Analytical Report #: 310985NP

Underwriters Laboratories is a NELAP accredited laboratory. All reported results meet the requirements of the NELAC standards, unless otherwise noted.

UL contact person: James Van Fleit

NELAP requires complete reporting of deviations from method requirements, regardless of the suspected impact on the data. Quality control failures not reported within the report summary are noted here.

There were no quality control failures.

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Authorized Signature Title Date

UL LLC
110 S. Hill St., South Bend, IN 46617-2702 USA
T: 800.332.4345 / F: 574.233.8207 / W: UL.com

Laboratory Report

Client:	Alpha Analytical	Report:	310985
Attn:	David Pingatore 6398 Dougherty Road, Suite 35 Dublin, CA 94568	Priority:	Standard Written
		Status:	Final
		PWS ID:	Not Supplied
Copies to:	None		

Sample Information

UL ID #	Client ID	Method	Collected Date / Time	Collected By:	Received Date / Time
2967017	14A1713-01	905.0	01/30/14 13:40	Client	02/04/14 11:45
2967018	14A1713-01	1613	01/30/14 13:40	Client	02/04/14 11:45
2967019	14A1713-01	7110 B	01/30/14 13:40	Client	02/04/14 11:45
2967020	14A1713-01	7500-Ra B	01/30/14 13:40	Client	02/04/14 11:45
2967020	14A1713-01	7500-Ra D	01/30/14 13:40	Client	02/04/14 11:45
2967021	14A1713-01	300.1	01/30/14 13:40	Client	02/04/14 11:45
2967022	14A1713-01	300.0	01/30/14 13:40	Client	02/04/14 11:45

Report Summary

Note: See attached page for additional comments.

Note: Sample containers were provided by the client except for Methods 300.0 and 300.1.

Note: Strontium-90 analysis was performed by General Engineering Laboratories, Charleston, SC.

Note: Dioxin analysis was performed by Pace Analytical, Minneapolis, MN.

Detailed quantitative results are presented on the following pages. The results presented relate only to the samples provided for analysis.

We appreciate the opportunity to provide you with this analysis. If you have any questions concerning this report, please do not hesitate to call James Van Fleit at (574) 233-4777.

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Authorized Signature | Title | Date

Client Name: Alpha Analytical
Report #: 310985

UL LLC
110 S. Hill St., South Bend, IN 46617-2702 USA
T: 800.332.4345 / F: 574.233.8207 / W: UL.com

Client Name: Alpha Analytical

Report #: 310985

Sampling Point: 14A1713-01

PWS ID: Not Supplied

General Chemistry

Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	UL ID #
14998-27-7	Chlorite	300.0	1000 *	20	< 20	ug/L	---	02/06/14 22:50	2967022
15541-45-4	Bromate	300.1	10 *	5.0	< 5.0	ug/L	---	02/05/14 02:08	2967021

Radionuclides

Analyte ID #	Analyte	Method	Reg Limit	DL**	Result	Units	Preparation Date	Analyzed	UL ID #
---	Gross Alpha	7110 B	15 *	3	**125 ± 5**	pCi/L	02/21/14 07:49	02/27/14 10:40	2967019
---	Gross Beta	7110 B	50 *	4	**114 ± 2**	pCi/L	02/21/14 07:49	02/27/14 10:40	2967019
13982-63-3	Radium-226	7500-Ra B	3 *	1.0	**22.0 ± 2.2**	pCi/L	02/18/14 09:45	03/02/14 11:36	2967020
15262-20-1	Radium-228	7500-Ra D	2 *	1.0	**16.3 ± 1.2**	pCi/L	02/18/14 09:45	02/26/14 16:02	2967020
---	Combined Radium	calc.	5 *	1.0	**38.3 ± 2.4**	pCi/L	02/18/14 09:45	03/02/14 11:36	2967020

** Detection Limit (DL) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Reference Lab Tests

Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	UL ID #
1746-01-6	Dioxin	1613	30 *	5	< 5	pg/L	03/03/14 00:00	03/04/14 13:42	2967018
---	Strontium-90	905.0	8 *	2.00	**0.748 ± 1.140**	pCi/L	---	02/20/14 08:05	2967017

† UL has demonstrated it can achieve these report limits in reagent water, but can not document them in all sample matrices.

Reg Limit Type:	MCL	SMCL	AL
Symbol:	*	^	!

Lab Definitions

Continuing Calibration Check Standard (CCC) / Continuing Calibration Verification (CCV) / Initial Calibration Verification Standard (ICV) / Initial Performance Check (IPC) - is a standard containing one or more of the target analytes that is prepared from the same standards used to calibrate the instrument. This standard is used to verify the calibration curve at the beginning of each analytical sequence, and may also be analyzed throughout and at the end of the sequence. The concentration of continuing standards may be varied, when prescribed by the reference method, so that the range of the calibration curve is verified on a regular basis.

Internal Standards (IS) - are pure compounds with properties similar to the analytes of interest, which are added to field samples or extracts, calibration standards, and quality control standards at a known concentration. They are used to measure the relative responses of the analytes of interest and surrogates in the sample, calibration standard or quality control standard.

Laboratory Duplicate (LD) - is a field sample aliquot taken from the same sample container in the laboratory and analyzed separately using identical procedures. Analysis of laboratory duplicates provides a measure of the precision of the laboratory procedures.

Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS) - is an aliquot of reagent water to which known concentrations of the analytes of interest are added. The LFB is analyzed exactly the same as the field samples. LFBs are used to determine whether the method is in control.

Laboratory Method Blank (LMB) / Laboratory Reagent Blank (LRB) - is a sample of reagent water included in the sample batch analyzed in the same way as the associated field samples. The LMB is used to determine if method analytes or other background contamination have been introduced during the preparation or analytical procedure. The LMB is analyzed exactly the same as the field samples.

Laboratory Trip Blank (LTB) / Field Reagent Blank (FRB) - is a sample of laboratory reagent water placed in a sample container in the laboratory and treated as a field sample, including storage, preservation, and all analytical procedures. The FRB/LTB container follows the collection bottles to and from the collection site, but the FRB/LTB is not opened at any time during the trip. The FRB/LTB is primarily a travel blank used to verify that the samples were not contaminated during shipment.

Matrix Spike Duplicate Sample (MSD) / Laboratory Fortified Sample Matrix Duplicate (LFSMD) - is a sample aliquot taken from the same field sample source as the Matrix Spike Sample to which known quantities of the analytes of interest are added in the laboratory. The MSD is analyzed exactly the same as the field samples. Analysis of the MSD provides a measure of the precision of the laboratory procedures in a specific matrix.

Matrix Spike Sample (MS) / Laboratory Fortified Sample Matrix (LFSM) - is a sample aliquot taken from field sample source to which known quantities of the analytes of interest are added in the laboratory. The MS is analyzed exactly the same as the field samples. The purpose is to demonstrate recovery of the analytes from a sample matrix to determine if the specific matrix contributes bias to the analytical results.

Quality Control Standard (QCS) / Second Source Calibration Verification (SSCV) - is a solution containing known concentrations of the analytes of interest prepared from a source different from the source of the calibration standards. The solution is obtained from a second manufacturer or lot if the lot can be demonstrated by the manufacturer as prepared independently from other lots. The QCS sample is analyzed using the same procedures as field samples. The QCS is used as a check on the calibration standards used in the method on a routine basis.

Reporting Limit Check (RLC) / Initial Calibration Check Standard (ICCS) - is a procedural standard that is analyzed each day to evaluate instrument performance at or below the minimum reporting limit (MRL).

Surrogate Standard (SS) / Surrogate Analyte (SUR) - is a pure compound with properties similar to the analytes of interest, which is highly unlikely to be found in any field sample, that is added to the field samples, calibration standards, blanks and quality control standards before sample preparation. The SS is used to evaluate the efficiency of the sample preparation process.

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

14A1713

SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: David S. Pingatore

RECEIVING LABORATORY:

Zymax
600 S. Andreasen Drive, Suite B
Escondido, CA 92029
Phone :(760) 781-3338
Fax: (760) 781-3339
Terms: Net 30

Analysis	Due	Expires	Comments
14A1713-01 FO-07 (Shallow) [Water] Sampled 01/30/14 13:40 Pacific			43451-1
Oxygen 18 - Isotope / Hydroger	02/14/14 12:00	07/29/14 13:40	
N and O Isotopes of Nitrate	02/14/14 12:00	02/06/14 13:40	

Containers Supplied:

250 mL Poly Unpres (AQ), 250 mL Poly Unpres (AR)

☐ *Report to State*

System Name: _____ **Employed by:** _____

User ID: _____ **Sampler:** _____

System Number: _____

+QC

Released By	Date	Received By	Date
			2/5/14 9:05
Released By	Date	Received By	Date

David S. Pingatore
Project Manager
Alpha Analytical Laboratories, Inc.
208 Mason Street
Ukiah, CA 95482
Tel: 707.468.0401
Fax: 707.468.5267
Project: 14A1713
Email: david @ alpha.com

Dr. Yi Wang
Director of ZymaX Forensics Isotope
Senior Environmental Geochemist, PACE
600 S. Andreasen Dr., Suite B
Escondido, CA 92029
Tel: 760.781.3338 ext 202
Fax: 760.781.3339
Cell: 609.721.2843
Email: yi.wang@zymaxusa.com

REPORT OF ENVIRONMENTAL FORENSICS ISOTOPE ANALYSES

Date Received: February 5th, 2014
Date Reported: March 20th, 2014

Sample from Alpha Analytical Labs for $\delta^{15}N$ (‰ Air), $\delta^{18}O$ and δD (‰ VSMOW) stable isotope analysis

ZymaX ID	Client ID/Sample Description	$\delta^{18}O_{H2O}$	δD_{H2O}	$\delta^{15}N_{NO3}$	$\delta^{18}O_{NO3}$
43451-1	14A1713-01 FO-07 (Shallow)	-6.36	-45.44	8.7	4.2
	Analytical precision (1σ)	0.06	0.32	0.2	0.4

ZymaX ID	$\delta^{18}O_{H2O}$	δD_{H2O}	$\delta^{15}N_{NO3}$	$\delta^{18}O_{NO3}$
QC-01	-5.89	-41.12	4.5	25.3
QC-02	-5.98	-41.57	4.8	25.9
Mean	-5.94	-41.35	4.7	25.6
Analytical Precision (1σ)	0.06	0.32	0.2	0.4

ZymaX Forensics Isotope Services

Product or Dissolved Organics: Chlorinated Solvents, Oil, Extract, Fraction and Kerogen
3D-CSIA of ^{13}C, ^{37}Cl, and ^{2}H for PCE, TCE, DCE, MTBE, BTEX, PAHs, Pesticides, Alkanes, Gasoline and Oil; Bulk ^{13}C, ^{2}H, ^{18}O, ^{34}S, and ^{15}N
Gas Sample
Gas Composition and 2D-CSIA of ^{13}C and ^{2}H of C1 to C5; ^{13}C of CO_2; ^{14}C of C1 and CO_2; ^{34}S of H_2S; ^{15}N and ^{18}O of N_2O gas
Water and Dissolved Inorganics
^{2}H, ^{3}H and ^{18}O; ^{34}S and ^{18}O of dissolved sulfate; ^{34}S of dissolved H_2S
^{15}N and ^{18}O of dissolved Nitrate; ^{15}N of Ammonia; ^{13}C of dissolved CO_2 and Carbonate/Bicarbonate
Soil and Minerals
^{13}C, ^{18}O, ^{15}N, ^{34}S, D/H; ^{14}C of carbonate or organics
Post-Analysis Forensic Isotope Data Interpretation

Laboratory Order - Summary

analytical chemistry for a better environment

Report To:	David S. Pingatore Alpha Analytical Laboratories, Inc. 208 Mason St. Ukiah, CA. 95482	Date Received: Date Due: Project:	02/05/2014 9:05AM 04/24/2014 12:00AM 14A1713	
Phone: Fax:	(707) 468-0401 (707) 468-5267	Project Number:		

Lab Number	Description	Analysis	Dept
43451-1	14A1713-01 FO-07	d15N and d18O of NO3	M6
		d18O+dD of H2O	M6

Notes/Special Instructions	SC Login/Computer Login CY/CY	DPRA PM: YW

ZymaX FORENSICS

Condition Upon Reciept

Lab Number: 43451 Client: AAL

Sample Temprature (should be 2-6 degrees C): 1.9°C

Do the sample descriptions on the containers match the discriptions on the COC?	☒ Yes	☐ No	
Do the sample dates on the containers match the sample dates on the COC?	☒ Yes	☐ No	
Are the samples within holding time for each analysis at time of reciept?	☒ Yes	☐ No	☐ N/A
Do the number of containers received match the number listed on the COC, and are all of the necessary containers for the required analysis available?	☒ Yes	☐ No	☐ N/A
Does the preservation of the samples match the notation on the COC, and is the preservation correct for requested analysis?	☐ Yes ☒ Zymax	☐ No	☐ N/A
Are all of the samples intact with no headspace, if required for analysis?	☒ Yes	☐ No	
Did samples arrive with custody seal intact?	☒ Yes	☐ No	☐ N/A

Sample Control Signature: [signature] Date: 2/5/14 Time: 9:05

Client Discrepancies

Contacted: _____ Date: _____ Sample Control Initials: _____

Discrepancy: _____

Solution: _____

Contacted: _____ Date: _____ Sample Control Initials: _____

Discrepancy: _____

Solution: _____

Contacted: _____ Date: _____ Sample Control Initials: _____

Discrepancy: _____

Solution: _____

Chain of Custody Record

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com

Laboratory & Corporate: 208 Mason Street, Ukiah, CA 95482
707-468-0401 Fax: 707-468-5267

Service Center & Micro Lab: 6398 Dougherty Rd, Ste 35, Dublin, CA 94568
925-828-6226 Fax: 925-828-6309

Reports and Invoices will be delivered by email in .pdf format.

Lab No. 14A1713

Signature below authorizes work under terms stated on reverse side.

Report to:
Company: Todd Engineers
Attn: Dr. Bill Motzer
Address: 2490 Mariner Square Loop, Suite 215, Alameda, CA 94501
Phone/Fax: 510.747.6920 / 510.747.6921
Email Address: bmotzer@toddengineers.com

Invoice to (if different):
Company:
Attn:
Address:
Phone/Fax:
Email Address:

Project Info for Report:
Project ID: Groundwater Reuse Project
Project No: Project # 60408
PO/Reference :

Samplers Signature:
Print:

TAT: 10 days ● RUSH: 5 days ○ 48 hours ○ Other: ___ days ○

Lab Approval Required For Rush TATs

Sample Notes (lab use only)
Temperature: 1.2° deg. C
Shipment Method:
Custody Seals: Y / N

Sample Identification	Sampled: Date	Sampled: Time	40ml VOA	Poly	Amber glass	Soil jar		NaOH	HNO3	H2SO4	Other	None	Water	Soil		Total Number of Containers	Inorganics Scan, DU-General Physical Scan	200.7 - Ca, K, Mg, Na	200.8 - Ag, B, Cu, Fe, Mn, U, V, Zn	Bicarbonate, Chloride, Conductivity	MBAS, Perchlorate, TDS, Sulfate	HAA5, TOC	507, 508, 515, 525 DHS, 531, 547, 548, 549	504.1, 524.2 Sample Traps scan	Asbestos DW (sub TEM Lab)	Cr6 218.6 DW (sub MAI) DU Peter	Dioxin 2,3,7,8 TCDD DW (sub UL)	Sample Notes or CDPH Source Numbers
FO-07 (shallow)	1-30-14	1340		x	x			x	x			x	x			4	x	x	x	x	x							
			x		x						x		x			3						x						
				x	x						x	x	x			10							x					(507/508/515.1 = one 1L BRA ea)
			x								x		x			7								x				
					x							x	x			2									x			
				x							x		x			1										x		
					x							x	x			2											x	
																								x				
Trip blank ($0.00 analysis)			x								x	x	x			2												

Relinquished by:	Received by:	Date:	Time:
Jim Johnson	Jim Johnson	1-30-14	15:00
Jim Johnson		1/30/14	1725
		1-30-14	1900
	LAB	1-30-14	2125

CDPH Write On EDT Transmission? ○ Yes ○ No
State System Number:
If "Y" please enter the Source Number(s) in the column above

CA Geotracker EDF Report? ○ Yes ○ No
Sampling Company Log Code:
Global ID:
EDF to (Email Address):
Travel and Site Time: | Mileage: | Misc. Supplies:

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com

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707-468-0401 Fax: 707-468-5267

Service Center & Micro Lab: 6398 Dougherty Rd, Ste 35, Dublin, CA 94568
925-828-6226 Fax: 925-828-6309

Chain of Custody Record

Reports and Invoices will be delivered by email in .pdf format.

Lab No. 1471713

Signature below authorizes work under terms stated on reverse side.

Report to:
Company: Todd Engineers
Attn: Dr. Bill Motzer
Address: 2490 Mariner Square Loop, Suite 215, Alameda, CA 94501
Phone/Fax: 510.747.6920 / 510.747.6921
Email Address: bmotzer@toddengineers.com

Invoice to (if different):
Company:
Attn:
Address:
Phone/Fax:
Email Address:

Project Info for Report:
Project ID: Groundwater Reuse Project
Project No: Project # 60408
PO/Reference :

Samplers Signature:
Print:

TAT: 10 days ● RUSH: 5 days ○ 48 hours ○ Other: ___days ○

Lab Approval Required For Rush TATs

Sample Notes (lab use only)
Temperature: 4 deg. C
Shipment Method:
Custody Seals: Y / N

Sample Identification	Sampled: Date	Sampled: Time	Container: 40ml VOA	Poly	Amber glass	Soil jar		Preservative: HCL	HNO3	H2SO4	Other	None	Matrix: Water	Soil		Total Number of Containers	8330B Explosives (sub ALS)	PPCP Hormones 1694M (sub Weck)	PPCP Negative Pharmas 1694M (sub Weck)	PPCP Positive Pharmas 1694M (sub Weck)	Nitrosamines LL 1625M (sub Weck)	Gross A & B, R226 &R228, Sr 90 (sub UL)	Bromate 300.1, Chlorite 300.0 (sub UL)	Tritium, Enriched (sub Isotech)	Oxygen 18 Isotope (sub Zymax)	N and O Isotopes of NO3 (sub Zymax)	j-flag MDL reporting + Standard excel EDD	Sample Notes or CDPH Source Numbers:
FO-07 (shallow)	1-30-14	1340			x							x	x			2	x										x	
					x						x		x			2		x	x	x								
					x							x	x			2					x							
				x					x				x			4						x						
				x							x		x			2							x					
				x								x	x			1								x				
				x								x	x			1									x			
				x								x	x			1										x		

Relinquished by:	Received by:	Date:	Time:
[signature]	[signature]	1-30-14	15:00
[signature] LATA	LATA	1-30-14	19:00
	LAB LATA	1-30-14	2125

CDPH Write On EDT Transmission? ○ Yes ○ No
State System Number:
If "Y" please enter the Source Number(s) in the column above

CA Geotracker EDF Report? ○ Yes ○ No
Global ID: Sampling Company Log Code:
EDF to (Email Address):

Travel and Site Time:	Mileage:	Misc. Supplies:

Alpha Analytical Laboratories Inc.
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ELAP Certificate Numbers 1551 and 2728

18 February 2014

Todd Groundwater
Attn: Dr. Bill Motzer
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501
RE: Groundwater Reuse Project
Work Order: 14B0089

Enclosed are the results of analyses for samples received by the laboratory on 02/03/14 21:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jeanette Poplin

Jeanette L. Poplin For David S. Pingatore
Project Manager

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com
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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Project: Project Number:	Dr. Bill Motzer Groundwater Reuse Project 60408	Reported: 02/18/14 14:32

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
FO-07 (Deep)	14B0089-01	Water	02/03/14 14:05	02/03/14 21:30
Trip Blank	14B0089-02	Water	02/03/14 14:05	02/03/14 21:30

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Metals (Drinking Water) by EPA 200 Series Methods
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
Mercury	ND	0.060	1.0	ug/l	1	AB40532	02/06/14 10:00	02/07/14 11:31	EPA 245.1	U

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com
Corporate: 208 Mason St., Ukiah, CA 95482 • Phone: (707) 468-0401 • Fax: (707) 468-5267
Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Metals by EPA 200 Series Methods
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
Calcium	**53**	0.010	1.0	mg/l	1	AB40524	02/05/14 10:04	02/10/14 12:46	EPA 200.7	
Magnesium	**6.8**	0.0080	1.0	"	"	"	"	"	"	
Potassium	**3.7**	0.0080	1.0	"	"	"	"	"	"	
Sodium	**86**	0.020	1.0	"	"	"	"	"	"	

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e-mail: clientservices@alpha-labs.com
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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Metals by EPA Method 200.8 ICP/MS
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
Aluminum	**170**	8.0	50	ug/l	4	AB40726	02/07/14 13:19	02/12/14 17:54	EPA 200.8	
Antimony	**0.75**	0.080	6.0	"	"	"	"	"	"	J
Arsenic	**7.6**	0.28	2.0	"	"	"	"	"	"	
Barium	**72**	0.12	100	"	"	"	"	"	"	J
Beryllium	ND	0.080	1.0	"	"	"	"	"	"	U
Boron	**140**	24	50	"	"	"	"	"	"	
Cadmium	ND	0.080	1.0	"	"	"	"	"	"	U
Chromium	**1.7**	0.32	10	"	"	"	"	"	"	J
Copper	**1.6**	0.16	2.0	"	"	"	"	"	"	R-01, J
Iron	**1100**	7.2	200	"	"	"	"	"	"	
Lead	**1.3**	0.080	5.0	"	"	"	"	"	"	J
Manganese	**83**	0.12	20	"	"	"	"	"	"	
Nickel	**2.8**	0.24	10	"	"	"	"	"	"	J
Selenium	**1.8**	0.28	5.0	"	"	"	"	"	"	J
Silver	ND	0.080	0.40	"	"	"	"	"	"	R-01, U
Thallium	ND	0.080	1.0	"	"	"	"	"	"	U
Uranium	**1.6**	0.080	1.0	pCi/l	"	"	"	"	"	
Vanadium	**5.8**	1.2	4.0	ug/l	"	"	"	"	"	
Zinc	**52**	2.0	20	"	"	"	"	"	"	

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Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Conventional Chemistry Parameters by APHA/EPA Methods
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
Bicarbonate	**210**	0.060	5.0	mg/l	1	AB41221	02/12/14 07:35	02/12/14 17:00	SM2320B	
Color	**4.0**	3.0	5.0	Color Units	"	AB40438	02/03/14 18:30	02/03/14 18:30	SM2120B	J
MBAS, calculated as LAS, mw 340	ND	0.030	0.050	mg/l	"	AB40528	02/05/14 11:20	02/12/14 12:02	SM5540C	U
Odor	ND		1.0	T.O.N.	"	AB40438	02/03/14 18:30	02/03/14 18:30	EPA 140.1	U
Perchlorate	**1.9**	0.90	4.0	ug/l	"	AB41141	02/11/14 09:49	02/11/14 14:19	EPA 314.0	J
Specific Conductance (EC)	**660**	1.0	20	umhos/cm	"	AB40448	02/04/14 13:00	02/04/14 17:00	SM2510B	
Total Dissolved Solids	**460**	5.0	10	mg/l	"	AB40515	02/05/14 09:15	02/10/14 13:00	SM2540C	
Turbidity	**10**	0.040	0.10	NTU	"	AB40440	02/03/14 18:30	02/03/14 18:30	SM2130B	
Nitrate + Nitrite as N	**0.13**	0.0086	0.40	mg/l	"	AB41339	02/13/14 10:39	02/13/14 11:18	EPA 300.0	J
Total Organic Carbon	**0.190**	0.100	0.300	"	"	AB40803	02/08/14 12:46	02/08/14 22:51	SM5310C	J

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Miscellaneous Physical/Conventional Chemistry Parameters
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
Cyanide (total)	**0.0023**	0.0020	0.10	mg/l	1	AB40428	02/04/14 09:46	02/05/14 15:27	10-204-00-1X	J

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Anions by EPA Method 300.0
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
Nitrate as NO3	**0.60**	0.20	2.0	mg/l	1	AB40426	02/04/14 09:20	02/04/14 13:51	EPA 300.0	J
Chloride	**100**	0.30	5.0	"	10	"	"	02/04/14 13:36	"	
Fluoride	ND	0.070	0.10	"	1	"	"	02/04/14 13:51	"	U
Nitrite as N	ND	0.020	0.40	"	"	"	"	"	"	U
Sulfate as SO4	**24**	0.090	0.50	"	"	"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
Acetone	ND	0.80	5.0	ug/l	1	AB40725	02/04/14 11:57	02/06/14 16:39	EPA 524.2	U
Acrylonitrile	ND	0.20	5.0	"	"	"	"	"	"	U
Benzene	ND	0.20	0.30	"	"	"	"	"	"	U
Bromobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Bromochloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Bromodichloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
Bromoform	ND	0.50	0.50	"	"	"	"	"	"	U
Bromomethane	ND	0.20	0.50	"	"	"	"	"	"	U
n-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
sec-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
tert-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Carbon disulfide	ND	0.20	0.50	"	"	"	"	"	"	U
Carbon tetrachloride	ND	0.30	0.50	"	"	"	"	"	"	U
Chlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Chloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
Chloroform	ND	0.50	0.50	"	"	"	"	"	"	U
Chloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
2-Chlorotoluene	ND	0.20	0.50	"	"	"	"	"	"	U
4-Chlorotoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Dibromochloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
1,2-Dibromo-3-chloropropane	ND	0.36	0.50	"	"	"	"	"	"	U
1,2-Dibromoethane (EDB)	ND	0.14	0.50	"	"	"	"	"	"	U
Dibromomethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,2-Dichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,4-Dichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
trans-1,4-Dichloro-2-butene	ND	0.095	5.0	"	"	"	"	"	"	U
Dichlorodifluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
1,2-Dichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethene	ND	0.10	0.30	"	"	"	"	"	"	U
cis-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
1,2-Dichloropropane	ND	0.20	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
1,3-Dichloropropane	ND	0.20	0.50	ug/l	1	AB40725	02/04/14 11:57	02/06/14 16:39	EPA 524.2	U
2,2-Dichloropropane	ND	0.10	0.50	"	"	"	"	"	"	U
1,1-Dichloropropene	ND	0.10	0.50	"	"	"	"	"	"	U
cis-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichloropropene (total)	ND	0.20	0.50	"	"	"	"	"	"	U
2-Hexanone	ND	0.097	5.0	"	"	"	"	"	"	U
Ethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Hexachlorobutadiene	ND	0.30	0.50	"	"	"	"	"	"	U
Isopropylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
p-Isopropyltoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Methyl ethyl ketone	ND	0.40	1.0	"	"	"	"	"	"	U
Methyl iodide	ND	0.12	2.0	"	"	"	"	"	"	U
Methyl isobutyl ketone	ND	0.30	1.0	"	"	"	"	"	"	U
Methylene chloride	ND	0.40	0.50	"	"	"	"	"	"	U
Naphthalene	ND	0.20	0.50	"	"	"	"	"	"	U
n-Propylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Styrene	ND	0.10	0.50	"	"	"	"	"	"	U
1,1,1,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Tetrachloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Toluene	ND	0.10	0.50	"	"	"	"	"	"	U
1,2,3-Trichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
1,2,4-Trichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,1-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorofluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorotrifluoroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,2,3-Trichloropropane	ND	0.13	0.50	"	"	"	"	"	"	U
1,2,4-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
1,3,5-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Vinyl chloride	ND	0.10	0.50	"	"	"	"	"	"	U
m,p-Xylene	ND	0.20	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
o-Xylene	ND	0.10	0.50	ug/l	1	AB40725	02/04/14 11:57	02/06/14 16:39	EPA 524.2	U
Xylenes (total)	ND	0.20	0.50	"	"	"	"	"	"	U
Trihalomethanes (total)	ND	0.50	0.50	"	"	"	"	"	"	U
Methyl tert-butyl ether	ND	0.50	0.50	"	"	"	"	"	"	U
Ethyl tert-butyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Tert-amyl methyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Surrogate: Bromofluorobenzene		*97.0 %*	*70-130*			"	"	"	"	
Surrogate: Dibromofluoromethane		*95.8 %*	*70-130*			"	"	"	"	
Surrogate: Toluene-d8		*99.6 %*	*70-130*			"	"	"	"	
Trip Blank (14B0089-02) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
Acetone	ND	0.80	5.0	ug/l	1	AB40725	02/04/14 11:57	02/06/14 17:16	EPA 524.2	U
Acrylonitrile	ND	0.20	5.0	"	"	"	"	"	"	U
Benzene	ND	0.20	0.30	"	"	"	"	"	"	U
Bromobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Bromochloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Bromodichloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
Bromoform	ND	0.50	0.50	"	"	"	"	"	"	U
Bromomethane	ND	0.20	0.50	"	"	"	"	"	"	U
n-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
sec-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
tert-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Carbon disulfide	ND	0.20	0.50	"	"	"	"	"	"	U
Carbon tetrachloride	ND	0.30	0.50	"	"	"	"	"	"	U
Chlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Chloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
Chloroform	ND	0.50	0.50	"	"	"	"	"	"	U
Chloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
2-Chlorotoluene	ND	0.20	0.50	"	"	"	"	"	"	U
4-Chlorotoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Dibromochloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
1,2-Dibromo-3-chloropropane	ND	0.36	0.50	"	"	"	"	"	"	U
1,2-Dibromoethane (EDB)	ND	0.14	0.50	"	"	"	"	"	"	U
Dibromomethane	ND	0.20	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Trip Blank (14B0089-02) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
1,2-Dichlorobenzene	ND	0.20	0.50	ug/l	1	AB40725	02/04/14 11:57	02/06/14 17:16	EPA 524.2	U
1,3-Dichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,4-Dichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
trans-1,4-Dichloro-2-butene	ND	0.095	5.0	"	"	"	"	"	"	U
Dichlorodifluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
1,2-Dichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethene	ND	0.10	0.30	"	"	"	"	"	"	U
cis-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
1,2-Dichloropropane	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichloropropane	ND	0.20	0.50	"	"	"	"	"	"	U
2,2-Dichloropropane	ND	0.10	0.50	"	"	"	"	"	"	U
1,1-Dichloropropene	ND	0.10	0.50	"	"	"	"	"	"	U
cis-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichloropropene (total)	ND	0.20	0.50	"	"	"	"	"	"	U
2-Hexanone	ND	0.097	5.0	"	"	"	"	"	"	U
Ethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Hexachlorobutadiene	ND	0.30	0.50	"	"	"	"	"	"	U
Isopropylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
p-Isopropyltoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Methyl ethyl ketone	ND	0.40	1.0	"	"	"	"	"	"	U
Methyl iodide	ND	0.12	2.0	"	"	"	"	"	"	U
Methyl isobutyl ketone	ND	0.30	1.0	"	"	"	"	"	"	U
Methylene chloride	ND	0.40	0.50	"	"	"	"	"	"	U
Naphthalene	ND	0.20	0.50	"	"	"	"	"	"	U
n-Propylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Styrene	ND	0.10	0.50	"	"	"	"	"	"	U
1,1,1,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Tetrachloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Toluene	ND	0.10	0.50	"	"	"	"	"	"	U
1,2,3-Trichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Trip Blank (14B0089-02) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
1,2,4-Trichlorobenzene	ND	0.20	0.50	ug/l	1	AB40725	02/04/14 11:57	02/06/14 17:16	EPA 524.2	U
1,1,1-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorofluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorotrifluoroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,2,3-Trichloropropane	ND	0.13	0.50	"	"	"	"	"	"	U
1,2,4-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
1,3,5-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Vinyl chloride	ND	0.10	0.50	"	"	"	"	"	"	U
m,p-Xylene	ND	0.20	0.50	"	"	"	"	"	"	U
o-Xylene	ND	0.10	0.50	"	"	"	"	"	"	U
Xylenes (total)	ND	0.20	0.50	"	"	"	"	"	"	U
Trihalomethanes (total)	ND	0.50	0.50	"	"	"	"	"	"	U
Methyl tert-butyl ether	ND	0.50	0.50	"	"	"	"	"	"	U
Ethyl tert-butyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Tert-amyl methyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Surrogate: Bromofluorobenzene		*98.8 %*	*70-130*			"	"	"	"	
Surrogate: Dibromofluoromethane		*96.5 %*	*70-130*			"	"	"	"	
Surrogate: Toluene-d8		*98.8 %*	*70-130*			"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Chlorinated Pesticides and PCBs by EPA Method 508
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
Aldrin	ND	0.010	0.050	ug/l	1	AB40514	02/05/14 08:08	02/12/14 01:17	EPA 508	U
Chloroneb	ND	0.20	0.50	"	"	"	"	"	"	U
Chlorobenzilate	ND	2.0	5.0	"	"	"	"	"	"	U
Chlorothalonil	ND	0.030	0.10	"	"	"	"	"	"	U
DCPA	ND	0.020	0.040	"	"	"	"	"	"	U
4,4´-DDD	ND	0.020	0.050	"	"	"	"	"	"	U
4,4´-DDE	ND	0.020	0.050	"	"	"	"	"	"	U
4,4´-DDT	ND	0.020	0.020	"	"	"	"	"	"	U
Dieldrin	ND	0.010	0.010	"	"	"	"	"	"	U
Endosulfan I	ND	0.020	0.050	"	"	"	"	"	"	U
Endosulfan II	ND	0.020	0.050	"	"	"	"	"	"	U
Endosulfan sulfate	ND	0.020	0.020	"	"	"	"	"	"	U
Endrin	ND	0.030	0.10	"	"	"	"	"	"	U
Endrin aldehyde	ND	0.020	0.050	"	"	"	"	"	"	U
HCH-alpha	ND	0.010	0.050	"	"	"	"	"	"	U
HCH-beta	ND	0.020	0.050	"	"	"	"	"	"	U
HCH-delta	ND	0.030	0.050	"	"	"	"	"	"	U
HCH-gamma (Lindane)	ND	0.010	0.010	"	"	"	"	"	"	U
Heptachlor	ND	0.010	0.010	"	"	"	"	"	"	U
Heptachlor epoxide	ND	0.010	0.010	"	"	"	"	"	"	U
Hexachlorobenzene	ND	0.010	0.040	"	"	"	"	"	"	U
Hexachlorocyclopentadiene	ND	0.040	0.40	"	"	"	"	"	"	U
Methoxychlor	ND	0.020	0.020	"	"	"	"	"	"	U
cis-Permethrin	ND	0.070	0.20	"	"	"	"	"	"	U
trans-Permethrin	ND	0.090	0.20	"	"	"	"	"	"	U
Propachlor	ND	0.070	0.20	"	"	"	"	"	"	U
Trifluralin	ND	0.020	0.040	"	"	"	"	"	"	U
PCB-1016	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1221	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1232	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1242	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1248	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1254	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1260	ND	0.030	0.50	"	"	"	"	"	"	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Chlorinated Pesticides and PCBs by EPA Method 508
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
Total PCBs	ND	0.30	0.50	ug/l	1	AB40514	02/05/14 08:08	02/12/14 01:17	EPA 508	U
Toxaphene	ND	0.40	0.50	"	"	"	"	"	"	U
Chlordane (tech)	ND	0.030	0.050	"	"	"	"	"	"	U
Surrogate: Dibutylchlorendate		*104 %*	*70-130*			"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Nitrogen- and Phosphorus- Pesticides by EPA Method 507
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
Alachlor	ND	0.50	0.50	ug/l	1	AB40730	02/08/14 15:03	02/11/14 13:08	EPA 507	U
Atrazine	ND	0.30	0.50	"	"	"	"	"	"	U
Bromacil	ND	0.50	5.0	"	"	"	"	"	"	U
Butachlor	ND	0.40	0.50	"	"	"	"	"	"	U
Dimethoate	ND	0.20	1.0	"	"	"	"	"	"	U
Metolachlor	ND	0.30	0.50	"	"	"	"	"	"	U
Metribuzin	ND	0.40	0.50	"	"	"	"	"	"	U
Molinate	ND	0.20	0.50	"	"	"	"	"	"	U
Prometryn	ND	0.50	0.50	"	"	"	"	"	"	U
Propachlor	ND	0.30	0.50	"	"	"	"	"	"	U
Simazine	ND	0.30	0.50	"	"	"	"	"	"	U
Thiobencarb	ND	0.20	1.0	"	"	"	"	"	"	U
Surrogate: 1,3-Dimethyl-2-nitrobenzene		*74.3 %*	*70-130*			*"*	*"*	*"*	*"*	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Organic Analytes by EPA Method 504.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
1,2-Dibromo-3-chloropropane	ND	0.0040	0.010	ug/l	1	AB40703	02/07/14 08:14	02/07/14 23:22	EPA 504.1	U
1,2-Dibromoethane (EDB)	ND	0.0050	0.020	"	"	"	"	"	"	U
Trip Blank (14B0089-02) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
1,2-Dibromo-3-chloropropane	ND	0.0040	0.010	ug/l	1	AB40703	02/07/14 08:14	02/07/14 23:57	EPA 504.1	U
1,2-Dibromoethane (EDB)	ND	0.0050	0.020	"	"	"	"	"	"	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Chlorinated Acids by EPA Method 515.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
Acifluorfen	ND	0.50	1.0	ug/l	1	AB41155	02/12/14 14:27	02/15/14 00:23	EPA 515.1	U
Bentazon	ND	0.40	0.40	"	"	"	"	"	"	U
2,4-D	ND	0.80	1.0	"	"	"	"	"	"	U
Dalapon	ND	6.0	6.0	"	"	"	"	"	"	U
2,4-DB	ND	4.0	5.0	"	"	"	"	"	"	U
Dicamba	ND	0.40	0.40	"	"	"	"	"	"	U
Dichlorprop	ND	1.0	1.0	"	"	"	"	"	"	U
Dinoseb	ND	0.80	1.0	"	"	"	"	"	"	U
4-Nitrophenol	ND	0.70	1.0	"	"	"	"	"	"	U
Pentachlorophenol	ND	0.20	0.20	"	"	"	"	"	"	U
Picloram	ND	0.50	1.0	"	"	"	"	"	"	U
2,4,5-T	ND	0.40	0.50	"	"	"	"	"	"	U
2,4,5-TP (Silvex)	ND	0.50	0.50	"	"	"	"	"	"	U
Surrogate: DCAA		*93.2 %*	*70-130*			*"*	*"*	*"*	*"*	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Carbamates by EPA Method 531.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
Aldicarb	ND	0.70	3.0	ug/l	1	AB41142	02/11/14 10:07	02/12/14 14:07	EPA 531.1	U
Aldicarb sulfone	ND	0.70	4.0	"	"	"	"	"	"	U
Aldicarb sulfoxide	ND	0.80	3.0	"	"	"	"	"	"	U
Carbaryl	ND	0.70	5.0	"	"	"	"	"	"	U
Carbofuran	ND	2.0	5.0	"	"	"	"	"	"	U
3-Hydroxycarbofuran	ND	0.90	3.0	"	"	"	"	"	"	U
Methiocarb	ND	2.0	5.0	"	"	"	"	"	"	U
Methomyl	ND	2.0	2.0	"	"	"	"	"	"	U
Oxamyl	ND	0.80	20	"	"	"	"	"	"	U
Propoxur	ND	2.0	5.0	"	"	"	"	"	"	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Endothall by EPA Method 548.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
Endothall	ND	2.0	45	ug/l	1	AB40801	02/10/14 09:16	02/11/14 14:18	EPA 548.1	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Glyphosate by EPA Method 547
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
Glyphosate	ND	3.0	10	ug/l	1	AB40427	02/04/14 09:22	02/05/14 05:30	EPA 547	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Diquat by EPA Method 549.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
Diquat	ND	2.0	2.0	ug/l	1	AB40717	02/07/14 10:11	02/11/14 00:55	EPA 549.2	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Haloacetic Acids by EPA Method 552.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
Monobromoacetic Acid	ND	0.8	1.0	ug/l	1	AB41050	02/11/14 13:22	02/12/14 18:58	EPA 552.2	U
Monochloroacetic Acid	ND	1.1	2.0	"	"	"	"	"	"	U
Dibromoacetic Acid	ND	0.8	1.0	"	"	"	"	"	"	U
Dichloroacetic Acid	ND	1.0	1.0	"	"	"	"	"	"	U
Trichloroacetic Acid	ND	1.0	1.0	"	"	"	"	"	"	U
Total Haloacetic Acids (HAA5)	ND	1.0	1.0	"	"	"	"	"	"	U
Surrogate: 2,3-Dibromopropionic Acid		*106 %*	*70-130*			"	"	"	"	
Surrogate: 2-Bromopropionic Acid		*82.7 %*	*70-130*			"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Semivolatile Organic Compounds by EPA Method 525.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
FO-07 (Deep) (14B0089-01) Water Sampled: 02/03/14 14:05 Received: 02/03/14 21:30										
Benzo (a) pyrene	ND	0.080	0.10	ug/l	1	AB40727	02/08/14 13:35	02/13/14 19:30	EPA 525.2	U
Di(2-ethylhexyl)adipate	ND	0.40	5.0	"	"	"	"	"	"	U
Di(2-ethylhexyl)phthalate	ND	0.20	3.0	"	"	"	"	"	"	U
Surrogate: 1,3-Dimethyl-2-nitrobenzene		*103 %*	*70-130*			"	"	"	"	
Surrogate: Perylene-d12		*61.2 %*	*70-130*			"	"	"	"	*S-05*
Surrogate: Triphenyl phosphate		*106 %*	*70-130*			"	"	"	"	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Metals (Drinking Water) by EPA 200 Series Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40532 - EPA 245.1 Hg Water											
Blank (AB40532-BLK1)					Prepared: 02/06/14 Analyzed: 02/07/14						
Mercury	ND	0.060	1.0	ug/l							U
LCS (AB40532-BS1)					Prepared: 02/06/14 Analyzed: 02/07/14						
Mercury	2.32	0.060	1.0	ug/l	2.50		92.8	80-120			
Duplicate (AB40532-DUP1)		**Source: 14B0232-01**			Prepared: 02/10/14 Analyzed: 02/11/14						
Mercury	ND	0.060	1.0	ug/l		ND				20	U
Matrix Spike (AB40532-MS1)		**Source: 14B0232-01**			Prepared: 02/10/14 Analyzed: 02/11/14						
Mercury	2.54	0.060	1.0	ug/l	2.50	ND	102	60-140			
Matrix Spike (AB40532-MS2)		**Source: 14B0093-01**			Prepared: 02/10/14 Analyzed: 02/11/14						
Mercury	2.52	0.060	1.0	ug/l	2.50	ND	101	60-140			
Matrix Spike Dup (AB40532-MSD1)		**Source: 14B0232-01**			Prepared: 02/10/14 Analyzed: 02/11/14						
Mercury	2.55	0.060	1.0	ug/l	2.50	ND	102	60-140	0.393	20	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Metals by EPA 200 Series Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40524 - Metals Digest											
Blank (AB40524-BLK1)					Prepared: 02/05/14 Analyzed: 02/07/14						
Calcium	ND	0.010	1.0	mg/l							U
Magnesium	ND	0.0080	1.0	"							U
Potassium	0.0126	0.0080	1.0	"							J
Sodium	0.0265	0.020	1.0	"							J
LCS (AB40524-BS1)					Prepared: 02/05/14 Analyzed: 02/07/14						
Calcium	5.56	0.010	1.0	mg/l	5.88		94.5	85-115			
Magnesium	7.59	0.0080	1.0	"	8.00		94.9	85-115			
Potassium	7.84	0.0080	1.0	"	8.00		98.0	85-115			
Sodium	7.76	0.020	1.0	"	8.00		97.0	85-115			
Duplicate (AB40524-DUP1)		**Source: 14B0094-01**			Prepared: 02/05/14 Analyzed: 02/07/14						
Calcium	17.9	0.010	1.0	mg/l		19.2			7.01	20	
Magnesium	8.60	0.0080	1.0	"		7.91			8.38	20	
Potassium	10.5	0.0080	1.0	"		11.1			5.86	20	
Sodium	66.8	0.020	1.0	"		74.1			10.5	20	
Matrix Spike (AB40524-MS1)		**Source: 14B0094-01**			Prepared: 02/05/14 Analyzed: 02/07/14						
Calcium	22.6	0.010	1.0	mg/l	5.88	19.2	58.3	70-130			QM-01
Magnesium	14.5	0.0080	1.0	"	8.00	7.91	82.2	70-130			
Potassium	17.1	0.0080	1.0	"	8.00	11.1	74.7	70-130			
Sodium	73.2	0.020	1.0	"	8.00	74.1	NR	70-130			QM-4X
Matrix Spike (AB40524-MS2)		**Source: 14B0174-01**			Prepared: 02/05/14 Analyzed: 02/07/14						
Calcium	5.85	0.010	1.0	mg/l	5.88	0.483	91.3	70-130			
Magnesium	8.39	0.0080	1.0	"	8.00	1.19	89.9	70-130			
Potassium	8.03	0.0080	1.0	"	8.00	0.312	96.5	70-130			
Sodium	13.9	0.020	1.0	"	8.00	6.35	94.9	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Metals by EPA 200 Series Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40524 - Metals Digest											
Matrix Spike Dup (AB40524-MSD1)		**Source: 14B0094-01**			Prepared: 02/05/14 Analyzed: 02/07/14						
Calcium	22.0	0.010	1.0	mg/l	5.88	19.2	48.1	70-130	2.69	20	QM-01
Magnesium	13.5	0.0080	1.0	"	8.00	7.91	69.6	70-130	7.22	20	
Potassium	16.9	0.0080	1.0	"	8.00	11.1	71.9	70-130	1.29	20	
Sodium	68.2	0.020	1.0	"	8.00	74.1	NR	70-130	6.98	20	QM-4X

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40726 - EPA 200.8											
Blank (AB40726-BLK1)					Prepared: 02/07/14 Analyzed: 02/12/14						
Aluminum	ND	2.0	50	ug/l							U
Antimony	ND	0.020	6.0	"							U
Arsenic	ND	0.070	2.0	"							U
Barium	ND	0.030	100	"							U
Beryllium	ND	0.020	1.0	"							U
Boron	9.55	6.0	50	"							J
Cadmium	ND	0.020	1.0	"							U
Chromium	ND	0.080	10	"							U
Copper	ND	0.040	0.50	"							U
Iron	ND	1.8	50	"							U
Lead	ND	0.020	5.0	"							U
Manganese	ND	0.030	5.0	"							U
Nickel	ND	0.060	10	"							U
Selenium	ND	0.070	5.0	"							U
Silver	ND	0.020	0.10	"							U
Thallium	ND	0.020	1.0	"							U
Uranium	ND	0.020	1.0	pCi/l							U
Vanadium	ND	0.30	1.0	ug/l							U
Zinc	1.22	0.50	5.0	"							J
LCS (AB40726-BS1)					Prepared: 02/07/14 Analyzed: 02/12/14						
Aluminum	495	2.0	50	ug/l	520		95.2	85-115			
Antimony	21.3	0.020	6.0	"	20.0		107	85-115			
Arsenic	20.2	0.070	2.0	"	20.0		101	85-115			
Barium	20.4	0.030	100	"	20.0		102	85-115			J
Beryllium	18.8	0.020	1.0	"	20.0		93.8	85-115			
Boron	103	6.0	50	"	100		103	85-115			
Cadmium	20.5	0.020	1.0	"	20.0		103	85-115			
Chromium	20.6	0.080	10	"	20.0		103	85-115			
Copper	19.9	0.040	0.50	"	20.0		99.5	85-115			
Iron	519	1.8	50	"	520		99.9	85-115			
Lead	19.9	0.020	5.0	"	20.0		99.6	85-115			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40726 - EPA 200.8											
LCS (AB40726-BS1)					Prepared: 02/07/14 Analyzed: 02/12/14						
Manganese	19.6	0.030	5.0	ug/l	20.0		98.0	85-115			
Nickel	20.0	0.060	10	"	20.0		100	85-115			
Selenium	20.2	0.070	5.0	"	20.0		101	85-115			
Silver	19.9	0.020	0.10	"	20.0		99.5	85-115			
Thallium	19.5	0.020	1.0	"	20.0		97.3	85-115			
Uranium	13.3	0.020	1.0	pCi/l	13.4		99.0	85-115			
Vanadium	21.2	0.30	1.0	ug/l	20.0		106	85-115			
Zinc	103	0.50	5.0	"	100		103	85-115			
Duplicate (AB40726-DUP1)		**Source: 14B0232-03**			Prepared: 02/07/14 Analyzed: 02/12/14						
Aluminum	19.5	2.0	50	ug/l		21.2			8.39	20	J
Antimony	0.0245	0.020	6.0	"		ND				20	J
Arsenic	0.177	0.070	2.0	"		0.282			46.0	20	J
Barium	115	0.030	100	"		109			5.21	20	
Beryllium	ND	0.020	1.0	"		ND				20	U
Boron	86.2	6.0	50	"		81.2			5.97	20	
Cadmium	0.0302	0.020	1.0	"		0.0263			13.8	20	J
Chromium	2.92	0.080	10	"		2.77			5.15	20	J
Copper	4.97	0.040	0.50	"		4.85			2.38	20	
Iron	39.0	1.8	50	"		40.4			3.68	20	J
Lead	0.260	0.020	5.0	"		0.237			9.27	20	J
Manganese	0.583	0.030	5.0	"		0.540			7.53	20	J
Nickel	2.33	0.060	10	"		2.42			4.00	20	J
Selenium	0.824	0.070	5.0	"		0.983			17.6	20	J
Silver	0.0411	0.020	0.10	"		ND				20	J
Thallium	ND	0.020	1.0	"		ND				20	U
Uranium	0.735	0.020	1.0	pCi/l		0.685			7.04	20	J
Vanadium	2.43	0.30	1.0	ug/l		2.37			2.73	20	
Zinc	5.83	0.50	5.0	"		5.95			2.04	20	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40726 - EPA 200.8											
Matrix Spike (AB40726-MS1)		**Source: 14B0232-03**			Prepared: 02/07/14 Analyzed: 02/12/14						
Aluminum	484	2.0	50	ug/l	520	21.2	88.9	70-130			
Antimony	20.8	0.020	6.0	"	20.0	ND	104	70-130			
Arsenic	20.1	0.070	2.0	"	20.0	0.282	98.9	70-130			
Barium	131	0.030	100	"	20.0	109	112	70-130			
Beryllium	18.3	0.020	1.0	"	20.0	ND	91.4	70-130			
Boron	160	6.0	50	"	100	81.2	78.8	70-130			
Cadmium	19.3	0.020	1.0	"	20.0	0.0263	96.1	70-130			
Chromium	21.7	0.080	10	"	20.0	2.77	94.6	70-130			
Copper	22.6	0.040	0.50	"	20.0	4.85	88.9	70-130			
Iron	521	1.8	50	"	520	40.4	92.4	70-130			
Lead	18.3	0.020	5.0	"	20.0	0.237	90.2	70-130			
Manganese	18.5	0.030	5.0	"	20.0	0.540	90.0	70-130			
Nickel	20.0	0.060	10	"	20.0	2.42	88.1	70-130			
Selenium	19.9	0.070	5.0	"	20.0	0.983	94.4	70-130			
Silver	18.6	0.020	0.10	"	20.0	ND	93.0	70-130			
Thallium	18.1	0.020	1.0	"	20.0	ND	90.5	70-130			
Uranium	13.3	0.020	1.0	pCi/l	13.4	0.685	94.0	70-130			
Vanadium	21.7	0.30	1.0	ug/l	20.0	2.37	96.9	70-130			
Zinc	96.9	0.50	5.0	"	100	5.95	91.0	70-130			
Matrix Spike (AB40726-MS2)		**Source: 14B0330-01**			Prepared: 02/07/14 Analyzed: 02/12/14						
Aluminum	545	2.0	50	ug/l	520	57.9	93.7	70-130			
Antimony	21.7	0.020	6.0	"	20.0	0.139	108	70-130			
Arsenic	22.6	0.070	2.0	"	20.0	1.84	104	70-130			
Barium	118	0.030	100	"	20.0	93.6	120	70-130			
Beryllium	20.0	0.020	1.0	"	20.0	ND	100	70-130			
Cadmium	20.2	0.020	1.0	"	20.0	ND	101	70-130			
Chromium	19.9	0.080	10	"	20.0	0.205	98.6	70-130			
Copper	19.4	0.040	0.50	"	20.0	0.544	94.3	70-130			
Iron	687	1.8	50	"	520	176	98.3	70-130			
Lead	18.8	0.020	5.0	"	20.0	0.0775	93.6	70-130			
Manganese	36.1	0.030	5.0	"	20.0	16.0	101	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40726 - EPA 200.8											
Matrix Spike (AB40726-MS2)		**Source: 14B0330-01**			Prepared: 02/07/14 Analyzed: 02/12/14						
Nickel	21.3	0.060	10	ug/l	20.0	2.33	94.9	70-130			
Selenium	20.2	0.070	5.0	"	20.0	0.0863	100	70-130			
Silver	19.5	0.020	0.10	"	20.0	ND	97.7	70-130			
Thallium	18.9	0.020	1.0	"	20.0	ND	94.3	70-130			
Uranium	12.9	0.020	1.0	pCi/l	13.4	0.0495	95.7	70-130			
Vanadium	21.4	0.30	1.0	ug/l	20.0	1.10	102	70-130			
Zinc	98.4	0.50	5.0	"	100	1.65	96.7	70-130			
Matrix Spike Dup (AB40726-MSD1)		**Source: 14B0232-03**			Prepared: 02/07/14 Analyzed: 02/12/14						
Aluminum	500	2.0	50	ug/l	520	21.2	92.1	70-130	3.42	20	
Antimony	21.5	0.020	6.0	"	20.0	ND	108	70-130	3.44	20	
Arsenic	20.7	0.070	2.0	"	20.0	0.282	102	70-130	3.08	20	
Barium	134	0.030	100	"	20.0	109	126	70-130	2.17	20	
Beryllium	18.8	0.020	1.0	"	20.0	ND	94.2	70-130	3.07	20	
Boron	162	6.0	50	"	100	81.2	81.2	70-130	1.55	20	
Cadmium	19.9	0.020	1.0	"	20.0	0.0263	99.4	70-130	3.34	20	
Chromium	22.3	0.080	10	"	20.0	2.77	97.6	70-130	2.72	20	
Copper	23.4	0.040	0.50	"	20.0	4.85	92.5	70-130	3.11	20	
Iron	537	1.8	50	"	520	40.4	95.5	70-130	3.02	20	
Lead	18.9	0.020	5.0	"	20.0	0.237	93.2	70-130	3.25	20	
Manganese	19.0	0.030	5.0	"	20.0	0.540	92.3	70-130	2.38	20	
Nickel	20.9	0.060	10	"	20.0	2.42	92.6	70-130	4.33	20	
Selenium	20.3	0.070	5.0	"	20.0	0.983	96.7	70-130	2.31	20	
Silver	19.0	0.020	0.10	"	20.0	ND	95.1	70-130	2.25	20	
Thallium	18.5	0.020	1.0	"	20.0	ND	92.4	70-130	2.01	20	
Uranium	13.7	0.020	1.0	pCi/l	13.4	0.685	97.0	70-130	3.01	20	
Vanadium	22.8	0.30	1.0	ug/l	20.0	2.37	102	70-130	4.69	20	
Zinc	100	0.50	5.0	"	100	5.95	94.2	70-130	3.33	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40440 - General Preparation											
Blank (AB40440-BLK1)					Prepared & Analyzed: 02/03/14						
Turbidity	ND	0.040	0.10	NTU							U
Duplicate (AB40440-DUP1)		**Source: 14B0115-02**			Prepared & Analyzed: 02/03/14						
Turbidity	2.42	0.040	0.10	NTU		2.42			0.00	30	
Batch AB40448 - General Preparation											
Duplicate (AB40448-DUP1)		**Source: 14B0118-01**			Prepared & Analyzed: 02/04/14						
Specific Conductance (EC)	197	1.0	20	umhos/cm		200			1.51	10	
Batch AB40515 - General Preparation											
Blank (AB40515-BLK1)					Prepared: 02/05/14 Analyzed: 02/10/14						
Total Dissolved Solids	ND	5.0	10	mg/l							U
Duplicate (AB40515-DUP1)		**Source: 14B0089-01**			Prepared: 02/05/14 Analyzed: 02/10/14						
Total Dissolved Solids	464	5.0	10	mg/l		464			0.00	30	
Duplicate (AB40515-DUP2)		**Source: 14B0098-03**			Prepared: 02/05/14 Analyzed: 02/10/14						
Total Dissolved Solids	496	5.0	10	mg/l		526			5.87	30	
Batch AB40528 - General Preparation											
Blank (AB40528-BLK1)					Prepared: 02/05/14 Analyzed: 02/12/14						
MBAS, calculated as LAS, mw 340	ND	0.030	0.050	mg/l							U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40528 - General Preparation											
LCS (AB40528-BS1)					Prepared: 02/05/14 Analyzed: 02/12/14						
MBAS, calculated as LAS, mw 340	0.215	0.030	0.050	mg/l	0.200		108	80-120			
Duplicate (AB40528-DUP1)		**Source: 14B0089-01**			Prepared: 02/05/14 Analyzed: 02/12/14						
MBAS, calculated as LAS, mw 340	ND	0.030	0.050	mg/l		ND				20	U
Matrix Spike (AB40528-MS1)		**Source: 14B0089-01**			Prepared: 02/05/14 Analyzed: 02/12/14						
MBAS, calculated as LAS, mw 340	0.212	0.030	0.050	mg/l	0.200	ND	106	80-120			
Matrix Spike Dup (AB40528-MSD1)		**Source: 14B0089-01**			Prepared: 02/05/14 Analyzed: 02/12/14						
MBAS, calculated as LAS, mw 340	0.208	0.030	0.050	mg/l	0.200	ND	104	80-120	1.63	20	
Batch AB40803 - General Prep											
Blank (AB40803-BLK1)					Prepared & Analyzed: 02/08/14						
Total Organic Carbon	ND	0.100	0.300	mg/l							U
LCS (AB40803-BS1)					Prepared & Analyzed: 02/08/14						
Total Organic Carbon	10.6	0.100	0.300	mg/l	10.0		106	85-115			
LCS Dup (AB40803-BSD1)					Prepared & Analyzed: 02/08/14						
Total Organic Carbon	10.5	0.100	0.300	mg/l	10.0		105	85-115	1.20	20	
Duplicate (AB40803-DUP1)		**Source: 14B0427-01**			Prepared & Analyzed: 02/08/14						
Total Organic Carbon	ND	0.100	0.300	mg/l		0.112				20	U
Matrix Spike (AB40803-MS1)		**Source: 14B0427-01**			Prepared & Analyzed: 02/08/14						
Total Organic Carbon	10.7	0.100	0.300	mg/l	10.0	0.112	106	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40803 - General Prep											
Matrix Spike Dup (AB40803-MSD1)		**Source: 14B0427-01**			Prepared & Analyzed: 02/08/14						
Total Organic Carbon	10.4	0.100	0.300	mg/l	10.0	0.112	102	70-130	3.54	20	
Batch AB41141 - General Preparation											
Blank (AB41141-BLK1)					Prepared & Analyzed: 02/11/14						
Perchlorate	0.967	0.90	4.0	ug/l							J
LCS (AB41141-BS1)					Prepared & Analyzed: 02/11/14						
Perchlorate	23.9	0.90	4.0	ug/l	25.0		95.5	85-115			
Duplicate (AB41141-DUP1)		**Source: 14A1643-01**			Prepared & Analyzed: 02/11/14						
Perchlorate	ND	0.90	4.0	ug/l		ND				15	U
Matrix Spike (AB41141-MS1)		**Source: 14A1643-01**			Prepared & Analyzed: 02/11/14						
Perchlorate	25.9	0.90	4.0	ug/l	25.0	ND	104	70-130			
Matrix Spike Dup (AB41141-MSD1)		**Source: 14A1643-01**			Prepared & Analyzed: 02/11/14						
Perchlorate	25.9	0.90	4.0	ug/l	25.0	ND	104	70-130	0.00386	15	
Batch AB41221 - General Preparation											
Duplicate (AB41221-DUP1)		**Source: 14B0313-04**			Prepared & Analyzed: 02/12/14						
Bicarbonate	354	0.060	5.0	mg/l		360			1.71	20	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Miscellaneous Physical/Conventional Chemistry Parameters - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40428 - General Preparation											
Blank (AB40428-BLK1)					Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	ND	0.0020	0.10	mg/l							U
LCS (AB40428-BS1)					Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.202	0.0020	0.10	mg/l	0.200		101	85-115			
Duplicate (AB40428-DUP1)		**Source: 14A1492-02**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	ND	0.0020	0.10	mg/l		ND				25	U
Matrix Spike (AB40428-MS1)		**Source: 14A1492-02**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.188	0.0020	0.10	mg/l	0.200	ND	93.9	85-115			
Matrix Spike (AB40428-MS2)		**Source: 14A1635-01**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.220	0.0020	0.10	mg/l	0.200	ND	110	85-115			
Matrix Spike Dup (AB40428-MSD1)		**Source: 14A1492-02**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.186	0.0020	0.10	mg/l	0.200	ND	92.8	85-115	1.23	25	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Anions by EPA Method 300.0 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40426 - General Preparation											
Blank (AB40426-BLK1)					Prepared & Analyzed: 02/04/14						
Nitrate as NO3	ND	0.20	2.0	mg/l							U
Sulfate as SO4	ND	0.090	0.50	"							U
Chloride	ND	0.030	0.50	"							U
Nitrite as N	ND	0.020	0.40	"							U
Fluoride	ND	0.070	0.10	"							U
LCS (AB40426-BS1)					Prepared & Analyzed: 02/04/14						
Nitrate as NO3	23	0.20	2.0	mg/l	22.2		102	90-110			
Nitrite as N	5.22	0.020	0.40	"	5.00		104	90-110			
Fluoride	5.18	0.070	0.10	"	5.00		104	90-110			
Chloride	10.2	0.030	0.50	"	10.0		102	90-110			
Sulfate as SO4	20.2	0.090	0.50	"	20.0		101	90-110			
Duplicate (AB40426-DUP1)		**Source: 14B0093-01**			Prepared & Analyzed: 02/04/14						
Nitrate as NO3	13	0.20	2.0	mg/l		13			0.107	20	
Nitrite as N	ND	0.020	0.40	"		ND				20	U
Chloride	59.0	0.15	2.5	"		59.0			0.0678	20	
Fluoride	ND	0.070	0.10	"		ND				20	U
Sulfate as SO4	13.8	0.090	0.50	"		13.8			0.0434	20	
Matrix Spike (AB40426-MS1)		**Source: 14B0093-01**			Prepared & Analyzed: 02/04/14						
Nitrate as NO3	37	1.0	10	mg/l	24.7	13	95.4	80-120			
Fluoride	4.92	0.35	0.50	"	5.56	ND	88.6	80-120			
Chloride	70.5	0.15	2.5	"	11.1	59.0	104	80-120			
Sulfate as SO4	34.8	0.45	2.5	"	22.2	13.8	94.4	80-120			
Nitrite as N	5.39	0.10	2.0	"	5.56	ND	97.0	80-120			
Matrix Spike (AB40426-MS2)		**Source: 14B0115-02**			Prepared & Analyzed: 02/04/14						
Nitrate as NO3	24	1.0	10	mg/l	24.7	0.67	96.5	80-120			
Chloride	20.9	0.15	2.5	"	11.1	9.42	103	80-120			
Nitrite as N	5.44	0.10	2.0	"	5.56	ND	98.0	80-120			
Sulfate as SO4	53.5	0.45	2.5	"	22.2	32.9	92.7	80-120			
Fluoride	5.07	0.35	0.50	"	5.56	0.107	89.4	80-120			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Anions by EPA Method 300.0 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40426 - General Preparation											
Matrix Spike Dup (AB40426-MSD1)		**Source: 14B0093-01**		Prepared & Analyzed: 02/04/14							
Nitrate as NO3	37	1.0	10	mg/l	24.7	13	95.6	80-120	0.136	20	
Sulfate as SO4	34.9	0.45	2.5	"	22.2	13.8	94.7	80-120	0.223	20	
Nitrite as N	5.42	0.10	2.0	"	5.56	ND	97.5	80-120	0.514	20	
Fluoride	4.94	0.35	0.50	"	5.56	ND	89.0	80-120	0.450	20	
Chloride	70.5	0.15	2.5	"	11.1	59.0	104	80-120	0.0473	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Blank (AB40725-BLK1)					Prepared & Analyzed: 02/04/14						
Acetone	ND	0.80	5.0	ug/l							U
Acrylonitrile	ND	0.20	5.0	"							U
Benzene	ND	0.20	0.30	"							U
Bromobenzene	ND	0.10	0.50	"							U
Bromochloromethane	ND	0.20	0.50	"							U
Bromodichloromethane	ND	0.50	0.50	"							U
Bromoform	ND	0.50	0.50	"							U
Bromomethane	ND	0.20	0.50	"							U
n-Butylbenzene	ND	0.10	0.50	"							U
sec-Butylbenzene	ND	0.10	0.50	"							U
tert-Butylbenzene	ND	0.10	0.50	"							U
Carbon disulfide	ND	0.20	0.50	"							U
Carbon tetrachloride	ND	0.30	0.50	"							U
Chlorobenzene	ND	0.20	0.50	"							U
Chloroethane	ND	0.10	0.50	"							U
Chloroform	ND	0.50	0.50	"							U
Chloromethane	ND	0.20	0.50	"							U
2-Chlorotoluene	ND	0.20	0.50	"							U
4-Chlorotoluene	ND	0.10	0.50	"							U
Dibromochloromethane	ND	0.50	0.50	"							U
1,2-Dibromo-3-chloropropane	ND	0.36	0.50	"							U
1,2-Dibromoethane (EDB)	ND	0.14	0.50	"							U
Dibromomethane	ND	0.20	0.50	"							U
1,2-Dichlorobenzene	ND	0.20	0.50	"							U
1,3-Dichlorobenzene	ND	0.20	0.50	"							U
1,4-Dichlorobenzene	ND	0.10	0.50	"							U
trans-1,4-Dichloro-2-butene	ND	0.095	5.0	"							U
Dichlorodifluoromethane	ND	0.20	0.50	"							U
1,1-Dichloroethane	ND	0.10	0.50	"							U
1,2-Dichloroethane	ND	0.20	0.50	"							U
1,1-Dichloroethene	ND	0.10	0.30	"							U
cis-1,2-Dichloroethene	ND	0.20	0.50	"							U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Blank (AB40725-BLK1)					Prepared & Analyzed: 02/04/14						
trans-1,2-Dichloroethene	ND	0.20	0.50	ug/l							U
1,2-Dichloropropane	ND	0.20	0.50	"							U
1,3-Dichloropropane	ND	0.20	0.50	"							U
2,2-Dichloropropane	ND	0.10	0.50	"							U
1,1-Dichloropropene	ND	0.10	0.50	"							U
cis-1,3-Dichloropropene	ND	0.20	0.50	"							U
trans-1,3-Dichloropropene	ND	0.20	0.50	"							U
1,3-Dichloropropene (total)	ND	0.20	0.50	"							U
Ethylbenzene	ND	0.10	0.50	"							U
2-Hexanone	ND	0.097	5.0	"							U
Hexachlorobutadiene	ND	0.30	0.50	"							U
Isopropylbenzene	ND	0.20	0.50	"							U
p-Isopropyltoluene	ND	0.10	0.50	"							U
Methyl ethyl ketone	ND	0.40	1.0	"							U
Methyl iodide	ND	0.12	2.0	"							U
Methyl isobutyl ketone	ND	0.30	1.0	"							U
Methylene chloride	ND	0.40	0.50	"							U
Naphthalene	ND	0.20	0.50	"							U
n-Propylbenzene	ND	0.20	0.50	"							U
Styrene	ND	0.10	0.50	"							U
1,1,1,2-Tetrachloroethane	ND	0.20	0.50	"							U
1,1,2,2-Tetrachloroethane	ND	0.20	0.50	"							U
Tetrachloroethene	ND	0.20	0.50	"							U
Toluene	ND	0.10	0.50	"							U
1,2,3-Trichlorobenzene	ND	0.10	0.50	"							U
1,2,4-Trichlorobenzene	ND	0.20	0.50	"							U
1,1,1-Trichloroethane	ND	0.20	0.50	"							U
1,1,2-Trichloroethane	ND	0.20	0.50	"							U
Trichloroethene	ND	0.20	0.50	"							U
Trichlorofluoromethane	ND	0.20	0.50	"							U
Trichlorotrifluoroethane	ND	0.20	0.50	"							U
1,2,3-Trichloropropane	ND	0.13	0.50	"							U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Blank (AB40725-BLK1)					Prepared & Analyzed: 02/04/14						
1,2,4-Trimethylbenzene	ND	0.10	0.50	ug/l							U
1,3,5-Trimethylbenzene	ND	0.10	0.50	"							U
Vinyl chloride	ND	0.10	0.50	"							U
m,p-Xylene	ND	0.20	0.50	"							U
o-Xylene	ND	0.10	0.50	"							U
Xylenes (total)	ND	0.20	0.50	"							U
Trihalomethanes (total)	ND	0.50	0.50	"							U
Methyl tert-butyl ether	ND	0.50	0.50	"							U
Ethyl tert-butyl ether	ND	0.20	0.50	"							U
Tert-amyl methyl ether	ND	0.20	0.50	"							U
Surrogate: Bromofluorobenzene	*25.0*			*"*	*25.0*		*99.8*	*70-130*			
Surrogate: Dibromofluoromethane	*24.0*			*"*	*25.0*		*95.9*	*70-130*			
Surrogate: Toluene-d8	*25.4*			*"*	*25.0*		*102*	*70-130*			
LCS (AB40725-BS1)					Prepared & Analyzed: 02/04/14						
Acetone	24.1	0.80	5.0	ug/l	20.0		120	70-130			
Acrylonitrile	5.73	0.20	5.0	"	5.00		115	70-130			
Benzene	4.88	0.20	0.30	"	5.00		97.6	70-130			
Bromobenzene	5.19	0.10	0.50	"	5.00		104	70-130			
Bromochloromethane	5.11	0.20	0.50	"	5.00		102	70-130			
Bromodichloromethane	4.65	0.50	0.50	"	5.00		93.0	70-130			
Bromoform	4.58	0.50	0.50	"	5.00		91.6	70-130			
Bromomethane	5.43	0.20	0.50	"	5.00		109	70-130			
n-Butylbenzene	5.09	0.10	0.50	"	5.00		102	70-130			
sec-Butylbenzene	5.06	0.10	0.50	"	5.00		101	70-130			
tert-Butylbenzene	5.24	0.10	0.50	"	5.00		105	70-130			
Carbon disulfide	4.99	0.20	0.50	"	5.00		99.8	70-130			
Carbon tetrachloride	4.76	0.30	0.50	"	5.00		95.2	70-130			
Chlorobenzene	5.07	0.20	0.50	"	5.00		101	70-130			
Chloroethane	5.33	0.10	0.50	"	5.00		107	70-130			
Chloroform	4.92	0.50	0.50	"	5.00		98.4	70-130			
Chloromethane	6.12	0.20	0.50	"	5.00		122	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS (AB40725-BS1)					Prepared & Analyzed: 02/04/14						
2-Chlorotoluene	5.26	0.20	0.50	ug/l	5.00		105	70-130			
4-Chlorotoluene	4.99	0.10	0.50	"	5.00		99.8	70-130			
Dibromochloromethane	4.81	0.50	0.50	"	5.00		96.2	70-130			
1,2-Dibromo-3-chloropropane	4.94	0.36	0.50	"	5.00		98.8	70-130			
1,2-Dibromoethane (EDB)	5.23	0.14	0.50	"	5.00		105	70-130			
Dibromomethane	4.94	0.20	0.50	"	5.00		98.8	70-130			
1,2-Dichlorobenzene	4.86	0.20	0.50	"	5.00		97.2	70-130			
1,3-Dichlorobenzene	5.18	0.20	0.50	"	5.00		104	70-130			
1,4-Dichlorobenzene	4.96	0.10	0.50	"	5.00		99.2	70-130			
trans-1,4-Dichloro-2-butene	4.74	0.095	5.0	"	5.00		94.8	70-130			J
Dichlorodifluoromethane	6.14	0.20	0.50	"	5.00		123	70-130			
1,1-Dichloroethane	5.10	0.10	0.50	"	5.00		102	70-130			
1,2-Dichloroethane	4.93	0.20	0.50	"	5.00		98.6	70-130			
1,1-Dichloroethene	4.96	0.10	0.30	"	5.00		99.2	70-130			
cis-1,2-Dichloroethene	5.01	0.20	0.50	"	5.00		100	70-130			
trans-1,2-Dichloroethene	4.99	0.20	0.50	"	5.00		99.8	70-130			
1,2-Dichloropropane	4.83	0.20	0.50	"	5.00		96.6	70-130			
1,3-Dichloropropane	5.09	0.20	0.50	"	5.00		102	70-130			
2,2-Dichloropropane	4.57	0.10	0.50	"	5.00		91.4	70-130			
1,1-Dichloropropene	4.65	0.10	0.50	"	5.00		93.0	70-130			
cis-1,3-Dichloropropene	4.66	0.20	0.50	"	5.00		93.2	70-130			
trans-1,3-Dichloropropene	4.58	0.20	0.50	"	5.00		91.6	70-130			
Ethylbenzene	5.06	0.10	0.50	"	5.00		101	70-130			
2-Hexanone	5.38	0.097	5.0	"	5.00		108	70-130			
Hexachlorobutadiene	4.93	0.30	0.50	"	5.00		98.6	70-130			
Isopropylbenzene	5.33	0.20	0.50	"	5.00		107	70-130			
p-Isopropyltoluene	5.25	0.10	0.50	"	5.00		105	70-130			
Methyl ethyl ketone	10.5	0.40	1.0	"	10.0		105	70-130			
Methyl iodide	5.04	0.12	2.0	"	5.00		101	70-130			
Methyl isobutyl ketone	10.3	0.30	1.0	"	10.0		103	70-130			
Methylene chloride	4.10	0.40	0.50	"	5.00		82.0	70-130			
Naphthalene	5.01	0.20	0.50	"	5.00		100	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS (AB40725-BS1)					Prepared & Analyzed: 02/04/14						
n-Propylbenzene	5.43	0.20	0.50	ug/l	5.00		109	70-130			
Styrene	5.32	0.10	0.50	"	5.00		106	70-130			
1,1,1,2-Tetrachloroethane	4.86	0.20	0.50	"	5.00		97.2	70-130			
1,1,2,2-Tetrachloroethane	5.08	0.20	0.50	"	5.00		102	70-130			
Tetrachloroethene	5.11	0.20	0.50	"	5.00		102	70-130			
Toluene	5.21	0.10	0.50	"	5.00		104	70-130			
1,2,3-Trichlorobenzene	5.08	0.10	0.50	"	5.00		102	70-130			
1,2,4-Trichlorobenzene	5.00	0.20	0.50	"	5.00		100	70-130			
1,1,1-Trichloroethane	4.89	0.20	0.50	"	5.00		97.8	70-130			
1,1,2-Trichloroethane	5.09	0.20	0.50	"	5.00		102	70-130			
Trichloroethene	4.93	0.20	0.50	"	5.00		98.6	70-130			
Trichlorofluoromethane	5.14	0.20	0.50	"	5.00		103	70-130			
Trichlorotrifluoroethane	5.56	0.20	0.50	"	5.00		111	70-130			
1,2,3-Trichloropropane	5.03	0.13	0.50	"	5.00		101	70-130			
1,2,4-Trimethylbenzene	5.36	0.10	0.50	"	5.00		107	70-130			
1,3,5-Trimethylbenzene	5.36	0.10	0.50	"	5.00		107	70-130			
Vinyl chloride	5.40	0.10	0.50	"	5.00		108	70-130			
m,p-Xylene	10.2	0.20	0.50	"	10.0		102	70-130			
o-Xylene	5.24	0.10	0.50	"	5.00		105	70-130			
Xylenes (total)	15.4	0.20	0.50	"	15.0		103	70-130			
Methyl tert-butyl ether	4.89	0.50	0.50	"	5.00		97.8	70-130			
Ethyl tert-butyl ether	4.85	0.20	0.50	"	5.00		97.0	70-130			
Tert-amyl methyl ether	4.93	0.20	0.50	"	5.00		98.6	70-130			
Surrogate: Bromofluorobenzene	*25.6*			*"*	*25.0*		*102*	*70-130*			
Surrogate: Dibromofluoromethane	*24.7*			*"*	*25.0*		*98.7*	*70-130*			
Surrogate: Toluene-d8	*25.3*			*"*	*25.0*		*101*	*70-130*			
LCS Dup (AB40725-BSD1)					Prepared & Analyzed: 02/04/14						
Acetone	22.4	0.80	5.0	ug/l	20.0		112	70-130	7.28	30	
Acrylonitrile	5.77	0.20	5.0	"	5.00		115	70-130	0.696	30	
Benzene	4.70	0.20	0.30	"	5.00		94.0	70-130	3.76	30	
Bromobenzene	5.09	0.10	0.50	"	5.00		102	70-130	1.95	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS Dup (AB40725-BSD1)					Prepared & Analyzed: 02/04/14						
Bromochloromethane	4.92	0.20	0.50	ug/l	5.00		98.4	70-130	3.79	30	
Bromodichloromethane	4.56	0.50	0.50	"	5.00		91.2	70-130	1.95	30	
Bromoform	4.71	0.50	0.50	"	5.00		94.2	70-130	2.80	30	
Bromomethane	5.46	0.20	0.50	"	5.00		109	70-130	0.551	30	
n-Butylbenzene	4.88	0.10	0.50	"	5.00		97.6	70-130	4.21	30	
sec-Butylbenzene	5.00	0.10	0.50	"	5.00		100	70-130	1.19	30	
tert-Butylbenzene	5.15	0.10	0.50	"	5.00		103	70-130	1.73	30	
Carbon disulfide	4.83	0.20	0.50	"	5.00		96.6	70-130	3.26	30	
Carbon tetrachloride	4.64	0.30	0.50	"	5.00		92.8	70-130	2.55	30	
Chlorobenzene	5.01	0.20	0.50	"	5.00		100	70-130	1.19	30	
Chloroethane	5.12	0.10	0.50	"	5.00		102	70-130	4.02	30	
Chloroform	4.84	0.50	0.50	"	5.00		96.8	70-130	1.64	30	
Chloromethane	5.86	0.20	0.50	"	5.00		117	70-130	4.34	30	
2-Chlorotoluene	5.27	0.20	0.50	"	5.00		105	70-130	0.190	30	
4-Chlorotoluene	5.07	0.10	0.50	"	5.00		101	70-130	1.59	30	
Dibromochloromethane	4.72	0.50	0.50	"	5.00		94.4	70-130	1.89	30	
1,2-Dibromo-3-chloropropane	4.95	0.36	0.50	"	5.00		99.0	70-130	0.202	25	
1,2-Dibromoethane (EDB)	5.17	0.14	0.50	"	5.00		103	70-130	1.15	25	
Dibromomethane	5.07	0.20	0.50	"	5.00		101	70-130	2.60	30	
1,2-Dichlorobenzene	4.70	0.20	0.50	"	5.00		94.0	70-130	3.35	30	
1,3-Dichlorobenzene	5.10	0.20	0.50	"	5.00		102	70-130	1.56	30	
1,4-Dichlorobenzene	4.87	0.10	0.50	"	5.00		97.4	70-130	1.83	30	
trans-1,4-Dichloro-2-butene	4.90	0.095	5.0	"	5.00		98.0	70-130	3.32	25	J
Dichlorodifluoromethane	5.94	0.20	0.50	"	5.00		119	70-130	3.31	30	
1,1-Dichloroethane	4.86	0.10	0.50	"	5.00		97.2	70-130	4.82	30	
1,2-Dichloroethane	4.84	0.20	0.50	"	5.00		96.8	70-130	1.84	30	
1,1-Dichloroethene	4.67	0.10	0.30	"	5.00		93.4	70-130	6.02	30	
cis-1,2-Dichloroethene	4.85	0.20	0.50	"	5.00		97.0	70-130	3.25	30	
trans-1,2-Dichloroethene	4.78	0.20	0.50	"	5.00		95.6	70-130	4.30	30	
1,2-Dichloropropane	4.88	0.20	0.50	"	5.00		97.6	70-130	1.03	30	
1,3-Dichloropropane	5.07	0.20	0.50	"	5.00		101	70-130	0.394	30	
2,2-Dichloropropane	4.36	0.10	0.50	"	5.00		87.2	70-130	4.70	30	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS Dup (AB40725-BSD1)					Prepared & Analyzed: 02/04/14						
1,1-Dichloropropene	4.56	0.10	0.50	ug/l	5.00		91.2	70-130	1.95	30	
cis-1,3-Dichloropropene	4.68	0.20	0.50	"	5.00		93.6	70-130	0.428	30	
trans-1,3-Dichloropropene	4.74	0.20	0.50	"	5.00		94.8	70-130	3.43	30	
2-Hexanone	5.44	0.097	5.0	"	5.00		109	70-130	1.11	25	
Ethylbenzene	4.96	0.10	0.50	"	5.00		99.2	70-130	2.00	30	
Hexachlorobutadiene	4.64	0.30	0.50	"	5.00		92.8	70-130	6.06	30	
Isopropylbenzene	5.24	0.20	0.50	"	5.00		105	70-130	1.70	30	
p-Isopropyltoluene	5.08	0.10	0.50	"	5.00		102	70-130	3.29	30	
Methyl ethyl ketone	11.0	0.40	1.0	"	10.0		110	70-130	4.74	30	
Methyl iodide	4.90	0.12	2.0	"	5.00		98.0	70-130	2.82	25	
Methyl isobutyl ketone	10.4	0.30	1.0	"	10.0		104	70-130	0.679	30	
Methylene chloride	4.06	0.40	0.50	"	5.00		81.2	70-130	0.980	30	
Naphthalene	4.96	0.20	0.50	"	5.00		99.2	70-130	1.00	30	
n-Propylbenzene	5.47	0.20	0.50	"	5.00		109	70-130	0.734	30	
Styrene	5.28	0.10	0.50	"	5.00		106	70-130	0.755	30	
1,1,1,2-Tetrachloroethane	4.77	0.20	0.50	"	5.00		95.4	70-130	1.87	30	
1,1,2,2-Tetrachloroethane	5.14	0.20	0.50	"	5.00		103	70-130	1.17	30	
Tetrachloroethene	4.82	0.20	0.50	"	5.00		96.4	70-130	5.84	30	
Toluene	5.15	0.10	0.50	"	5.00		103	70-130	1.16	30	
1,2,3-Trichlorobenzene	4.99	0.10	0.50	"	5.00		99.8	70-130	1.79	30	
1,2,4-Trichlorobenzene	4.83	0.20	0.50	"	5.00		96.6	70-130	3.46	30	
1,1,1-Trichloroethane	4.70	0.20	0.50	"	5.00		94.0	70-130	3.96	30	
1,1,2-Trichloroethane	5.20	0.20	0.50	"	5.00		104	70-130	2.14	30	
Trichloroethene	4.67	0.20	0.50	"	5.00		93.4	70-130	5.42	30	
Trichlorofluoromethane	5.01	0.20	0.50	"	5.00		100	70-130	2.56	30	
Trichlorotrifluoroethane	5.29	0.20	0.50	"	5.00		106	70-130	4.98	30	
1,2,3-Trichloropropane	5.09	0.13	0.50	"	5.00		102	70-130	1.19	25	
1,2,4-Trimethylbenzene	5.28	0.10	0.50	"	5.00		106	70-130	1.50	30	
1,3,5-Trimethylbenzene	5.28	0.10	0.50	"	5.00		106	70-130	1.50	30	
Vinyl chloride	5.27	0.10	0.50	"	5.00		105	70-130	2.44	30	
m,p-Xylene	10.1	0.20	0.50	"	10.0		101	70-130	0.888	30	
o-Xylene	5.11	0.10	0.50	"	5.00		102	70-130	2.51	30	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS Dup (AB40725-BSD1)					Prepared & Analyzed: 02/04/14						
Xylenes (total)	15.2	0.20	0.50	ug/l	15.0		101	70-130	1.44	30	
Methyl tert-butyl ether	4.81	0.50	0.50	"	5.00		96.2	70-130	1.65	30	
Ethyl tert-butyl ether	5.20	0.20	0.50	"	5.00		104	70-130	6.97	30	
Tert-amyl methyl ether	4.85	0.20	0.50	"	5.00		97.0	70-130	1.64	30	
Surrogate: Bromofluorobenzene	*25.4*			*"*	*25.0*		*102*	*70-130*			
Surrogate: Dibromofluoromethane	*24.0*			*"*	*25.0*		*96.1*	*70-130*			
Surrogate: Toluene-d8	*25.2*			*"*	*25.0*		*101*	*70-130*			
Matrix Spike (AB40725-MS1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
Acetone	26.9	0.80	5.0	ug/l	20.0	1.79	126	70-130			
Acrylonitrile	5.81	0.20	5.0	"	5.00	ND	116	70-130			
Benzene	5.43	0.20	0.30	"	5.00	ND	109	70-130			
Bromobenzene	5.48	0.10	0.50	"	5.00	ND	110	70-130			
Bromochloromethane	5.55	0.20	0.50	"	5.00	ND	111	70-130			
Bromodichloromethane	10.0	0.50	0.50	"	5.00	4.42	112	70-130			
Bromoform	4.44	0.50	0.50	"	5.00	ND	88.8	70-130			
Bromomethane	6.20	0.20	0.50	"	5.00	ND	124	70-130			
n-Butylbenzene	5.03	0.10	0.50	"	5.00	ND	101	70-130			
sec-Butylbenzene	5.41	0.10	0.50	"	5.00	ND	108	70-130			
tert-Butylbenzene	5.60	0.10	0.50	"	5.00	ND	112	70-130			
Carbon disulfide	5.36	0.20	0.50	"	5.00	ND	107	70-130			
Carbon tetrachloride	4.97	0.30	0.50	"	5.00	ND	99.4	70-130			
Chlorobenzene	5.35	0.20	0.50	"	5.00	ND	107	70-130			
Chloroethane	6.00	0.10	0.50	"	5.00	ND	120	70-130			
Chloroform	35.3	0.50	0.50	"	5.00	31.5	76.2	70-130			
Chloromethane	6.60	0.20	0.50	"	5.00	ND	132	70-130			QM-05
2-Chlorotoluene	5.65	0.20	0.50	"	5.00	ND	113	70-130			
4-Chlorotoluene	5.61	0.10	0.50	"	5.00	ND	112	70-130			
Dibromochloromethane	4.80	0.50	0.50	"	5.00	ND	96.0	70-130			
1,2-Dibromo-3-chloropropane	4.62	0.36	0.50	"	5.00	ND	92.4	70-130			
1,2-Dibromoethane (EDB)	5.29	0.14	0.50	"	5.00	ND	106	70-130			
Dibromomethane	5.47	0.20	0.50	"	5.00	ND	109	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike (AB40725-MS1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
1,2-Dichlorobenzene	4.95	0.20	0.50	ug/l	5.00	ND	99.0	70-130			
1,3-Dichlorobenzene	5.47	0.20	0.50	"	5.00	ND	109	70-130			
1,4-Dichlorobenzene	5.16	0.10	0.50	"	5.00	ND	103	70-130			
trans-1,4-Dichloro-2-butene	5.53	0.095	5.0	"	5.00	ND	111	70-130			
Dichlorodifluoromethane	6.69	0.20	0.50	"	5.00	ND	134	70-130			QM-05
1,1-Dichloroethane	5.61	0.10	0.50	"	5.00	ND	112	70-130			
1,2-Dichloroethane	5.51	0.20	0.50	"	5.00	ND	110	70-130			
1,1-Dichloroethene	5.37	0.10	0.30	"	5.00	ND	107	70-130			
cis-1,2-Dichloroethene	5.51	0.20	0.50	"	5.00	ND	110	70-130			
trans-1,2-Dichloroethene	5.31	0.20	0.50	"	5.00	ND	106	70-130			
1,2-Dichloropropane	5.29	0.20	0.50	"	5.00	ND	106	70-130			
1,3-Dichloropropane	5.45	0.20	0.50	"	5.00	ND	109	70-130			
2,2-Dichloropropane	4.58	0.10	0.50	"	5.00	ND	91.6	70-130			
1,1-Dichloropropene	5.13	0.10	0.50	"	5.00	ND	103	70-130			
cis-1,3-Dichloropropene	4.84	0.20	0.50	"	5.00	ND	96.8	70-130			
trans-1,3-Dichloropropene	4.50	0.20	0.50	"	5.00	ND	90.0	70-130			
2-Hexanone	5.62	0.097	5.0	"	5.00	ND	112	70-130			
Ethylbenzene	5.30	0.10	0.50	"	5.00	ND	106	70-130			
Hexachlorobutadiene	4.84	0.30	0.50	"	5.00	ND	96.8	70-130			
Isopropylbenzene	5.74	0.20	0.50	"	5.00	ND	115	70-130			
p-Isopropyltoluene	5.59	0.10	0.50	"	5.00	ND	112	70-130			
Methyl ethyl ketone	12.3	0.40	1.0	"	10.0	ND	123	70-130			
Methyl iodide	5.66	0.12	2.0	"	5.00	ND	113	70-130			
Methyl isobutyl ketone	10.7	0.30	1.0	"	10.0	ND	107	70-130			
Methylene chloride	4.34	0.40	0.50	"	5.00	ND	86.8	70-130			
Naphthalene	5.02	0.20	0.50	"	5.00	ND	100	70-130			
n-Propylbenzene	5.74	0.20	0.50	"	5.00	ND	115	70-130			
Styrene	5.53	0.10	0.50	"	5.00	ND	111	70-130			
1,1,1,2-Tetrachloroethane	4.62	0.20	0.50	"	5.00	ND	92.4	70-130			
1,1,2,2-Tetrachloroethane	5.37	0.20	0.50	"	5.00	ND	107	70-130			
Tetrachloroethene	5.41	0.20	0.50	"	5.00	ND	108	70-130			
Toluene	5.51	0.10	0.50	"	5.00	ND	110	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike (AB40725-MS1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
1,2,3-Trichlorobenzene	5.07	0.10	0.50	ug/l	5.00	ND	101	70-130			
1,2,4-Trichlorobenzene	4.77	0.20	0.50	"	5.00	ND	95.4	70-130			
1,1,1-Trichloroethane	5.12	0.20	0.50	"	5.00	ND	102	70-130			
1,1,2-Trichloroethane	5.46	0.20	0.50	"	5.00	ND	109	70-130			
Trichloroethene	5.13	0.20	0.50	"	5.00	ND	103	70-130			
Trichlorofluoromethane	5.52	0.20	0.50	"	5.00	ND	110	70-130			
Trichlorotrifluoroethane	6.04	0.20	0.50	"	5.00	ND	121	70-130			
1,2,3-Trichloropropane	5.35	0.13	0.50	"	5.00	ND	107	70-130			
1,2,4-Trimethylbenzene	5.57	0.10	0.50	"	5.00	ND	111	70-130			
1,3,5-Trimethylbenzene	5.57	0.10	0.50	"	5.00	ND	111	70-130			
Vinyl chloride	6.10	0.10	0.50	"	5.00	ND	122	70-130			
m,p-Xylene	11.0	0.20	0.50	"	10.0	ND	110	70-130			
o-Xylene	5.54	0.10	0.50	"	5.00	ND	111	70-130			
Xylenes (total)	16.6	0.20	0.50	"	15.0	ND	110	70-130			
Methyl tert-butyl ether	4.80	0.50	0.50	"	5.00	ND	96.0	70-130			
Ethyl tert-butyl ether	5.52	0.20	0.50	"	5.00	ND	110	70-130			
Tert-amyl methyl ether	4.93	0.20	0.50	"	5.00	ND	98.6	70-130			
Surrogate: Bromofluorobenzene	*25.3*			*"*	*25.0*		*101*	*70-130*			
Surrogate: Dibromofluoromethane	*24.5*			*"*	*25.0*		*98.1*	*70-130*			
Surrogate: Toluene-d8	*25.0*			*"*	*25.0*		*99.9*	*70-130*			
Matrix Spike Dup (AB40725-MSD1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
Acetone	26.1	0.80	5.0	ug/l	20.0	1.79	122	70-130	2.87	30	
Acrylonitrile	5.35	0.20	5.0	"	5.00	ND	107	70-130	8.24	30	
Benzene	4.92	0.20	0.30	"	5.00	ND	98.4	70-130	9.86	30	
Bromobenzene	5.04	0.10	0.50	"	5.00	ND	101	70-130	8.37	30	
Bromochloromethane	5.02	0.20	0.50	"	5.00	ND	100	70-130	10.0	30	
Bromodichloromethane	9.77	0.50	0.50	"	5.00	4.42	107	70-130	2.43	30	
Bromoform	4.34	0.50	0.50	"	5.00	ND	86.8	70-130	2.28	30	
Bromomethane	5.65	0.20	0.50	"	5.00	ND	113	70-130	9.28	30	
n-Butylbenzene	4.55	0.10	0.50	"	5.00	ND	91.0	70-130	10.0	30	
sec-Butylbenzene	5.00	0.10	0.50	"	5.00	ND	100	70-130	7.88	30	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike Dup (AB40725-MSD1)		**Source: 14B0115-02**		Prepared: 02/04/14 Analyzed: 02/06/14							
tert-Butylbenzene	5.08	0.10	0.50	ug/l	5.00	ND	102	70-130	9.74	30	
Carbon disulfide	4.92	0.20	0.50	"	5.00	ND	98.4	70-130	8.56	30	
Carbon tetrachloride	4.66	0.30	0.50	"	5.00	ND	93.2	70-130	6.44	30	
Chlorobenzene	5.02	0.20	0.50	"	5.00	ND	100	70-130	6.36	30	
Chloroethane	5.44	0.10	0.50	"	5.00	ND	109	70-130	9.79	30	
Chloroform	35.4	0.50	0.50	"	5.00	31.5	77.4	70-130	0.170	30	
Chloromethane	6.07	0.20	0.50	"	5.00	ND	121	70-130	8.37	30	
2-Chlorotoluene	5.19	0.20	0.50	"	5.00	ND	104	70-130	8.49	30	
4-Chlorotoluene	4.85	0.10	0.50	"	5.00	ND	97.0	70-130	14.5	30	
Dibromochloromethane	4.76	0.50	0.50	"	5.00	ND	95.2	70-130	0.837	30	
1,2-Dibromo-3-chloropropane	4.49	0.36	0.50	"	5.00	ND	89.8	70-130	2.85	25	
1,2-Dibromoethane (EDB)	4.82	0.14	0.50	"	5.00	ND	96.4	70-130	9.30	25	
Dibromomethane	5.04	0.20	0.50	"	5.00	ND	101	70-130	8.18	30	
1,2-Dichlorobenzene	4.59	0.20	0.50	"	5.00	ND	91.8	70-130	7.55	30	
1,3-Dichlorobenzene	5.02	0.20	0.50	"	5.00	ND	100	70-130	8.58	30	
trans-1,4-Dichloro-2-butene	5.09	0.095	5.0	"	5.00	ND	102	70-130	8.29	25	
1,4-Dichlorobenzene	4.76	0.10	0.50	"	5.00	ND	95.2	70-130	8.06	30	
Dichlorodifluoromethane	6.09	0.20	0.50	"	5.00	ND	122	70-130	9.39	30	
1,1-Dichloroethane	5.17	0.10	0.50	"	5.00	ND	103	70-130	8.16	30	
1,2-Dichloroethane	5.08	0.20	0.50	"	5.00	ND	102	70-130	8.12	30	
1,1-Dichloroethene	4.99	0.10	0.30	"	5.00	ND	99.8	70-130	7.34	30	
cis-1,2-Dichloroethene	5.09	0.20	0.50	"	5.00	ND	102	70-130	7.92	30	
trans-1,2-Dichloroethene	4.93	0.20	0.50	"	5.00	ND	98.6	70-130	7.42	30	
1,2-Dichloropropane	4.86	0.20	0.50	"	5.00	ND	97.2	70-130	8.47	30	
1,3-Dichloropropane	5.15	0.20	0.50	"	5.00	ND	103	70-130	5.66	30	
2,2-Dichloropropane	4.28	0.10	0.50	"	5.00	ND	85.6	70-130	6.77	30	
1,1-Dichloropropene	4.75	0.10	0.50	"	5.00	ND	95.0	70-130	7.69	30	
cis-1,3-Dichloropropene	4.62	0.20	0.50	"	5.00	ND	92.4	70-130	4.65	30	
trans-1,3-Dichloropropene	4.22	0.20	0.50	"	5.00	ND	84.4	70-130	6.42	30	
2-Hexanone	5.28	0.097	5.0	"	5.00	ND	106	70-130	6.24	25	
Ethylbenzene	4.83	0.10	0.50	"	5.00	ND	96.6	70-130	9.28	30	
Hexachlorobutadiene	4.48	0.30	0.50	"	5.00	ND	89.6	70-130	7.73	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike Dup (AB40725-MSD1)		**Source: 14B0115-02**		Prepared: 02/04/14 Analyzed: 02/06/14							
Isopropylbenzene	5.21	0.20	0.50	ug/l	5.00	ND	104	70-130	9.68	30	
p-Isopropyltoluene	4.91	0.10	0.50	"	5.00	ND	98.2	70-130	13.0	30	
Methyl ethyl ketone	11.8	0.40	1.0	"	10.0	ND	118	70-130	3.89	30	
Methyl iodide	5.13	0.12	2.0	"	5.00	ND	103	70-130	9.82	25	
Methyl isobutyl ketone	9.80	0.30	1.0	"	10.0	ND	98.0	70-130	8.69	30	
Methylene chloride	3.66	0.40	0.50	"	5.00	ND	73.2	70-130	17.0	30	
Naphthalene	4.66	0.20	0.50	"	5.00	ND	93.2	70-130	7.44	30	
n-Propylbenzene	5.17	0.20	0.50	"	5.00	ND	103	70-130	10.4	30	
Styrene	5.04	0.10	0.50	"	5.00	ND	101	70-130	9.27	30	
1,1,1,2-Tetrachloroethane	4.34	0.20	0.50	"	5.00	ND	86.8	70-130	6.25	30	
1,1,2,2-Tetrachloroethane	4.95	0.20	0.50	"	5.00	ND	99.0	70-130	8.14	30	
Tetrachloroethene	4.90	0.20	0.50	"	5.00	ND	98.0	70-130	9.89	30	
Toluene	5.03	0.10	0.50	"	5.00	ND	101	70-130	9.11	30	
1,2,3-Trichlorobenzene	4.89	0.10	0.50	"	5.00	ND	97.8	70-130	3.61	30	
1,2,4-Trichlorobenzene	4.38	0.20	0.50	"	5.00	ND	87.6	70-130	8.52	30	
1,1,1-Trichloroethane	4.75	0.20	0.50	"	5.00	ND	95.0	70-130	7.50	30	
1,1,2-Trichloroethane	5.07	0.20	0.50	"	5.00	ND	101	70-130	7.41	30	
Trichloroethene	4.86	0.20	0.50	"	5.00	ND	97.2	70-130	5.41	30	
Trichlorofluoromethane	4.90	0.20	0.50	"	5.00	ND	98.0	70-130	11.9	30	
Trichlorotrifluoroethane	5.57	0.20	0.50	"	5.00	ND	111	70-130	8.10	30	
1,2,3-Trichloropropane	4.93	0.13	0.50	"	5.00	ND	98.6	70-130	8.17	25	
1,2,4-Trimethylbenzene	5.11	0.10	0.50	"	5.00	ND	102	70-130	8.61	30	
1,3,5-Trimethylbenzene	5.11	0.10	0.50	"	5.00	ND	102	70-130	8.61	30	
Vinyl chloride	5.41	0.10	0.50	"	5.00	ND	108	70-130	12.0	30	
m,p-Xylene	9.99	0.20	0.50	"	10.0	ND	99.9	70-130	9.71	30	
o-Xylene	5.07	0.10	0.50	"	5.00	ND	101	70-130	8.86	30	
Xylenes (total)	15.1	0.20	0.50	"	15.0	ND	100	70-130	9.43	30	
Methyl tert-butyl ether	4.31	0.50	0.50	"	5.00	ND	86.2	70-130	10.8	30	
Ethyl tert-butyl ether	5.09	0.20	0.50	"	5.00	ND	102	70-130	8.11	30	
Tert-amyl methyl ether	4.48	0.20	0.50	"	5.00	ND	89.6	70-130	9.56	30	
Surrogate: Bromofluorobenzene	*25.4*			*"*	*25.0*		*101*	*70-130*			
Surrogate: Dibromofluoromethane	*24.2*			*"*	*25.0*		*97.0*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike Dup (AB40725-MSD1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
Surrogate: Toluene-d8	*24.8*			*ug/l*	*25.0*		*99.0*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
Blank (AB40514-BLK1)					Prepared: 02/05/14 Analyzed: 02/11/14						
Aldrin	ND	0.010	0.050	ug/l							U
Chloroneb	ND	0.20	0.50	"							U
Chlorobenzilate	ND	2.0	5.0	"							U
Chlorothalonil	ND	0.030	0.10	"							U
DCPA	ND	0.020	0.040	"							U
4,4´-DDD	ND	0.020	0.050	"							U
4,4´-DDE	ND	0.020	0.050	"							U
4,4´-DDT	ND	0.020	0.020	"							U
Dieldrin	ND	0.010	0.010	"							U
Endosulfan I	ND	0.020	0.050	"							U
Endosulfan II	ND	0.020	0.050	"							U
Endosulfan sulfate	ND	0.020	0.020	"							U
Endrin	ND	0.030	0.10	"							U
Endrin aldehyde	ND	0.020	0.050	"							U
HCH-alpha	ND	0.010	0.050	"							U
HCH-beta	ND	0.020	0.050	"							U
HCH-delta	ND	0.030	0.050	"							U
HCH-gamma (Lindane)	ND	0.010	0.010	"							U
Heptachlor	ND	0.010	0.010	"							U
Heptachlor epoxide	ND	0.010	0.010	"							U
Hexachlorobenzene	ND	0.010	0.040	"							U
Hexachlorocyclopentadiene	ND	0.040	0.40	"							U
Methoxychlor	ND	0.020	0.020	"							U
cis-Permethrin	ND	0.070	0.20	"							U
trans-Permethrin	ND	0.090	0.20	"							U
Propachlor	ND	0.070	0.20	"							U
Trifluralin	ND	0.020	0.040	"							U
PCB-1016	ND	0.030	0.50	"							U
PCB-1221	ND	0.030	0.50	"							U
PCB-1232	ND	0.030	0.50	"							U
PCB-1242	ND	0.030	0.50	"							U
PCB-1248	ND	0.030	0.50	"							U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
Blank (AB40514-BLK1)					Prepared: 02/05/14 Analyzed: 02/11/14						
PCB-1254	ND	0.030	0.50	ug/l							U
PCB-1260	ND	0.030	0.50	"							U
Total PCBs	ND	0.30	0.50	"							U
Toxaphene	ND	0.40	0.50	"							U
Chlordane (tech)	ND	0.030	0.050	"							U
Surrogate: Dibutylchlorendate	*1.05*			*"*	*0.952*		*110*	*70-130*			
LCS (AB40514-BS1)					Prepared: 02/05/14 Analyzed: 02/11/14						
Aldrin	0.263	0.010	0.050	ug/l	0.280		94.1	70-130			
Chloroneb	2.73	0.20	0.50	"	2.80		97.5	70-130			
Chlorobenzilate	3.29	2.0	5.0	"	2.80		117	70-130			J
Chlorothalonil	0.313	0.030	0.10	"	0.280		112	70-130			
DCPA	0.289	0.020	0.040	"	0.280		103	70-130			
4,4´-DDD	0.203	0.020	0.050	"	0.280		72.3	70-130			
4,4´-DDE	0.279	0.020	0.050	"	0.280		99.6	70-130			
4,4´-DDT	0.290	0.020	0.020	"	0.280		104	70-130			
Dieldrin	0.283	0.010	0.010	"	0.280		101	70-130			
Endosulfan I	0.285	0.020	0.050	"	0.280		102	70-130			
Endosulfan II	0.277	0.020	0.050	"	0.280		98.9	70-130			
Endosulfan sulfate	0.306	0.020	0.020	"	0.280		109	70-130			
Endrin	0.319	0.030	0.10	"	0.280		114	70-130			
Endrin aldehyde	0.267	0.020	0.050	"	0.280		95.3	70-130			
HCH-alpha	0.269	0.010	0.050	"	0.280		96.1	70-130			
HCH-beta	0.279	0.020	0.050	"	0.280		99.7	70-130			
HCH-delta	0.286	0.030	0.050	"	0.280		102	70-130			
HCH-gamma (Lindane)	0.273	0.010	0.010	"	0.280		97.7	70-130			
Heptachlor	0.273	0.010	0.010	"	0.280		97.6	70-130			
Heptachlor epoxide	0.279	0.010	0.010	"	0.280		99.5	70-130			
Hexachlorocyclopentadiene	0.409	0.040	0.40	"	0.560		73.1	15-90			
Hexachlorobenzene	0.237	0.010	0.040	"	0.280		84.7	70-130			
Methoxychlor	0.301	0.020	0.020	"	0.280		107	70-130			
cis-Permethrin	1.59	0.070	0.20	"	1.40		114	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
LCS (AB40514-BS1)					Prepared: 02/05/14 Analyzed: 02/11/14						
trans-Permethrin	1.60	0.090	0.20	ug/l	1.40		114	70-130			
Propachlor	0.306	0.070	0.20	"	0.280		109	70-130			
Trifluralin	0.416	0.020	0.040	"	0.420		99.0	70-130			
Surrogate: Dibutylchlorendate	*1.05*			*"*	*0.952*		*110*	*70-130*			
LCS Dup (AB40514-BSD1)					Prepared: 02/05/14 Analyzed: 02/11/14						
Aldrin	0.276	0.010	0.050	ug/l	0.280		98.7	70-130	4.77	25	
Chloroneb	2.84	0.20	0.50	"	2.80		101	70-130	3.76	25	
Chlorobenzilate	3.51	2.0	5.0	"	2.80		125	70-130	6.58	25	J
Chlorothalonil	0.334	0.030	0.10	"	0.280		119	70-130	6.41	25	
DCPA	0.304	0.020	0.040	"	0.280		109	70-130	5.05	25	
4,4´-DDD	0.208	0.020	0.050	"	0.280		74.3	70-130	2.71	25	
4,4´-DDE	0.299	0.020	0.050	"	0.280		107	70-130	7.17	25	
4,4´-DDT	0.307	0.020	0.020	"	0.280		109	70-130	5.49	25	
Dieldrin	0.301	0.010	0.010	"	0.280		108	70-130	6.30	25	
Endosulfan I	0.300	0.020	0.050	"	0.280		107	70-130	5.34	25	
Endosulfan II	0.287	0.020	0.050	"	0.280		103	70-130	3.69	25	
Endosulfan sulfate	0.324	0.020	0.020	"	0.280		116	70-130	5.53	25	
Endrin	0.336	0.030	0.10	"	0.280		120	70-130	5.28	25	
Endrin aldehyde	0.309	0.020	0.050	"	0.280		110	70-130	14.8	25	
HCH-alpha	0.280	0.010	0.050	"	0.280		99.9	70-130	3.84	25	
HCH-beta	0.294	0.020	0.050	"	0.280		105	70-130	5.16	25	
HCH-delta	0.303	0.030	0.050	"	0.280		108	70-130	5.61	25	
HCH-gamma (Lindane)	0.286	0.010	0.010	"	0.280		102	70-130	4.33	25	
Heptachlor	0.282	0.010	0.010	"	0.280		101	70-130	3.11	25	
Heptachlor epoxide	0.289	0.010	0.010	"	0.280		103	70-130	3.81	25	
Hexachlorocyclopentadiene	0.434	0.040	0.40	"	0.560		77.6	15-90	5.97	50	
Hexachlorobenzene	0.243	0.010	0.040	"	0.280		86.8	70-130	2.40	25	
Methoxychlor	0.326	0.020	0.020	"	0.280		116	70-130	8.17	25	
cis-Permethrin	1.62	0.070	0.20	"	1.40		116	70-130	1.95	25	
trans-Permethrin	1.67	0.090	0.20	"	1.40		119	70-130	4.72	25	
Propachlor	0.334	0.070	0.20	"	0.280		119	70-130	8.68	25	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
LCS Dup (AB40514-BSD1)					Prepared: 02/05/14 Analyzed: 02/11/14						
Trifluralin	0.437	0.020	0.040	ug/l	0.420		104	70-130	5.02	25	
Surrogate: Dibutylchlorendate	*1.07*			*"*	*0.952*		*112*	*70-130*			
Matrix Spike (AB40514-MS1)		**Source: 14A1713-01**			Prepared: 02/05/14 Analyzed: 02/12/14						
Aldrin	0.269	0.010	0.050	ug/l	0.280	ND	96.0	70-130			
Chloroneb	2.86	0.20	0.50	"	2.80	ND	102	70-130			
Chlorobenzilate	3.57	2.0	5.0	"	2.80	ND	127	70-130			J
Chlorothalonil	0.329	0.030	0.10	"	0.280	ND	117	70-130			
DCPA	0.303	0.020	0.040	"	0.280	ND	108	70-130			
4,4´-DDD	0.212	0.020	0.050	"	0.280	ND	75.7	70-130			
4,4´-DDE	0.288	0.020	0.050	"	0.280	ND	103	70-130			
4,4´-DDT	0.300	0.020	0.020	"	0.280	ND	107	70-130			
Dieldrin	0.295	0.010	0.010	"	0.280	ND	105	70-130			
Endosulfan I	0.298	0.020	0.050	"	0.280	ND	106	70-130			
Endosulfan II	0.298	0.020	0.050	"	0.280	ND	106	70-130			
Endosulfan sulfate	0.318	0.020	0.020	"	0.280	ND	113	70-130			
Endrin	0.354	0.030	0.10	"	0.280	ND	126	70-130			
Endrin aldehyde	0.299	0.020	0.050	"	0.280	ND	107	70-130			
HCH-alpha	0.285	0.010	0.050	"	0.280	ND	102	70-130			
HCH-beta	0.290	0.020	0.050	"	0.280	ND	104	70-130			
HCH-delta	0.300	0.030	0.050	"	0.280	ND	107	70-130			
HCH-gamma (Lindane)	0.291	0.010	0.010	"	0.280	ND	104	70-130			
Heptachlor	0.280	0.010	0.010	"	0.280	ND	100	70-130			
Heptachlor epoxide	0.286	0.010	0.010	"	0.280	ND	102	70-130			
Hexachlorobenzene	0.255	0.010	0.040	"	0.280	ND	91.0	70-130			
Hexachlorocyclopentadiene	0.486	0.040	0.40	"	0.560	ND	86.7	15-90			
Methoxychlor	0.323	0.020	0.020	"	0.280	ND	116	70-130			
cis-Permethrin	1.78	0.070	0.20	"	1.40	ND	127	70-130			
trans-Permethrin	1.78	0.090	0.20	"	1.40	ND	127	70-130			
Propachlor	0.336	0.070	0.20	"	0.280	ND	120	70-130			
Trifluralin	0.436	0.020	0.040	"	0.420	ND	104	70-130			
Surrogate: Dibutylchlorendate	*1.09*			*"*	*0.952*		*115*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
Matrix Spike Dup (AB40514-MSD1)		**Source: 14A1713-01**		Prepared: 02/05/14 Analyzed: 02/12/14							
Aldrin	0.260	0.010	0.050	ug/l	0.280	ND	92.8	70-130	3.40	25	
Chloroneb	2.76	0.20	0.50	"	2.80	ND	98.6	70-130	3.61	25	
Chlorobenzilate	3.40	2.0	5.0	"	2.80	ND	121	70-130	4.87	25	J
Chlorothalonil	0.313	0.030	0.10	"	0.280	ND	112	70-130	4.86	25	
DCPA	0.290	0.020	0.040	"	0.280	ND	103	70-130	4.52	25	
4,4´-DDD	0.210	0.020	0.050	"	0.280	ND	74.9	70-130	1.06	25	
4,4´-DDE	0.275	0.020	0.050	"	0.280	ND	98.1	70-130	4.80	25	
4,4´-DDT	0.289	0.020	0.020	"	0.280	ND	103	70-130	3.94	25	
Dieldrin	0.283	0.010	0.010	"	0.280	ND	101	70-130	4.34	25	
Endosulfan I	0.285	0.020	0.050	"	0.280	ND	102	70-130	4.19	25	
Endosulfan II	0.288	0.020	0.050	"	0.280	ND	103	70-130	3.14	25	
Endosulfan sulfate	0.302	0.020	0.020	"	0.280	ND	108	70-130	5.03	25	
Endrin	0.320	0.030	0.10	"	0.280	ND	114	70-130	10.1	25	
Endrin aldehyde	0.275	0.020	0.050	"	0.280	ND	98.2	70-130	8.56	25	
HCH-alpha	0.271	0.010	0.050	"	0.280	ND	96.8	70-130	4.94	25	
HCH-beta	0.282	0.020	0.050	"	0.280	ND	101	70-130	2.62	25	
HCH-delta	0.290	0.030	0.050	"	0.280	ND	104	70-130	3.17	25	
HCH-gamma (Lindane)	0.279	0.010	0.010	"	0.280	ND	99.5	70-130	4.43	25	
Heptachlor	0.267	0.010	0.010	"	0.280	ND	95.4	70-130	4.78	25	
Heptachlor epoxide	0.277	0.010	0.010	"	0.280	ND	99.0	70-130	3.09	25	
Hexachlorocyclopentadiene	0.433	0.040	0.40	"	0.560	ND	77.3	15-90	11.5	50	
Hexachlorobenzene	0.238	0.010	0.040	"	0.280	ND	85.1	70-130	6.62	25	
Methoxychlor	0.309	0.020	0.020	"	0.280	ND	110	70-130	4.66	25	
cis-Permethrin	1.72	0.070	0.20	"	1.40	ND	123	70-130	3.19	25	
trans-Permethrin	1.68	0.090	0.20	"	1.40	ND	120	70-130	5.53	25	
Propachlor	0.320	0.070	0.20	"	0.280	ND	114	70-130	4.81	25	
Trifluralin	0.420	0.020	0.040	"	0.420	ND	100	70-130	3.78	25	
Surrogate: Dibutylchlorendate	*1.03*			*"*	*0.952*		*108*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40730 - SVOAs in Water GC											
Blank (AB40730-BLK1)					Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	ND	0.50	0.50	ug/l							U
Atrazine	ND	0.30	0.50	"							U
Bromacil	ND	0.50	5.0	"							U
Butachlor	ND	0.40	0.50	"							U
Dimethoate	ND	0.20	1.0	"							U
Metolachlor	ND	0.30	0.50	"							U
Metribuzin	ND	0.40	0.50	"							U
Molinate	ND	0.20	0.50	"							U
Prometryn	ND	0.50	0.50	"							U
Propachlor	ND	0.30	0.50	"							U
Simazine	ND	0.30	0.50	"							U
Thiobencarb	ND	0.20	1.0	"							U
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.69*			*"*	*2.00*		*84.3*	*70-130*			
LCS (AB40730-BS1)					Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	1.88	0.50	0.50	ug/l	2.00		94.2	62-128			
Atrazine	1.92	0.30	0.50	"	2.00		96.1	62-122			
Bromacil	1.94	0.50	5.0	"	2.00		96.9	61-121			J
Butachlor	1.99	0.40	0.50	"	2.00		99.3	66-126			
Dimethoate	1.97	0.20	1.0	"	2.00		98.3	67-127			
Metolachlor	1.93	0.30	0.50	"	2.00		96.6	63-123			
Metribuzin	1.91	0.40	0.50	"	2.00		95.4	71-131			
Molinate	1.95	0.20	0.50	"	2.00		97.4	44-137			
Prometryn	1.95	0.50	0.50	"	2.00		97.6	63-123			
Propachlor	1.95	0.30	0.50	"	2.00		97.3	66-126			
Simazine	1.94	0.30	0.50	"	2.00		96.9	70-130			
Thiobencarb	2.01	0.20	1.0	"	2.00		100	69-129			
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.80*			*"*	*2.00*		*89.8*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40730 - SVOAs in Water GC											
LCS Dup (AB40730-BSD1)					Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	2.02	0.50	0.50	ug/l	2.00		101	62-128	6.95	30	
Atrazine	2.01	0.30	0.50	"	2.00		100	62-122	4.47	30	
Bromacil	2.14	0.50	5.0	"	2.00		107	61-121	10.0	30	J
Butachlor	2.09	0.40	0.50	"	2.00		105	66-126	5.23	30	
Dimethoate	2.17	0.20	1.0	"	2.00		108	67-127	9.82	30	
Metolachlor	2.02	0.30	0.50	"	2.00		101	63-123	4.37	30	
Metribuzin	2.04	0.40	0.50	"	2.00		102	71-131	6.92	30	
Molinate	1.94	0.20	0.50	"	2.00		96.8	44-137	0.569	30	
Prometryn	2.07	0.50	0.50	"	2.00		103	63-123	5.75	30	
Propachlor	2.00	0.30	0.50	"	2.00		100	66-126	2.80	30	
Simazine	2.09	0.30	0.50	"	2.00		105	70-130	7.61	30	
Thiobencarb	2.19	0.20	1.0	"	2.00		109	69-129	8.57	30	
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.85*			*"*	*2.00*		*92.6*	*70-130*			
Matrix Spike (AB40730-MS1)		**Source: 14A1588-01**			Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	1.81	0.50	0.50	ug/l	2.00	ND	90.7	62-128			
Atrazine	1.79	0.30	0.50	"	2.00	ND	89.7	62-122			
Bromacil	1.75	0.50	5.0	"	2.00	ND	87.5	61-121			J
Butachlor	1.85	0.40	0.50	"	2.00	ND	92.6	66-126			
Dimethoate	1.70	0.20	1.0	"	2.00	ND	84.9	67-127			
Metolachlor	1.82	0.30	0.50	"	2.00	ND	91.2	63-123			
Metribuzin	1.78	0.40	0.50	"	2.00	ND	89.2	71-131			
Molinate	1.87	0.20	0.50	"	2.00	ND	93.4	44-137			
Prometryn	1.68	0.50	0.50	"	2.00	ND	83.9	63-123			
Propachlor	1.93	0.30	0.50	"	2.00	ND	96.6	66-126			
Simazine	1.85	0.30	0.50	"	2.00	ND	92.5	70-130			
Thiobencarb	1.90	0.20	1.0	"	2.00	ND	95.2	69-129			
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.51*			*"*	*2.00*		*75.3*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40730 - SVOAs in Water GC											
Matrix Spike Dup (AB40730-MSD1)		**Source: 14A1588-01**		Prepared: 02/08/14 Analyzed: 02/11/14							
Alachlor	1.91	0.50	0.50	ug/l	2.00	ND	95.3	62-128	4.97	30	
Atrazine	1.96	0.30	0.50	"	2.00	ND	98.2	62-122	9.04	30	
Bromacil	2.13	0.50	5.0	"	2.00	ND	107	61-121	19.7	30	J
Butachlor	2.02	0.40	0.50	"	2.00	ND	101	66-126	8.67	30	
Dimethoate	2.14	0.20	1.0	"	2.00	ND	107	67-127	23.0	30	
Metolachlor	1.96	0.30	0.50	"	2.00	ND	97.9	63-123	7.12	30	
Metribuzin	2.02	0.40	0.50	"	2.00	ND	101	71-131	12.3	30	
Molinate	1.79	0.20	0.50	"	2.00	ND	89.6	44-137	4.16	30	
Prometryn	2.02	0.50	0.50	"	2.00	ND	101	63-123	18.4	30	
Propachlor	1.93	0.30	0.50	"	2.00	ND	96.4	66-126	0.171	30	
Simazine	2.07	0.30	0.50	"	2.00	ND	104	70-130	11.3	30	
Thiobencarb	1.96	0.20	1.0	"	2.00	ND	97.8	69-129	2.64	30	
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.60*			*"*	*2.00*		*79.9*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Organic Analytes by EPA Method 504.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40703 - EPA 504.1											
Blank (AB40703-BLK1)					Prepared & Analyzed: 02/07/14						
1,2-Dibromo-3-chloropropane	ND	0.0040	0.010	ug/l							U
1,2-Dibromoethane (EDB)	ND	0.0050	0.020	"							U
LCS (AB40703-BS1)					Prepared & Analyzed: 02/07/14						
1,2-Dibromo-3-chloropropane	0.299	0.0040	0.010	ug/l	0.250		119	70-130			
1,2-Dibromoethane (EDB)	0.279	0.0050	0.020	"	0.250		112	70-130			
LCS Dup (AB40703-BSD1)					Prepared & Analyzed: 02/07/14						
1,2-Dibromo-3-chloropropane	0.314	0.0040	0.010	ug/l	0.250		126	70-130	5.15	25	
1,2-Dibromoethane (EDB)	0.292	0.0050	0.020	"	0.250		117	70-130	4.42	25	
Matrix Spike (AB40703-MS1)		**Source: 14B0336-01**			Prepared & Analyzed: 02/07/14						
1,2-Dibromo-3-chloropropane	0.381	0.0040	0.010	ug/l	0.250	0.111	108	70-130			
1,2-Dibromoethane (EDB)	0.265	0.0050	0.020	"	0.250	ND	106	70-130			
Matrix Spike Dup (AB40703-MSD1)		**Source: 14B0336-01**			Prepared & Analyzed: 02/07/14						
1,2-Dibromo-3-chloropropane	0.357	0.0040	0.010	ug/l	0.250	0.111	98.0	70-130	6.77	25	
1,2-Dibromoethane (EDB)	0.235	0.0050	0.020	"	0.250	ND	94.0	70-130	12.0	25	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Chlorinated Acids by EPA Method 515.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41155 - EPA 515.1											
Blank (AB41155-BLK1)					Prepared: 02/12/14 Analyzed: 02/14/14						
Acifluorfen	ND	0.50	1.0	ug/l							U
Bentazon	ND	0.40	0.40	"							U
2,4-D	ND	0.80	1.0	"							U
Dalapon	ND	6.0	6.0	"							U
2,4-DB	ND	4.0	5.0	"							U
Dicamba	ND	0.40	0.40	"							U
Dichlorprop	ND	1.0	1.0	"							U
Dinoseb	ND	0.80	1.0	"							U
4-Nitrophenol	ND	0.70	1.0	"							U
Pentachlorophenol	ND	0.20	0.20	"							U
Picloram	ND	0.50	1.0	"							U
2,4,5-T	ND	0.40	0.50	"							U
2,4,5-TP (Silvex)	ND	0.50	0.50	"							U
Surrogate: DCAA	*13.8*			*"*	*14.2*		*97.0*	*70-130*			
LCS (AB41155-BS1)					Prepared: 02/12/14 Analyzed: 02/14/14						
Acifluorfen	0.895	0.50	1.0	ug/l	0.960		93.2	70-130			J
Bentazon	1.68	0.40	0.40	"	1.92		87.7	70-130			
2,4-D	1.62	0.80	1.0	"	1.92		84.5	48-124			
Dalapon	10.9	6.0	6.0	"	12.5		87.5	40-112			
2,4-DB	7.43	4.0	5.0	"	7.68		96.8	54-123			
Dicamba	0.861	0.40	0.40	"	0.960		89.7	70-130			
Dichlorprop	2.88	1.0	1.0	"	2.88		100	54-106			
Dinoseb	5.06	0.80	1.0	"	6.42		78.7	20-105			
4-Nitrophenol	0.759	0.70	1.0	"	0.960		79.0	60-202			J
Pentachlorophenol	0.816	0.20	0.20	"	0.960		85.0	70-130			
Picloram	0.929	0.50	1.0	"	0.960		96.7	70-130			J
2,4,5-T	0.918	0.40	0.50	"	0.960		95.6	68-166			
2,4,5-TP (Silvex)	0.969	0.50	0.50	"	0.960		101	70-130			
Surrogate: DCAA	*14.7*			*"*	*14.2*		*103*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Chlorinated Acids by EPA Method 515.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41155 - EPA 515.1											
LCS Dup (AB41155-BSD1)					Prepared: 02/12/14 Analyzed: 02/14/14						
Acifluorfen	0.947	0.50	1.0	ug/l	0.960		98.7	70-130	5.68	50	J
Bentazon	1.74	0.40	0.40	"	1.92		90.5	70-130	3.16	50	
2,4-D	1.34	0.80	1.0	"	1.92		69.7	48-124	19.2	50	
Dalapon	10.6	6.0	6.0	"	12.5		85.2	40-112	2.63	50	
2,4-DB	7.11	4.0	5.0	"	7.68		92.6	54-123	4.37	50	
Dicamba	0.872	0.40	0.40	"	0.960		90.8	70-130	1.23	50	
Dichlorprop	2.46	1.0	1.0	"	2.88		85.2	54-106	15.9	50	
Dinoseb	5.84	0.80	1.0	"	6.42		90.9	20-105	14.4	50	
4-Nitrophenol	0.982	0.70	1.0	"	0.960		102	60-202	25.6	50	J
Pentachlorophenol	0.871	0.20	0.20	"	0.960		90.7	70-130	6.49	50	
Picloram	0.976	0.50	1.0	"	0.960		102	70-130	4.94	50	J
2,4,5-T	0.681	0.40	0.50	"	0.960		70.9	68-166	29.7	50	
2,4,5-TP (Silvex)	0.783	0.50	0.50	"	0.960		81.5	70-130	21.3	50	
Surrogate: DCAA	*13.7*			*"*	*14.2*		*96.4*	*70-130*			
Matrix Spike (AB41155-MS1)		**Source: 14B0093-01**			Prepared: 02/12/14 Analyzed: 02/15/14						
Acifluorfen	0.842	0.50	1.0	ug/l	0.960	ND	87.7	70-130			J
Bentazon	1.55	0.40	0.40	"	1.92	ND	80.9	70-130			
2,4-D	1.44	0.80	1.0	"	1.92	ND	75.1	48-124			
Dalapon	11.9	6.0	6.0	"	12.5	ND	95.4	40-112			
2,4-DB	5.89	4.0	5.0	"	7.68	ND	76.7	54-123			
Dicamba	0.889	0.40	0.40	"	0.960	ND	92.6	70-130			
Dichlorprop	2.46	1.0	1.0	"	2.88	ND	85.2	54-106			
Dinoseb	4.86	0.80	1.0	"	6.42	ND	75.7	20-105			
4-Nitrophenol	1.02	0.70	1.0	"	0.960	ND	107	60-202			
Pentachlorophenol	0.822	0.20	0.20	"	0.960	ND	85.6	70-130			
Picloram	0.865	0.50	1.0	"	0.960	ND	90.1	70-130			J
2,4,5-T	0.730	0.40	0.50	"	0.960	ND	76.0	68-166			
2,4,5-TP (Silvex)	0.805	0.50	0.50	"	0.960	ND	83.9	70-130			
Surrogate: DCAA	*12.7*			*"*	*14.2*		*89.6*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Chlorinated Acids by EPA Method 515.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41155 - EPA 515.1											
Matrix Spike Dup (AB41155-MSD1)		**Source: 14B0093-01**		Prepared: 02/12/14 Analyzed: 02/15/14							
Acifluorfen	0.798	0.50	1.0	ug/l	0.960	ND	83.2	70-130	5.34	50	J
Bentazon	1.71	0.40	0.40	"	1.92	ND	89.0	70-130	9.58	50	
2,4-D	1.27	0.80	1.0	"	1.92	ND	66.0	48-124	12.8	50	
Dalapon	11.2	6.0	6.0	"	12.5	ND	89.6	40-112	6.23	50	
2,4-DB	5.76	4.0	5.0	"	7.68	ND	75.0	54-123	2.16	50	
Dicamba	0.837	0.40	0.40	"	0.960	ND	87.2	70-130	6.01	50	
Dichlorprop	2.39	1.0	1.0	"	2.88	ND	83.0	54-106	2.62	50	
Dinoseb	4.47	0.80	1.0	"	6.42	ND	69.6	20-105	8.43	50	
4-Nitrophenol	1.42	0.70	1.0	"	0.960	ND	148	60-202	32.4	50	
Pentachlorophenol	0.808	0.20	0.20	"	0.960	ND	84.2	70-130	1.62	50	
Picloram	0.847	0.50	1.0	"	0.960	ND	88.2	70-130	2.10	50	J
2,4,5-T	0.628	0.40	0.50	"	0.960	ND	65.5	68-166	14.9	50	QM-07
2,4,5-TP (Silvex)	0.725	0.50	0.50	"	0.960	ND	75.5	70-130	10.5	50	
Surrogate: DCAA	*12.5*			*"*	*14.2*		*88.2*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Carbamates by EPA Method 531.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41142 - HPLC											
Blank (AB41142-BLK1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	ND	0.70	3.0	ug/l							U
Aldicarb sulfone	ND	0.70	4.0	"							U
Aldicarb sulfoxide	ND	0.80	3.0	"							U
Carbaryl	ND	0.70	5.0	"							U
Carbofuran	ND	2.0	5.0	"							U
3-Hydroxycarbofuran	ND	0.90	3.0	"							U
Methiocarb	ND	2.0	5.0	"							U
Methomyl	ND	2.0	2.0	"							U
Oxamyl	ND	0.80	20	"							U
Propoxur	ND	2.0	5.0	"							U
LCS (AB41142-BS1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	20.0	0.70	3.0	ug/l	20.0		99.9	80-120			
Aldicarb sulfone	20.1	0.70	4.0	"	19.0		106	80-120			
Aldicarb sulfoxide	19.2	0.80	3.0	"	19.8		97.0	80-120			
Carbaryl	20.4	0.70	5.0	"	20.0		102	80-120			
Carbofuran	19.5	2.0	5.0	"	20.0		97.7	80-120			
3-Hydroxycarbofuran	20.7	0.90	3.0	"	20.0		103	80-120			
Methiocarb	18.6	2.0	5.0	"	20.0		93.2	80-120			
Methomyl	21.1	2.0	2.0	"	20.0		105	80-120			
Oxamyl	20.5	0.80	20	"	20.0		102	80-120			
Propoxur	20.2	2.0	5.0	"	20.0		101	80-120			
LCS Dup (AB41142-BSD1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	19.3	0.70	3.0	ug/l	20.0		96.6	80-120	3.34	20	
Aldicarb sulfone	19.3	0.70	4.0	"	19.0		102	80-120	3.93	20	
Aldicarb sulfoxide	18.6	0.80	3.0	"	19.8		93.7	80-120	3.45	20	
Carbaryl	18.8	0.70	5.0	"	20.0		94.1	80-120	8.11	20	
Carbofuran	19.4	2.0	5.0	"	20.0		97.1	80-120	0.645	20	
3-Hydroxycarbofuran	19.0	0.90	3.0	"	20.0		95.1	80-120	8.35	20	
Methiocarb	19.1	2.0	5.0	"	20.0		95.7	80-120	2.65	20	
Methomyl	19.5	2.0	2.0	"	20.0		97.7	80-120	7.69	20	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Carbamates by EPA Method 531.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41142 - HPLC											
LCS Dup (AB41142-BSD1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Oxamyl	19.2	0.80	20	ug/l	20.0		95.8	80-120	6.62	20	J
Propoxur	19.0	2.0	5.0	"	20.0		94.8	80-120	6.54	20	
Matrix Spike (AB41142-MS1)		**Source: 14B0426-01**			Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	18.7	0.70	3.0	ug/l	20.0	ND	93.3	80-120			
Aldicarb sulfone	20.1	0.70	4.0	"	19.0	ND	106	80-120			
Aldicarb sulfoxide	20.1	0.80	3.0	"	19.8	ND	102	80-120			
Carbaryl	20.0	0.70	5.0	"	20.0	ND	99.8	80-120			
Carbofuran	19.3	2.0	5.0	"	20.0	ND	96.6	80-120			
3-Hydroxycarbofuran	20.7	0.90	3.0	"	20.0	ND	103	80-120			
Methiocarb	18.2	2.0	5.0	"	20.0	ND	91.2	80-120			
Methomyl	21.0	2.0	2.0	"	20.0	ND	105	80-120			
Oxamyl	20.3	0.80	20	"	20.0	ND	102	80-120			
Propoxur	19.2	2.0	5.0	"	20.0	ND	95.9	80-120			
Matrix Spike Dup (AB41142-MSD1)		**Source: 14B0426-01**			Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	17.4	0.70	3.0	ug/l	20.0	ND	87.1	80-120	6.84	20	
Aldicarb sulfone	19.0	0.70	4.0	"	19.0	ND	100	80-120	5.57	20	
Aldicarb sulfoxide	18.8	0.80	3.0	"	19.8	ND	94.8	80-120	6.85	20	
Carbaryl	19.4	0.70	5.0	"	20.0	ND	97.1	80-120	2.76	20	
Carbofuran	19.4	2.0	5.0	"	20.0	ND	96.9	80-120	0.339	20	
3-Hydroxycarbofuran	19.8	0.90	3.0	"	20.0	ND	98.9	80-120	4.29	20	
Methiocarb	18.9	2.0	5.0	"	20.0	ND	94.6	80-120	3.68	20	
Methomyl	20.6	2.0	2.0	"	20.0	ND	103	80-120	1.83	20	
Oxamyl	19.2	0.80	20	"	20.0	ND	95.8	80-120	5.89	20	J
Propoxur	19.5	2.0	5.0	"	20.0	ND	97.3	80-120	1.47	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Endothall by EPA Method 548.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40801 - EPA 548.1											
Blank (AB40801-BLK1)					Prepared: 02/10/14 Analyzed: 02/11/14						
Endothall	ND	2.0	45	ug/l							U
LCS (AB40801-BS1)					Prepared: 02/10/14 Analyzed: 02/11/14						
Endothall	201	2.0	45	ug/l	200		100	80-120			
LCS Dup (AB40801-BSD1)					Prepared: 02/10/14 Analyzed: 02/11/14						
Endothall	204	2.0	45	ug/l	200		102	80-120	1.53	30	
Matrix Spike (AB40801-MS1)		**Source: 14B0089-01**			Prepared: 02/10/14 Analyzed: 02/11/14						
Endothall	190	2.0	45	ug/l	200	ND	94.8	80-120			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Glyphosate by EPA Method 547 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40427 - HPLC											
Blank (AB40427-BLK1)					Prepared & Analyzed: 02/04/14						
Glyphosate	ND	3.0	10	ug/l							U
LCS (AB40427-BS1)					Prepared & Analyzed: 02/04/14						
Glyphosate	111	3.0	10	ug/l	120		92.7	66-126			
LCS Dup (AB40427-BSD1)					Prepared & Analyzed: 02/04/14						
Glyphosate	112	3.0	10	ug/l	120		93.7	66-126	1.08	30	
Matrix Spike (AB40427-MS1)		**Source: 14B0093-01**			Prepared: 02/04/14 Analyzed: 02/05/14						
Glyphosate	111	3.0	10	ug/l	120	ND	92.7	66-126			
Matrix Spike Dup (AB40427-MSD1)		**Source: 14B0093-01**			Prepared: 02/04/14 Analyzed: 02/05/14						
Glyphosate	110	3.0	10	ug/l	120	ND	92.0	66-126	0.801	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Diquat by EPA Method 549.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40717 - HPLC											
Blank (AB40717-BLK1)					Prepared: 02/07/14 Analyzed: 02/10/14						
Diquat	ND	2.0	2.0	ug/l							U
LCS (AB40717-BS1)					Prepared: 02/07/14 Analyzed: 02/11/14						
Diquat	17.4	2.0	2.0	ug/l	19.8		87.8	70-130			
LCS Dup (AB40717-BSD1)					Prepared: 02/07/14 Analyzed: 02/11/14						
Diquat	18.0	2.0	2.0	ug/l	19.8		90.5	70-130	3.10	25	
Matrix Spike (AB40717-MS1)		**Source: 14B0426-01**			Prepared: 02/07/14 Analyzed: 02/11/14						
Diquat	19.8	2.0	2.0	ug/l	19.8	ND	99.9	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Haloacetic Acids by EPA Method 552.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41050 - EPA 552.2											
Blank (AB41050-BLK1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Monobromoacetic Acid	ND	0.8	1.0	ug/l							U
Monochloroacetic Acid	ND	1.1	2.0	"							U
Dibromoacetic Acid	ND	0.8	1.0	"							U
Dichloroacetic Acid	ND	1.0	1.0	"							U
Trichloroacetic Acid	ND	1.0	1.0	"							U
Total Haloacetic Acids (HAA5)	ND	1.0	1.0	"							U
Surrogate: 2,3-Dibromopropionic Acid	*9.59*			*"*	*10.0*		*95.9*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*11.7*			*"*	*10.0*		*117*	*70-130*			
LCS (AB41050-BS1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Monobromoacetic Acid	25.5	0.8	1.0	ug/l	25.0		102	70-130			
Monochloroacetic Acid	26.9	1.1	2.0	"	25.0		107	70-130			
Dibromoacetic Acid	26.8	0.8	1.0	"	25.0		107	70-130			
Dichloroacetic Acid	26.0	1.0	1.0	"	25.0		104	70-130			
Trichloroacetic Acid	26.6	1.0	1.0	"	25.0		106	70-130			
Surrogate: 2,3-Dibromopropionic Acid	*11.0*			*"*	*10.0*		*110*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*10.1*			*"*	*10.0*		*101*	*70-130*			
MRL Check (AB41050-MRL1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Monobromoacetic Acid	1.07	0.8	1.0	ug/l	1.00		107	0-200			
Monochloroacetic Acid	ND	1.1	2.0	"	1.00			0-200			U
Dibromoacetic Acid	1.37	0.8	1.0	"	1.00		137	0-200			
Dichloroacetic Acid	ND	1.0	1.0	"	1.00			0-200			U
Trichloroacetic Acid	1.05	1.0	1.0	"	1.00		105	0-200			
Surrogate: 2,3-Dibromopropionic Acid	*1.40*			*"*	*1.00*		*140*	*0-200*			
Surrogate: 2-Bromopropionic Acid	*1.14*			*"*	*1.00*		*114*	*0-200*			
Matrix Spike (AB41050-MS1)		**Source: 14A1713-01**			Prepared: 02/11/14 Analyzed: 02/13/14						
Monobromoacetic Acid	24.9	0.8	1.0	ug/l	25.0	ND	99.7	70-130			
Monochloroacetic Acid	26.6	1.1	2.0	"	25.0	ND	106	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:32

Haloacetic Acids by EPA Method 552.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41050 - EPA 552.2											
Matrix Spike (AB41050-MS1)		**Source: 14A1713-01**			Prepared: 02/11/14 Analyzed: 02/13/14						
Dibromoacetic Acid	32.2	0.8	1.0	ug/l	25.0	ND	129	70-130			
Dichloroacetic Acid	25.1	1.0	1.0	"	25.0	ND	100	70-130			
Trichloroacetic Acid	29.9	1.0	1.0	"	25.0	ND	120	70-130			
Surrogate: 2,3-Dibromopropionic Acid	*12.1*			*"*	*10.0*		*121*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*9.42*			*"*	*10.0*		*94.2*	*70-130*			
Matrix Spike (AB41050-MS2)		**Source: 14B0089-01**			Prepared: 02/11/14 Analyzed: 02/13/14						
Monobromoacetic Acid	24.4	0.8	1.0	ug/l	25.0	ND	97.6	70-130			
Monochloroacetic Acid	25.3	1.1	2.0	"	25.0	ND	101	70-130			
Dibromoacetic Acid	31.9	0.8	1.0	"	25.0	ND	128	70-130			
Dichloroacetic Acid	24.0	1.0	1.0	"	25.0	ND	96.0	70-130			
Trichloroacetic Acid	31.1	1.0	1.0	"	25.0	ND	124	70-130			
Surrogate: 2,3-Dibromopropionic Acid	*13.9*			*"*	*10.0*		*139*	*70-130*			*S-GC*
Surrogate: 2-Bromopropionic Acid	*10.9*			*"*	*10.0*		*109*	*70-130*			
Reference (AB41050-SRM1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Monobromoacetic Acid	25.1	0.8	1.0	ug/l	25.0		100	0-200			
Monochloroacetic Acid	26.7	1.1	2.0	"	25.0		107	0-200			
Dibromoacetic Acid	25.6	0.8	1.0	"	25.0		103	0-200			
Dichloroacetic Acid	24.9	1.0	1.0	"	25.0		99.7	0-200			
Trichloroacetic Acid	25.8	1.0	1.0	"	25.0		103	0-200			
Surrogate: 2,3-Dibromopropionic Acid	*10.6*			*"*	*10.0*		*106*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*9.92*			*"*	*10.0*		*99.2*	*70-130*			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Semivolatile Organic Compounds by EPA Method 525.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40727 - EPA 525.2											
Blank (AB40727-BLK1)					Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	ND	0.080	0.10	ug/l							U
Di(2-ethylhexyl)adipate	ND	0.40	5.0	"							U
Di(2-ethylhexyl)phthalate	ND	0.20	3.0	"							U
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.23*			*"*	*5.00*		*105*	*70-130*			
Surrogate: Perylene-d12	*3.73*			*"*	*5.00*		*74.6*	*70-130*			
Surrogate: Triphenyl phosphate	*4.72*			*"*	*5.00*		*94.4*	*70-130*			
LCS (AB40727-BS1)					Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	2.13	0.080	0.10	ug/l	3.00		71.0	70-130			
Di(2-ethylhexyl)adipate	2.49	0.40	5.0	"	3.00		83.0	70-130			J
Di(2-ethylhexyl)phthalate	2.40	0.20	3.0	"	3.00		80.0	70-130			J
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.36*			*"*	*5.00*		*107*	*70-130*			
Surrogate: Perylene-d12	*4.65*			*"*	*5.00*		*93.0*	*70-130*			
Surrogate: Triphenyl phosphate	*5.36*			*"*	*5.00*		*107*	*70-130*			
LCS Dup (AB40727-BSD1)					Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	2.40	0.080	0.10	ug/l	3.00		80.0	70-130	11.9	20	
Di(2-ethylhexyl)adipate	2.70	0.40	5.0	"	3.00		90.0	70-130	8.09	20	J
Di(2-ethylhexyl)phthalate	2.57	0.20	3.0	"	3.00		85.7	70-130	6.84	20	J
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.39*			*"*	*5.00*		*108*	*70-130*			
Surrogate: Perylene-d12	*4.84*			*"*	*5.00*		*96.8*	*70-130*			
Surrogate: Triphenyl phosphate	*5.47*			*"*	*5.00*		*109*	*70-130*			
Matrix Spike (AB40727-MS1)		**Source: 14A1714-01**			Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	2.79	0.080	0.10	ug/l	3.00	ND	93.0	70-130			
Di(2-ethylhexyl)adipate	3.11	0.40	5.0	"	3.00	ND	104	70-130			J
Di(2-ethylhexyl)phthalate	2.79	0.20	3.0	"	3.00	ND	93.0	70-130			J
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.27*			*"*	*5.00*		*105*	*70-130*			
Surrogate: Perylene-d12	*5.52*			*"*	*5.00*		*110*	*70-130*			

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Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:32

Semivolatile Organic Compounds by EPA Method 525.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40727 - EPA 525.2											
Matrix Spike (AB40727-MS1)		**Source: 14A1714-01**			Prepared: 02/08/14 Analyzed: 02/13/14						
Surrogate: Triphenyl phosphate	*5.65*			*ug/l*	*5.00*		*113*	*70-130*			

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e-mail: clientservices@alpha-labs.com
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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Project: Project Number:	Dr. Bill Motzer Groundwater Reuse Project 60408	Reported: 02/18/14 14:32

Notes and Definitions

J	Detected but below the Reporting Limit; therefore, result is an estimated concentration, detected but not quantified (DNQ).
QM-01	The spike recovery for this QC sample is outside of established control limits possibly due to a sample matrix interference.
QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QM-4X	The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.
R-01	The Reporting Limit for this analyte has been raised to account for matrix interference.
S-05	Surrogate recovery for this sample is outside of control limits. Client notified to re-sample if analyte is required for regulatory purposes.
S-GC	Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogates.
U	Analyte included in analysis, but not detected at or above MDL.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

ASBESTOS TEM LABORATORIES, INC.

EPA 600/4-83 Drinking Water
Transmission Electron Microscopy
Analytical Report

Laboratory Job # 1288-00574

630 Bancroft Way
Berkeley, CA 94710
(510) 704-8930
FAX (510) 704-8429

ASBESTOS TEM LABORATORIES, INC

Certified by
CA DPH ELAP
Lab No. 1866

Feb/12/2014

David S. Pingatore
Alpha Analytical Laboratories, Inc.
208 Mason Street
Ukiah, CA 95482

RE: LABORATORY JOB # 1288-00574
Transmission electron microscopy analytical results for 1 water sample(s).
Job Site:
Job No.: 14B0089

Enclosed please find results for the TEM analysis of one or more water samples. The analytical procedures were performed according to EPA Method 100.2 for the analysis of asbestos in drinking water.

Prior to analysis, samples are checked for damage, disruption of any chain-of-custody seals, and completeness of accompanying paperwork. If no problems are found, samples are then logged-in, each given a unique laboratory number, and a hard copy containing all pertinent information is generated. This, and all other relevant paper work are kept with each sample throughout the analytical procedures to assure proper analysis.

Preparation of water samples is performed within a HEPA filtered, Class 100 air, laminar flow clean bench environment. Prior to filtration, water sample containers are ultrasonicated, and the exterior surfaces cleaned. An aliquot of water is drawn from the sample container and drawn through a special filtration apparatus and collected onto a mixed cellulose ester (MCE) or polycarbonate (PC) filter. The filters are removed from the apparatus and dried. A portion of each sample filter is sectioned, placed onto a glass microscope slide, and carbon coated. The filters are further sectioned and placed carbon side up onto 200-mesh copper TEM sample grids in a solvent bath until all filter material is dissolved. The TEM grids are removed and placed into labeled grid storage boxes.

TEM analysis is performed on a Philips EM-300 or CM-12 transmission electron microscope operating at 80 or 100 kV. Initially, the grid is scanned at low and medium magnification to insure proper sample loading, and coherence of the carbon support film. Then TEM grid openings are analyzed at a magnification of 10,000X. All fibers >10 um in length and exhibiting an aspect ratio >3:1 are analyzed. Scanning continues until either 100 asbestiform fibers >10um in length are counted, or an analytical sensitivity of 0.2 million fibers per liter (MFL) is achieved. Analyzed fibers are subjected to detailed morphological and selected area diffraction (SAED) analysis. Fibers indicated as asbestos, or potentially asbestos, are further analyzed by energy dispersive X-ray (EDX) analysis as needed. The number of asbestos fibers detected, and other analytical parameters, are then used to calculate the concentration of asbestos in MFL. The results are entered into a standard report format and reviewed by the analyst and the laboratory manager before release to the client.

Sincerely Yours,

Laboratory Manager
ASBESTOS TEM LABORATORIES, INC.

--- These results relate only to the samples tested and must not be reproduced, except in full, with the approval of the laboratory. This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government. ---

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www.asbestostemlabs.com *With Offices in Reno, NV (775) 359-3377*

TRANSMISSION ELECTRON MICROSCOPY ANALYTICAL REPORT

Contact:	David S. Pingatore		
Address:	Alpha Analytical Laboratories, Inc. 208 Mason Street Ukiah, CA 95482	Report No.:	**323884**
		Date:	Feb-12-14
		Total Samples Analyzed:	1
Job Site / No.	14B0089	Sample Collector:	

CLIENT SAMPLE #	**14B0089-01**	**SAMPLE LOCATION/DESCRIPTION**	FO-07
Laboratory Sample #	1288-00574-001		

WATER SAMPLE DATA

Date/Time Collected	Feb-03-14 / 2:05 pm	Volume Submitted (ml)	1000
Date/Time Lab Received	Feb-04-14 / 4:48 pm	Volume Filtered (ml)	5
Date/Time Filtered	Feb-04-14 / 5:00 pm	Filter & Pore Size	MCE 0.22
Date/Time Analyzed	Feb-12-14 / 10:55 am	UV/Ozone Treated:	NO

IDENTIFIED STRUCTURES (>10um)			
ASBESTOS		OTHER	
CHRYS	AMPH	AMBIG	NON-ASB
NSD	NSD	NSD	NSD

CALCULATED ASBESTOS STRUCTURE CONCENTRATION (>10um)		
CHRYS	AMPH	TOTAL
< 0.1 MFL	< 0.1 MFL	< 0.1 MFL

COMMENTS

No asbestos detected

Filter Loading: MODERATE

SAED Photo ID Nos.

TEM / ANALYTICAL PARAMETERS

Grid Openings Scanned at 10,000X	24	Analytical Sensitivity	0.1 MFL
Grid Opening Area (mm2)	0.0094	95% UCL	0.33 MFL
Scan Area (mm2)	0.2256	95% LCL	0 MFL

WATER SAMPLE LAB BLANK RESULTS

Lab ID#	Blank 9483	Analytical Sensitivity	0.01 MFL
Grid Openings Scanned at 10,000X	8	Asbestos Structure Concentration	<0.01 MFL
Volume Filtered (ml)	300		

NOTATION KEY

Chrys. - Chrysotile Asbestos
Amph. - Amphibole Asbestos
NSD - No Structures Detected
1 mm = 1 millimeter

1 um = 1 micron = 0.001 mm
MFL = Millions of Fibers per Liter
UCL = Upper Confidence Level
LCL = Lower Confidence Level

ANALYST SIGNATURE

Stephanie Dunn
LAB QC REVIEWER SIGNATURE

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McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1402035

Report Created for: Alpha Analytical Laboratories
208 Mason Street
Ukiah, CA 95482

Project Contact: David S. Pingatore
Project P.O.:
Project Name: #14B0089

Project Received: 02/04/2014

Analytical Report reviewed & approved for release on 02/10/2014 by:

Question about your data?

Click here to email McCampbell

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

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NELAP: 12283CA ♦ ELAP: 1644 ♦ ISO/IEC: 17025:2005 ♦ WSDE: C972-11 ♦ ADEC: UST-098 ♦ UCMR3

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Glossary of Terms & Qualifier Definitions

Client: Alpha Analytical Laboratories
Project: #14B0089
WorkOrder: 1402035

Glossary Abbreviation	Description
95% Interval	95% Confident Interval
DF	Dilution Factor
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not detected at or above the indicated MDL or RL
NR	Matrix interferences, or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix; or sample diluted due to high matrix or analyte content.
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
TEQ	Toxicity Equivalence

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Analytical Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	1402035
Project:	#14B0089	**Extraction Method**	E218.6
Date Received:	2/4/14 9:21	**Analytical Method:**	E218.6
Date Prepared:	2/4/14	**Unit:**	µg/L

Hexachrome by IC

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
FO-07 (Deep)	**1402035-001A**	**Water**	**02/03/2014 14:05**	**IC2**	**86689**

Analytes	Result	RL	DF	Date Analyzed
Hexachrome	ND	0.050	1	02/04/2014 14:03

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Quality Control Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	1402035
Date Prepared:	2/4/14	**BatchID:**	86689
Date Analyzed:	2/4/14	**Extraction Method**	E218.6
Instrument:	IC2	**Analytical Method:**	E218.6
Matrix:	Water	**Unit:**	µg/L
Project:	#14B0089	**Sample ID:**	MB/LCS-86689 1402035-001AMS/MSD

QC Summary Report for E218.6

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Hexachrome	ND	24.04	0.050	25	-	96.2	90-110

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Hexachrome	23.52	24.27	25	ND	94.1	97.1	90-110	3.14	10

McCampbell Analytical, Inc.

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Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1402035 **ClientCode: ALPU**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
David S. Pingatore
Alpha Analytical Laboratories
208 Mason Street
Ukiah, CA 95482
(707) 468-0401 FAX: (707) 468-5267

Email: sspeaks@alpha-labs.com;david@alpha-lab
cc:
PO:
ProjectNo: #14B0089

Bill to:
Accounts Payable
Alpha Analytical Laboratories
208 Mason Street
Ukiah, CA 95482

Requested TAT: 5 days

Date Received: 02/04/2014
Date Printed: 02/04/2014

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
1402035-001	FO-07 (Deep)	Water	2/3/2014 14:05	☐	A											

Test Legend:

1	218_6_DW	2		3		4		5	
6		7		8		9		10	
11		12							

Prepared by: Maria Venegas

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

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WORK ORDER SUMMARY

Client Name: ALPHA ANALYTICAL LABORATORIES
QC Level: LEVEL 2
Work Order: 1402035
Project: #14B0089
Client Contact: David S. Pingatore
Date Received: 2/4/2014
Comments:
Contact's Email: sspeaks@alpha-labs.com;david@alpha-labs.com

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Number of Containers	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1402035-001A	FO-07 (Deep)	Water	E218.6 (Hexachrome)	1	250mL HDPE w/ (NH4)2SO4	☐	2/3/2014 14:05	5 days	Present	☐	

*** NOTE: STLC and TCLP extractions require 48 hrs to complete; therefore, all TATs begin after the extraction is completed (i.e., 24hr TAT yields results in 72 hrs from sample submission).**

Bottle Legend:

250mL HDPE w/ (NH4)2SO4 = 250mL HDPE Bottle w/ Ammonium Sulfate

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

1402035

14B0089

SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: David S. Pingatore

RECEIVING LABORATORY:

McCampbell Analytical
1534 Willowpass Rd.
Pittsburg, CA 94565
Phone :(925) 252-9262
Fax: (925) 252-9269
Terms: Net 30

Analysis	Due	Expires	Comments
14B0089-01 FO-07 (Deep) [Water] Sampled 02/03/14 14:05 Pacific			
Cr6 218.6 DW	02/18/14 12:00	02/08/14 14:05	
Containers Supplied:			
250ml Poly - (NH4)2SO4 (A			

☐ *Report to State*

System Name: _____ **Employed by:** _____

User ID: _____ **Sampler:** _____

System Number: _____

NO

ICE/T° 1.3
GOOD CONDITION_____ APPROPRIATE
HEAD SPACE ABSENT_____ CONTAINERS_____
DECHLORINATED IN LAB_____ PRESERVED IN LAB_____

PRESERVATION	VOAS	O&G	METALS	OTHER

Released By	Date	Received By	Date
	02/04/14		2/4/14 0916
Released By	Date	Received By	Date

Page 1 of 1

McCampbell Analytical, Inc.
"When Quality Counts"

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Sample Receipt Checklist

Client Name:	**Alpha Analytical Laboratories**	Date and Time Received:	**2/4/2014 9:21:13 AM**
Project Name:	**#14B0089**	LogIn Reviewed by:	Maria Venegas
WorkOrder N°:	**1402035** Matrix: Water	Carrier:	Client Drop-In

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐
Chain of custody signed when relinquished and received?	Yes ☑	No ☐
Chain of custody agrees with sample labels?	Yes ☑	No ☐
Sample IDs noted by Client on COC?	Yes ☑	No ☐
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐
Sampler's name noted on COC?	Yes ☐	No ☑

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp: 1.3°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	NA ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☑	No ☐	

(Ice Type: BLUE ICE)

** NOTE: If the "No" box is checked, see comments below.*

Comments:

ALS Environmental
ALS Group USA, Corp.
1317 South 13th Avenue
Kelso, WA 98626
T: +1 360 577 7222
F: +1 360 636 1068
www.alsglobal.com

February 21, 2014 Analytical Report for Service Request No: K1401157

David Pingatore
Alpha Analytical Laboratories, Inc.
6398 Dougherty Road, Suite 35
Dublin, CA 94568

RE: 14B0089

Dear David:

Enclosed are the results of the sample submitted to our laboratory on February 05, 2014. For your reference, these analyses have been assigned our service request number K1401157.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3293. You may also contact me via Email at Shar.Samy@alsglobal.com.

Respectfully submitted,

ALS Group USA Corp. dba ALS Environmental

Shar Samy, Ph.D.
Project Manager

SS/mj

RIGHT SOLUTIONS | RIGHT PARTNER

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2286
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L12-28
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Georgia DNR	http://www.gaepd.org/Documents/techguide_pcb.html#cel	881
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
Indiana DOH	http://www.in.gov/isdh/24859.htm	C-WA-01
ISO 17025	http://www.pjlabs.com/	L12-27
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	3016
Maine DHS	Not available	WA0035
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-368
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA35
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA200001
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	4704427-08-TX
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C1203
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.caslab.com or at the accreditation bodies web site

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

ALS ENVIRONMENTAL

Client:	Alpha Analytical Laboratories, Inc.	**Service Request No.:**	K1401157
Project:	14B0089	**Date Received:**	02/05/14
Sample Matrix:	Water		

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Matrix/Duplicate Matrix Spike (MS/DMS), and Laboratory Control Sample (LCS).

Sample Receipt

One water sample was received for analysis at ALS Environmental on 02/05/14. The sample was received in good condition and consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4ºC upon receipt at the laboratory.

Explosives by EPA Method 8330

Sample Notes and Discussion:
Insufficient sample volume was received to perform a Matrix Spike/Matrix Spike Duplicate (MS/MSD). A Laboratory Control Sample/Duplicate Laboratory Control Sample (LCS/DLCS) was analyzed and reported in lieu of the MS/MSD.

No other anomalies associated with the analysis of this sample were observed.

Approved by_____

K1401157

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

14B0089

SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: David S. Pingatore

RECEIVING LABORATORY:

ALS Environmental - Kelso
1317 S. 13th Ave
Kelso, WA 98626
Phone :(360) 577-7222
Fax: -
Terms: Net 30

Analysis	Due	Expires	Comments
14B0089-01 FO-07 (Deep) [Water] Sampled 02/03/14 14:05 Pacific			
8330B Explosives Water	02/18/14 12:00	02/10/14 14:05	
Containers Supplied:			
1L Amber- Unpres. (AD) 1L Amber- Unpres. (AE)			

☐ *Report to State*

System Name: _____ **Employed by:** _____

User ID: _____ **Sampler:** _____

System Number: _____

+QC

Released By	Date	Received By	Date
[signature]	2-4-14	[signature]	2/5/14 1020

ALS

PC Shar

Cooler Receipt and Preservation Form

Client / Project: Alpha Service Request K14 01157

Received: 2/5/14 Opened: 2/5/14 By: [illegible] Unloaded: 2/5/14 By: [illegible]

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? _____

   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
-0.9	-0.6	—	—	-0.1	308		1Z894250 0148947731	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

Page ____ *of* ____

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Alpha Analytical Laboratories, Inc. (Uki	**Service Request:**	K1401157
Project:	14B0089	**Date Collected:**	02/03/2014
Sample Matrix:	Water	**Date Received:**	02/05/2014

Nitroaromatics and Nitramines (Explosives)

Sample Name:	14B0089-01 FO-07 (Deep)	**Units:**	ug/L
Lab Code:	K1401157-001	**Basis:**	NA
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	8330B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
HMX	ND	U	0.12	0.012	1	02/06/14	02/08/14	KWG1400979	
RDX	ND	U	0.12	0.019	1	02/06/14	02/08/14	KWG1400979	
1,3,5-Trinitrobenzene	ND	U	0.23	0.056	1	02/06/14	02/08/14	KWG1400979	
1,3-Dinitrobenzene	ND	U	0.12	0.0095	1	02/06/14	02/08/14	KWG1400979	
3,5-Dinitroaniline	ND	U	0.12	0.015	1	02/06/14	02/08/14	KWG1400979	
TETRYL	ND	U	0.12	0.047	1	02/06/14	02/08/14	KWG1400979	
Nitrobenzene	ND	U	0.12	0.015	1	02/06/14	02/08/14	KWG1400979	
4-Amino-2,6-dinitrotoluene	ND	U	0.12	0.018	1	02/06/14	02/08/14	KWG1400979	
2-Amino-4,6-dinitrotoluene	ND	U	0.12	0.0099	1	02/06/14	02/08/14	KWG1400979	
2,4,6-Trinitrotoluene	ND	U	0.12	0.029	1	02/06/14	02/08/14	KWG1400979	
2,6-Dinitrotoluene	**0.064**	JN	0.23	0.060	1	02/06/14	02/08/14	KWG1400979	
2,4-Dinitrotoluene	ND	U	0.12	0.011	1	02/06/14	02/08/14	KWG1400979	
2-Nitrotoluene	ND	U	0.12	0.036	1	02/06/14	02/08/14	KWG1400979	
4-Nitrotoluene	ND	U	0.12	0.022	1	02/06/14	02/08/14	KWG1400979	
3-Nitrotoluene	ND	U	0.12	0.0072	1	02/06/14	02/08/14	KWG1400979	
Nitroglycerin	ND	U	1.2	0.44	1	02/06/14	02/08/14	KWG1400979	
Pentaerythritol Tetranitrate	ND	U	0.56	0.20	1	02/06/14	02/08/14	KWG1400979	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1-Chloro-3-nitrobenzene	85	23-98	02/08/14	Acceptable

Comments:

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Alpha Analytical Laboratories, Inc. (Uki	**Service Request:**	K1401157
Project:	14B0089	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Nitroaromatics and Nitramines (Explosives)

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG1400979-3	**Basis:**	NA
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	8330B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
HMX	ND	U	0.098	0.010	1	02/06/14	02/07/14	KWG1400979	
RDX	ND	U	0.098	0.017	1	02/06/14	02/07/14	KWG1400979	
1,3,5-Trinitrobenzene	ND	U	0.20	0.050	1	02/06/14	02/07/14	KWG1400979	
1,3-Dinitrobenzene	ND	U	0.098	0.0085	1	02/06/14	02/07/14	KWG1400979	
3,5-Dinitroaniline	ND	U	0.098	0.013	1	02/06/14	02/07/14	KWG1400979	
TETRYL	ND	U	0.10	0.042	1	02/06/14	02/07/14	KWG1400979	
Nitrobenzene	ND	U	0.098	0.013	1	02/06/14	02/07/14	KWG1400979	
4-Amino-2,6-dinitrotoluene	ND	U	0.098	0.016	1	02/06/14	02/07/14	KWG1400979	
2-Amino-4,6-dinitrotoluene	ND	U	0.098	0.0089	1	02/06/14	02/07/14	KWG1400979	
2,4,6-Trinitrotoluene	ND	U	0.098	0.026	1	02/06/14	02/07/14	KWG1400979	
2,6-Dinitrotoluene	**0.068**	JN	0.20	0.054	1	02/06/14	02/07/14	KWG1400979	
2,4-Dinitrotoluene	ND	U	0.098	0.0091	1	02/06/14	02/07/14	KWG1400979	
2-Nitrotoluene	ND	U	0.10	0.032	1	02/06/14	02/07/14	KWG1400979	
4-Nitrotoluene	ND	U	0.098	0.019	1	02/06/14	02/07/14	KWG1400979	
3-Nitrotoluene	ND	U	0.098	0.0064	1	02/06/14	02/07/14	KWG1400979	
Nitroglycerin	ND	U	0.98	0.39	1	02/06/14	02/07/14	KWG1400979	
Pentaerythritol Tetranitrate	ND	U	0.49	0.18	1	02/06/14	02/07/14	KWG1400979	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1-Chloro-3-nitrobenzene	75	23-98	02/07/14	Acceptable

Comments:

Client: Alpha Analytical Laboratories, Inc. (Uki
Service Request: K1401157
Project: 14B0089
Sample Matrix: Water

Surrogate Recovery Summary
Nitroaromatics and Nitramines (Explosives)

Extraction Method: METHOD
Units: Percent
Analysis Method: 8330B
Level: Low

Sample Name	Lab Code	Sur1
14B0089-01 FO-07 (Deep)	K1401157-001	85
Method Blank	KWG1400979-3	75
Duplicate Lab Control Sample	KWG1400979-1	82
Lab Control Sample	KWG1400979-2	91

Surrogate Recovery Control Limits (%)

Sur1 = 1-Chloro-3-nitrobenzene 23-98

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	Alpha Analytical Laboratories, Inc. (Uki	**Service Request:**	K1401157
Project:	14B0089	**Date Extracted:**	02/06/2014
Sample Matrix:	Water	**Date Analyzed:**	02/07/2014

Lab Control Spike/Duplicate Lab Control Spike Summary
Nitroaromatics and Nitramines (Explosives)

Extraction Method:	METHOD	**Units:**	ug/L
Analysis Method:	8330B	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG1400979

	Lab Control Sample KWG1400979-2 Lab Control Spike			Duplicate Lab Control Sample KWG1400979-1 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
HMX	7.75	8.00	97	7.46	8.00	93	11-147	4	30
RDX	7.53	8.00	94	7.26	8.00	91	10-142	4	30
1,3,5-Trinitrobenzene	7.54	8.00	94	7.01	8.00	88	16-137	7	30
1,3-Dinitrobenzene	7.51	8.00	94	7.03	8.00	88	26-125	7	30
3,5-Dinitroaniline	7.48	8.00	93	7.09	8.00	89	30-133	5	30
TETRYL	7.71	8.00	96	7.26	8.00	91	29-123	6	30
Nitrobenzene	7.43	8.00	93	6.93	8.00	87	10-116	7	30
4-Amino-2,6-dinitrotoluene	7.57	8.00	95	7.11	8.00	89	55-117	6	30
2-Amino-4,6-dinitrotoluene	7.47	8.00	93	7.00	8.00	88	54-116	6	30
2,4,6-Trinitrotoluene	7.53	8.00	94	6.93	8.00	87	47-118	8	30
2,6-Dinitrotoluene	7.57	8.00	95	6.95	8.00	87	40-108	9	30
2,4-Dinitrotoluene	7.46	8.00	93	6.83	8.00	85	50-111	9	30
2-Nitrotoluene	7.18	8.00	90	6.55	8.00	82	12-110	9	30
4-Nitrotoluene	7.21	8.00	90	6.58	8.00	82	16-113	9	30
3-Nitrotoluene	7.51	8.00	94	6.83	8.00	85	13-109	10	30
Nitroglycerin	7.71	8.00	96	7.43	8.00	93	15-136	4	30
Pentaerythritol Tetranitrate	7.81	8.00	98	7.35	8.00	92	66-103	6	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ASBESTOS TEM LABORATORIES, INC.

EPA 600/4-83 Drinking Water
Transmission Electron Microscopy
Analytical Report

Laboratory Job # 1288-00574

630 Bancroft Way
Berkeley, CA 94710
(510) 704-8930
FAX (510) 704-8429

ASBESTOS TEM LABORATORIES, INC

Certified by
CA DPH ELAP
Lab No. 1866

Feb/12/2014

David S. Pingatore
Alpha Analytical Laboratories, Inc.
208 Mason Street
Ukiah, CA 95482

RE: LABORATORY JOB # 1288-00574
Transmission electron microscopy analytical results for 1 water sample(s).
Job Site:
Job No.: 14B0089

Enclosed please find results for the TEM analysis of one or more water samples. The analytical procedures were performed according to EPA Method 100.2 for the analysis of asbestos in drinking water.

Prior to analysis, samples are checked for damage, disruption of any chain-of-custody seals, and completeness of accompanying paperwork. If no problems are found, samples are then logged-in, each given a unique laboratory number, and a hard copy containing all pertinent information is generated. This, and all other relevant paper work are kept with each sample throughout the analytical procedures to assure proper analysis.

Preparation of water samples is performed within a HEPA filtered, Class 100 air, laminar flow clean bench environment. Prior to filtration, water sample containers are ultrasonicated, and the exterior surfaces cleaned. An aliquot of water is drawn from the sample container and drawn through a special filtration apparatus and collected onto a mixed cellulose ester (MCE) or polycarbonate (PC) filter. The filters are removed from the apparatus and dried. A portion of each sample filter is sectioned, placed onto a glass microscope slide, and carbon coated. The filters are further sectioned and placed carbon side up onto 200-mesh copper TEM sample grids in a solvent bath until all filter material is dissolved. The TEM grids are removed and placed into labeled grid storage boxes.

TEM analysis is performed on a Philips EM-300 or CM-12 transmission electron microscope operating at 80 or 100 kV. Initially, the grid is scanned at low and medium magnification to insure proper sample loading, and coherence of the carbon support film. Then TEM grid openings are analyzed at a magnification of 10,000X. All fibers >10 um in length and exhibiting an aspect ratio >3:1 are analyzed. Scanning continues until either 100 asbestiform fibers >10um in length are counted, or an analytical sensitivity of 0.2 million fibers per liter (MFL) is achieved. Analyzed fibers are subjected to detailed morphological and selected area diffraction (SAED) analysis. Fibers indicated as asbestos, or potentially asbestos, are further analyzed by energy dispersive X-ray (EDX) analysis as needed. The number of asbestos fibers detected, and other analytical parameters, are then used to calculate the concentration of asbestos in MFL. The results are entered into a standard report format and reviewed by the analyst and the laboratory manager before release to the client.

Sincerely Yours,

Laboratory Manager
ASBESTOS TEM LABORATORIES, INC.

--- These results relate only to the samples tested and must not be reproduced, except in full, with the approval of the laboratory. This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government. ---

630 Bancroft Way • BERKELEY, CA 94710 • (510) 704-8930 • FAX (510) 704-8429
www.asbestostemlabs.com *With Offices in Reno, NV (775) 359-3377*

TRANSMISSION ELECTRON MICROSCOPY ANALYTICAL REPORT

Contact:	David S. Pingatore		
Address:	Alpha Analytical Laboratories, Inc. 208 Mason Street Ukiah, CA 95482	Report No.:	**323884**
		Date:	Feb-12-14
		Total Samples Analyzed:	1
Job Site / No.	14B0089	Sample Collector:	

CLIENT SAMPLE #	**14B0089-01**	**SAMPLE LOCATION/DESCRIPTION**	FO-07
Laboratory Sample #	1288-00574-001		

WATER SAMPLE DATA

Date/Time Collected	Feb-03-14 / 2:05 pm	Volume Submitted (ml)	1000
Date/Time Lab Received	Feb-04-14 / 4:48 pm	Volume Filtered (ml)	5
Date/Time Filtered	Feb-04-14 / 5:00 pm	Filter & Pore Size	MCE 0.22
Date/Time Analyzed	Feb-12-14 / 10:55 am	UV/Ozone Treated:	NO

IDENTIFIED STRUCTURES (>10um)			
ASBESTOS		OTHER	
CHRYS	AMPH	AMBIG	NON-ASB
NSD	NSD	NSD	NSD

CALCULATED ASBESTOS STRUCTURE CONCENTRATION (>10um)		
CHRYS	AMPH	TOTAL
< 0.1 MFL	< 0.1 MFL	< 0.1 MFL

COMMENTS

No asbestos detected

Filter Loading: MODERATE

SAED Photo ID Nos.

TEM / ANALYTICAL PARAMETERS

Grid Openings Scanned at 10,000X	24	Analytical Sensitivity	0.1 MFL
Grid Opening Area (mm2)	0.0094	95% UCL	0.33 MFL
Scan Area (mm2)	0.2256	95% LCL	0 MFL

WATER SAMPLE LAB BLANK RESULTS

Lab ID#	Blank 9483	Analytical Sensitivity	0.01 MFL
Grid Openings Scanned at 10,000X	8	Asbestos Structure Concentration	<0.01 MFL
Volume Filtered (ml)	300		

NOTATION KEY

Chrys. - Chrysotile Asbestos
Amph. - Amphibole Asbestos
NSD - No Structures Detected
1 mm = 1 millimeter

1 um = 1 micron = 0.001 mm
MFL = Millions of Fibers per Liter
UCL = Upper Confidence Level
LCL = Lower Confidence Level

ANALYST SIGNATURE

Stephanie Dunn

LAB QC REVIEWER SIGNATURE

WECK LABORATORIES, INC.
Analytical Laboratory Service - Since 1964

Certificate of Analysis

Report Date: 02/24/14 10:55
Received Date: 02/05/14 08:30
Turnaround Time: Normal

Project: 14B0089

Phones: (925) 872-9637
Fax: (707) 468-5267

P.O. #:

Attn: David S. Pingatore

Client: Alpha Analytical Laboratories - Ukiah
208 Mason St
Ukiah, CA 95482

Dear David S. Pingatore :

Enclosed are the results of analyses for samples received 2/5/2014 with the Chain of Custody document. The samples were received in good condition, at 1.7 °C and on ice. All analysis met the method criteria except as noted below or in the report with data qualifiers.

Lab Sample ID: 4B05035-01 **Sample ID: 14B0089-01 FO-07 (Deep)** **Matrix:** Water
Sampled by: Client **Sampled: 02/03/14 14:05**

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
N-Nitrosodiethylamine	ND		2.0	ng/l	1	EPA 1625M	2/10/14	2/11/14 22:56	W4B0362	
N-Nitrosodimethylamine	ND		2.0	ng/l	1	EPA 1625M	2/10/14	2/11/14 22:56	W4B0362	
N-Nitrosodi-n-butylamine	ND		2.0	ng/l	1	EPA 1625M	2/10/14	2/11/14 22:56	W4B0362	
N-Nitrosodi-n-propylamine	ND		2.0	ng/l	1	EPA 1625M	2/10/14	2/11/14 22:56	W4B0362	
N-Nitrosomethylethylamine	ND		2.0	ng/l	1	EPA 1625M	2/10/14	2/11/14 22:56	W4B0362	
N-Nitrosomorpholine	ND		2.0	ng/l	1	EPA 1625M	2/10/14	2/11/14 22:56	W4B0362	
N-Nitrosopiperidine	ND		2.0	ng/l	1	EPA 1625M	2/10/14	2/11/14 22:56	W4B0362	
N-Nitrosopyrrolidine	ND		2.0	ng/l	1	EPA 1625M	2/10/14	2/11/14 22:56	W4B0362	
17-a-Ethynylestradiol	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 20:03	W4B0281	
17-b-Estradiol	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 20:03	W4B0281	
Estrone	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 20:03	W4B0281	
Progesterone	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 20:03	W4B0281	
Testosterone	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 20:03	W4B0281	
Bisphenol A	**62**		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 0:33	W4B0283	
Gemfibrozil	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 0:33	W4B0283	
Ibuprofen	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 0:33	W4B0283	
Iopromide	ND		5.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 0:33	W4B0283	
Naproxen	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 0:33	W4B0283	
Salicylic Acid	ND		50	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 0:33	W4B0283	
Triclosan	ND		2.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 0:33	W4B0283	

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Lab Sample ID: 4B05035-01 **Sample ID:** 14B0089-01 FO-07 (Deep) **Matrix:** Water
Sampled by: Client **Sampled:** 02/03/14 14:05

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
Acetaminophen	ND		20	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
Amoxicillin	ND		10	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
Atenolol	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
Atorvastatin	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
Azithromycin	ND		10	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
Caffeine	**2.7**		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
Carbamazepine	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
Ciprofloxacin	ND		5.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
Cotinine	ND		2.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
DEET	**2.3**		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
Diazepam	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
Fluoxetine	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
Meprobamate	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
Methadone	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
Oxybenzone	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
Phenytoin	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
Primidone	ND		10	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	R-01
Sucralose	ND		5.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
Sulfamethoxazole	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
TCEP	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
TCPP	**2.5**		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	B
TDCPP	**3.1**		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	
Trimethoprim	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:59	W4B0282	

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Quality Control Section

Nitrosamines by isotopic dilution GC/MS CI Mode - Quality Control

Batch W4B0362 - EPA 1625M

Blank (W4B0362-BLK1) — **Prepared: 02/10/14 Analyzed: 02/11/14 19:08**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine		4.01	B-06	ng/l					
N-Nitrosomethylethylamine		ND		ng/l					
N-Nitrosodiethylamine		ND		ng/l					
N-Nitrosodi-n-propylamine		ND		ng/l					
N-Nitrosomorpholine		ND		ng/l					
N-Nitrosopyrrolidine		ND		ng/l					
N-Nitrosopiperidine		ND		ng/l					
N-Nitrosodi-n-butylamine		ND		ng/l					

LCS (W4B0362-BS1) — **Prepared: 02/10/14 Analyzed: 02/11/14 19:37**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine		2.87		ng/l	3.00	96	50-150		
N-Nitrosomethylethylamine		2.86		ng/l	3.00	95	50-150		
N-Nitrosodiethylamine		2.97		ng/l	3.00	99	50-150		
N-Nitrosodi-n-propylamine		3.77		ng/l	3.00	126	50-150		
N-Nitrosomorpholine		2.95		ng/l	3.00	98	50-150		
N-Nitrosopyrrolidine		3.15		ng/l	3.00	105	50-150		
N-Nitrosopiperidine		3.42		ng/l	3.00	114	50-150		
N-Nitrosodi-n-butylamine		5.24	Q-08	ng/l	3.00	175	50-150		

LCS Dup (W4B0362-BSD1) — **Prepared: 02/10/14 Analyzed: 02/11/14 20:05**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine		2.81		ng/l	3.00	94	50-150	2	30
N-Nitrosomethylethylamine		3.25		ng/l	3.00	108	50-150	13	30
N-Nitrosodiethylamine		4.22	Q-12	ng/l	3.00	141	50-150	35	30
N-Nitrosodi-n-propylamine		3.89		ng/l	3.00	130	50-150	3	30
N-Nitrosomorpholine		3.41		ng/l	3.00	114	50-150	15	30
N-Nitrosopyrrolidine		4.24		ng/l	3.00	141	50-150	29	30
N-Nitrosopiperidine		3.84		ng/l	3.00	128	50-150	12	30
N-Nitrosodi-n-butylamine		6.63	Q-08	ng/l	3.00	221	50-150	23	30

PPCPs - Pharmaceuticals by LC/MSMS-ESI+ - Quality Control

Batch W4B0282 - EPA 1694M-ESI+

Blank (W4B0282-BLK1) — **Prepared: 02/07/14 Analyzed: 02/18/14 22:39**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Acetaminophen		ND		ng/l					
Caffeine		ND		ng/l					
Sulfamethoxazole		ND		ng/l					
Trimethoprim		ND		ng/l					
Azithromycin		ND		ng/l					
Cotinine		ND		ng/l					

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PPCPs - Pharmaceuticals by LC/MSMS-ESI+ - Quality Control

Batch W4B0282 - EPA 1694M-ESI+

Blank (W4B0282-BLK1) — **Prepared: 02/07/14 Analyzed: 02/18/14 22:39**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Atenolol		ND		ng/l					
Ciprofloxacin		ND		ng/l					
Carbamazepine		ND		ng/l					
DEET		ND		ng/l					
Fluoxetine		ND		ng/l					
Atorvastatin		ND		ng/l					
Methadone		ND		ng/l					
Primidone		ND		ng/l					
Diazepam		ND		ng/l					
TCPP		2.23	B	ng/l					
TCEP		ND		ng/l					
TDCPP		ND		ng/l					
Phenytoin		ND		ng/l					
Amoxicillin		ND		ng/l					
Meprobamate		ND		ng/l					
Sucralose		ND		ng/l					
Oxybenzone		ND		ng/l					

LCS (W4B0282-BS1) — **Prepared: 02/07/14 Analyzed: 02/18/14 22:53**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Acetaminophen		435		ng/l	400	109	66-156		
Caffeine		17.4		ng/l	20.0	87	55-152		
Sulfamethoxazole		17.6		ng/l	20.0	88	60-133		
Trimethoprim		18.6		ng/l	20.0	93	67-139		
Azithromycin		199		ng/l	200	100	52-166		
Cotinine		22.6		ng/l	20.0	113	68-155		
Atenolol		21.0		ng/l	20.0	105	56-164		
Ciprofloxacin		83.8		ng/l	100	84	51-168		
Carbamazepine		19.3		ng/l	20.0	96	60-135		
DEET		15.5		ng/l	20.0	78	45-135		
Fluoxetine		23.8		ng/l	20.0	119	55-150		
Atorvastatin		16.3		ng/l	20.0	82	0.1-173		
Methadone		19.0		ng/l	20.0	95	62-137		
Primidone		17.1		ng/l	20.0	86	54-147		
Diazepam		18.3		ng/l	20.0	92	58-127		
TCPP		18.1		ng/l	20.0	90	24-149		
TCEP		17.5		ng/l	20.0	88	25-149		
TDCPP		17.7		ng/l	20.0	88	20-158		
Phenytoin		18.2		ng/l	20.0	91	69-138		
Amoxicillin		164		ng/l	200	82	14-167		
Meprobamate		20.5		ng/l	20.0	102	11-166		
Sucralose		95.7		ng/l	100	96	50-150		
Oxybenzone		15.4		ng/l	20.0	77	50-150		

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PPCPs - Pharmaceuticals by LC/MSMS-ESI+ - Quality Control

Batch W4B0282 - EPA 1694M-ESI+

LCS Dup (W4B0282-BSD1) — **Prepared: 02/07/14 Analyzed: 02/18/14 23:07**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Acetaminophen		499		ng/l	400	125	66-156	14	30
Caffeine		18.2		ng/l	20.0	91	55-152	4	30
Sulfamethoxazole		19.4		ng/l	20.0	97	60-133	10	30
Trimethoprim		18.4		ng/l	20.0	92	67-139	1	30
Azithromycin		206		ng/l	200	103	52-166	3	30
Cotinine		26.7		ng/l	20.0	134	68-155	17	30
Atenolol		23.0		ng/l	20.0	115	56-164	9	30
Ciprofloxacin		83.4		ng/l	100	83	51-168	0.5	30
Carbamazepine		19.7		ng/l	20.0	98	60-135	2	30
DEET		16.4		ng/l	20.0	82	45-135	6	30
Fluoxetine		22.8		ng/l	20.0	114	55-150	4	30
Atorvastatin		15.1		ng/l	20.0	76	0.1-173	8	30
Methadone		19.1		ng/l	20.0	96	62-137	0.5	30
Primidone		16.2		ng/l	20.0	81	54-147	5	30
Diazepam		18.9		ng/l	20.0	94	58-127	3	30
TCPP		21.0		ng/l	20.0	105	24-149	15	30
TCEP		20.6		ng/l	20.0	103	25-149	16	30
TDCPP		18.9		ng/l	20.0	94	20-158	7	30
Phenytoin		18.4		ng/l	20.0	92	69-138	1	30
Amoxicillin		164		ng/l	200	82	14-167	0	30
Meprobamate		20.6		ng/l	20.0	103	11-166	0.5	30
Sucralose		93.0		ng/l	100	93	50-150	3	30
Oxybenzone		18.3		ng/l	20.0	92	50-150	17	30

PPCPs - Pharmaceuticals by LC/MSMS-ESI- - Quality Control

Batch W4B0283 - EPA 1694M-ESI-

Blank (W4B0283-BLK1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:08**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Bisphenol A		1.99	B	ng/l					
Gemfibrozil		ND		ng/l					
Ibuprofen		ND		ng/l					
Naproxen		ND		ng/l					
Salicylic Acid		ND		ng/l					
Triclosan		ND		ng/l					
Iopromide		ND		ng/l					

LCS (W4B0283-BS1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:22**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Bisphenol A		19.5		ng/l	20.0	98	53-168		
Gemfibrozil		18.0		ng/l	20.0	90	76-122		
Ibuprofen		17.7		ng/l	20.0	88	67-139		
Naproxen		17.3		ng/l	20.0	86	64-138		
Salicylic Acid		171		ng/l	200	86	56-229		

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PPCPs - Pharmaceuticals by LC/MSMS-ESI- - Quality Control

Batch W4B0283 - EPA 1694M-ESI-

LCS (W4B0283-BS1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:22**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Triclosan		38.9		ng/l	40.0	97	76-139		
Iopromide		114		ng/l	100	114	0.1-163		

LCS Dup (W4B0283-BSD1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:37**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Bisphenol A		18.4		ng/l	20.0	92	53-168	6	30
Gemfibrozil		18.3		ng/l	20.0	92	76-122	2	30
Ibuprofen		19.8		ng/l	20.0	99	67-139	11	30
Naproxen		19.1		ng/l	20.0	96	64-138	10	30
Salicylic Acid		183		ng/l	200	92	56-229	7	30
Triclosan		40.5		ng/l	40.0	101	76-139	4	30
Iopromide		104		ng/l	100	104	0.1-163	9	30

PPCPs - Hormones by LC/MSMS-APCI - Quality Control

Batch W4B0281 - EPA 1694M-APCI

Blank (W4B0281-BLK1) — **Prepared: 02/07/14 Analyzed: 02/19/14 16:58**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
17-a-Ethynylestradiol		ND		ng/l					
17-b-Estradiol		ND		ng/l					
Estrone		ND		ng/l					
Progesterone		ND		ng/l					
Testosterone		ND		ng/l					

LCS (W4B0281-BS1) — **Prepared: 02/07/14 Analyzed: 02/19/14 17:15**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
17-a-Ethynylestradiol		19.1		ng/l	20.0	96	68-159		
17-b-Estradiol		18.0		ng/l	20.0	90	65-146		
Estrone		17.6		ng/l	20.0	88	59-141		
Progesterone		17.8		ng/l	20.0	89	58-154		
Testosterone		24.8		ng/l	20.0	124	60-172		

LCS Dup (W4B0281-BSD1) — **Prepared: 02/07/14 Analyzed: 02/19/14 17:31**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
17-a-Ethynylestradiol		18.9		ng/l	20.0	94	68-159	1	30
17-b-Estradiol		18.4		ng/l	20.0	92	65-146	2	30
Estrone		18.3		ng/l	20.0	92	59-141	4	30
Progesterone		18.1		ng/l	20.0	90	58-154	2	30
Testosterone		26.0		ng/l	20.0	130	60-172	5	30

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Notes:
The Chain of Custody document is part of the analytical report.
Any remaining sample(s) for testing will be disposed of one month from the final report date unless other arrangements are made in advance.
All results are expressed on wet weight basis unless otherwise specified.

An Absence of Total Coliform meets the drinking water standards as established by the State of California Department of Health Services.
The Reporting Limit (RL) is referenced as laboratory's Practical Quantitation Limit (PQL).
For Potable water analysis, the Reporting Limit (RL) is referenced as Detection Limit for reporting purposes (DLRs) defined by EPA.

If sample collected by Weck Laboratories, sampled in accordance to lab SOP MIS002

Authorized Signature
Contact: Kim G Tu
(Project Manager)

ELAP # 1132
LACSD # 10143
NELAC # 04229CA

The results in this report apply to the samples analyzed in accordance with the chain of custody document. Weck Laboratories certifies that the test results meet all requirements of NELAC unless noted in the Case Narrative. This analytical report must be reproduced in its entirety.

Flags for Data Qualifiers:

B	Blank contamination. The analyte was found in the associated blank as well as in the sample.
B-06	This analyte was found in the method blank, which was possibly contaminated during sample preparation. The batch was accepted since this analyte was either not detected or more than 10 times of the blank value for all the samples in the batch.
Q-08	High bias in the QC sample does not affect sample result since analyte was not detected or below the reporting limit.
Q-12	The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on the percent recoveries and/or other acceptable QC data.
R-01	The Reporting Limit for this analyte has been raised to account for matrix interference.
ND	NOT DETECTED at or above the Reporting Limit. If J-value reported, then NOT DETECTED at or above the Method Detection Limit (MDL).
Sub	Subcontracted analysis, original report enclosed.
DL	Method Detection Limit
RL	Method Reporting Limit
MDA	Minimum Detectable Activity
NR	Not Reportable

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ISOTECH

ISOTECH LABORATORIES INC

ANALYSIS REPORT

Water Analysis

Lab Number: 410668 Job Number: 24232 IS-69368

Sample Name: FO-07 (DEEP)

Company Lab #:

Company Job #:

Company: Alpha Analytical, Inc.

API/Well:

Field or Site: WO 14B0089

Location:

Depth/Formation:

Container Type: 1 Liter Plastic Bottle

Date Sampled: 2/03/2014 Date Received 2/05/2014 Date Reported: 2/26/2014

δD of water	----------	na
$\delta^{18}O$ of water	----------	na
Tritium content of water	----------	< 1.00 TU
$\delta^{13}C$ of DIC	----------	na
^{14}C content of DIC	----------	na
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na

Remarks:

LABORATORY REPORT

This report contains 7 pages.
(including the cover page)

If you have any questions concerning this report, please do not hesitate to call us at (800) 332-4345 or (574) 233-4777.

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UL LLC
110 S. Hill St., South Bend, IN 46617-2702 USA
T: 800.332.4345 / F: 574.233.8207 / W: UL.com

NELAC NARRATIVE PAGE

Client: Alpha Analytical Report #: 311112NP

Underwriters Laboratories is a NELAP accredited laboratory. All reported results meet the requirements of the NELAC standards, unless otherwise noted.

UL contact person: James Van Fleit

NELAP requires complete reporting of deviations from method requirements, regardless of the suspected impact on the data. Quality control failures not reported within the report summary are noted here.

There were no quality control failures.

Note: This report may not be reproduced, except in full, without written approval from UL. UL is accredited by the National Environmental Laboratory Accreditation Program (NELAP).

Authorized Signature Title Date

UL LLC
110 S. Hill St., South Bend, IN 46617-2702 USA
T: 800.332.4345 / F: 574.233.8207 / W: UL.com

Laboratory Report

Client: Alpha Analytical

Attn: David Pingatore
6398 Dougherty Road, Suite 35
Dublin, CA 94568

Report: 311112
Priority: Standard Written
Status: Final
PWS ID: Not Supplied

Copies to: None

Sample Information

UL ID #	Client ID	Method	Collected Date / Time	Collected By:	Received Date / Time
2968123	14B0089-01	905.0	02/03/14 14:05	Client	02/06/14 09:45
2968124	14B0089-01	7500-Ra B	02/03/14 14:05	Client	02/06/14 09:45
2968124	14B0089-01	7500-Ra D	02/03/14 14:05	Client	02/06/14 09:45
2968125	14B0089-01	7110 B	02/03/14 14:05	Client	02/06/14 09:45
2968126	14B0089-01	1613	02/03/14 14:05	Client	02/06/14 09:45
2968127	14B0089-01	300.1	02/03/14 14:05	Client	02/06/14 09:45
2968128	14B0089-01	300.0	02/03/14 14:05	Client	02/06/14 09:45

Report Summary

Note: See attached page for additional comments.

Note: Sample containers were provided by the client except for Methods 300.0 and 300.1.

Note: Dioxin analysis was performed by Pace Analytical Services, Minneapolis, MN.

Note: Strontium-90 analysis was performed by GEL Laboratories, Charleston, SC.

Detailed quantitative results are presented on the following pages. The results presented relate only to the samples provided for analysis.

We appreciate the opportunity to provide you with this analysis. If you have any questions concerning this report, please do not hesitate to call James Van Fleit at (574) 233-4777.

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Authorized Signature | Title | Date

Client Name: Alpha Analytical
Report #: 311112

UL LLC
110 S. Hill St., South Bend, IN 46617-2702 USA
T: 800.332.4345 / F: 574.233.8207 / W: UL.com

Client Name: Alpha Analytical

Report #: 311112

Sampling Point: 14B0089-01

PWS ID: Not Supplied

General Chemistry

Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	UL ID #
14998-27-7	Chlorite	300.0	1000 *	20	< 20	ug/L	---	02/07/14 07:05	2968128
15541-45-4	Bromate	300.1	10 *	5.0	< 5.0	ug/L	---	02/07/14 18:21	2968127

Radionuclides

Analyte ID #	Analyte	Method	Reg Limit	DL**	Result	Units	Preparation Date	Analyzed	UL ID #
---	Gross Alpha	7110 B	15 *	3.0	**3.0 ± 0.5**	pCi/L	02/24/14 09:07	02/27/14 13:25	2968125
---	Gross Beta	7110 B	50 *	4.0	**4.5 ± 0.5**	pCi/L	02/24/14 09:07	02/27/14 13:25	2968125
13982-63-3	Radium-226	7500-Ra B	3 *	1.00	0.47 ± 0.43	pCi/L	02/21/14 09:22	02/27/14 15:45	2968124
15262-20-1	Radium-228	7500-Ra D	2 *	1.00	0.44 ± 0.38	pCi/L	02/21/14 09:22	03/03/14 14:08	2968124
---	Combined Radium	calc.	5 *	1.00	0.91 ± 0.57	pCi/L	02/21/14 09:22	03/03/14 14:08	2968124

** Detection Limit (DL) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Reference Lab Tests

Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	UL ID #
1746-01-6	Dioxin	1613	30 *	5	< 5	pg/L	03/03/14 00:00	03/04/14 14:37	2968126
---	Strontium-90	905.0	8 *	2.00	**-0.439 ± 0.720**	pCi/L	---	02/24/14 09:53	2968123

† UL has demonstrated it can achieve these report limits in reagent water, but can not document them in all sample matrices.

Reg Limit Type:	MCL	SMCL	AL
Symbol:	*	^	!

Lab Definitions

Continuing Calibration Check Standard (CCC) / Continuing Calibration Verification (CCV) / Initial Calibration Verification Standard (ICV) / Initial Performance Check (IPC) - is a standard containing one or more of the target analytes that is prepared from the same standards used to calibrate the instrument. This standard is used to verify the calibration curve at the beginning of each analytical sequence, and may also be analyzed throughout and at the end of the sequence. The concentration of continuing standards may be varied, when prescribed by the reference method, so that the range of the calibration curve is verified on a regular basis.

Internal Standards (IS) - are pure compounds with properties similar to the analytes of interest, which are added to field samples or extracts, calibration standards, and quality control standards at a known concentration. They are used to measure the relative responses of the analytes of interest and surrogates in the sample, calibration standard or quality control standard.

Laboratory Duplicate (LD) - is a field sample aliquot taken from the same sample container in the laboratory and analyzed separately using identical procedures. Analysis of laboratory duplicates provides a measure of the precision of the laboratory procedures.

Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS) - is an aliquot of reagent water to which known concentrations of the analytes of interest are added. The LFB is analyzed exactly the same as the field samples. LFBs are used to determine whether the method is in control.

Laboratory Method Blank (LMB) / Laboratory Reagent Blank (LRB) - is a sample of reagent water included in the sample batch analyzed in the same way as the associated field samples. The LMB is used to determine if method analytes or other background contamination have been introduced during the preparation or analytical procedure. The LMB is analyzed exactly the same as the field samples.

Laboratory Trip Blank (LTB) / Field Reagent Blank (FRB) - is a sample of laboratory reagent water placed in a sample container in the laboratory and treated as a field sample, including storage, preservation, and all analytical procedures. The FRB/LTB container follows the collection bottles to and from the collection site, but the FRB/LTB is not opened at any time during the trip. The FRB/LTB is primarily a travel blank used to verify that the samples were not contaminated during shipment.

Matrix Spike Duplicate Sample (MSD) / Laboratory Fortified Sample Matrix Duplicate (LFSMD) - is a sample aliquot taken from the same field sample source as the Matrix Spike Sample to which known quantities of the analytes of interest are added in the laboratory. The MSD is analyzed exactly the same as the field samples. Analysis of the MSD provides a measure of the precision of the laboratory procedures in a specific matrix.

Matrix Spike Sample (MS) / Laboratory Fortified Sample Matrix (LFSM) - is a sample aliquot taken from field sample source to which known quantities of the analytes of interest are added in the laboratory. The MS is analyzed exactly the same as the field samples. The purpose is to demonstrate recovery of the analytes from a sample matrix to determine if the specific matrix contributes bias to the analytical results.

Quality Control Standard (QCS) / Second Source Calibration Verification (SSCV) - is a solution containing known concentrations of the analytes of interest prepared from a source different from the source of the calibration standards. The solution is obtained from a second manufacturer or lot if the lot can be demonstrated by the manufacturer as prepared independently from other lots. The QCS sample is analyzed using the same procedures as field samples. The QCS is used as a check on the calibration standards used in the method on a routine basis.

Reporting Limit Check (RLC) / Initial Calibration Check Standard (ICCS) - is a procedural standard that is analyzed each day to evaluate instrument performance at or below the minimum reporting limit (MRL).

Surrogate Standard (SS) / Surrogate Analyte (SUR) - is a pure compound with properties similar to the analytes of interest, which is highly unlikely to be found in any field sample, that is added to the field samples, calibration standards, blanks and quality control standards before sample preparation. The SS is used to evaluate the efficiency of the sample preparation process.

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

14B0089

SENDING LABORATORY:	**RECEIVING LABORATORY:**
Alpha Analytical Laboratories, Inc.	Zymax
208 Mason St.	600 S. Andreasen Drive, Suite B
Ukiah, CA 95482	Escondido, CA 92029
Phone: (707)468-0401	Phone :(760) 781-3338
Fax: (707)468-5267	Fax: (760) 781-3339
Project Manager: David S. Pingatore	**Terms: Net 30**

Analysis	Due	Expires	Comments
14B0089-01 FO-07 (Deep) [Water] Sampled 02/03/14 14:05 Pacific			43453-1
N and O Isotopes of Nitrate	02/18/14 12:00	02/10/14 14:05	
Oxygen 18 - Isotope / Hydroger	02/18/14 12:00	08/02/14 14:05	

Containers Supplied:

250 mL Poly Unpres (AQ) 250 mL Poly Unpres (AR)

☐ *Report to State*

System Name: _____ **Employed by:** _____

User ID: _____ **Sampler:** _____

System Number: _____

+QC

Released By	Date	Received By	Date
[signature]	2-4-14	[signature]	2/5/14 9:05
Released By	Date	Received By	Date

David S. Pingatore
Project Manager
Alpha Analytical Laboratories, Inc.
208 Mason Street
Ukiah, CA 95482
Tel: 707.468.0401
Fax: 707.468.5267
Project: 14B0089
Email: david @ alpha.com

Dr. Yi Wang
Director of ZymaX Forensics Isotope
Senior Environmental Geochemist, PACE
600 S. Andreasen Dr., Suite B
Escondido, CA 92029
Tel: 760.781.3338 ext 202
Fax: 760.781.3339
Cell: 609.721.2843
Email: yi.wang@zymaxusa.com

REPORT OF ENVIRONMENTAL FORENSICS ISOTOPE ANALYSES

Date Received: February 5th, 2014
Date Reported: March 20th, 2014

Sample from Alpha Analytical Labs for $\delta^{15}N$ (‰ Air), $\delta^{18}O$ and δD (‰ VSMOW) stable isotope analysis

ZymaX ID	Client ID/Sample Description	$\delta^{18}O_{H2O}$	δD_{H2O}	$\delta^{15}N_{NO3}$	$\delta^{18}O_{NO3}$
43453-1	14B0089-01 FO-07 (Deep)	-7.18	-48.55	U -	U -
	Analytical precision (1σ)	0.06	0.32	0.2	0.4

U - Either there was no peak corresponding to the target analyte or that such a peak did not produce a reliable CSIA result

ZymaX ID	$\delta^{18}O_{H2O}$	δD_{H2O}	$\delta^{15}N_{NO3}$	$\delta^{18}O_{NO3}$
QC-01	-5.89	-41.12	4.5	25.3
QC-02	-5.98	-41.57	4.8	25.9
Mean	-5.94	-41.35	4.7	25.6
Analytical Precision (1σ)	0.06	0.32	0.2	0.4

ZymaX Forensics Isotope Services

Product or Dissolved Organics: Chlorinated Solvents, Oil, Extract, Fraction and Kerogen
3D-CSIA of ^{13}C, ^{37}Cl, and ^{2}H for PCE, TCE, DCE, MTBE, BTEX, PAHs, Pesticides, Alkanes, Gasoline and Oil; Bulk ^{13}C, ^{2}H, ^{18}O, ^{34}S, and ^{15}N
Gas Sample
Gas Composition and 2D-CSIA of ^{13}C and ^{2}H of C1 to C5; ^{13}C of CO_2; ^{14}C of C1 and CO_2; ^{34}S of H_2S; ^{15}N and ^{18}O of N_2O gas
Water and Dissolved Inorganics
^{2}H, ^{3}H and ^{18}O; ^{34}S and ^{18}O of dissolved sulfate; ^{34}S of dissolved H_2S
^{15}N and ^{18}O of dissolved Nitrate; ^{15}N of Ammonia; ^{13}C of dissolved CO_2 and Carbonate/Bicarbonate
Soil and Minerals
^{13}C, ^{18}O, ^{15}N, ^{34}S, D/H; ^{14}C of carbonate or organics
Post-Analysis Forensic Isotope Data Interpretation

Laboratory Order - Summary

analytical chemistry for a better environment

Report To:	David S. Pingatore Alpha Analytical Laboratories, Inc. 208 Mason St. Ukiah, CA. 95482	Date Received: Date Due: Project:	02/05/2014 9:05AM 04/28/2014 12:00AM 14B0089
Phone: Fax:	(707) 468-0401 (707) 468-5267	Project Number:	

Lab Number	Description	Analysis	Dept
43453-1	14B0089-01 FO-07	d15N and d18O of NO3	M6
		d18O+dD of H2O	M6

Notes/Special Instructions	SC Login/Computer Login CY/CY	DPRA PM: YW

ZymaX FORENSICS

Condition Upon Reciept

Lab Number: 43453 Client: AAL

Sample Temprature (should be 2-6 degrees C): 1.9°C

Do the sample descriptions on the containers match the discriptions on the COC? ☒ Yes ☐ No

Do the sample dates on the containers match the sample dates on the COC? ☒ Yes ☐ No

Are the samples within holding time for each analysis at time of reciept? ☒ Yes ☐ No ☐ N/A

Do the number of containers received match the number listed on the COC, and are all of the necessary containers for the required analysis available? ☒ Yes ☐ No ☐ N/A

Does the preservation of the samples match the notation on the COC, and is the preservation correct for requested analysis? ☐ Yes ☐ No ☐ N/A ☒ Zymax

Are all of the samples intact with no headspace, if required for analysis? ☒ Yes ☐ No

Did samples arrive with custody seal intact? ☒ Yes ☐ No ☐ N/A

Sample Control Signature: [signature] Date: 2/5/14 Time: 9:05

Client Discrepancies

Contacted: _____ Date: _____ Sample Control Initials: _____

Discrepancy: _____

Solution: _____

Contacted: _____ Date: _____ Sample Control Initials: _____

Discrepancy: _____

Solution: _____

Contacted: _____ Date: _____ Sample Control Initials: _____

Discrepancy: _____

Solution: _____

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com

Laboratory & Corporate: 208 Mason Street, Ukiah, CA 95482
707-468-0401 Fax: 707-468-5267

Service Center & Micro Lab: 6398 Dougherty Rd, Ste 35, Dublin, CA 94568
925-828-6226 Fax: 925-828-6309

Chain of Custody Record

Reports and Invoices will be delivered by email in .pdf format.

Lab No. 14B0089

Signature below authorizes work under terms stated on reverse side.

Report to:
Company: Todd Engineers
Attn: Dr. Bill Motzer
Address: 2490 Mariner Square Loop, Suite 215, Alameda, CA 94501
Phone/Fax: 510.747.6920 / 510.747.6921
Email Address: bmotzer@toddengineers.com

Invoice to (if different):
Company:
Attn:
Address:
Phone/Fax:
Email Address:

Project Info for Report:
Project ID: Groundwater Reuse Project
Project No: Project # 60408
PO/Reference :

Samplers Signature:
Print: Jesse Ortiz

TAT: 10 days ● RUSH: 5 days ○ 48 hours ○ Other: ___ days ○
Lab Approval Required For Rush TATs
Sample Notes (lab use only)
Temperature: 1.9 deg. C
Shipment Method:
Custody Seals: Y / N

Sample Identification	Sampled: Date	Sampled: Time	Container: 40ml VOA	Poly	Amber glass	Soil jar	Preservative: NaOH	HNO3	H2SO4	Other	None	Matrix: Water	Soil	Total Number of Containers	Inorganics Scan, DU-General Physical Scan	200.7 - Ca, K, Mg, Na	200.8 - Ag, B, Cu, Fe, Mn, U, V, Zn	Bicarbonate, Chloride, Conductivity	MBAS, Perchlorate, TDS, Sulfate	HAA5, TOC	507, 508, 515, 525 DHS, 531, 547, 548, 549	504.1, 524.2 Sample Traps scan	Asbestos DW (sub TEM Lab) ~~B-45~~	Cr6 218.6 DW (sub MAI) - DU Refer	Dioxin 2,3,7,8 TCDD DW (sub UL)	Sample Notes or CDPH Source Numbers:
FO-07 (deep)	2-3-14	1405		x	x		x	x			x	x		4	x	x	x	x	x							
			x		x					x		x		3						x						
				x	x					x	x	x		10							x					(507/508/515.1 = one 1L BRA ea)
			x							x		x		7								x				
					x						x	x		2									x			
				x						x		x		1										x		
					x						x	x		2											x	
Trip blank ($0.00 analysis)	2-3-14	1405	x							x	x	x		2							x					

Relinquished by:	Received by:	Date:	Time:
[signature]	[signature]	2-3-14	15:10
[signature]	[signature]	2-3-14	1700
Lucci	Lucci	2-3-14	1930
	LAB Lucci	2-3-14	2130

CDPH Write On EDT Transmission? ○ Yes ○ No
State System Number:
If "Y" please enter the Source Number(s) in the column above

CA Geotracker EDF Report? ○ Yes ○ No
Global ID: Sampling Company Log Code:
EDF to (Email Address):
Travel and Site Time: Mileage: Misc. Supplies:

Chain of Custody Record

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com

Laboratory & Corporate: 208 Mason Street, Ukiah, CA 95482
707-468-0401 Fax: 707-468-5267

Service Center & Micro Lab: 6398 Dougherty Rd, Ste 35, Dublin, CA 94568
925-828-6226 Fax: 925-828-6309

Reports and Invoices will be delivered by email in .pdf format

Lab No. 14B0089

Signature below authorizes work under terms stated on reverse side.

Report to:	Invoice to (if different):	Project Info for Report:
Company: Todd Engineers	Company:	Project ID: Groundwater Reuse Project
Attn: Dr. Bill Motzer	Attn:	
Address: 2490 Mariner Square Loop, Suite 215 Alameda, CA 94501	Address:	Project No: Project # 60408
Phone/Fax: 510.747.6920 / 510.747.6921	Phone/Fax:	PO/Reference :
Email Address: bmotzer@toddengineers.com	Email Address:	

Samplers Signature:

Print: Jose Ortiz

TAT: 10 days ● RUSH: 5 days ○ 48 hours ○ Other: ___days ○

Lab Approval Required For Rush TATs

Sample Notes (lab use only): Temperature: 4 deg. C; Shipment Method:; Custody Seals: Y / N

Sample Identification	Sampled: Date	Sampled: Time	Container: 40ml VOA	Container: Poly	Container: Amber glass	Container: Soil jar	Preservative: HCL	Preservative: HNO3	Preservative: H2SO4	Preservative: Other	Preservative: None	Matrix: Water	Matrix: Soil	Total Number of Containers	8330B Explosives (sub ALS)	PPCP Hormones 1694M (sub Weck)	PPCP Negative Pharmas 1694M (sub Weck)	PPCP Positive Pharmas 1694M (sub Weck)	Nitrosamines LL 1625M (sub Weck)	Gross A & B, R226 &R228, Sr 90 (sub UL)	Bromate 300.1, Chlorite 300.0 (sub UL)	Tritium, Enriched (sub Isotech)	Oxygen 18 Isotope (sub Zymax)	N and O Isotopes of NO3 (sub Zymax)	j-flag MDL reporting + Standard excel EDD	Sample Notes or CDPH Source Numbers:
FO-07 (deep)	2-3-14	1405			x						x	x		2	x										x	
					x					x		x		2		x	x	x								
					x						x	x		2					x							
				x				x				x		4						x						
				x						x		x		2							x					
				x							x	x		1								x				
				x							x	x		1									x			
				x							x	x		1										x		

Relinquished by:	Received by:	Date:	Time:
[signature]	[signature]	2-3-14	15:10
[signature]	[signature]	2-3-14	1850
[signature]	[signature]	2-3-14	2130

CDPH Write On EDT Transmission? ○ Yes ○ No

State System Number:

If "Y" please enter the Source Number(s) in the column above

CA Geotracker EDF Report? ○ Yes ○ No

Global ID: Sampling Company Log Code:

EDF to (Email Address):

Travel and Site Time: Mileage: Misc. Supplies:

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com
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Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

ELAP Certificate Numbers 1551 and 2728

18 February 2014

Todd Groundwater
Attn: Dr. Bill Motzer
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501
RE: Groundwater Reuse Project
Work Order: 14A1714

Enclosed are the results of analyses for samples received by the laboratory on 01/30/14 21:25. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jeanette Poplin

Jeanette L. Poplin For David S. Pingatore
Project Manager

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com
Corporate: 208 Mason St., Ukiah, CA 95482 • Phone: (707) 468-0401 • Fax: (707) 468-5267
Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Santa Margarita ASR MW-1	14A1714-01	Water	01/30/14 14:50	01/30/14 21:25
Trip Blank	14A1714-02	Water	01/30/14 14:50	01/30/14 21:25

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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e-mail: clientservices@alpha-labs.com
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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Metals (Drinking Water) by EPA 200 Series Methods
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
Mercury	**0.85**	0.060	1.0	ug/l	1	AA43136	02/05/14 09:00	02/05/14 13:41	EPA 245.1	J

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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e-mail: clientservices@alpha-labs.com
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Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Metals by EPA 200 Series Methods
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
Calcium	**76**	0.010	1.0	mg/l	1	AA43133	01/31/14 14:45	02/05/14 14:13	EPA 200.7	
Magnesium	**22**	0.0080	1.0	"	"	"	"	"	"	
Potassium	**5.1**	0.0080	1.0	"	"	"	"	"	"	
Sodium	**91**	0.020	1.0	"	"	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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e-mail: clientservices@alpha-labs.com
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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Metals by EPA Method 200.8 ICP/MS
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
Aluminum	**4.8**	2.0	50	ug/l	1	AB40328	02/03/14 09:47	02/05/14 14:55	EPA 200.8	J
Antimony	**0.34**	0.020	6.0	"	"	"	"	"	"	J
Arsenic	**1.6**	0.070	2.0	"	"	"	"	"	"	J
Barium	**66**	0.030	100	"	"	"	"	"	"	J
Beryllium	ND	0.020	1.0	"	"	"	"	"	"	U
Boron	**90**	6.0	50	"	"	"	"	"	"	
Cadmium	**0.51**	0.020	1.0	"	"	"	"	"	"	J
Chromium	ND	0.080	10	"	"	"	"	"	"	U
Copper	**4.3**	0.040	0.50	"	"	"	"	"	"	
Iron	**21**	1.8	50	"	"	"	"	"	"	J
Lead	**0.78**	0.020	5.0	"	"	"	"	"	"	J
Manganese	**23**	0.030	5.0	"	"	"	"	"	"	
Nickel	**4.0**	0.060	10	"	"	"	"	"	"	J
Selenium	**1.8**	0.070	5.0	"	"	"	"	"	"	J
Silver	ND	0.020	0.10	"	"	"	"	"	"	U
Thallium	ND	0.020	1.0	"	"	"	"	"	"	U
Uranium	**1.3**	0.020	1.0	pCi/l	"	"	"	"	"	
Vanadium	**0.76**	0.30	1.0	ug/l	"	"	"	"	"	J
Zinc	**25**	0.50	5.0	"	"	"	"	"	"	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Conventional Chemistry Parameters by APHA/EPA Methods
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
Bicarbonate	**270**	0.060	5.0	mg/l	1	AA43121	02/11/14 10:19	02/11/14 17:00	SM2320B	
Color	**3.0**	3.0	5.0	Color Units	"	AA43128	01/30/14 18:00	01/30/14 18:00	SM2120B	J
MBAS, calculated as LAS, mw 340	ND	0.030	0.050	mg/l	"	AA43107	01/31/14 14:45	02/04/14 16:00	SM5540C	U
Odor	ND		1.0	T.O.N.	"	AA43128	01/30/14 18:00	01/30/14 18:00	EPA 140.1	U
Perchlorate	ND	0.90	4.0	ug/l	"	AB41141	02/11/14 09:49	02/11/14 13:47	EPA 314.0	U
Specific Conductance (EC)	**900**	1.0	20	umhos/cm	"	AA43147	01/31/14 17:00	01/31/14 17:00	SM2510B	
Total Dissolved Solids	**560**	5.0	10	mg/l	"	AB40322	02/03/14 09:00	02/05/14 08:30	SM2540C	
Turbidity	**0.37**	0.040	0.10	NTU	"	AA43129	01/30/14 18:00	01/30/14 18:00	SM2130B	
Nitrate + Nitrite as N	**0.094**	0.0086	0.40	mg/l	"	AB41339	02/13/14 10:39	02/13/14 11:18	EPA 300.0	J
Total Organic Carbon	**0.627**	0.100	0.300	"	"	AB40803	02/08/14 12:46	02/08/14 22:38	SM5310C	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Miscellaneous Physical/Conventional Chemistry Parameters
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
Cyanide (total)	ND	0.0020	0.10	mg/l	1	AB40428	02/04/14 09:46	02/05/14 15:20	10-204-00-1X	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Anions by EPA Method 300.0
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
Nitrate as NO3	**0.42**	0.20	2.0	mg/l	1	AA43111	01/31/14 12:28	01/31/14 19:43	EPA 300.0	J
Chloride	**120**	0.30	5.0	"	10	"	"	01/31/14 19:28	"	
Fluoride	**0.15**	0.070	0.10	"	1	"	"	01/31/14 19:43	"	
Nitrite as N	ND	0.020	0.40	"	"	"	"	"	"	U
Sulfate as SO4	**73**	0.90	5.0	"	10	"	"	01/31/14 19:28	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
Acetone	ND	0.80	5.0	ug/l	1	AB40725	02/04/14 11:57	02/06/14 15:25	EPA 524.2	U
Acrylonitrile	ND	0.20	5.0	"	"	"	"	"	"	U
Benzene	ND	0.20	0.30	"	"	"	"	"	"	U
Bromobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Bromochloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Bromodichloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
Bromoform	ND	0.50	0.50	"	"	"	"	"	"	U
Bromomethane	ND	0.20	0.50	"	"	"	"	"	"	U
n-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
sec-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
tert-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Carbon disulfide	ND	0.20	0.50	"	"	"	"	"	"	U
Carbon tetrachloride	ND	0.30	0.50	"	"	"	"	"	"	U
Chlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Chloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
Chloroform	**0.87**	0.50	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
2-Chlorotoluene	ND	0.20	0.50	"	"	"	"	"	"	U
4-Chlorotoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Dibromochloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
1,2-Dibromo-3-chloropropane	ND	0.36	0.50	"	"	"	"	"	"	U
1,2-Dibromoethane (EDB)	ND	0.14	0.50	"	"	"	"	"	"	U
Dibromomethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,2-Dichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,4-Dichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
trans-1,4-Dichloro-2-butene	ND	0.095	5.0	"	"	"	"	"	"	U
Dichlorodifluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
1,2-Dichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethene	ND	0.10	0.30	"	"	"	"	"	"	U
cis-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
1,2-Dichloropropane	ND	0.20	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
1,3-Dichloropropane	ND	0.20	0.50	ug/l	1	AB40725	02/04/14 11:57	02/06/14 15:25	EPA 524.2	U
2,2-Dichloropropane	ND	0.10	0.50	"	"	"	"	"	"	U
1,1-Dichloropropene	ND	0.10	0.50	"	"	"	"	"	"	U
cis-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichloropropene (total)	ND	0.20	0.50	"	"	"	"	"	"	U
2-Hexanone	ND	0.097	5.0	"	"	"	"	"	"	U
Ethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Hexachlorobutadiene	ND	0.30	0.50	"	"	"	"	"	"	U
Isopropylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
p-Isopropyltoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Methyl ethyl ketone	ND	0.40	1.0	"	"	"	"	"	"	U
Methyl iodide	ND	0.12	2.0	"	"	"	"	"	"	U
Methyl isobutyl ketone	ND	0.30	1.0	"	"	"	"	"	"	U
Methylene chloride	ND	0.40	0.50	"	"	"	"	"	"	U
Naphthalene	ND	0.20	0.50	"	"	"	"	"	"	U
n-Propylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Styrene	ND	0.10	0.50	"	"	"	"	"	"	U
1,1,1,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Tetrachloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Toluene	ND	0.10	0.50	"	"	"	"	"	"	U
1,2,3-Trichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
1,2,4-Trichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,1-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorofluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorotrifluoroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,2,3-Trichloropropane	ND	0.13	0.50	"	"	"	"	"	"	U
1,2,4-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
1,3,5-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Vinyl chloride	ND	0.10	0.50	"	"	"	"	"	"	U
m,p-Xylene	ND	0.20	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
o-Xylene	ND	0.10	0.50	ug/l	1	AB40725	02/04/14 11:57	02/06/14 15:25	EPA 524.2	U
Xylenes (total)	ND	0.20	0.50	"	"	"	"	"	"	U
Trihalomethanes (total)	**0.87**	0.50	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	0.50	0.50	"	"	"	"	"	"	U
Ethyl tert-butyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Tert-amyl methyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Surrogate: Bromofluorobenzene		*97.7 %*	*70-130*			"	"	"	"	
Surrogate: Dibromofluoromethane		*95.1 %*	*70-130*			"	"	"	"	
Surrogate: Toluene-d8		*100 %*	*70-130*			"	"	"	"	
Trip Blank (14A1714-02) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
Acetone	ND	0.80	5.0	ug/l	1	AB40725	02/04/14 11:57	02/06/14 16:02	EPA 524.2	U
Acrylonitrile	ND	0.20	5.0	"	"	"	"	"	"	U
Benzene	ND	0.20	0.30	"	"	"	"	"	"	U
Bromobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Bromochloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Bromodichloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
Bromoform	ND	0.50	0.50	"	"	"	"	"	"	U
Bromomethane	ND	0.20	0.50	"	"	"	"	"	"	U
n-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
sec-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
tert-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Carbon disulfide	ND	0.20	0.50	"	"	"	"	"	"	U
Carbon tetrachloride	ND	0.30	0.50	"	"	"	"	"	"	U
Chlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Chloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
Chloroform	ND	0.50	0.50	"	"	"	"	"	"	U
Chloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
2-Chlorotoluene	ND	0.20	0.50	"	"	"	"	"	"	U
4-Chlorotoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Dibromochloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
1,2-Dibromo-3-chloropropane	ND	0.36	0.50	"	"	"	"	"	"	U
1,2-Dibromoethane (EDB)	ND	0.14	0.50	"	"	"	"	"	"	U
Dibromomethane	ND	0.20	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Trip Blank (14A1714-02) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
1,2-Dichlorobenzene	ND	0.20	0.50	ug/l	1	AB40725	02/04/14 11:57	02/06/14 16:02	EPA 524.2	U
1,3-Dichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,4-Dichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
trans-1,4-Dichloro-2-butene	ND	0.095	5.0	"	"	"	"	"	"	U
Dichlorodifluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
1,2-Dichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethene	ND	0.10	0.30	"	"	"	"	"	"	U
cis-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
1,2-Dichloropropane	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichloropropane	ND	0.20	0.50	"	"	"	"	"	"	U
2,2-Dichloropropane	ND	0.10	0.50	"	"	"	"	"	"	U
1,1-Dichloropropene	ND	0.10	0.50	"	"	"	"	"	"	U
cis-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichloropropene (total)	ND	0.20	0.50	"	"	"	"	"	"	U
2-Hexanone	ND	0.097	5.0	"	"	"	"	"	"	U
Ethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Hexachlorobutadiene	ND	0.30	0.50	"	"	"	"	"	"	U
Isopropylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
p-Isopropyltoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Methyl ethyl ketone	ND	0.40	1.0	"	"	"	"	"	"	U
Methyl iodide	ND	0.12	2.0	"	"	"	"	"	"	U
Methyl isobutyl ketone	ND	0.30	1.0	"	"	"	"	"	"	U
Methylene chloride	ND	0.40	0.50	"	"	"	"	"	"	U
Naphthalene	ND	0.20	0.50	"	"	"	"	"	"	U
n-Propylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Styrene	ND	0.10	0.50	"	"	"	"	"	"	U
1,1,1,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Tetrachloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Toluene	ND	0.10	0.50	"	"	"	"	"	"	U
1,2,3-Trichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Trip Blank (14A1714-02) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
1,2,4-Trichlorobenzene	ND	0.20	0.50	ug/l	1	AB40725	02/04/14 11:57	02/06/14 16:02	EPA 524.2	U
1,1,1-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorofluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorotrifluoroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,2,3-Trichloropropane	ND	0.13	0.50	"	"	"	"	"	"	U
1,2,4-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
1,3,5-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Vinyl chloride	ND	0.10	0.50	"	"	"	"	"	"	U
m,p-Xylene	ND	0.20	0.50	"	"	"	"	"	"	U
o-Xylene	ND	0.10	0.50	"	"	"	"	"	"	U
Xylenes (total)	ND	0.20	0.50	"	"	"	"	"	"	U
Trihalomethanes (total)	ND	0.50	0.50	"	"	"	"	"	"	U
Methyl tert-butyl ether	ND	0.50	0.50	"	"	"	"	"	"	U
Ethyl tert-butyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Tert-amyl methyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Surrogate: Bromofluorobenzene		*98.6 %*	*70-130*			"	"	"	"	
Surrogate: Dibromofluoromethane		*97.0 %*	*70-130*			"	"	"	"	
Surrogate: Toluene-d8		*101 %*	*70-130*			"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Chlorinated Pesticides and PCBs by EPA Method 508
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
Aldrin	ND	0.010	0.050	ug/l	1	AB40514	02/05/14 08:08	02/12/14 00:22	EPA 508	U
Chloroneb	ND	0.20	0.50	"	"	"	"	"	"	U
Chlorobenzilate	ND	2.0	5.0	"	"	"	"	"	"	U
Chlorothalonil	ND	0.030	0.10	"	"	"	"	"	"	U
DCPA	ND	0.020	0.040	"	"	"	"	"	"	U
4,4´-DDD	ND	0.020	0.050	"	"	"	"	"	"	U
4,4´-DDE	ND	0.020	0.050	"	"	"	"	"	"	U
4,4´-DDT	ND	0.020	0.020	"	"	"	"	"	"	U
Dieldrin	ND	0.010	0.010	"	"	"	"	"	"	U
Endosulfan I	ND	0.020	0.050	"	"	"	"	"	"	U
Endosulfan II	ND	0.020	0.050	"	"	"	"	"	"	U
Endosulfan sulfate	ND	0.020	0.020	"	"	"	"	"	"	U
Endrin	ND	0.030	0.10	"	"	"	"	"	"	U
Endrin aldehyde	ND	0.020	0.050	"	"	"	"	"	"	U
HCH-alpha	ND	0.010	0.050	"	"	"	"	"	"	U
HCH-beta	ND	0.020	0.050	"	"	"	"	"	"	U
HCH-delta	ND	0.030	0.050	"	"	"	"	"	"	U
HCH-gamma (Lindane)	ND	0.010	0.010	"	"	"	"	"	"	U
Heptachlor	ND	0.010	0.010	"	"	"	"	"	"	U
Heptachlor epoxide	ND	0.010	0.010	"	"	"	"	"	"	U
Hexachlorobenzene	ND	0.010	0.040	"	"	"	"	"	"	U
Hexachlorocyclopentadiene	ND	0.040	0.40	"	"	"	"	"	"	U
Methoxychlor	ND	0.020	0.020	"	"	"	"	"	"	U
cis-Permethrin	ND	0.070	0.20	"	"	"	"	"	"	U
trans-Permethrin	ND	0.090	0.20	"	"	"	"	"	"	U
Propachlor	ND	0.070	0.20	"	"	"	"	"	"	U
Trifluralin	ND	0.020	0.040	"	"	"	"	"	"	U
PCB-1016	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1221	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1232	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1242	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1248	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1254	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1260	ND	0.030	0.50	"	"	"	"	"	"	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Chlorinated Pesticides and PCBs by EPA Method 508
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
Total PCBs	ND	0.30	0.50	ug/l	1	AB40514	02/05/14 08:08	02/12/14 00:22	EPA 508	U
Toxaphene	ND	0.40	0.50	"	"	"	"	"	"	U
Chlordane (tech)	ND	0.030	0.050	"	"	"	"	"	"	U
Surrogate: Dibutylchlorendate		*110 %*	*70-130*			"	"	"	"	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Nitrogen- and Phosphorus- Pesticides by EPA Method 507
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
Alachlor	ND	0.50	0.50	ug/l	1	AB40730	02/08/14 15:03	02/11/14 09:17	EPA 507	U
Atrazine	ND	0.30	0.50	"	"	"	"	"	"	U
Bromacil	ND	0.50	5.0	"	"	"	"	"	"	U
Butachlor	ND	0.40	0.50	"	"	"	"	"	"	U
Dimethoate	ND	0.20	1.0	"	"	"	"	"	"	U
Metolachlor	ND	0.30	0.50	"	"	"	"	"	"	U
Metribuzin	ND	0.40	0.50	"	"	"	"	"	"	U
Molinate	ND	0.20	0.50	"	"	"	"	"	"	U
Prometryn	ND	0.50	0.50	"	"	"	"	"	"	U
Propachlor	ND	0.30	0.50	"	"	"	"	"	"	U
Simazine	ND	0.30	0.50	"	"	"	"	"	"	U
Thiobencarb	ND	0.20	1.0	"	"	"	"	"	"	U
Surrogate: 1,3-Dimethyl-2-nitrobenzene		*94.0 %*	*70-130*			*"*	*"*	*"*	*"*	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Organic Analytes by EPA Method 504.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
1,2-Dibromo-3-chloropropane	ND	0.0040	0.010	ug/l	1	AB40359	02/04/14 10:00	02/05/14 04:42	EPA 504.1	U
1,2-Dibromoethane (EDB)	ND	0.0050	0.020	"	"	"	"	"	"	U
Trip Blank (14A1714-02) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
1,2-Dibromo-3-chloropropane	ND	0.0040	0.010	ug/l	1	AB40359	02/04/14 10:00	02/05/14 05:17	EPA 504.1	U
1,2-Dibromoethane (EDB)	ND	0.0050	0.020	"	"	"	"	"	"	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Chlorinated Acids by EPA Method 515.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
Acifluorfen	ND	0.50	1.0	ug/l	1	AB40536	02/06/14 14:29	02/08/14 05:47	EPA 515.1	U
Bentazon	ND	0.40	0.40	"	"	"	"	"	"	U
2,4-D	ND	0.80	1.0	"	"	"	"	"	"	U
Dalapon	ND	6.0	6.0	"	"	"	"	"	"	U
2,4-DB	ND	4.0	5.0	"	"	"	"	"	"	U
Dicamba	ND	0.40	0.40	"	"	"	"	"	"	U
Dichlorprop	ND	1.0	1.0	"	"	"	"	"	"	U
Dinoseb	ND	0.80	1.0	"	"	"	"	"	"	U
4-Nitrophenol	ND	0.70	1.0	"	"	"	"	"	"	U
Pentachlorophenol	ND	0.20	0.20	"	"	"	"	"	"	U
Picloram	ND	0.50	1.0	"	"	"	"	"	"	U
2,4,5-T	ND	0.40	0.50	"	"	"	"	"	"	U
2,4,5-TP (Silvex)	ND	0.50	0.50	"	"	"	"	"	"	U
Surrogate: DCAA		*94.2 %*	*70-130*			*"*	*"*	*"*	*"*	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Carbamates by EPA Method 531.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
Aldicarb	ND	0.70	3.0	ug/l	1	AB41142	02/11/14 10:07	02/12/14 12:15	EPA 531.1	U
Aldicarb sulfone	ND	0.70	4.0	"	"	"	"	"	"	U
Aldicarb sulfoxide	ND	0.80	3.0	"	"	"	"	"	"	U
Carbaryl	ND	0.70	5.0	"	"	"	"	"	"	U
Carbofuran	ND	2.0	5.0	"	"	"	"	"	"	U
3-Hydroxycarbofuran	ND	0.90	3.0	"	"	"	"	"	"	U
Methiocarb	ND	2.0	5.0	"	"	"	"	"	"	U
Methomyl	ND	2.0	2.0	"	"	"	"	"	"	U
Oxamyl	ND	0.80	20	"	"	"	"	"	"	U
Propoxur	ND	2.0	5.0	"	"	"	"	"	"	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Endothall by EPA Method 548.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
Endothall	ND	2.0	45	ug/l	1	AB40357	02/04/14 14:37	02/06/14 16:10	EPA 548.1	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Glyphosate by EPA Method 547
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
Glyphosate	ND	3.0	10	ug/l	1	AB40427	02/04/14 09:22	02/05/14 00:34	EPA 547	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Diquat by EPA Method 549.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
Diquat	ND	2.0	2.0	ug/l	1	AA43118	02/03/14 09:48	02/10/14 21:54	EPA 549.2	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Haloacetic Acids by EPA Method 552.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
Monobromoacetic Acid	ND	0.8	1.0	ug/l	1	AB41050	02/11/14 13:22	02/12/14 17:04	EPA 552.2	U
Monochloroacetic Acid	ND	1.1	2.0	"	"	"	"	"	"	U
Dibromoacetic Acid	ND	0.8	1.0	"	"	"	"	"	"	U
Dichloroacetic Acid	ND	1.0	1.0	"	"	"	"	"	"	U
Trichloroacetic Acid	ND	1.0	1.0	"	"	"	"	"	"	U
Total Haloacetic Acids (HAA5)	ND	1.0	1.0	"	"	"	"	"	"	U
Surrogate: 2,3-Dibromopropionic Acid		*80.8 %*	*70-130*			*"*	*"*	*"*	*"*	
Surrogate: 2-Bromopropionic Acid		*88.0 %*	*70-130*			*"*	*"*	*"*	*"*	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Semivolatile Organic Compounds by EPA Method 525.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Santa Margarita ASR MW-1 (14A1714-01) Water Sampled: 01/30/14 14:50 Received: 01/30/14 21:25										
Benzo (a) pyrene	ND	0.080	0.10	ug/l	1	AB40727	02/08/14 13:35	02/13/14 19:00	EPA 525.2	U
Di(2-ethylhexyl)adipate	ND	0.40	5.0	"	"	"	"	"	"	U
Di(2-ethylhexyl)phthalate	ND	0.20	3.0	"	"	"	"	"	"	U
Surrogate: 1,3-Dimethyl-2-nitrobenzene		*106 %*	*70-130*			"	"	"	"	
Surrogate: Perylene-d12		*100 %*	*70-130*			"	"	"	"	
Surrogate: Triphenyl phosphate		*112 %*	*70-130*			"	"	"	"	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Metals (Drinking Water) by EPA 200 Series Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43136 - EPA 245.1 Hg Water											
Blank (AA43136-BLK1)					Prepared & Analyzed: 02/05/14						
Mercury	ND	0.060	1.0	ug/l							U
LCS (AA43136-BS1)					Prepared & Analyzed: 02/05/14						
Mercury	2.30	0.060	1.0	ug/l	2.50		92.0	80-120			
Duplicate (AA43136-DUP1)		**Source: 14A1575-02**			Prepared & Analyzed: 02/05/14						
Mercury	ND	0.060	1.0	ug/l		ND				20	U
Matrix Spike (AA43136-MS1)		**Source: 14A1575-02**			Prepared & Analyzed: 02/05/14						
Mercury	2.26	0.060	1.0	ug/l	2.50	ND	90.4	60-140			
Matrix Spike (AA43136-MS2)		**Source: 14B0218-01**			Prepared & Analyzed: 02/05/14						
Mercury	2.32	0.060	1.0	ug/l	2.50	0.0600	90.4	60-140			
Matrix Spike Dup (AA43136-MSD1)		**Source: 14A1575-02**			Prepared & Analyzed: 02/05/14						
Mercury	2.29	0.060	1.0	ug/l	2.50	ND	91.6	60-140	1.32	20	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Metals by EPA 200 Series Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43133 - Metals Digest											
Blank (AA43133-BLK1)					Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	ND	0.010	1.0	mg/l							U
Magnesium	ND	0.0080	1.0	"							U
Potassium	ND	0.0080	1.0	"							U
Sodium	ND	0.020	1.0	"							U
LCS (AA43133-BS1)					Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	5.36	0.010	1.0	mg/l	5.88		91.2	85-115			
Magnesium	7.09	0.0080	1.0	"	8.00		88.6	85-115			
Potassium	7.97	0.0080	1.0	"	8.00		99.6	85-115			
Sodium	7.75	0.020	1.0	"	8.00		96.8	85-115			
Duplicate (AA43133-DUP1)		**Source: 14A1643-01**			Prepared: 01/31/14 Analyzed: 02/12/14						
Calcium	18.2	0.010	1.0	mg/l		16.5			9.76	20	
Magnesium	6.86	0.0080	1.0	"		6.53			4.91	20	
Potassium	3.66	0.0080	1.0	"		3.35			8.82	20	
Sodium	52.8	0.020	1.0	"		50.2			5.03	20	
Matrix Spike (AA43133-MS1)		**Source: 14A1643-01**			Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	22.4	0.010	1.0	mg/l	5.88	16.5	100	70-130			
Magnesium	13.0	0.0080	1.0	"	8.00	6.53	81.3	70-130			
Potassium	10.8	0.0080	1.0	"	8.00	3.35	92.8	70-130			
Sodium	58.8	0.020	1.0	"	8.00	50.2	107	70-130			
Matrix Spike (AA43133-MS2)		**Source: 14A1713-01**			Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	35.4	0.010	1.0	mg/l	5.88	28.8	112	70-130			
Magnesium	11.0	0.0080	1.0	"	8.00	3.85	89.5	70-130			
Potassium	11.1	0.0080	1.0	"	8.00	3.56	94.7	70-130			
Sodium	47.2	0.020	1.0	"	8.00	38.1	114	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Metals by EPA 200 Series Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43133 - Metals Digest											
Matrix Spike Dup (AA43133-MSD1)		**Source: 14A1643-01**			Prepared: 01/31/14 Analyzed: 02/05/14						
Calcium	23.2	0.010	1.0	mg/l	5.88	16.5	113	70-130	3.39	20	
Magnesium	14.3	0.0080	1.0	"	8.00	6.53	97.1	70-130	9.24	20	
Potassium	11.0	0.0080	1.0	"	8.00	3.35	95.8	70-130	2.21	20	
Sodium	60.3	0.020	1.0	"	8.00	50.2	126	70-130	2.49	20	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40328 - EPA 200.8											
Blank (AB40328-BLK1)					Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	ND	2.0	50	ug/l							U
Antimony	ND	0.020	6.0	"							U
Arsenic	ND	0.070	2.0	"							U
Barium	ND	0.030	100	"							U
Beryllium	ND	0.020	1.0	"							U
Boron	17.8	6.0	50	"							J
Cadmium	ND	0.020	1.0	"							U
Chromium	ND	0.080	10	"							U
Copper	ND	0.040	0.50	"							U
Iron	ND	1.8	50	"							U
Lead	ND	0.020	5.0	"							U
Manganese	ND	0.030	5.0	"							U
Nickel	ND	0.060	10	"							U
Selenium	0.0754	0.070	5.0	"							J
Silver	ND	0.020	0.10	"							U
Thallium	ND	0.020	1.0	"							U
Uranium	ND	0.020	1.0	pCi/l							U
Vanadium	ND	0.30	1.0	ug/l							U
Zinc	1.13	0.50	5.0	"							J
LCS (AB40328-BS1)					Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	483	2.0	50	ug/l	520		92.8	85-115			
Antimony	20.1	0.020	6.0	"	20.0		100	85-115			
Arsenic	19.7	0.070	2.0	"	20.0		98.7	85-115			
Barium	19.1	0.030	100	"	20.0		95.4	85-115			J
Beryllium	18.8	0.020	1.0	"	20.0		94.1	85-115			
Boron	110	6.0	50	"	100		110	85-115			
Cadmium	18.8	0.020	1.0	"	20.0		94.0	85-115			
Chromium	19.3	0.080	10	"	20.0		96.6	85-115			
Copper	19.0	0.040	0.50	"	20.0		95.1	85-115			
Iron	502	1.8	50	"	520		96.6	85-115			
Lead	17.5	0.020	5.0	"	20.0		87.5	85-115			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40328 - EPA 200.8											
LCS (AB40328-BS1)					Prepared: 02/03/14 Analyzed: 02/04/14						
Manganese	18.8	0.030	5.0	ug/l	20.0		94.2	85-115			
Nickel	19.3	0.060	10	"	20.0		96.6	85-115			
Selenium	20.1	0.070	5.0	"	20.0		100	85-115			
Silver	18.1	0.020	0.10	"	20.0		90.4	85-115			
Thallium	17.1	0.020	1.0	"	20.0		85.6	85-115			
Uranium	11.5	0.020	1.0	pCi/l	13.4		85.5	85-115			
Vanadium	19.8	0.30	1.0	ug/l	20.0		99.0	85-115			
Zinc	98.6	0.50	5.0	"	100		98.6	85-115			
Duplicate (AB40328-DUP1)		**Source: 14A1755-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	1120	2.0	50	ug/l		1150			1.98	20	
Antimony	0.0754	0.020	6.0	"		0.0744			1.34	20	J
Arsenic	1.08	0.070	2.0	"		1.15			6.89	20	J
Barium	70.3	0.030	100	"		68.3			2.85	20	J
Beryllium	0.0788	0.020	1.0	"		0.0838			6.24	20	J
Boron	37.9	6.0	50	"		36.2			4.75	20	J
Cadmium	0.0848	0.020	1.0	"		0.0857			1.11	20	J
Chromium	0.470	0.080	10	"		0.382			20.5	20	J
Copper	12.8	0.040	0.50	"		12.3			3.69	20	
Iron	412	1.8	50	"		408			0.910	20	
Lead	1.06	0.020	5.0	"		1.12			4.92	20	J
Manganese	6.46	0.030	5.0	"		7.23			11.3	20	
Nickel	1.21	0.060	10	"		1.20			1.54	20	J
Selenium	0.159	0.070	5.0	"		0.171			7.50	20	J
Silver	0.0362	0.020	0.10	"		0.0220			48.8	20	J
Thallium	0.105	0.020	1.0	"		0.0948			9.86	20	J
Uranium	0.249	0.020	1.0	pCi/l		0.265			6.25	20	J
Vanadium	1.52	0.30	1.0	ug/l		1.64			7.56	20	
Zinc	6.79	0.50	5.0	"		6.73			0.780	20	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40328 - EPA 200.8											
Matrix Spike (AB40328-MS1)		**Source: 14A1755-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	1570	2.0	50	ug/l	520	1150	81.5	70-130			
Antimony	18.9	0.020	6.0	"	20.0	0.0744	94.1	70-130			
Arsenic	19.9	0.070	2.0	"	20.0	1.15	93.5	70-130			
Barium	85.5	0.030	100	"	20.0	68.3	85.8	70-130			J
Beryllium	17.8	0.020	1.0	"	20.0	0.0838	88.5	70-130			
Boron	114	6.0	50	"	100	36.2	78.1	70-130			
Cadmium	18.7	0.020	1.0	"	20.0	0.0857	93.0	70-130			
Chromium	17.4	0.080	10	"	20.0	0.382	85.1	70-130			
Copper	29.6	0.040	0.50	"	20.0	12.3	86.4	70-130			
Iron	858	1.8	50	"	520	408	86.4	70-130			
Lead	19.8	0.020	5.0	"	20.0	1.12	93.4	70-130			
Manganese	23.4	0.030	5.0	"	20.0	7.23	80.7	70-130			
Nickel	18.2	0.060	10	"	20.0	1.20	85.0	70-130			
Selenium	18.7	0.070	5.0	"	20.0	0.171	92.7	70-130			
Silver	17.9	0.020	0.10	"	20.0	0.0220	89.3	70-130			
Thallium	18.5	0.020	1.0	"	20.0	0.0948	92.1	70-130			
Uranium	13.5	0.020	1.0	pCi/l	13.4	0.265	98.5	70-130			
Vanadium	19.1	0.30	1.0	ug/l	20.0	1.64	87.4	70-130			
Zinc	98.9	0.50	5.0	"	100	6.73	92.1	70-130			
Matrix Spike (AB40328-MS2)		**Source: 14B0124-02**			Prepared: 02/05/14 Analyzed: 02/06/14						
Aluminum	529	2.0	50	ug/l	520	70.3	88.1	70-130			
Antimony	20.4	0.020	6.0	"	20.0	0.0711	102	70-130			
Arsenic	21.4	0.070	2.0	"	20.0	2.13	96.2	70-130			
Barium	35.8	0.030	100	"	20.0	16.9	94.7	70-130			J
Beryllium	19.3	0.020	1.0	"	20.0	ND	96.4	70-130			
Boron	150	6.0	50	"	100	63.0	87.0	70-130			
Cadmium	19.4	0.020	1.0	"	20.0	ND	97.0	70-130			
Chromium	20.0	0.080	10	"	20.0	0.590	97.0	70-130			
Copper	19.6	0.040	0.50	"	20.0	1.39	90.9	70-130			
Iron	602	1.8	50	"	520	91.5	98.1	70-130			
Lead	20.2	0.020	5.0	"	20.0	0.0825	101	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40328 - EPA 200.8											
Matrix Spike (AB40328-MS2)		**Source: 14B0124-02**			Prepared: 02/05/14 Analyzed: 02/06/14						
Manganese	26.7	0.030	5.0	ug/l	20.0	7.07	98.0	70-130			
Nickel	19.5	0.060	10	"	20.0	0.983	92.8	70-130			
Selenium	19.2	0.070	5.0	"	20.0	0.207	95.2	70-130			
Silver	19.4	0.020	0.10	"	20.0	ND	97.2	70-130			
Thallium	19.8	0.020	1.0	"	20.0	ND	99.0	70-130			
Uranium	14.2	0.020	1.0	pCi/l	13.4	0.107	105	70-130			
Vanadium	24.6	0.30	1.0	ug/l	20.0	5.40	95.9	70-130			
Zinc	99.9	0.50	5.0	"	100	3.69	96.2	70-130			
Matrix Spike Dup (AB40328-MSD1)		**Source: 14A1755-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	1580	2.0	50	ug/l	520	1150	83.4	70-130	0.635	20	
Antimony	19.7	0.020	6.0	"	20.0	0.0744	98.1	70-130	4.13	20	
Arsenic	20.5	0.070	2.0	"	20.0	1.15	96.6	70-130	3.05	20	
Barium	88.4	0.030	100	"	20.0	68.3	100	70-130	3.29	20	J
Beryllium	19.1	0.020	1.0	"	20.0	0.0838	95.3	70-130	7.32	20	
Boron	125	6.0	50	"	100	36.2	88.8	70-130	8.99	20	
Cadmium	19.7	0.020	1.0	"	20.0	0.0857	98.0	70-130	5.25	20	
Chromium	18.0	0.080	10	"	20.0	0.382	88.1	70-130	3.40	20	
Copper	30.7	0.040	0.50	"	20.0	12.3	91.9	70-130	3.64	20	
Iron	860	1.8	50	"	520	408	86.8	70-130	0.291	20	
Lead	21.5	0.020	5.0	"	20.0	1.12	102	70-130	8.35	20	
Manganese	23.8	0.030	5.0	"	20.0	7.23	83.1	70-130	2.03	20	
Nickel	18.6	0.060	10	"	20.0	1.20	87.2	70-130	2.36	20	
Selenium	19.1	0.070	5.0	"	20.0	0.171	94.8	70-130	2.29	20	
Silver	19.1	0.020	0.10	"	20.0	0.0220	95.5	70-130	6.75	20	
Thallium	20.0	0.020	1.0	"	20.0	0.0948	99.5	70-130	7.72	20	
Uranium	14.5	0.020	1.0	pCi/l	13.4	0.265	107	70-130	7.74	20	
Vanadium	19.8	0.30	1.0	ug/l	20.0	1.64	91.0	70-130	3.68	20	
Zinc	105	0.50	5.0	"	100	6.73	97.9	70-130	5.71	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43107 - General Preparation											
Blank (AA43107-BLK1)					Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	ND	0.030	0.050	mg/l							U
LCS (AA43107-BS1)					Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	0.205	0.030	0.050	mg/l	0.200		103	80-120			
Duplicate (AA43107-DUP1)		**Source: 14A1588-02**			Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	ND	0.030	0.050	mg/l		ND				20	U
Matrix Spike (AA43107-MS1)		**Source: 14A1588-02**			Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	0.208	0.030	0.050	mg/l	0.200	ND	104	80-120			
Matrix Spike Dup (AA43107-MSD1)		**Source: 14A1588-02**			Prepared: 01/31/14 Analyzed: 02/04/14						
MBAS, calculated as LAS, mw 340	0.210	0.030	0.050	mg/l	0.200	ND	105	80-120	0.826	20	
Batch AA43121 - General Preparation											
Duplicate (AA43121-DUP1)		**Source: 14B0229-03**			Prepared: 02/01/14 Analyzed: 02/11/14						
Bicarbonate	42.7	0.060	5.0	mg/l		42.7			0.00	20	
Batch AA43129 - General Preparation											
Blank (AA43129-BLK1)					Prepared & Analyzed: 01/30/14						
Turbidity	ND	0.040	0.10	NTU							U
Duplicate (AA43129-DUP1)		**Source: 14A1722-01**			Prepared & Analyzed: 01/30/14						
Turbidity	2.48	0.040	0.10	NTU		2.48			0.00	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43147 - General Preparation											
Duplicate (AA43147-DUP1)		**Source: 14A1739-01**			Prepared & Analyzed: 01/31/14						
Specific Conductance (EC)	143	1.0	20	umhos/cm		144			0.697	10	
Batch AB40322 - General Preparation											
Blank (AB40322-BLK1)					Prepared: 02/03/14 Analyzed: 02/05/14						
Total Dissolved Solids	ND	5.0	10	mg/l							U
Duplicate (AB40322-DUP1)		**Source: 14A1635-01**			Prepared: 02/03/14 Analyzed: 02/05/14						
Total Dissolved Solids	361	5.0	10	mg/l		352			2.52	30	
Duplicate (AB40322-DUP2)		**Source: 14A1730-01**			Prepared: 02/03/14 Analyzed: 02/05/14						
Total Dissolved Solids	1010	5.0	10	mg/l		964			4.46	30	
Batch AB40803 - General Prep											
Blank (AB40803-BLK1)					Prepared & Analyzed: 02/08/14						
Total Organic Carbon	ND	0.100	0.300	mg/l							U
LCS (AB40803-BS1)					Prepared & Analyzed: 02/08/14						
Total Organic Carbon	10.6	0.100	0.300	mg/l	10.0		106	85-115			
LCS Dup (AB40803-BSD1)					Prepared & Analyzed: 02/08/14						
Total Organic Carbon	10.5	0.100	0.300	mg/l	10.0		105	85-115	1.20	20	
Duplicate (AB40803-DUP1)		**Source: 14B0427-01**			Prepared & Analyzed: 02/08/14						
Total Organic Carbon	ND	0.100	0.300	mg/l		0.112				20	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40803 - General Prep											
Matrix Spike (AB40803-MS1)		**Source: 14B0427-01**			Prepared & Analyzed: 02/08/14						
Total Organic Carbon	10.7	0.100	0.300	mg/l	10.0	0.112	106	70-130			
Matrix Spike Dup (AB40803-MSD1)		**Source: 14B0427-01**			Prepared & Analyzed: 02/08/14						
Total Organic Carbon	10.4	0.100	0.300	mg/l	10.0	0.112	102	70-130	3.54	20	
Batch AB41141 - General Preparation											
Blank (AB41141-BLK1)					Prepared & Analyzed: 02/11/14						
Perchlorate	0.967	0.90	4.0	ug/l							J
LCS (AB41141-BS1)					Prepared & Analyzed: 02/11/14						
Perchlorate	23.9	0.90	4.0	ug/l	25.0		95.5	85-115			
Duplicate (AB41141-DUP1)		**Source: 14A1643-01**			Prepared & Analyzed: 02/11/14						
Perchlorate	ND	0.90	4.0	ug/l		ND				15	U
Matrix Spike (AB41141-MS1)		**Source: 14A1643-01**			Prepared & Analyzed: 02/11/14						
Perchlorate	25.9	0.90	4.0	ug/l	25.0	ND	104	70-130			
Matrix Spike Dup (AB41141-MSD1)		**Source: 14A1643-01**			Prepared & Analyzed: 02/11/14						
Perchlorate	25.9	0.90	4.0	ug/l	25.0	ND	104	70-130	0.00386	15	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Miscellaneous Physical/Conventional Chemistry Parameters - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40428 - General Preparation											
Blank (AB40428-BLK1)					Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	ND	0.0020	0.10	mg/l							U
LCS (AB40428-BS1)					Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.202	0.0020	0.10	mg/l	0.200		101	85-115			
Duplicate (AB40428-DUP1)		**Source: 14A1492-02**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	ND	0.0020	0.10	mg/l		ND				25	U
Matrix Spike (AB40428-MS1)		**Source: 14A1492-02**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.188	0.0020	0.10	mg/l	0.200	ND	93.9	85-115			
Matrix Spike (AB40428-MS2)		**Source: 14A1635-01**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.220	0.0020	0.10	mg/l	0.200	ND	110	85-115			
Matrix Spike Dup (AB40428-MSD1)		**Source: 14A1492-02**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.186	0.0020	0.10	mg/l	0.200	ND	92.8	85-115	1.23	25	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Anions by EPA Method 300.0 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43111 - General Preparation											
Blank (AA43111-BLK1)					Prepared & Analyzed: 01/31/14						
Nitrate as NO3	ND	0.20	2.0	mg/l							U
Chloride	ND	0.030	0.50	"							U
Nitrite as N	ND	0.020	0.40	"							U
Sulfate as SO4	ND	0.090	0.50	"							U
Fluoride	ND	0.070	0.10	"							U
LCS (AA43111-BS1)					Prepared & Analyzed: 01/31/14						
Nitrate as NO3	22	0.20	2.0	mg/l	22.2		101	90-110			
Chloride	10.2	0.030	0.50	"	10.0		102	90-110			
Fluoride	5.25	0.070	0.10	"	5.00		105	90-110			
Nitrite as N	5.21	0.020	0.40	"	5.00		104	90-110			
Sulfate as SO4	20.0	0.090	0.50	"	20.0		100	90-110			
Duplicate (AA43111-DUP1)		**Source: 14A1704-01**			Prepared & Analyzed: 01/31/14						
Nitrate as NO3	0.43	0.20	2.0	mg/l		0.43			1.40	20	J
Sulfate as SO4	9.21	0.090	0.50	"		9.36			1.61	20	
Chloride	2.62	0.030	0.50	"		2.61			0.0765	20	
Fluoride	ND	0.070	0.10	"		ND				20	U
Nitrite as N	ND	0.020	0.40	"		ND				20	U
Matrix Spike (AA43111-MS1)		**Source: 14A1704-01**			Prepared & Analyzed: 01/31/14						
Nitrate as NO3	25	0.20	2.0	mg/l	24.7	0.43	99.8	80-120			
Nitrite as N	5.79	0.020	0.40	"	5.56	ND	104	80-120			
Chloride	14.2	0.030	0.50	"	11.1	2.61	104	80-120			
Fluoride	5.68	0.070	0.10	"	5.56	ND	102	80-120			
Sulfate as SO4	32.0	0.090	0.50	"	22.2	9.36	102	80-120			
Matrix Spike (AA43111-MS2)		**Source: 14A1713-01**			Prepared & Analyzed: 01/31/14						
Nitrate as NO3	26	1.0	10	mg/l	24.7	2.4	96.0	80-120			
Nitrite as N	5.44	0.10	2.0	"	5.56	ND	98.0	80-120			
Chloride	54.8	0.15	2.5	"	11.1	43.7	100	80-120			
Fluoride	4.85	0.35	0.50	"	5.56	ND	87.3	80-120			
Sulfate as SO4	34.3	0.45	2.5	"	22.2	13.3	94.2	80-120			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Anions by EPA Method 300.0 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43111 - General Preparation											
Matrix Spike Dup (AA43111-MSD1)		**Source: 14A1704-01**		Prepared & Analyzed: 01/31/14							
Nitrate as NO3	25	0.20	2.0	mg/l	24.7	0.43	99.9	80-120	0.124	20	
Nitrite as N	5.79	0.020	0.40	"	5.56	ND	104	80-120	0.0768	20	
Fluoride	5.69	0.070	0.10	"	5.56	ND	102	80-120	0.235	20	
Chloride	14.2	0.030	0.50	"	11.1	2.61	104	80-120	0.133	20	
Sulfate as SO4	32.0	0.090	0.50	"	22.2	9.36	102	80-120	0.149	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Blank (AB40725-BLK1)					Prepared & Analyzed: 02/04/14						
Acetone	ND	0.80	5.0	ug/l							U
Acrylonitrile	ND	0.20	5.0	"							U
Benzene	ND	0.20	0.30	"							U
Bromobenzene	ND	0.10	0.50	"							U
Bromochloromethane	ND	0.20	0.50	"							U
Bromodichloromethane	ND	0.50	0.50	"							U
Bromoform	ND	0.50	0.50	"							U
Bromomethane	ND	0.20	0.50	"							U
n-Butylbenzene	ND	0.10	0.50	"							U
sec-Butylbenzene	ND	0.10	0.50	"							U
tert-Butylbenzene	ND	0.10	0.50	"							U
Carbon disulfide	ND	0.20	0.50	"							U
Carbon tetrachloride	ND	0.30	0.50	"							U
Chlorobenzene	ND	0.20	0.50	"							U
Chloroethane	ND	0.10	0.50	"							U
Chloroform	ND	0.50	0.50	"							U
Chloromethane	ND	0.20	0.50	"							U
2-Chlorotoluene	ND	0.20	0.50	"							U
4-Chlorotoluene	ND	0.10	0.50	"							U
Dibromochloromethane	ND	0.50	0.50	"							U
1,2-Dibromo-3-chloropropane	ND	0.36	0.50	"							U
1,2-Dibromoethane (EDB)	ND	0.14	0.50	"							U
Dibromomethane	ND	0.20	0.50	"							U
1,2-Dichlorobenzene	ND	0.20	0.50	"							U
1,3-Dichlorobenzene	ND	0.20	0.50	"							U
1,4-Dichlorobenzene	ND	0.10	0.50	"							U
trans-1,4-Dichloro-2-butene	ND	0.095	5.0	"							U
Dichlorodifluoromethane	ND	0.20	0.50	"							U
1,1-Dichloroethane	ND	0.10	0.50	"							U
1,2-Dichloroethane	ND	0.20	0.50	"							U
1,1-Dichloroethene	ND	0.10	0.30	"							U
cis-1,2-Dichloroethene	ND	0.20	0.50	"							U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Blank (AB40725-BLK1)					Prepared & Analyzed: 02/04/14						
trans-1,2-Dichloroethene	ND	0.20	0.50	ug/l							U
1,2-Dichloropropane	ND	0.20	0.50	"							U
1,3-Dichloropropane	ND	0.20	0.50	"							U
2,2-Dichloropropane	ND	0.10	0.50	"							U
1,1-Dichloropropene	ND	0.10	0.50	"							U
cis-1,3-Dichloropropene	ND	0.20	0.50	"							U
trans-1,3-Dichloropropene	ND	0.20	0.50	"							U
2-Hexanone	ND	0.097	5.0	"							U
1,3-Dichloropropene (total)	ND	0.20	0.50	"							U
Ethylbenzene	ND	0.10	0.50	"							U
Hexachlorobutadiene	ND	0.30	0.50	"							U
Isopropylbenzene	ND	0.20	0.50	"							U
p-Isopropyltoluene	ND	0.10	0.50	"							U
Methyl ethyl ketone	ND	0.40	1.0	"							U
Methyl iodide	ND	0.12	2.0	"							U
Methyl isobutyl ketone	ND	0.30	1.0	"							U
Methylene chloride	ND	0.40	0.50	"							U
Naphthalene	ND	0.20	0.50	"							U
n-Propylbenzene	ND	0.20	0.50	"							U
Styrene	ND	0.10	0.50	"							U
1,1,1,2-Tetrachloroethane	ND	0.20	0.50	"							U
1,1,2,2-Tetrachloroethane	ND	0.20	0.50	"							U
Tetrachloroethene	ND	0.20	0.50	"							U
Toluene	ND	0.10	0.50	"							U
1,2,3-Trichlorobenzene	ND	0.10	0.50	"							U
1,2,4-Trichlorobenzene	ND	0.20	0.50	"							U
1,1,1-Trichloroethane	ND	0.20	0.50	"							U
1,1,2-Trichloroethane	ND	0.20	0.50	"							U
Trichloroethene	ND	0.20	0.50	"							U
Trichlorofluoromethane	ND	0.20	0.50	"							U
Trichlorotrifluoroethane	ND	0.20	0.50	"							U
1,2,3-Trichloropropane	ND	0.13	0.50	"							U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Blank (AB40725-BLK1)					Prepared & Analyzed: 02/04/14						
1,2,4-Trimethylbenzene	ND	0.10	0.50	ug/l							U
1,3,5-Trimethylbenzene	ND	0.10	0.50	"							U
Vinyl chloride	ND	0.10	0.50	"							U
m,p-Xylene	ND	0.20	0.50	"							U
o-Xylene	ND	0.10	0.50	"							U
Xylenes (total)	ND	0.20	0.50	"							U
Trihalomethanes (total)	ND	0.50	0.50	"							U
Methyl tert-butyl ether	ND	0.50	0.50	"							U
Ethyl tert-butyl ether	ND	0.20	0.50	"							U
Tert-amyl methyl ether	ND	0.20	0.50	"							U
Surrogate: Bromofluorobenzene	*25.0*			*"*	*25.0*		*99.8*	*70-130*			
Surrogate: Dibromofluoromethane	*24.0*			*"*	*25.0*		*95.9*	*70-130*			
Surrogate: Toluene-d8	*25.4*			*"*	*25.0*		*102*	*70-130*			
LCS (AB40725-BS1)					Prepared & Analyzed: 02/04/14						
Acetone	24.1	0.80	5.0	ug/l	20.0		120	70-130			
Acrylonitrile	5.73	0.20	5.0	"	5.00		115	70-130			
Benzene	4.88	0.20	0.30	"	5.00		97.6	70-130			
Bromobenzene	5.19	0.10	0.50	"	5.00		104	70-130			
Bromochloromethane	5.11	0.20	0.50	"	5.00		102	70-130			
Bromodichloromethane	4.65	0.50	0.50	"	5.00		93.0	70-130			
Bromoform	4.58	0.50	0.50	"	5.00		91.6	70-130			
Bromomethane	5.43	0.20	0.50	"	5.00		109	70-130			
n-Butylbenzene	5.09	0.10	0.50	"	5.00		102	70-130			
sec-Butylbenzene	5.06	0.10	0.50	"	5.00		101	70-130			
tert-Butylbenzene	5.24	0.10	0.50	"	5.00		105	70-130			
Carbon disulfide	4.99	0.20	0.50	"	5.00		99.8	70-130			
Carbon tetrachloride	4.76	0.30	0.50	"	5.00		95.2	70-130			
Chlorobenzene	5.07	0.20	0.50	"	5.00		101	70-130			
Chloroethane	5.33	0.10	0.50	"	5.00		107	70-130			
Chloroform	4.92	0.50	0.50	"	5.00		98.4	70-130			
Chloromethane	6.12	0.20	0.50	"	5.00		122	70-130			

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Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS (AB40725-BS1)					Prepared & Analyzed: 02/04/14						
2-Chlorotoluene	5.26	0.20	0.50	ug/l	5.00		105	70-130			
4-Chlorotoluene	4.99	0.10	0.50	"	5.00		99.8	70-130			
Dibromochloromethane	4.81	0.50	0.50	"	5.00		96.2	70-130			
1,2-Dibromo-3-chloropropane	4.94	0.36	0.50	"	5.00		98.8	70-130			
1,2-Dibromoethane (EDB)	5.23	0.14	0.50	"	5.00		105	70-130			
Dibromomethane	4.94	0.20	0.50	"	5.00		98.8	70-130			
1,2-Dichlorobenzene	4.86	0.20	0.50	"	5.00		97.2	70-130			
1,3-Dichlorobenzene	5.18	0.20	0.50	"	5.00		104	70-130			
1,4-Dichlorobenzene	4.96	0.10	0.50	"	5.00		99.2	70-130			
trans-1,4-Dichloro-2-butene	4.74	0.095	5.0	"	5.00		94.8	70-130			J
Dichlorodifluoromethane	6.14	0.20	0.50	"	5.00		123	70-130			
1,1-Dichloroethane	5.10	0.10	0.50	"	5.00		102	70-130			
1,2-Dichloroethane	4.93	0.20	0.50	"	5.00		98.6	70-130			
1,1-Dichloroethene	4.96	0.10	0.30	"	5.00		99.2	70-130			
cis-1,2-Dichloroethene	5.01	0.20	0.50	"	5.00		100	70-130			
trans-1,2-Dichloroethene	4.99	0.20	0.50	"	5.00		99.8	70-130			
1,2-Dichloropropane	4.83	0.20	0.50	"	5.00		96.6	70-130			
1,3-Dichloropropane	5.09	0.20	0.50	"	5.00		102	70-130			
2,2-Dichloropropane	4.57	0.10	0.50	"	5.00		91.4	70-130			
1,1-Dichloropropene	4.65	0.10	0.50	"	5.00		93.0	70-130			
cis-1,3-Dichloropropene	4.66	0.20	0.50	"	5.00		93.2	70-130			
trans-1,3-Dichloropropene	4.58	0.20	0.50	"	5.00		91.6	70-130			
2-Hexanone	5.38	0.097	5.0	"	5.00		108	70-130			
Ethylbenzene	5.06	0.10	0.50	"	5.00		101	70-130			
Hexachlorobutadiene	4.93	0.30	0.50	"	5.00		98.6	70-130			
Isopropylbenzene	5.33	0.20	0.50	"	5.00		107	70-130			
p-Isopropyltoluene	5.25	0.10	0.50	"	5.00		105	70-130			
Methyl ethyl ketone	10.5	0.40	1.0	"	10.0		105	70-130			
Methyl iodide	5.04	0.12	2.0	"	5.00		101	70-130			
Methyl isobutyl ketone	10.3	0.30	1.0	"	10.0		103	70-130			
Methylene chloride	4.10	0.40	0.50	"	5.00		82.0	70-130			
Naphthalene	5.01	0.20	0.50	"	5.00		100	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS (AB40725-BS1)					Prepared & Analyzed: 02/04/14						
n-Propylbenzene	5.43	0.20	0.50	ug/l	5.00		109	70-130			
Styrene	5.32	0.10	0.50	"	5.00		106	70-130			
1,1,1,2-Tetrachloroethane	4.86	0.20	0.50	"	5.00		97.2	70-130			
1,1,2,2-Tetrachloroethane	5.08	0.20	0.50	"	5.00		102	70-130			
Tetrachloroethene	5.11	0.20	0.50	"	5.00		102	70-130			
Toluene	5.21	0.10	0.50	"	5.00		104	70-130			
1,2,3-Trichlorobenzene	5.08	0.10	0.50	"	5.00		102	70-130			
1,2,4-Trichlorobenzene	5.00	0.20	0.50	"	5.00		100	70-130			
1,1,1-Trichloroethane	4.89	0.20	0.50	"	5.00		97.8	70-130			
1,1,2-Trichloroethane	5.09	0.20	0.50	"	5.00		102	70-130			
Trichloroethene	4.93	0.20	0.50	"	5.00		98.6	70-130			
Trichlorofluoromethane	5.14	0.20	0.50	"	5.00		103	70-130			
Trichlorotrifluoroethane	5.56	0.20	0.50	"	5.00		111	70-130			
1,2,3-Trichloropropane	5.03	0.13	0.50	"	5.00		101	70-130			
1,2,4-Trimethylbenzene	5.36	0.10	0.50	"	5.00		107	70-130			
1,3,5-Trimethylbenzene	5.36	0.10	0.50	"	5.00		107	70-130			
Vinyl chloride	5.40	0.10	0.50	"	5.00		108	70-130			
m,p-Xylene	10.2	0.20	0.50	"	10.0		102	70-130			
o-Xylene	5.24	0.10	0.50	"	5.00		105	70-130			
Xylenes (total)	15.4	0.20	0.50	"	15.0		103	70-130			
Methyl tert-butyl ether	4.89	0.50	0.50	"	5.00		97.8	70-130			
Ethyl tert-butyl ether	4.85	0.20	0.50	"	5.00		97.0	70-130			
Tert-amyl methyl ether	4.93	0.20	0.50	"	5.00		98.6	70-130			
Surrogate: Bromofluorobenzene	*25.6*			*"*	*25.0*		*102*	*70-130*			
Surrogate: Dibromofluoromethane	*24.7*			*"*	*25.0*		*98.7*	*70-130*			
Surrogate: Toluene-d8	*25.3*			*"*	*25.0*		*101*	*70-130*			
LCS Dup (AB40725-BSD1)					Prepared & Analyzed: 02/04/14						
Acetone	22.4	0.80	5.0	ug/l	20.0		112	70-130	7.28	30	
Acrylonitrile	5.77	0.20	5.0	"	5.00		115	70-130	0.696	30	
Benzene	4.70	0.20	0.30	"	5.00		94.0	70-130	3.76	30	
Bromobenzene	5.09	0.10	0.50	"	5.00		102	70-130	1.95	30	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS Dup (AB40725-BSD1)					Prepared & Analyzed: 02/04/14						
Bromochloromethane	4.92	0.20	0.50	ug/l	5.00		98.4	70-130	3.79	30	
Bromodichloromethane	4.56	0.50	0.50	"	5.00		91.2	70-130	1.95	30	
Bromoform	4.71	0.50	0.50	"	5.00		94.2	70-130	2.80	30	
Bromomethane	5.46	0.20	0.50	"	5.00		109	70-130	0.551	30	
n-Butylbenzene	4.88	0.10	0.50	"	5.00		97.6	70-130	4.21	30	
sec-Butylbenzene	5.00	0.10	0.50	"	5.00		100	70-130	1.19	30	
tert-Butylbenzene	5.15	0.10	0.50	"	5.00		103	70-130	1.73	30	
Carbon disulfide	4.83	0.20	0.50	"	5.00		96.6	70-130	3.26	30	
Carbon tetrachloride	4.64	0.30	0.50	"	5.00		92.8	70-130	2.55	30	
Chlorobenzene	5.01	0.20	0.50	"	5.00		100	70-130	1.19	30	
Chloroethane	5.12	0.10	0.50	"	5.00		102	70-130	4.02	30	
Chloroform	4.84	0.50	0.50	"	5.00		96.8	70-130	1.64	30	
Chloromethane	5.86	0.20	0.50	"	5.00		117	70-130	4.34	30	
2-Chlorotoluene	5.27	0.20	0.50	"	5.00		105	70-130	0.190	30	
4-Chlorotoluene	5.07	0.10	0.50	"	5.00		101	70-130	1.59	30	
Dibromochloromethane	4.72	0.50	0.50	"	5.00		94.4	70-130	1.89	30	
1,2-Dibromo-3-chloropropane	4.95	0.36	0.50	"	5.00		99.0	70-130	0.202	25	
1,2-Dibromoethane (EDB)	5.17	0.14	0.50	"	5.00		103	70-130	1.15	25	
Dibromomethane	5.07	0.20	0.50	"	5.00		101	70-130	2.60	30	
1,2-Dichlorobenzene	4.70	0.20	0.50	"	5.00		94.0	70-130	3.35	30	
1,3-Dichlorobenzene	5.10	0.20	0.50	"	5.00		102	70-130	1.56	30	
trans-1,4-Dichloro-2-butene	4.90	0.095	5.0	"	5.00		98.0	70-130	3.32	25	J
1,4-Dichlorobenzene	4.87	0.10	0.50	"	5.00		97.4	70-130	1.83	30	
Dichlorodifluoromethane	5.94	0.20	0.50	"	5.00		119	70-130	3.31	30	
1,1-Dichloroethane	4.86	0.10	0.50	"	5.00		97.2	70-130	4.82	30	
1,2-Dichloroethane	4.84	0.20	0.50	"	5.00		96.8	70-130	1.84	30	
1,1-Dichloroethene	4.67	0.10	0.30	"	5.00		93.4	70-130	6.02	30	
cis-1,2-Dichloroethene	4.85	0.20	0.50	"	5.00		97.0	70-130	3.25	30	
trans-1,2-Dichloroethene	4.78	0.20	0.50	"	5.00		95.6	70-130	4.30	30	
1,2-Dichloropropane	4.88	0.20	0.50	"	5.00		97.6	70-130	1.03	30	
1,3-Dichloropropane	5.07	0.20	0.50	"	5.00		101	70-130	0.394	30	
2,2-Dichloropropane	4.36	0.10	0.50	"	5.00		87.2	70-130	4.70	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS Dup (AB40725-BSD1)					Prepared & Analyzed: 02/04/14						
1,1-Dichloropropene	4.56	0.10	0.50	ug/l	5.00		91.2	70-130	1.95	30	
cis-1,3-Dichloropropene	4.68	0.20	0.50	"	5.00		93.6	70-130	0.428	30	
trans-1,3-Dichloropropene	4.74	0.20	0.50	"	5.00		94.8	70-130	3.43	30	
Ethylbenzene	4.96	0.10	0.50	"	5.00		99.2	70-130	2.00	30	
2-Hexanone	5.44	0.097	5.0	"	5.00		109	70-130	1.11	25	
Hexachlorobutadiene	4.64	0.30	0.50	"	5.00		92.8	70-130	6.06	30	
Isopropylbenzene	5.24	0.20	0.50	"	5.00		105	70-130	1.70	30	
p-Isopropyltoluene	5.08	0.10	0.50	"	5.00		102	70-130	3.29	30	
Methyl ethyl ketone	11.0	0.40	1.0	"	10.0		110	70-130	4.74	30	
Methyl iodide	4.90	0.12	2.0	"	5.00		98.0	70-130	2.82	25	
Methyl isobutyl ketone	10.4	0.30	1.0	"	10.0		104	70-130	0.679	30	
Methylene chloride	4.06	0.40	0.50	"	5.00		81.2	70-130	0.980	30	
Naphthalene	4.96	0.20	0.50	"	5.00		99.2	70-130	1.00	30	
n-Propylbenzene	5.47	0.20	0.50	"	5.00		109	70-130	0.734	30	
Styrene	5.28	0.10	0.50	"	5.00		106	70-130	0.755	30	
1,1,1,2-Tetrachloroethane	4.77	0.20	0.50	"	5.00		95.4	70-130	1.87	30	
1,1,2,2-Tetrachloroethane	5.14	0.20	0.50	"	5.00		103	70-130	1.17	30	
Tetrachloroethene	4.82	0.20	0.50	"	5.00		96.4	70-130	5.84	30	
Toluene	5.15	0.10	0.50	"	5.00		103	70-130	1.16	30	
1,2,3-Trichlorobenzene	4.99	0.10	0.50	"	5.00		99.8	70-130	1.79	30	
1,2,4-Trichlorobenzene	4.83	0.20	0.50	"	5.00		96.6	70-130	3.46	30	
1,1,1-Trichloroethane	4.70	0.20	0.50	"	5.00		94.0	70-130	3.96	30	
1,1,2-Trichloroethane	5.20	0.20	0.50	"	5.00		104	70-130	2.14	30	
Trichloroethene	4.67	0.20	0.50	"	5.00		93.4	70-130	5.42	30	
Trichlorofluoromethane	5.01	0.20	0.50	"	5.00		100	70-130	2.56	30	
Trichlorotrifluoroethane	5.29	0.20	0.50	"	5.00		106	70-130	4.98	30	
1,2,3-Trichloropropane	5.09	0.13	0.50	"	5.00		102	70-130	1.19	25	
1,2,4-Trimethylbenzene	5.28	0.10	0.50	"	5.00		106	70-130	1.50	30	
1,3,5-Trimethylbenzene	5.28	0.10	0.50	"	5.00		106	70-130	1.50	30	
Vinyl chloride	5.27	0.10	0.50	"	5.00		105	70-130	2.44	30	
m,p-Xylene	10.1	0.20	0.50	"	10.0		101	70-130	0.888	30	
o-Xylene	5.11	0.10	0.50	"	5.00		102	70-130	2.51	30	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS Dup (AB40725-BSD1)					Prepared & Analyzed: 02/04/14						
Xylenes (total)	15.2	0.20	0.50	ug/l	15.0		101	70-130	1.44	30	
Methyl tert-butyl ether	4.81	0.50	0.50	"	5.00		96.2	70-130	1.65	30	
Ethyl tert-butyl ether	5.20	0.20	0.50	"	5.00		104	70-130	6.97	30	
Tert-amyl methyl ether	4.85	0.20	0.50	"	5.00		97.0	70-130	1.64	30	
Surrogate: Bromofluorobenzene	*25.4*			*"*	*25.0*		*102*	*70-130*			
Surrogate: Dibromofluoromethane	*24.0*			*"*	*25.0*		*96.1*	*70-130*			
Surrogate: Toluene-d8	*25.2*			*"*	*25.0*		*101*	*70-130*			
Matrix Spike (AB40725-MS1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
Acetone	26.9	0.80	5.0	ug/l	20.0	1.79	126	70-130			
Acrylonitrile	5.81	0.20	5.0	"	5.00	ND	116	70-130			
Benzene	5.43	0.20	0.30	"	5.00	ND	109	70-130			
Bromobenzene	5.48	0.10	0.50	"	5.00	ND	110	70-130			
Bromochloromethane	5.55	0.20	0.50	"	5.00	ND	111	70-130			
Bromodichloromethane	10.0	0.50	0.50	"	5.00	4.42	112	70-130			
Bromoform	4.44	0.50	0.50	"	5.00	ND	88.8	70-130			
Bromomethane	6.20	0.20	0.50	"	5.00	ND	124	70-130			
n-Butylbenzene	5.03	0.10	0.50	"	5.00	ND	101	70-130			
sec-Butylbenzene	5.41	0.10	0.50	"	5.00	ND	108	70-130			
tert-Butylbenzene	5.60	0.10	0.50	"	5.00	ND	112	70-130			
Carbon disulfide	5.36	0.20	0.50	"	5.00	ND	107	70-130			
Carbon tetrachloride	4.97	0.30	0.50	"	5.00	ND	99.4	70-130			
Chlorobenzene	5.35	0.20	0.50	"	5.00	ND	107	70-130			
Chloroethane	6.00	0.10	0.50	"	5.00	ND	120	70-130			
Chloroform	35.3	0.50	0.50	"	5.00	31.5	76.2	70-130			
Chloromethane	6.60	0.20	0.50	"	5.00	ND	132	70-130			QM-05
2-Chlorotoluene	5.65	0.20	0.50	"	5.00	ND	113	70-130			
4-Chlorotoluene	5.61	0.10	0.50	"	5.00	ND	112	70-130			
Dibromochloromethane	4.80	0.50	0.50	"	5.00	ND	96.0	70-130			
1,2-Dibromo-3-chloropropane	4.62	0.36	0.50	"	5.00	ND	92.4	70-130			
1,2-Dibromoethane (EDB)	5.29	0.14	0.50	"	5.00	ND	106	70-130			
Dibromomethane	5.47	0.20	0.50	"	5.00	ND	109	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike (AB40725-MS1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
1,2-Dichlorobenzene	4.95	0.20	0.50	ug/l	5.00	ND	99.0	70-130			
1,3-Dichlorobenzene	5.47	0.20	0.50	"	5.00	ND	109	70-130			
trans-1,4-Dichloro-2-butene	5.53	0.095	5.0	"	5.00	ND	111	70-130			
1,4-Dichlorobenzene	5.16	0.10	0.50	"	5.00	ND	103	70-130			
Dichlorodifluoromethane	6.69	0.20	0.50	"	5.00	ND	134	70-130			QM-05
1,1-Dichloroethane	5.61	0.10	0.50	"	5.00	ND	112	70-130			
1,2-Dichloroethane	5.51	0.20	0.50	"	5.00	ND	110	70-130			
1,1-Dichloroethene	5.37	0.10	0.30	"	5.00	ND	107	70-130			
cis-1,2-Dichloroethene	5.51	0.20	0.50	"	5.00	ND	110	70-130			
trans-1,2-Dichloroethene	5.31	0.20	0.50	"	5.00	ND	106	70-130			
1,2-Dichloropropane	5.29	0.20	0.50	"	5.00	ND	106	70-130			
1,3-Dichloropropane	5.45	0.20	0.50	"	5.00	ND	109	70-130			
2,2-Dichloropropane	4.58	0.10	0.50	"	5.00	ND	91.6	70-130			
1,1-Dichloropropene	5.13	0.10	0.50	"	5.00	ND	103	70-130			
cis-1,3-Dichloropropene	4.84	0.20	0.50	"	5.00	ND	96.8	70-130			
trans-1,3-Dichloropropene	4.50	0.20	0.50	"	5.00	ND	90.0	70-130			
2-Hexanone	5.62	0.097	5.0	"	5.00	ND	112	70-130			
Ethylbenzene	5.30	0.10	0.50	"	5.00	ND	106	70-130			
Hexachlorobutadiene	4.84	0.30	0.50	"	5.00	ND	96.8	70-130			
Isopropylbenzene	5.74	0.20	0.50	"	5.00	ND	115	70-130			
p-Isopropyltoluene	5.59	0.10	0.50	"	5.00	ND	112	70-130			
Methyl ethyl ketone	12.3	0.40	1.0	"	10.0	ND	123	70-130			
Methyl iodide	5.66	0.12	2.0	"	5.00	ND	113	70-130			
Methyl isobutyl ketone	10.7	0.30	1.0	"	10.0	ND	107	70-130			
Methylene chloride	4.34	0.40	0.50	"	5.00	ND	86.8	70-130			
Naphthalene	5.02	0.20	0.50	"	5.00	ND	100	70-130			
n-Propylbenzene	5.74	0.20	0.50	"	5.00	ND	115	70-130			
Styrene	5.53	0.10	0.50	"	5.00	ND	111	70-130			
1,1,1,2-Tetrachloroethane	4.62	0.20	0.50	"	5.00	ND	92.4	70-130			
1,1,2,2-Tetrachloroethane	5.37	0.20	0.50	"	5.00	ND	107	70-130			
Tetrachloroethene	5.41	0.20	0.50	"	5.00	ND	108	70-130			
Toluene	5.51	0.10	0.50	"	5.00	ND	110	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike (AB40725-MS1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
1,2,3-Trichlorobenzene	5.07	0.10	0.50	ug/l	5.00	ND	101	70-130			
1,2,4-Trichlorobenzene	4.77	0.20	0.50	"	5.00	ND	95.4	70-130			
1,1,1-Trichloroethane	5.12	0.20	0.50	"	5.00	ND	102	70-130			
1,1,2-Trichloroethane	5.46	0.20	0.50	"	5.00	ND	109	70-130			
Trichloroethene	5.13	0.20	0.50	"	5.00	ND	103	70-130			
Trichlorofluoromethane	5.52	0.20	0.50	"	5.00	ND	110	70-130			
Trichlorotrifluoroethane	6.04	0.20	0.50	"	5.00	ND	121	70-130			
1,2,3-Trichloropropane	5.35	0.13	0.50	"	5.00	ND	107	70-130			
1,2,4-Trimethylbenzene	5.57	0.10	0.50	"	5.00	ND	111	70-130			
1,3,5-Trimethylbenzene	5.57	0.10	0.50	"	5.00	ND	111	70-130			
Vinyl chloride	6.10	0.10	0.50	"	5.00	ND	122	70-130			
m,p-Xylene	11.0	0.20	0.50	"	10.0	ND	110	70-130			
o-Xylene	5.54	0.10	0.50	"	5.00	ND	111	70-130			
Xylenes (total)	16.6	0.20	0.50	"	15.0	ND	110	70-130			
Methyl tert-butyl ether	4.80	0.50	0.50	"	5.00	ND	96.0	70-130			
Ethyl tert-butyl ether	5.52	0.20	0.50	"	5.00	ND	110	70-130			
Tert-amyl methyl ether	4.93	0.20	0.50	"	5.00	ND	98.6	70-130			
Surrogate: Bromofluorobenzene	*25.3*			*"*	*25.0*		*101*	*70-130*			
Surrogate: Dibromofluoromethane	*24.5*			*"*	*25.0*		*98.1*	*70-130*			
Surrogate: Toluene-d8	*25.0*			*"*	*25.0*		*99.9*	*70-130*			
Matrix Spike Dup (AB40725-MSD1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
Acetone	26.1	0.80	5.0	ug/l	20.0	1.79	122	70-130	2.87	30	
Acrylonitrile	5.35	0.20	5.0	"	5.00	ND	107	70-130	8.24	30	
Benzene	4.92	0.20	0.30	"	5.00	ND	98.4	70-130	9.86	30	
Bromobenzene	5.04	0.10	0.50	"	5.00	ND	101	70-130	8.37	30	
Bromochloromethane	5.02	0.20	0.50	"	5.00	ND	100	70-130	10.0	30	
Bromodichloromethane	9.77	0.50	0.50	"	5.00	4.42	107	70-130	2.43	30	
Bromoform	4.34	0.50	0.50	"	5.00	ND	86.8	70-130	2.28	30	
Bromomethane	5.65	0.20	0.50	"	5.00	ND	113	70-130	9.28	30	
n-Butylbenzene	4.55	0.10	0.50	"	5.00	ND	91.0	70-130	10.0	30	
sec-Butylbenzene	5.00	0.10	0.50	"	5.00	ND	100	70-130	7.88	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike Dup (AB40725-MSD1)		**Source: 14B0115-02**		Prepared: 02/04/14 Analyzed: 02/06/14							
tert-Butylbenzene	5.08	0.10	0.50	ug/l	5.00	ND	102	70-130	9.74	30	
Carbon disulfide	4.92	0.20	0.50	"	5.00	ND	98.4	70-130	8.56	30	
Carbon tetrachloride	4.66	0.30	0.50	"	5.00	ND	93.2	70-130	6.44	30	
Chlorobenzene	5.02	0.20	0.50	"	5.00	ND	100	70-130	6.36	30	
Chloroethane	5.44	0.10	0.50	"	5.00	ND	109	70-130	9.79	30	
Chloroform	35.4	0.50	0.50	"	5.00	31.5	77.4	70-130	0.170	30	
Chloromethane	6.07	0.20	0.50	"	5.00	ND	121	70-130	8.37	30	
2-Chlorotoluene	5.19	0.20	0.50	"	5.00	ND	104	70-130	8.49	30	
4-Chlorotoluene	4.85	0.10	0.50	"	5.00	ND	97.0	70-130	14.5	30	
Dibromochloromethane	4.76	0.50	0.50	"	5.00	ND	95.2	70-130	0.837	30	
1,2-Dibromo-3-chloropropane	4.49	0.36	0.50	"	5.00	ND	89.8	70-130	2.85	25	
1,2-Dibromoethane (EDB)	4.82	0.14	0.50	"	5.00	ND	96.4	70-130	9.30	25	
Dibromomethane	5.04	0.20	0.50	"	5.00	ND	101	70-130	8.18	30	
1,2-Dichlorobenzene	4.59	0.20	0.50	"	5.00	ND	91.8	70-130	7.55	30	
1,3-Dichlorobenzene	5.02	0.20	0.50	"	5.00	ND	100	70-130	8.58	30	
trans-1,4-Dichloro-2-butene	5.09	0.095	5.0	"	5.00	ND	102	70-130	8.29	25	
1,4-Dichlorobenzene	4.76	0.10	0.50	"	5.00	ND	95.2	70-130	8.06	30	
Dichlorodifluoromethane	6.09	0.20	0.50	"	5.00	ND	122	70-130	9.39	30	
1,1-Dichloroethane	5.17	0.10	0.50	"	5.00	ND	103	70-130	8.16	30	
1,2-Dichloroethane	5.08	0.20	0.50	"	5.00	ND	102	70-130	8.12	30	
1,1-Dichloroethene	4.99	0.10	0.30	"	5.00	ND	99.8	70-130	7.34	30	
cis-1,2-Dichloroethene	5.09	0.20	0.50	"	5.00	ND	102	70-130	7.92	30	
trans-1,2-Dichloroethene	4.93	0.20	0.50	"	5.00	ND	98.6	70-130	7.42	30	
1,2-Dichloropropane	4.86	0.20	0.50	"	5.00	ND	97.2	70-130	8.47	30	
1,3-Dichloropropane	5.15	0.20	0.50	"	5.00	ND	103	70-130	5.66	30	
2,2-Dichloropropane	4.28	0.10	0.50	"	5.00	ND	85.6	70-130	6.77	30	
1,1-Dichloropropene	4.75	0.10	0.50	"	5.00	ND	95.0	70-130	7.69	30	
cis-1,3-Dichloropropene	4.62	0.20	0.50	"	5.00	ND	92.4	70-130	4.65	30	
trans-1,3-Dichloropropene	4.22	0.20	0.50	"	5.00	ND	84.4	70-130	6.42	30	
Ethylbenzene	4.83	0.10	0.50	"	5.00	ND	96.6	70-130	9.28	30	
2-Hexanone	5.28	0.097	5.0	"	5.00	ND	106	70-130	6.24	25	
Hexachlorobutadiene	4.48	0.30	0.50	"	5.00	ND	89.6	70-130	7.73	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike Dup (AB40725-MSD1)		**Source: 14B0115-02**		Prepared: 02/04/14 Analyzed: 02/06/14							
Isopropylbenzene	5.21	0.20	0.50	ug/l	5.00	ND	104	70-130	9.68	30	
p-Isopropyltoluene	4.91	0.10	0.50	"	5.00	ND	98.2	70-130	13.0	30	
Methyl ethyl ketone	11.8	0.40	1.0	"	10.0	ND	118	70-130	3.89	30	
Methyl iodide	5.13	0.12	2.0	"	5.00	ND	103	70-130	9.82	25	
Methyl isobutyl ketone	9.80	0.30	1.0	"	10.0	ND	98.0	70-130	8.69	30	
Methylene chloride	3.66	0.40	0.50	"	5.00	ND	73.2	70-130	17.0	30	
Naphthalene	4.66	0.20	0.50	"	5.00	ND	93.2	70-130	7.44	30	
n-Propylbenzene	5.17	0.20	0.50	"	5.00	ND	103	70-130	10.4	30	
Styrene	5.04	0.10	0.50	"	5.00	ND	101	70-130	9.27	30	
1,1,1,2-Tetrachloroethane	4.34	0.20	0.50	"	5.00	ND	86.8	70-130	6.25	30	
1,1,2,2-Tetrachloroethane	4.95	0.20	0.50	"	5.00	ND	99.0	70-130	8.14	30	
Tetrachloroethene	4.90	0.20	0.50	"	5.00	ND	98.0	70-130	9.89	30	
Toluene	5.03	0.10	0.50	"	5.00	ND	101	70-130	9.11	30	
1,2,3-Trichlorobenzene	4.89	0.10	0.50	"	5.00	ND	97.8	70-130	3.61	30	
1,2,4-Trichlorobenzene	4.38	0.20	0.50	"	5.00	ND	87.6	70-130	8.52	30	
1,1,1-Trichloroethane	4.75	0.20	0.50	"	5.00	ND	95.0	70-130	7.50	30	
1,1,2-Trichloroethane	5.07	0.20	0.50	"	5.00	ND	101	70-130	7.41	30	
Trichloroethene	4.86	0.20	0.50	"	5.00	ND	97.2	70-130	5.41	30	
Trichlorofluoromethane	4.90	0.20	0.50	"	5.00	ND	98.0	70-130	11.9	30	
Trichlorotrifluoroethane	5.57	0.20	0.50	"	5.00	ND	111	70-130	8.10	30	
1,2,3-Trichloropropane	4.93	0.13	0.50	"	5.00	ND	98.6	70-130	8.17	25	
1,2,4-Trimethylbenzene	5.11	0.10	0.50	"	5.00	ND	102	70-130	8.61	30	
1,3,5-Trimethylbenzene	5.11	0.10	0.50	"	5.00	ND	102	70-130	8.61	30	
Vinyl chloride	5.41	0.10	0.50	"	5.00	ND	108	70-130	12.0	30	
m,p-Xylene	9.99	0.20	0.50	"	10.0	ND	99.9	70-130	9.71	30	
o-Xylene	5.07	0.10	0.50	"	5.00	ND	101	70-130	8.86	30	
Xylenes (total)	15.1	0.20	0.50	"	15.0	ND	100	70-130	9.43	30	
Methyl tert-butyl ether	4.31	0.50	0.50	"	5.00	ND	86.2	70-130	10.8	30	
Ethyl tert-butyl ether	5.09	0.20	0.50	"	5.00	ND	102	70-130	8.11	30	
Tert-amyl methyl ether	4.48	0.20	0.50	"	5.00	ND	89.6	70-130	9.56	30	
Surrogate: Bromofluorobenzene	*25.4*			*"*	*25.0*		*101*	*70-130*			
Surrogate: Dibromofluoromethane	*24.2*			*"*	*25.0*		*97.0*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike Dup (AB40725-MSD1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
Surrogate: Toluene-d8	*24.8*			*ug/l*	*25.0*		*99.0*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
Blank (AB40514-BLK1)					Prepared: 02/05/14 Analyzed: 02/11/14						
Aldrin	ND	0.010	0.050	ug/l							U
Chloroneb	ND	0.20	0.50	"							U
Chlorobenzilate	ND	2.0	5.0	"							U
Chlorothalonil	ND	0.030	0.10	"							U
DCPA	ND	0.020	0.040	"							U
4,4´-DDD	ND	0.020	0.050	"							U
4,4´-DDE	ND	0.020	0.050	"							U
4,4´-DDT	ND	0.020	0.020	"							U
Dieldrin	ND	0.010	0.010	"							U
Endosulfan I	ND	0.020	0.050	"							U
Endosulfan II	ND	0.020	0.050	"							U
Endosulfan sulfate	ND	0.020	0.020	"							U
Endrin	ND	0.030	0.10	"							U
Endrin aldehyde	ND	0.020	0.050	"							U
HCH-alpha	ND	0.010	0.050	"							U
HCH-beta	ND	0.020	0.050	"							U
HCH-delta	ND	0.030	0.050	"							U
HCH-gamma (Lindane)	ND	0.010	0.010	"							U
Heptachlor	ND	0.010	0.010	"							U
Heptachlor epoxide	ND	0.010	0.010	"							U
Hexachlorobenzene	ND	0.010	0.040	"							U
Hexachlorocyclopentadiene	ND	0.040	0.40	"							U
Methoxychlor	ND	0.020	0.020	"							U
cis-Permethrin	ND	0.070	0.20	"							U
trans-Permethrin	ND	0.090	0.20	"							U
Propachlor	ND	0.070	0.20	"							U
Trifluralin	ND	0.020	0.040	"							U
PCB-1016	ND	0.030	0.50	"							U
PCB-1221	ND	0.030	0.50	"							U
PCB-1232	ND	0.030	0.50	"							U
PCB-1242	ND	0.030	0.50	"							U
PCB-1248	ND	0.030	0.50	"							U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
Blank (AB40514-BLK1)					Prepared: 02/05/14 Analyzed: 02/11/14						
PCB-1254	ND	0.030	0.50	ug/l							U
PCB-1260	ND	0.030	0.50	"							U
Total PCBs	ND	0.30	0.50	"							U
Toxaphene	ND	0.40	0.50	"							U
Chlordane (tech)	ND	0.030	0.050	"							U
Surrogate: Dibutylchlorendate	*1.05*			*"*	*0.952*		*110*	*70-130*			
LCS (AB40514-BS1)					Prepared: 02/05/14 Analyzed: 02/11/14						
Aldrin	0.263	0.010	0.050	ug/l	0.280		94.1	70-130			
Chloroneb	2.73	0.20	0.50	"	2.80		97.5	70-130			
Chlorobenzilate	3.29	2.0	5.0	"	2.80		117	70-130			J
Chlorothalonil	0.313	0.030	0.10	"	0.280		112	70-130			
DCPA	0.289	0.020	0.040	"	0.280		103	70-130			
4,4´-DDD	0.203	0.020	0.050	"	0.280		72.3	70-130			
4,4´-DDE	0.279	0.020	0.050	"	0.280		99.6	70-130			
4,4´-DDT	0.290	0.020	0.020	"	0.280		104	70-130			
Dieldrin	0.283	0.010	0.010	"	0.280		101	70-130			
Endosulfan I	0.285	0.020	0.050	"	0.280		102	70-130			
Endosulfan II	0.277	0.020	0.050	"	0.280		98.9	70-130			
Endosulfan sulfate	0.306	0.020	0.020	"	0.280		109	70-130			
Endrin	0.319	0.030	0.10	"	0.280		114	70-130			
Endrin aldehyde	0.267	0.020	0.050	"	0.280		95.3	70-130			
HCH-alpha	0.269	0.010	0.050	"	0.280		96.1	70-130			
HCH-beta	0.279	0.020	0.050	"	0.280		99.7	70-130			
HCH-delta	0.286	0.030	0.050	"	0.280		102	70-130			
HCH-gamma (Lindane)	0.273	0.010	0.010	"	0.280		97.7	70-130			
Heptachlor	0.273	0.010	0.010	"	0.280		97.6	70-130			
Heptachlor epoxide	0.279	0.010	0.010	"	0.280		99.5	70-130			
Hexachlorocyclopentadiene	0.409	0.040	0.40	"	0.560		73.1	15-90			
Hexachlorobenzene	0.237	0.010	0.040	"	0.280		84.7	70-130			
Methoxychlor	0.301	0.020	0.020	"	0.280		107	70-130			
cis-Permethrin	1.59	0.070	0.20	"	1.40		114	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
LCS (AB40514-BS1)					Prepared: 02/05/14 Analyzed: 02/11/14						
trans-Permethrin	1.60	0.090	0.20	ug/l	1.40		114	70-130			
Propachlor	0.306	0.070	0.20	"	0.280		109	70-130			
Trifluralin	0.416	0.020	0.040	"	0.420		99.0	70-130			
Surrogate: Dibutylchlorendate	*1.05*			*"*	*0.952*		*110*	*70-130*			
LCS Dup (AB40514-BSD1)					Prepared: 02/05/14 Analyzed: 02/11/14						
Aldrin	0.276	0.010	0.050	ug/l	0.280		98.7	70-130	4.77	25	
Chloroneb	2.84	0.20	0.50	"	2.80		101	70-130	3.76	25	
Chlorobenzilate	3.51	2.0	5.0	"	2.80		125	70-130	6.58	25	J
Chlorothalonil	0.334	0.030	0.10	"	0.280		119	70-130	6.41	25	
DCPA	0.304	0.020	0.040	"	0.280		109	70-130	5.05	25	
4,4´-DDD	0.208	0.020	0.050	"	0.280		74.3	70-130	2.71	25	
4,4´-DDE	0.299	0.020	0.050	"	0.280		107	70-130	7.17	25	
4,4´-DDT	0.307	0.020	0.020	"	0.280		109	70-130	5.49	25	
Dieldrin	0.301	0.010	0.010	"	0.280		108	70-130	6.30	25	
Endosulfan I	0.300	0.020	0.050	"	0.280		107	70-130	5.34	25	
Endosulfan II	0.287	0.020	0.050	"	0.280		103	70-130	3.69	25	
Endosulfan sulfate	0.324	0.020	0.020	"	0.280		116	70-130	5.53	25	
Endrin	0.336	0.030	0.10	"	0.280		120	70-130	5.28	25	
Endrin aldehyde	0.309	0.020	0.050	"	0.280		110	70-130	14.8	25	
HCH-alpha	0.280	0.010	0.050	"	0.280		99.9	70-130	3.84	25	
HCH-beta	0.294	0.020	0.050	"	0.280		105	70-130	5.16	25	
HCH-delta	0.303	0.030	0.050	"	0.280		108	70-130	5.61	25	
HCH-gamma (Lindane)	0.286	0.010	0.010	"	0.280		102	70-130	4.33	25	
Heptachlor	0.282	0.010	0.010	"	0.280		101	70-130	3.11	25	
Heptachlor epoxide	0.289	0.010	0.010	"	0.280		103	70-130	3.81	25	
Hexachlorocyclopentadiene	0.434	0.040	0.40	"	0.560		77.6	15-90	5.97	50	
Hexachlorobenzene	0.243	0.010	0.040	"	0.280		86.8	70-130	2.40	25	
Methoxychlor	0.326	0.020	0.020	"	0.280		116	70-130	8.17	25	
cis-Permethrin	1.62	0.070	0.20	"	1.40		116	70-130	1.95	25	
trans-Permethrin	1.67	0.090	0.20	"	1.40		119	70-130	4.72	25	
Propachlor	0.334	0.070	0.20	"	0.280		119	70-130	8.68	25	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
LCS Dup (AB40514-BSD1)					Prepared: 02/05/14 Analyzed: 02/11/14						
Trifluralin	0.437	0.020	0.040	ug/l	0.420		104	70-130	5.02	25	
Surrogate: Dibutylchlorendate	*1.07*			*"*	*0.952*		*112*	*70-130*			
Matrix Spike (AB40514-MS1)		**Source: 14A1713-01**			Prepared: 02/05/14 Analyzed: 02/12/14						
Aldrin	0.269	0.010	0.050	ug/l	0.280	ND	96.0	70-130			
Chloroneb	2.86	0.20	0.50	"	2.80	ND	102	70-130			
Chlorobenzilate	3.57	2.0	5.0	"	2.80	ND	127	70-130			J
Chlorothalonil	0.329	0.030	0.10	"	0.280	ND	117	70-130			
DCPA	0.303	0.020	0.040	"	0.280	ND	108	70-130			
4,4´-DDD	0.212	0.020	0.050	"	0.280	ND	75.7	70-130			
4,4´-DDE	0.288	0.020	0.050	"	0.280	ND	103	70-130			
4,4´-DDT	0.300	0.020	0.020	"	0.280	ND	107	70-130			
Dieldrin	0.295	0.010	0.010	"	0.280	ND	105	70-130			
Endosulfan I	0.298	0.020	0.050	"	0.280	ND	106	70-130			
Endosulfan II	0.298	0.020	0.050	"	0.280	ND	106	70-130			
Endosulfan sulfate	0.318	0.020	0.020	"	0.280	ND	113	70-130			
Endrin	0.354	0.030	0.10	"	0.280	ND	126	70-130			
Endrin aldehyde	0.299	0.020	0.050	"	0.280	ND	107	70-130			
HCH-alpha	0.285	0.010	0.050	"	0.280	ND	102	70-130			
HCH-beta	0.290	0.020	0.050	"	0.280	ND	104	70-130			
HCH-delta	0.300	0.030	0.050	"	0.280	ND	107	70-130			
HCH-gamma (Lindane)	0.291	0.010	0.010	"	0.280	ND	104	70-130			
Heptachlor	0.280	0.010	0.010	"	0.280	ND	100	70-130			
Heptachlor epoxide	0.286	0.010	0.010	"	0.280	ND	102	70-130			
Hexachlorobenzene	0.255	0.010	0.040	"	0.280	ND	91.0	70-130			
Hexachlorocyclopentadiene	0.486	0.040	0.40	"	0.560	ND	86.7	15-90			
Methoxychlor	0.323	0.020	0.020	"	0.280	ND	116	70-130			
cis-Permethrin	1.78	0.070	0.20	"	1.40	ND	127	70-130			
trans-Permethrin	1.78	0.090	0.20	"	1.40	ND	127	70-130			
Propachlor	0.336	0.070	0.20	"	0.280	ND	120	70-130			
Trifluralin	0.436	0.020	0.040	"	0.420	ND	104	70-130			
Surrogate: Dibutylchlorendate	*1.09*			*"*	*0.952*		*115*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
Matrix Spike Dup (AB40514-MSD1)		**Source: 14A1713-01**		Prepared: 02/05/14 Analyzed: 02/12/14							
Aldrin	0.260	0.010	0.050	ug/l	0.280	ND	92.8	70-130	3.40	25	
Chloroneb	2.76	0.20	0.50	"	2.80	ND	98.6	70-130	3.61	25	
Chlorobenzilate	3.40	2.0	5.0	"	2.80	ND	121	70-130	4.87	25	J
Chlorothalonil	0.313	0.030	0.10	"	0.280	ND	112	70-130	4.86	25	
DCPA	0.290	0.020	0.040	"	0.280	ND	103	70-130	4.52	25	
4,4´-DDD	0.210	0.020	0.050	"	0.280	ND	74.9	70-130	1.06	25	
4,4´-DDE	0.275	0.020	0.050	"	0.280	ND	98.1	70-130	4.80	25	
4,4´-DDT	0.289	0.020	0.020	"	0.280	ND	103	70-130	3.94	25	
Dieldrin	0.283	0.010	0.010	"	0.280	ND	101	70-130	4.34	25	
Endosulfan I	0.285	0.020	0.050	"	0.280	ND	102	70-130	4.19	25	
Endosulfan II	0.288	0.020	0.050	"	0.280	ND	103	70-130	3.14	25	
Endosulfan sulfate	0.302	0.020	0.020	"	0.280	ND	108	70-130	5.03	25	
Endrin	0.320	0.030	0.10	"	0.280	ND	114	70-130	10.1	25	
Endrin aldehyde	0.275	0.020	0.050	"	0.280	ND	98.2	70-130	8.56	25	
HCH-alpha	0.271	0.010	0.050	"	0.280	ND	96.8	70-130	4.94	25	
HCH-beta	0.282	0.020	0.050	"	0.280	ND	101	70-130	2.62	25	
HCH-delta	0.290	0.030	0.050	"	0.280	ND	104	70-130	3.17	25	
HCH-gamma (Lindane)	0.279	0.010	0.010	"	0.280	ND	99.5	70-130	4.43	25	
Heptachlor	0.267	0.010	0.010	"	0.280	ND	95.4	70-130	4.78	25	
Heptachlor epoxide	0.277	0.010	0.010	"	0.280	ND	99.0	70-130	3.09	25	
Hexachlorobenzene	0.238	0.010	0.040	"	0.280	ND	85.1	70-130	6.62	25	
Hexachlorocyclopentadiene	0.433	0.040	0.40	"	0.560	ND	77.3	15-90	11.5	50	
Methoxychlor	0.309	0.020	0.020	"	0.280	ND	110	70-130	4.66	25	
cis-Permethrin	1.72	0.070	0.20	"	1.40	ND	123	70-130	3.19	25	
trans-Permethrin	1.68	0.090	0.20	"	1.40	ND	120	70-130	5.53	25	
Propachlor	0.320	0.070	0.20	"	0.280	ND	114	70-130	4.81	25	
Trifluralin	0.420	0.020	0.040	"	0.420	ND	100	70-130	3.78	25	
Surrogate: Dibutylchlorendate	*1.03*			*"*	*0.952*		*108*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40730 - SVOAs in Water GC											
Blank (AB40730-BLK1)					Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	ND	0.50	0.50	ug/l							U
Atrazine	ND	0.30	0.50	"							U
Bromacil	ND	0.50	5.0	"							U
Butachlor	ND	0.40	0.50	"							U
Dimethoate	ND	0.20	1.0	"							U
Metolachlor	ND	0.30	0.50	"							U
Metribuzin	ND	0.40	0.50	"							U
Molinate	ND	0.20	0.50	"							U
Prometryn	ND	0.50	0.50	"							U
Propachlor	ND	0.30	0.50	"							U
Simazine	ND	0.30	0.50	"							U
Thiobencarb	ND	0.20	1.0	"							U
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.69*			*"*	*2.00*		*84.3*	*70-130*			
LCS (AB40730-BS1)					Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	1.88	0.50	0.50	ug/l	2.00		94.2	62-128			
Atrazine	1.92	0.30	0.50	"	2.00		96.1	62-122			
Bromacil	1.94	0.50	5.0	"	2.00		96.9	61-121			J
Butachlor	1.99	0.40	0.50	"	2.00		99.3	66-126			
Dimethoate	1.97	0.20	1.0	"	2.00		98.3	67-127			
Metolachlor	1.93	0.30	0.50	"	2.00		96.6	63-123			
Metribuzin	1.91	0.40	0.50	"	2.00		95.4	71-131			
Molinate	1.95	0.20	0.50	"	2.00		97.4	44-137			
Prometryn	1.95	0.50	0.50	"	2.00		97.6	63-123			
Propachlor	1.95	0.30	0.50	"	2.00		97.3	66-126			
Simazine	1.94	0.30	0.50	"	2.00		96.9	70-130			
Thiobencarb	2.01	0.20	1.0	"	2.00		100	69-129			
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.80*			*"*	*2.00*		*89.8*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40730 - SVOAs in Water GC											
LCS Dup (AB40730-BSD1)					Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	2.02	0.50	0.50	ug/l	2.00		101	62-128	6.95	30	
Atrazine	2.01	0.30	0.50	"	2.00		100	62-122	4.47	30	
Bromacil	2.14	0.50	5.0	"	2.00		107	61-121	10.0	30	J
Butachlor	2.09	0.40	0.50	"	2.00		105	66-126	5.23	30	
Dimethoate	2.17	0.20	1.0	"	2.00		108	67-127	9.82	30	
Metolachlor	2.02	0.30	0.50	"	2.00		101	63-123	4.37	30	
Metribuzin	2.04	0.40	0.50	"	2.00		102	71-131	6.92	30	
Molinate	1.94	0.20	0.50	"	2.00		96.8	44-137	0.569	30	
Prometryn	2.07	0.50	0.50	"	2.00		103	63-123	5.75	30	
Propachlor	2.00	0.30	0.50	"	2.00		100	66-126	2.80	30	
Simazine	2.09	0.30	0.50	"	2.00		105	70-130	7.61	30	
Thiobencarb	2.19	0.20	1.0	"	2.00		109	69-129	8.57	30	
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.85*			*"*	*2.00*		*92.6*	*70-130*			
Matrix Spike (AB40730-MS1)		**Source: 14A1588-01**			Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	1.81	0.50	0.50	ug/l	2.00	ND	90.7	62-128			
Atrazine	1.79	0.30	0.50	"	2.00	ND	89.7	62-122			
Bromacil	1.75	0.50	5.0	"	2.00	ND	87.5	61-121			J
Butachlor	1.85	0.40	0.50	"	2.00	ND	92.6	66-126			
Dimethoate	1.70	0.20	1.0	"	2.00	ND	84.9	67-127			
Metolachlor	1.82	0.30	0.50	"	2.00	ND	91.2	63-123			
Metribuzin	1.78	0.40	0.50	"	2.00	ND	89.2	71-131			
Molinate	1.87	0.20	0.50	"	2.00	ND	93.4	44-137			
Prometryn	1.68	0.50	0.50	"	2.00	ND	83.9	63-123			
Propachlor	1.93	0.30	0.50	"	2.00	ND	96.6	66-126			
Simazine	1.85	0.30	0.50	"	2.00	ND	92.5	70-130			
Thiobencarb	1.90	0.20	1.0	"	2.00	ND	95.2	69-129			
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.51*			*"*	*2.00*		*75.3*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40730 - SVOAs in Water GC											
Matrix Spike Dup (AB40730-MSD1)		**Source: 14A1588-01**		Prepared: 02/08/14 Analyzed: 02/11/14							
Alachlor	1.91	0.50	0.50	ug/l	2.00	ND	95.3	62-128	4.97	30	
Atrazine	1.96	0.30	0.50	"	2.00	ND	98.2	62-122	9.04	30	
Bromacil	2.13	0.50	5.0	"	2.00	ND	107	61-121	19.7	30	J
Butachlor	2.02	0.40	0.50	"	2.00	ND	101	66-126	8.67	30	
Dimethoate	2.14	0.20	1.0	"	2.00	ND	107	67-127	23.0	30	
Metolachlor	1.96	0.30	0.50	"	2.00	ND	97.9	63-123	7.12	30	
Metribuzin	2.02	0.40	0.50	"	2.00	ND	101	71-131	12.3	30	
Molinate	1.79	0.20	0.50	"	2.00	ND	89.6	44-137	4.16	30	
Prometryn	2.02	0.50	0.50	"	2.00	ND	101	63-123	18.4	30	
Propachlor	1.93	0.30	0.50	"	2.00	ND	96.4	66-126	0.171	30	
Simazine	2.07	0.30	0.50	"	2.00	ND	104	70-130	11.3	30	
Thiobencarb	1.96	0.20	1.0	"	2.00	ND	97.8	69-129	2.64	30	
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.60*			*"*	*2.00*		*79.9*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Organic Analytes by EPA Method 504.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40359 - EPA 504.1											
Blank (AB40359-BLK1)					Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	ND	0.0040	0.010	ug/l							U
1,2-Dibromoethane (EDB)	ND	0.0050	0.020	"							U
LCS (AB40359-BS1)					Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	0.262	0.0040	0.010	ug/l	0.250		105	70-130			
1,2-Dibromoethane (EDB)	0.255	0.0050	0.020	"	0.250		102	70-130			
LCS Dup (AB40359-BSD1)					Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	0.273	0.0040	0.010	ug/l	0.250		109	70-130	4.17	25	
1,2-Dibromoethane (EDB)	0.270	0.0050	0.020	"	0.250		108	70-130	5.47	25	
Matrix Spike (AB40359-MS1)		**Source: 14A1588-01**			Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	0.212	0.0040	0.010	ug/l	0.250	ND	84.8	70-130			
1,2-Dibromoethane (EDB)	0.214	0.0050	0.020	"	0.250	ND	85.5	70-130			
Matrix Spike Dup (AB40359-MSD1)		**Source: 14A1588-01**			Prepared & Analyzed: 02/04/14						
1,2-Dibromo-3-chloropropane	0.211	0.0040	0.010	ug/l	0.250	ND	84.2	70-130	0.698	25	
1,2-Dibromoethane (EDB)	0.212	0.0050	0.020	"	0.250	ND	84.8	70-130	0.771	25	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Chlorinated Acids by EPA Method 515.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40536 - EPA 515.1											
Blank (AB40536-BLK1)					Prepared: 02/06/14 Analyzed: 02/07/14						
Acifluorfen	ND	0.50	1.0	ug/l							U
Bentazon	ND	0.40	0.40	"							U
2,4-D	ND	0.80	1.0	"							U
Dalapon	ND	6.0	6.0	"							U
2,4-DB	ND	4.0	5.0	"							U
Dicamba	ND	0.40	0.40	"							U
Dichlorprop	ND	1.0	1.0	"							U
Dinoseb	ND	0.80	1.0	"							U
4-Nitrophenol	ND	0.70	1.0	"							U
Pentachlorophenol	ND	0.20	0.20	"							U
Picloram	ND	0.50	1.0	"							U
2,4,5-T	ND	0.40	0.50	"							U
2,4,5-TP (Silvex)	ND	0.50	0.50	"							U
Surrogate: DCAA	*13.2*			*"*	*14.2*		*93.2*	*70-130*			
LCS (AB40536-BS1)					Prepared: 02/06/14 Analyzed: 02/07/14						
Acifluorfen	1.04	0.50	1.0	ug/l	0.960		109	70-130			
Bentazon	1.48	0.40	0.40	"	1.92		76.9	70-130			
2,4-D	1.68	0.80	1.0	"	1.92		87.8	48-124			
Dalapon	11.3	6.0	6.0	"	12.5		90.3	40-112			
2,4-DB	7.11	4.0	5.0	"	7.68		92.6	54-123			
Dicamba	0.876	0.40	0.40	"	0.960		91.3	70-130			
Dichlorprop	2.70	1.0	1.0	"	2.88		93.7	54-106			
Dinoseb	5.59	0.80	1.0	"	6.42		87.1	20-105			
4-Nitrophenol	1.13	0.70	1.0	"	0.960		117	60-202			
Pentachlorophenol	0.840	0.20	0.20	"	0.960		87.5	70-130			
Picloram	1.07	0.50	1.0	"	0.960		111	70-130			
2,4,5-T	0.892	0.40	0.50	"	0.960		93.0	68-166			
2,4,5-TP (Silvex)	0.900	0.50	0.50	"	0.960		93.7	70-130			
Surrogate: DCAA	*14.5*			*"*	*14.2*		*102*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Chlorinated Acids by EPA Method 515.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40536 - EPA 515.1											
LCS Dup (AB40536-BSD1)					Prepared: 02/06/14 Analyzed: 02/07/14						
Acifluorfen	1.03	0.50	1.0	ug/l	0.960		108	70-130	0.944	50	
Bentazon	1.63	0.40	0.40	"	1.92		84.8	70-130	9.86	50	
2,4-D	1.69	0.80	1.0	"	1.92		88.0	48-124	0.327	50	
Dalapon	11.4	6.0	6.0	"	12.5		91.2	40-112	0.968	50	
2,4-DB	7.24	4.0	5.0	"	7.68		94.3	54-123	1.84	50	
Dicamba	0.877	0.40	0.40	"	0.960		91.4	70-130	0.0891	50	
Dichlorprop	2.69	1.0	1.0	"	2.88		93.5	54-106	0.220	50	
Dinoseb	5.77	0.80	1.0	"	6.42		89.9	20-105	3.18	50	
4-Nitrophenol	0.901	0.70	1.0	"	0.960		93.8	60-202	22.3	50	J
Pentachlorophenol	0.841	0.20	0.20	"	0.960		87.6	70-130	0.0986	50	
Picloram	0.964	0.50	1.0	"	0.960		100	70-130	10.5	50	J
2,4,5-T	0.931	0.40	0.50	"	0.960		96.9	68-166	4.18	50	
2,4,5-TP (Silvex)	0.964	0.50	0.50	"	0.960		100	70-130	6.85	50	
Surrogate: DCAA	*14.2*			*"*	*14.2*		*99.8*	*70-130*			
Matrix Spike (AB40536-MS1)		**Source: 14A1588-01**			Prepared: 02/06/14 Analyzed: 02/08/14						
Acifluorfen	0.696	0.50	1.0	ug/l	0.960	ND	72.5	70-130			J
Bentazon	1.79	0.40	0.40	"	1.92	ND	93.0	70-130			
2,4-D	1.50	0.80	1.0	"	1.92	ND	78.3	48-124			
Dalapon	11.1	6.0	6.0	"	12.5	ND	88.8	40-112			
2,4-DB	7.08	4.0	5.0	"	7.68	ND	92.2	54-123			
Dicamba	0.867	0.40	0.40	"	0.960	ND	90.3	70-130			
Dichlorprop	2.75	1.0	1.0	"	2.88	ND	95.6	54-106			
Dinoseb	5.23	0.80	1.0	"	6.42	ND	81.4	20-105			
4-Nitrophenol	0.969	0.70	1.0	"	0.960	ND	101	60-202			J
Pentachlorophenol	0.642	0.20	0.20	"	0.960	ND	66.9	70-130			QM-07
Picloram	0.973	0.50	1.0	"	0.960	ND	101	70-130			J
2,4,5-T	0.862	0.40	0.50	"	0.960	ND	89.8	68-166			
2,4,5-TP (Silvex)	0.911	0.50	0.50	"	0.960	ND	94.9	70-130			
Surrogate: DCAA	*13.8*			*"*	*14.2*		*97.5*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Chlorinated Acids by EPA Method 515.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40536 - EPA 515.1											
Matrix Spike Dup (AB40536-MSD1)		**Source: 14A1588-01**		Prepared: 02/06/14 Analyzed: 02/08/14							
Acifluorfen	0.926	0.50	1.0	ug/l	0.960	ND	96.5	70-130	28.3	50	J
Bentazon	1.79	0.40	0.40	"	1.92	ND	93.5	70-130	0.474	50	
2,4-D	1.64	0.80	1.0	"	1.92	ND	85.2	48-124	8.45	50	
Dalapon	11.5	6.0	6.0	"	12.5	ND	92.3	40-112	3.86	50	
2,4-DB	7.32	4.0	5.0	"	7.68	ND	95.4	54-123	3.40	50	
Dicamba	0.910	0.40	0.40	"	0.960	ND	94.8	70-130	4.86	50	
Dichlorprop	2.90	1.0	1.0	"	2.88	ND	101	54-106	5.12	50	
Dinoseb	5.49	0.80	1.0	"	6.42	ND	85.5	20-105	4.84	50	
4-Nitrophenol	1.04	0.70	1.0	"	0.960	ND	108	60-202	6.64	50	
Pentachlorophenol	0.721	0.20	0.20	"	0.960	ND	75.1	70-130	11.5	50	
Picloram	1.16	0.50	1.0	"	0.960	ND	121	70-130	17.4	50	
2,4,5-T	0.945	0.40	0.50	"	0.960	ND	98.4	68-166	9.12	50	
2,4,5-TP (Silvex)	0.967	0.50	0.50	"	0.960	ND	101	70-130	5.94	50	
Surrogate: DCAA	*14.5*			*"*	*14.2*		*102*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Carbamates by EPA Method 531.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41142 - HPLC											
Blank (AB41142-BLK1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	ND	0.70	3.0	ug/l							U
Aldicarb sulfone	ND	0.70	4.0	"							U
Aldicarb sulfoxide	ND	0.80	3.0	"							U
Carbaryl	ND	0.70	5.0	"							U
Carbofuran	ND	2.0	5.0	"							U
3-Hydroxycarbofuran	ND	0.90	3.0	"							U
Methiocarb	ND	2.0	5.0	"							U
Methomyl	ND	2.0	2.0	"							U
Oxamyl	ND	0.80	20	"							U
Propoxur	ND	2.0	5.0	"							U
LCS (AB41142-BS1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	20.0	0.70	3.0	ug/l	20.0		99.9	80-120			
Aldicarb sulfone	20.1	0.70	4.0	"	19.0		106	80-120			
Aldicarb sulfoxide	19.2	0.80	3.0	"	19.8		97.0	80-120			
Carbaryl	20.4	0.70	5.0	"	20.0		102	80-120			
Carbofuran	19.5	2.0	5.0	"	20.0		97.7	80-120			
3-Hydroxycarbofuran	20.7	0.90	3.0	"	20.0		103	80-120			
Methiocarb	18.6	2.0	5.0	"	20.0		93.2	80-120			
Methomyl	21.1	2.0	2.0	"	20.0		105	80-120			
Oxamyl	20.5	0.80	20	"	20.0		102	80-120			
Propoxur	20.2	2.0	5.0	"	20.0		101	80-120			
LCS Dup (AB41142-BSD1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	19.3	0.70	3.0	ug/l	20.0		96.6	80-120	3.34	20	
Aldicarb sulfone	19.3	0.70	4.0	"	19.0		102	80-120	3.93	20	
Aldicarb sulfoxide	18.6	0.80	3.0	"	19.8		93.7	80-120	3.45	20	
Carbaryl	18.8	0.70	5.0	"	20.0		94.1	80-120	8.11	20	
Carbofuran	19.4	2.0	5.0	"	20.0		97.1	80-120	0.645	20	
3-Hydroxycarbofuran	19.0	0.90	3.0	"	20.0		95.1	80-120	8.35	20	
Methiocarb	19.1	2.0	5.0	"	20.0		95.7	80-120	2.65	20	
Methomyl	19.5	2.0	2.0	"	20.0		97.7	80-120	7.69	20	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Carbamates by EPA Method 531.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41142 - HPLC											
LCS Dup (AB41142-BSD1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Oxamyl	19.2	0.80	20	ug/l	20.0		95.8	80-120	6.62	20	J
Propoxur	19.0	2.0	5.0	"	20.0		94.8	80-120	6.54	20	
Matrix Spike (AB41142-MS1)		**Source: 14B0426-01**			Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	18.7	0.70	3.0	ug/l	20.0	ND	93.3	80-120			
Aldicarb sulfone	20.1	0.70	4.0	"	19.0	ND	106	80-120			
Aldicarb sulfoxide	20.1	0.80	3.0	"	19.8	ND	102	80-120			
Carbaryl	20.0	0.70	5.0	"	20.0	ND	99.8	80-120			
Carbofuran	19.3	2.0	5.0	"	20.0	ND	96.6	80-120			
3-Hydroxycarbofuran	20.7	0.90	3.0	"	20.0	ND	103	80-120			
Methiocarb	18.2	2.0	5.0	"	20.0	ND	91.2	80-120			
Methomyl	21.0	2.0	2.0	"	20.0	ND	105	80-120			
Oxamyl	20.3	0.80	20	"	20.0	ND	102	80-120			
Propoxur	19.2	2.0	5.0	"	20.0	ND	95.9	80-120			
Matrix Spike Dup (AB41142-MSD1)		**Source: 14B0426-01**			Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	17.4	0.70	3.0	ug/l	20.0	ND	87.1	80-120	6.84	20	
Aldicarb sulfone	19.0	0.70	4.0	"	19.0	ND	100	80-120	5.57	20	
Aldicarb sulfoxide	18.8	0.80	3.0	"	19.8	ND	94.8	80-120	6.85	20	
Carbaryl	19.4	0.70	5.0	"	20.0	ND	97.1	80-120	2.76	20	
Carbofuran	19.4	2.0	5.0	"	20.0	ND	96.9	80-120	0.339	20	
3-Hydroxycarbofuran	19.8	0.90	3.0	"	20.0	ND	98.9	80-120	4.29	20	
Methiocarb	18.9	2.0	5.0	"	20.0	ND	94.6	80-120	3.68	20	
Methomyl	20.6	2.0	2.0	"	20.0	ND	103	80-120	1.83	20	
Oxamyl	19.2	0.80	20	"	20.0	ND	95.8	80-120	5.89	20	J
Propoxur	19.5	2.0	5.0	"	20.0	ND	97.3	80-120	1.47	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Endothall by EPA Method 548.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40357 - EPA 548.1											
Blank (AB40357-BLK1)					Prepared: 02/04/14 Analyzed: 02/06/14						
Endothall	ND	2.0	45	ug/l							U
LCS (AB40357-BS1)					Prepared: 02/04/14 Analyzed: 02/06/14						
Endothall	209	2.0	45	ug/l	200		104	80-120			
LCS Dup (AB40357-BSD1)					Prepared: 02/04/14 Analyzed: 02/06/14						
Endothall	217	2.0	45	ug/l	200		108	80-120	3.75	30	
Matrix Spike (AB40357-MS1)		**Source: 14A1588-01**			Prepared: 02/04/14 Analyzed: 02/06/14						
Endothall	187	2.0	45	ug/l	200	ND	93.7	80-120			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Glyphosate by EPA Method 547 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40427 - HPLC											
Blank (AB40427-BLK1)					Prepared & Analyzed: 02/04/14						
Glyphosate	ND	3.0	10	ug/l							U
LCS (AB40427-BS1)					Prepared & Analyzed: 02/04/14						
Glyphosate	111	3.0	10	ug/l	120		92.7	66-126			
LCS Dup (AB40427-BSD1)					Prepared & Analyzed: 02/04/14						
Glyphosate	112	3.0	10	ug/l	120		93.7	66-126	1.08	30	
Matrix Spike (AB40427-MS1)		**Source: 14B0093-01**			Prepared: 02/04/14 Analyzed: 02/05/14						
Glyphosate	111	3.0	10	ug/l	120	ND	92.7	66-126			
Matrix Spike Dup (AB40427-MSD1)		**Source: 14B0093-01**			Prepared: 02/04/14 Analyzed: 02/05/14						
Glyphosate	110	3.0	10	ug/l	120	ND	92.0	66-126	0.801	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Diquat by EPA Method 549.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AA43118 - HPLC											
Blank (AA43118-BLK1)					Prepared: 02/03/14 Analyzed: 02/10/14						
Diquat	ND	2.0	2.0	ug/l							U
LCS (AA43118-BS1)					Prepared: 02/03/14 Analyzed: 02/10/14						
Diquat	16.5	2.0	2.0	ug/l	19.8		83.3	70-130			
LCS Dup (AA43118-BSD1)					Prepared: 02/03/14 Analyzed: 02/10/14						
Diquat	16.2	2.0	2.0	ug/l	19.8		81.6	70-130	2.03	25	
Matrix Spike (AA43118-MS1)		**Source: 14A1755-01**			Prepared: 02/03/14 Analyzed: 02/10/14						
Diquat	8.63	2.0	2.0	ug/l	19.8	ND	43.5	70-130			QM-05

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 11:18

Haloacetic Acids by EPA Method 552.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41050 - EPA 552.2											
Blank (AB41050-BLK1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Monobromoacetic Acid	ND	0.8	1.0	ug/l							U
Monochloroacetic Acid	ND	1.1	2.0	"							U
Dibromoacetic Acid	ND	0.8	1.0	"							U
Dichloroacetic Acid	ND	1.0	1.0	"							U
Trichloroacetic Acid	ND	1.0	1.0	"							U
Total Haloacetic Acids (HAA5)	ND	1.0	1.0	"							U
Surrogate: 2,3-Dibromopropionic Acid	*9.59*			*"*	*10.0*		*95.9*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*11.7*			*"*	*10.0*		*117*	*70-130*			
LCS (AB41050-BS1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Monobromoacetic Acid	25.5	0.8	1.0	ug/l	25.0		102	70-130			
Monochloroacetic Acid	26.9	1.1	2.0	"	25.0		107	70-130			
Dibromoacetic Acid	26.8	0.8	1.0	"	25.0		107	70-130			
Dichloroacetic Acid	26.0	1.0	1.0	"	25.0		104	70-130			
Trichloroacetic Acid	26.6	1.0	1.0	"	25.0		106	70-130			
Surrogate: 2,3-Dibromopropionic Acid	*11.0*			*"*	*10.0*		*110*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*10.1*			*"*	*10.0*		*101*	*70-130*			
MRL Check (AB41050-MRL1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Monobromoacetic Acid	1.07	0.8	1.0	ug/l	1.00		107	0-200			
Monochloroacetic Acid	ND	1.1	2.0	"	1.00			0-200			U
Dibromoacetic Acid	1.37	0.8	1.0	"	1.00		137	0-200			
Dichloroacetic Acid	ND	1.0	1.0	"	1.00			0-200			U
Trichloroacetic Acid	1.05	1.0	1.0	"	1.00		105	0-200			
Surrogate: 2,3-Dibromopropionic Acid	*1.40*			*"*	*1.00*		*140*	*0-200*			
Surrogate: 2-Bromopropionic Acid	*1.14*			*"*	*1.00*		*114*	*0-200*			
Matrix Spike (AB41050-MS1)		**Source: 14A1713-01**			Prepared: 02/11/14 Analyzed: 02/13/14						
Monobromoacetic Acid	24.9	0.8	1.0	ug/l	25.0	ND	99.7	70-130			
Monochloroacetic Acid	26.6	1.1	2.0	"	25.0	ND	106	70-130			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408		Reported: 02/18/14 11:18

Haloacetic Acids by EPA Method 552.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41050 - EPA 552.2											
Matrix Spike (AB41050-MS1)		**Source: 14A1713-01**			Prepared: 02/11/14 Analyzed: 02/13/14						
Dibromoacetic Acid	32.2	0.8	1.0	ug/l	25.0	ND	129	70-130			
Dichloroacetic Acid	25.1	1.0	1.0	"	25.0	ND	100	70-130			
Trichloroacetic Acid	29.9	1.0	1.0	"	25.0	ND	120	70-130			
Surrogate: 2,3-Dibromopropionic Acid	*12.1*			*"*	*10.0*		*121*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*9.42*			*"*	*10.0*		*94.2*	*70-130*			
Matrix Spike (AB41050-MS2)		**Source: 14B0089-01**			Prepared: 02/11/14 Analyzed: 02/13/14						
Monobromoacetic Acid	24.4	0.8	1.0	ug/l	25.0	ND	97.6	70-130			
Monochloroacetic Acid	25.3	1.1	2.0	"	25.0	ND	101	70-130			
Dibromoacetic Acid	31.9	0.8	1.0	"	25.0	ND	128	70-130			
Dichloroacetic Acid	24.0	1.0	1.0	"	25.0	ND	96.0	70-130			
Trichloroacetic Acid	31.1	1.0	1.0	"	25.0	ND	124	70-130			
Surrogate: 2,3-Dibromopropionic Acid	*13.9*			*"*	*10.0*		*139*	*70-130*			*S-GC*
Surrogate: 2-Bromopropionic Acid	*10.9*			*"*	*10.0*		*109*	*70-130*			
Reference (AB41050-SRM1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Monobromoacetic Acid	25.1	0.8	1.0	ug/l	25.0		100	0-200			
Monochloroacetic Acid	26.7	1.1	2.0	"	25.0		107	0-200			
Dibromoacetic Acid	25.6	0.8	1.0	"	25.0		103	0-200			
Dichloroacetic Acid	24.9	1.0	1.0	"	25.0		99.7	0-200			
Trichloroacetic Acid	25.8	1.0	1.0	"	25.0		103	0-200			
Surrogate: 2,3-Dibromopropionic Acid	*10.6*			*"*	*10.0*		*106*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*9.92*			*"*	*10.0*		*99.2*	*70-130*			

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Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Semivolatile Organic Compounds by EPA Method 525.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40727 - EPA 525.2											
Blank (AB40727-BLK1)					Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	ND	0.080	0.10	ug/l							U
Di(2-ethylhexyl)adipate	ND	0.40	5.0	"							U
Di(2-ethylhexyl)phthalate	ND	0.20	3.0	"							U
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.23*			*"*	*5.00*		*105*	*70-130*			
Surrogate: Perylene-d12	*3.73*			*"*	*5.00*		*74.6*	*70-130*			
Surrogate: Triphenyl phosphate	*4.72*			*"*	*5.00*		*94.4*	*70-130*			
LCS (AB40727-BS1)					Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	2.13	0.080	0.10	ug/l	3.00		71.0	70-130			
Di(2-ethylhexyl)adipate	2.49	0.40	5.0	"	3.00		83.0	70-130			J
Di(2-ethylhexyl)phthalate	2.40	0.20	3.0	"	3.00		80.0	70-130			J
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.36*			*"*	*5.00*		*107*	*70-130*			
Surrogate: Perylene-d12	*4.65*			*"*	*5.00*		*93.0*	*70-130*			
Surrogate: Triphenyl phosphate	*5.36*			*"*	*5.00*		*107*	*70-130*			
LCS Dup (AB40727-BSD1)					Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	2.40	0.080	0.10	ug/l	3.00		80.0	70-130	11.9	20	
Di(2-ethylhexyl)adipate	2.70	0.40	5.0	"	3.00		90.0	70-130	8.09	20	J
Di(2-ethylhexyl)phthalate	2.57	0.20	3.0	"	3.00		85.7	70-130	6.84	20	J
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.39*			*"*	*5.00*		*108*	*70-130*			
Surrogate: Perylene-d12	*4.84*			*"*	*5.00*		*96.8*	*70-130*			
Surrogate: Triphenyl phosphate	*5.47*			*"*	*5.00*		*109*	*70-130*			
Matrix Spike (AB40727-MS1)		**Source: 14A1714-01**			Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	2.79	0.080	0.10	ug/l	3.00	ND	93.0	70-130			
Di(2-ethylhexyl)adipate	3.11	0.40	5.0	"	3.00	ND	104	70-130			J
Di(2-ethylhexyl)phthalate	2.79	0.20	3.0	"	3.00	ND	93.0	70-130			J
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.27*			*"*	*5.00*		*105*	*70-130*			
Surrogate: Perylene-d12	*5.52*			*"*	*5.00*		*110*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 11:18

Semivolatile Organic Compounds by EPA Method 525.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40727 - EPA 525.2											
Matrix Spike (AB40727-MS1)		**Source: 14A1714-01**			Prepared: 02/08/14 Analyzed: 02/13/14						
Surrogate: Triphenyl phosphate	*5.65*			*ug/l*	*5.00*		*113*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Project: Project Number:	Dr. Bill Motzer Groundwater Reuse Project 60408	Reported: 02/18/14 11:18

Notes and Definitions

J	Detected but below the Reporting Limit; therefore, result is an estimated concentration, detected but not quantified (DNQ).
QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
S-GC	Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogates.
U	Analyte included in analysis, but not detected at or above MDL.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

ASBESTOS TEM LABORATORIES, INC.

EPA 600/4-83 Drinking Water
Transmission Electron Microscopy
Analytical Report

Laboratory Job # 1288-00572

630 Bancroft Way
Berkeley, CA 94710
(510) 704-8930
FAX (510) 704-8429

ASBESTOS TEM LABORATORIES, INC

Certified by
CA DPH ELAP
Lab No. 1866

Feb/11/2014

David S. Pingatore
Alpha Analytical Laboratories, Inc.
208 Mason Street
Ukiah, CA 95482

RE: LABORATORY JOB # 1288-00572
Transmission electron microscopy analytical results for 1 water sample(s).
Job Site: Santa Margarita
Job No.: 14A1714

Enclosed please find results for the TEM analysis of one or more water samples. The analytical procedures were performed according to EPA Method 100.2 for the analysis of asbestos in drinking water.

Prior to analysis, samples are checked for damage, disruption of any chain-of-custody seals, and completeness of accompanying paperwork. If no problems are found, samples are then logged-in, each given a unique laboratory number, and a hard copy containing all pertinent information is generated. This, and all other relevant paper work are kept with each sample throughout the analytical procedures to assure proper analysis.

Preparation of water samples is performed within a HEPA filtered, Class 100 air, laminar flow clean bench environment. Prior to filtration, water sample containers are ultrasonicated, and the exterior surfaces cleaned. An aliquot of water is drawn from the sample container and drawn through a special filtration apparatus and collected onto a mixed cellulose ester (MCE) or polycarbonate (PC) filter. The filters are removed from the apparatus and dried. A portion of each sample filter is sectioned, placed onto a glass microscope slide, and carbon coated. The filters are further sectioned and placed carbon side up onto 200-mesh copper TEM sample grids in a solvent bath until all filter material is dissolved. The TEM grids are removed and placed into labeled grid storage boxes.

TEM analysis is performed on a Philips EM-300 or CM-12 transmission electron microscope operating at 80 or 100 kV. Initially, the grid is scanned at low and medium magnification to insure proper sample loading, and coherence of the carbon support film. Then TEM grid openings are analyzed at a magnification of 10,000X. All fibers >10 um in length and exhibiting an aspect ratio >3:1 are analyzed. Scanning continues until either 100 asbestiform fibers >10um in length are counted, or an analytical sensitivity of 0.2 million fibers per liter (MFL) is achieved. Analyzed fibers are subjected to detailed morphological and selected area diffraction (SAED) analysis. Fibers indicated as asbestos, or potentially asbestos, are further analyzed by energy dispersive X-ray (EDX) analysis as needed. The number of asbestos fibers detected, and other analytical parameters, are then used to calculate the concentration of asbestos in MFL. The results are entered into a standard report format and reviewed by the analyst and the laboratory manager before release to the client.

Sincerely Yours,

Laboratory Manager
ASBESTOS TEM LABORATORIES, INC.

--- These results relate only to the samples tested and must not be reproduced, except in full, with the approval of the laboratory. This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government. ---

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www.asbestostemlabs.com *With Offices in Reno, NV (775) 359-3377*

TRANSMISSION ELECTRON MICROSCOPY ANALYTICAL REPORT

Contact:	David S. Pingatore		
Address:	Alpha Analytical Laboratories, Inc. 208 Mason Street Ukiah, CA 95482	Report No.:	**323875**
		Date:	Feb-11-14
		Total Samples Analyzed:	1
Job Site / No.	Santa Margarita 14A1714	Sample Collector:	

CLIENT SAMPLE # **14A1714-01**

Laboratory Sample # 1288-00572-001

SAMPLE LOCATION/DESCRIPTION

Santa Margarita ASR MW-1

WATER SAMPLE DATA

Date/Time Collected	Jan-30-14 / 2:50 pm	Volume Submitted (ml)	1000
Date/Time Lab Received	Feb-03-14 / 3:55 pm	Volume Filtered (ml)	15
Date/Time Filtered	Feb-05-14 / 9:00 pm	Filter & Pore Size	MCE 0.22
Date/Time Analyzed	Feb-11-14 / 8:25 am	UV/Ozone Treated:	YES

IDENTIFIED STRUCTURES (>10um)			
ASBESTOS		OTHER	
CHRYS	AMPH	AMBIG	NON-ASB
NSD	NSD	NSD	NSD

CALCULATED ASBESTOS STRUCTURE CONCENTRATION (>10um)		
CHRYS	AMPH	TOTAL
< 0.1 MFL	< 0.1 MFL	< 0.1 MFL

COMMENTS

No asbestos detected

Filter Loading: MODERATE

SAED Photo ID Nos.

TEM / ANALYTICAL PARAMETERS

Grid Openings Scanned at 10,000X	8	Analytical Sensitivity	0.1 MFL
Grid Opening Area (mm2)	0.0094	95% UCL	0.33 MFL
Scan Area (mm2)	0.0752	95% LCL	0 MFL

WATER SAMPLE LAB BLANK RESULTS

Lab ID#	Blank 9476	Analytical Sensitivity	0.01 MFL
Grid Openings Scanned at 10,000X	8	Asbestos Structure Concentration	<0.01 MFL
Volume Filtered (ml)	300		

NOTATION KEY

Chrys. - Chrysotile Asbestos
Amph. - Amphibole Asbestos
NSD - No Structures Detected
1 mm = 1 millimeter

1 um = 1 micron = 0.001 mm
MFL = Millions of Fibers per Liter
UCL = Upper Confidence Level
LCL = Lower Confidence Level

ANALYST SIGNATURE

Stephanie Dunn

LAB QC REVIEWER SIGNATURE

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

14A1714

SENDING LABORATORY:	**RECEIVING LABORATORY:**
Alpha Analytical Laboratories, Inc.	Asbestos TEM Laboratories, Inc.
208 Mason St.	630 Bancroft Way
Ukiah, CA 95482	Berkeley, CA 94710
Phone: (707)468-0401	Phone :(510) 704-8930
Fax: (707)468-5267	Fax: (510) 704-8429
Project Manager: David S. Pingatore	**Terms: Net 30**

Analysis	Due	Expires	Comments
14A1714-01 Santa Margarita ASR MW-1 [Water] Sampled 01/30/14 14:50 Pacific			
Asbestos-DW SUB	02/14/14 12:00	02/01/14 14:50	
Containers Supplied:			
1L Amber- Unpres. (Y)	1L Amber- Unpres. (Z)		

☐ *Report to State*

System Name: _____ **Employed by:** _____

User ID: _____ **Sampler:** _____

System Number: _____

+QC

Released By	Date	Received By	Date
	1-31-14	ATEM/RY	02-03-14 P03:55 IN
Released By	Date	Received By	Date

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1401904

Report Created for: Alpha Analytical Laboratories
208 Mason Street
Ukiah, CA 95482

Project Contact: David S. Pingatore
Project P.O.:
Project Name: #14A1714

Project Received: 01/31/2014

Analytical Report reviewed & approved for release on 02/05/2014 by:

Question about your data?

Click here to email McCampbell

Angela Rydelius,
Laboratory Manager

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NELAP: 12283CA ♦ ELAP: 1644 ♦ ISO/IEC: 17025:2005 ♦ WSDE: C972-11 ♦ ADEC: UST-098 ♦ UCMR3

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Glossary of Terms & Qualifier Definitions

Client: Alpha Analytical Laboratories
Project: #14A1714
WorkOrder: 1401904

Glossary Abbreviation	Description
95% Interval	95% Confident Interval
DF	Dilution Factor
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not detected at or above the indicated MDL or RL
NR	Matrix interferences, or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix; or sample diluted due to high matrix or analyte content.
RD	Relative Difference
RL	Reporting Limit
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
TEQ	Toxicity Equivalence

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Analytical Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	1401904
Project:	#14A1714	**Extraction Method**	E218.6
Date Received:	1/31/14 12:16	**Analytical Method:**	E218.6
Date Prepared:	1/31/14	**Unit:**	µg/L

Hexachrome by IC

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
Santa Margarita ASR MW-1	**1401904-001A**	**Water**	**01/30/2014 14:50**	**IC2**	**86616**

Analytes	Result	RL	DF	Date Analyzed
Hexachrome	ND	0.050	1	01/31/2014 18:09

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Quality Control Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	1401904
Date Prepared:	1/31/14	**BatchID:**	86616
Date Analyzed:	1/31/14	**Extraction Method**	E218.6
Instrument:	IC2	**Analytical Method:**	E218.6
Matrix:	Water	**Unit:**	µg/L
Project:	#14A1714	**Sample ID:**	MB/LCS-86616 1401905-001AMS/MSD

QC Summary Report for E218.6

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Hexachrome	ND	25.38	0.050	25	-	102	90-110

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Hexachrome	24.94	25.03	25	1.560	93.5	93.9	90-110	0.360	10

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1401904 **ClientCode: ALPU**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
David S. Pingatore
Alpha Analytical Laboratories
208 Mason Street
Ukiah, CA 95482
(707) 468-0401 FAX: (707) 468-5267

Email: sspeaks@alpha-labs.com;david@alpha-lab
cc:
PO:
ProjectNo: #14A1714

Bill to:
Accounts Payable
Alpha Analytical Laboratories
208 Mason Street
Ukiah, CA 95482

Requested TAT: 5 days

Date Received: 01/31/2014
Date Printed: 01/31/2014

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
1401904-001	Santa Margarita ASR MW-1	Water	1/30/2014 14:50	☐	A											

Test Legend:

1	218_6_DW	2		3		4		5	
6		7		8		9		10	
11		12							

Prepared by: Maria Venegas

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.
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WORK ORDER SUMMARY

Client Name: ALPHA ANALYTICAL LABORATORIES
QC Level: LEVEL 2
Work Order: 1401904
Project: #14A1714
Client Contact: David S. Pingatore
Date Received: 1/31/2014
Comments:
Contact's Email: sspeaks@alpha-labs.com;david@alpha-labs.com

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Number of Containers	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1401904-001A	Santa Margarita ASR MW-1	Water	E218.6 (Hexachrome)	1	250mL HDPE w/ (NH4)2SO4	☐	1/30/2014 14:50	5 days	Trace	☐	

*** NOTE: STLC and TCLP extractions require 48 hrs to complete; therefore, all TATs begin after the extraction is completed (i.e., 24hr TAT yields results in 72 hrs from sample submission).**

Bottle Legend:

250mL HDPE w/ (NH4)2SO4 = 250mL HDPE Bottle w/ Ammonium Sulfate

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

1401904

14A1714

SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: David S. Pingatore

RECEIVING LABORATORY:

McCampbell Analytical
1534 Willowpass Rd.
Pittsburg, CA 94565
Phone :(925) 252-9262
Fax: (925) 252-9269
Terms: Net 30

Analysis	Due	Expires	Comments
14A1714-01 Santa Margarita ASR MW-1 [Water] Sampled 01/30/14 14:50			
Pacific			
Cr6 218.6 DW	02/14/14 12:00	02/04/14 14:50	
Containers Supplied:			
250ml Poly - (NH4)2SO4 (A			

☐ *Report to State*

System Name: _____ **Employed by:** _____

User ID: _____ **Sampler:** _____

System Number: _____

NO

ICE/t° 3.2
GOOD CONDITION_____ APPROPRIATE
HEAD SPACE ABSENT_____ CONTAINERS_____
DECHLORINATED IN LAB_____ PRESERVED IN LAB_____

PRESERVATION	VOAS	O&G	METALS	OTHER

Released By	Date	Received By	Date
	01/31/14		1/31/14
Released By	Date	Received By	Date
	1/31/14		1/31/14 1150

Page 1 of 1

McCampbell Analytical, Inc.
"When Quality Counts"

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Sample Receipt Checklist

Client Name:	**Alpha Analytical Laboratories**	Date and Time Received:	**1/31/2014 12:16:46 PM**
Project Name:	**#14A1714**	LogIn Reviewed by:	Maria Venegas
WorkOrder N°:	**1401904** Matrix: Water	Carrier:	Client Drop-In

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐
Chain of custody signed when relinquished and received?	Yes ☑	No ☐
Chain of custody agrees with sample labels?	Yes ☑	No ☐
Sample IDs noted by Client on COC?	Yes ☑	No ☐
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐
Sampler's name noted on COC?	Yes ☐	No ☑

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp: 3.2°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	NA ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☑	No ☐	

(Ice Type: BLUE ICE)

** NOTE: If the "No" box is checked, see comments below.*

Comments:

ALS Environmental
ALS Group USA, Corp.
1317 South 13th Avenue
Kelso, WA 98626
T: +1 360 577 7222
F: +1 360 636 1068
www.alsglobal.com

February 21, 2014 Analytical Report for Service Request No: K1401156

David Pingatore
Alpha Analytical Laboratories, Inc.
6398 Dougherty Road, Suite 35
Dublin, CA 94568

RE: 14A1714

Dear David:

Enclosed are the results of the sample submitted to our laboratory on February 05, 2014. For your reference, these analyses have been assigned our service request number K1401156.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3293. You may also contact me via Email at Shar.Samy@alsglobal.com.

Respectfully submitted,

ALS Group USA Corp. dba ALS Environmental

Shar Samy, Ph.D.
Project Manager

SS/mj

RIGHT SOLUTIONS | RIGHT PARTNER

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2286
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L12-28
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Georgia DNR	http://www.gaepd.org/Documents/techguide_pcb.html#cel	881
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
Indiana DOH	http://www.in.gov/isdh/24859.htm	C-WA-01
ISO 17025	http://www.pjlabs.com/	L12-27
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	3016
Maine DHS	Not available	WA0035
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-368
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA35
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA200001
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	4704427-08-TX
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C1203
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.caslab.com or at the accreditation bodies web site

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

ALS ENVIRONMENTAL

Client:	Alpha Analytical Laboratories, Inc.	**Service Request No.:**	K1401156
Project:	14A1714	**Date Received:**	02/05/14
Sample Matrix:	Water		

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Matrix/Duplicate Matrix Spike (MS/DMS), and Laboratory Control Sample (LCS).

Sample Receipt

One water sample was received for analysis at ALS Environmental on 02/05/14. The sample was received in good condition and consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4ºC upon receipt at the laboratory.

Explosives by EPA Method 8330

Sample Notes and Discussion:
Insufficient sample volume was received to perform a Matrix Spike/Matrix Spike Duplicate (MS/MSD). A Laboratory Control Sample/Duplicate Laboratory Control Sample (LCS/DLCS) was analyzed and reported in lieu of the MS/MSD.

No other anomalies associated with the analysis of this sample were observed.

Approved by_____

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

14A1714

K1401156

SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: David S. Pingatore

RECEIVING LABORATORY:

ALS Environmental - Kelso
1317 S. 13th Ave
Kelso, WA 98626
Phone :(360) 577-7222
Fax: -
Terms: Net 30

Analysis	Due	Expires	Comments
14A1714-01 Santa Margarita ASR MW-1 [Water] Sampled 01/30/14 14:50 Pacific			
8330B Explosives Water	02/14/14 12:00	02/06/14 14:50	
Containers Supplied:			
1L Amber- Unpres. (AD) 1L Amber- Unpres. (AE)			

☐ *Report to State*

System Name: _____ **Employed by:** _____

User ID: _____ **Sampler:** _____

System Number: _____

+QC

Released By	Date	Received By	Date
	1-31-14		2/3/14 1020
Released By	Date	Received By	Date

ALS

PC Shaw

Cooler Receipt and Preservation Form

Client / Project: Alpha Service Request K14 01156

Received: 2/5/14 Opened: 2/5/14 By: [illegible] Unloaded: 2/5/14 By: [illegible]

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? _____

   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected. Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
-0.9	-0.6	–	–	-0.1	308		1Z894250 0148947238	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

Page ____ *of* ____

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Alpha Analytical Laboratories, Inc. (Uki	**Service Request:**	K1401156
Project:	14A1714	**Date Collected:**	01/30/2014
Sample Matrix:	Water	**Date Received:**	02/05/2014

Nitroaromatics and Nitramines (Explosives)

Sample Name:	14A1714-01 Santa Margarita ASR MW-1	**Units:**	ug/L
Lab Code:	K1401156-001	**Basis:**	NA
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	8330B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
HMX	ND	U	0.098	0.010	1	02/06/14	02/08/14	KWG1400979	
RDX	ND	U	0.098	0.017	1	02/06/14	02/08/14	KWG1400979	
1,3,5-Trinitrobenzene	ND	U	0.20	0.050	1	02/06/14	02/08/14	KWG1400979	
1,3-Dinitrobenzene	ND	U	0.098	0.0085	1	02/06/14	02/08/14	KWG1400979	
3,5-Dinitroaniline	ND	U	0.098	0.013	1	02/06/14	02/08/14	KWG1400979	
TETRYL	ND	U	0.10	0.042	1	02/06/14	02/08/14	KWG1400979	
Nitrobenzene	ND	U	0.098	0.013	1	02/06/14	02/08/14	KWG1400979	
4-Amino-2,6-dinitrotoluene	ND	U	0.098	0.016	1	02/06/14	02/08/14	KWG1400979	
2-Amino-4,6-dinitrotoluene	ND	U	0.098	0.0089	1	02/06/14	02/08/14	KWG1400979	
2,4,6-Trinitrotoluene	ND	U	0.098	0.026	1	02/06/14	02/08/14	KWG1400979	
2,6-Dinitrotoluene	ND	U	0.20	0.054	1	02/06/14	02/08/14	KWG1400979	
2,4-Dinitrotoluene	ND	U	0.098	0.0091	1	02/06/14	02/08/14	KWG1400979	
2-Nitrotoluene	**0.037**	JN	0.10	0.032	1	02/06/14	02/08/14	KWG1400979	
4-Nitrotoluene	ND	U	0.098	0.019	1	02/06/14	02/08/14	KWG1400979	
3-Nitrotoluene	ND	U	0.098	0.0064	1	02/06/14	02/08/14	KWG1400979	
Nitroglycerin	ND	U	0.98	0.39	1	02/06/14	02/08/14	KWG1400979	
Pentaerythritol Tetranitrate	ND	U	0.49	0.18	1	02/06/14	02/08/14	KWG1400979	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1-Chloro-3-nitrobenzene	87	23-98	02/08/14	Acceptable

Comments:

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Alpha Analytical Laboratories, Inc. (Uki	**Service Request:**	K1401156
Project:	14A1714	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Nitroaromatics and Nitramines (Explosives)

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG1400979-3	**Basis:**	NA
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	8330B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
HMX	ND	U	0.098	0.010	1	02/06/14	02/07/14	KWG1400979	
RDX	ND	U	0.098	0.017	1	02/06/14	02/07/14	KWG1400979	
1,3,5-Trinitrobenzene	ND	U	0.20	0.050	1	02/06/14	02/07/14	KWG1400979	
1,3-Dinitrobenzene	ND	U	0.098	0.0085	1	02/06/14	02/07/14	KWG1400979	
3,5-Dinitroaniline	ND	U	0.098	0.013	1	02/06/14	02/07/14	KWG1400979	
TETRYL	ND	U	0.10	0.042	1	02/06/14	02/07/14	KWG1400979	
Nitrobenzene	ND	U	0.098	0.013	1	02/06/14	02/07/14	KWG1400979	
4-Amino-2,6-dinitrotoluene	ND	U	0.098	0.016	1	02/06/14	02/07/14	KWG1400979	
2-Amino-4,6-dinitrotoluene	ND	U	0.098	0.0089	1	02/06/14	02/07/14	KWG1400979	
2,4,6-Trinitrotoluene	ND	U	0.098	0.026	1	02/06/14	02/07/14	KWG1400979	
2,6-Dinitrotoluene	**0.068**	JN	0.20	0.054	1	02/06/14	02/07/14	KWG1400979	
2,4-Dinitrotoluene	ND	U	0.098	0.0091	1	02/06/14	02/07/14	KWG1400979	
2-Nitrotoluene	ND	U	0.10	0.032	1	02/06/14	02/07/14	KWG1400979	
4-Nitrotoluene	ND	U	0.098	0.019	1	02/06/14	02/07/14	KWG1400979	
3-Nitrotoluene	ND	U	0.098	0.0064	1	02/06/14	02/07/14	KWG1400979	
Nitroglycerin	ND	U	0.98	0.39	1	02/06/14	02/07/14	KWG1400979	
Pentaerythritol Tetranitrate	ND	U	0.49	0.18	1	02/06/14	02/07/14	KWG1400979	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1-Chloro-3-nitrobenzene	75	23-98	02/07/14	Acceptable

Comments:

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: Alpha Analytical Laboratories, Inc. (Uki
Service Request: K1401156
Project: 14A1714
Sample Matrix: Water

Surrogate Recovery Summary
Nitroaromatics and Nitramines (Explosives)

Extraction Method: METHOD
Units: Percent
Analysis Method: 8330B
Level: Low

Sample Name	Lab Code	Sur1
14A1714-01 Santa Margarita ASR MV	K1401156-001	87
Method Blank	KWG1400979-3	75
Duplicate Lab Control Sample	KWG1400979-1	82
Lab Control Sample	KWG1400979-2	91

Surrogate Recovery Control Limits (%)

Sur1 = 1-Chloro-3-nitrobenzene 23-98

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	Alpha Analytical Laboratories, Inc. (Uki	**Service Request:**	K1401156
Project:	14A1714	**Date Extracted:**	02/06/2014
Sample Matrix:	Water	**Date Analyzed:**	02/07/2014

Lab Control Spike/Duplicate Lab Control Spike Summary
Nitroaromatics and Nitramines (Explosives)

Extraction Method:	METHOD	**Units:**	ug/L
Analysis Method:	8330B	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG1400979

	Lab Control Sample KWG1400979-2 Lab Control Spike			Duplicate Lab Control Sample KWG1400979-1 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
HMX	7.75	8.00	97	7.46	8.00	93	11-147	4	30
RDX	7.53	8.00	94	7.26	8.00	91	10-142	4	30
1,3,5-Trinitrobenzene	7.54	8.00	94	7.01	8.00	88	16-137	7	30
1,3-Dinitrobenzene	7.51	8.00	94	7.03	8.00	88	26-125	7	30
3,5-Dinitroaniline	7.48	8.00	93	7.09	8.00	89	30-133	5	30
TETRYL	7.71	8.00	96	7.26	8.00	91	29-123	6	30
Nitrobenzene	7.43	8.00	93	6.93	8.00	87	10-116	7	30
4-Amino-2,6-dinitrotoluene	7.57	8.00	95	7.11	8.00	89	55-117	6	30
2-Amino-4,6-dinitrotoluene	7.47	8.00	93	7.00	8.00	88	54-116	6	30
2,4,6-Trinitrotoluene	7.53	8.00	94	6.93	8.00	87	47-118	8	30
2,6-Dinitrotoluene	7.57	8.00	95	6.95	8.00	87	40-108	9	30
2,4-Dinitrotoluene	7.46	8.00	93	6.83	8.00	85	50-111	9	30
2-Nitrotoluene	7.18	8.00	90	6.55	8.00	82	12-110	9	30
4-Nitrotoluene	7.21	8.00	90	6.58	8.00	82	16-113	9	30
3-Nitrotoluene	7.51	8.00	94	6.83	8.00	85	13-109	10	30
Nitroglycerin	7.71	8.00	96	7.43	8.00	93	15-136	4	30
Pentaerythritol Tetranitrate	7.81	8.00	98	7.35	8.00	92	66-103	6	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

WECK LABORATORIES, INC.
Analytical Laboratory Service - Since 1964

Certificate of Analysis

Report Date: 02/24/14 10:55
Received Date: 02/05/14 08:30
Turnaround Time: Normal

Project: 14A1714

Phones: (925) 872-9637
Fax: (707) 468-5267

P.O. #:

Attn: David S. Pingatore

Client: Alpha Analytical Laboratories - Ukiah
208 Mason St
Ukiah, CA 95482

Dear David S. Pingatore :

Enclosed are the results of analyses for samples received 2/5/2014 with the Chain of Custody document. The samples were received in good condition, at 1.7 °C and on ice. All analysis met the method criteria except as noted below or in the report with data qualifiers.

Lab Sample ID: 4B05034-01 **Sample ID: 14A1714-01 Santa Margarita ASR MW-1 Pacific** **Matrix:** Water
Sampled by: Client **Sampled: 01/30/14 14:50**

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
N-Nitrosodiethylamine	ND		2.0	ng/l	1	EPA 1625M	2/6/14	2/7/14 12:34	W4B0247	
N-Nitrosodimethylamine	ND		2.0	ng/l	1	EPA 1625M	2/6/14	2/7/14 12:34	W4B0247	
N-Nitrosodi-n-butylamine	ND		2.0	ng/l	1	EPA 1625M	2/6/14	2/7/14 12:34	W4B0247	
N-Nitrosodi-n-propylamine	ND		2.0	ng/l	1	EPA 1625M	2/6/14	2/7/14 12:34	W4B0247	
N-Nitrosomethylethylamine	ND		2.0	ng/l	1	EPA 1625M	2/6/14	2/7/14 12:34	W4B0247	
N-Nitrosomorpholine	ND		2.0	ng/l	1	EPA 1625M	2/6/14	2/7/14 12:34	W4B0247	
N-Nitrosopiperidine	ND		2.0	ng/l	1	EPA 1625M	2/6/14	2/7/14 12:34	W4B0247	
N-Nitrosopyrrolidine	ND		2.0	ng/l	1	EPA 1625M	2/6/14	2/7/14 12:34	W4B0247	
17-a-Ethynylestradiol	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 19:29	W4B0281	
17-b-Estradiol	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 19:29	W4B0281	
Estrone	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 19:29	W4B0281	
Progesterone	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 19:29	W4B0281	
Testosterone	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 19:29	W4B0281	
Bisphenol A	**1400**		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 0:04	W4B0283	
Gemfibrozil	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 0:04	W4B0283	
Ibuprofen	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 0:04	W4B0283	
Iopromide	ND		5.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 0:04	W4B0283	
Naproxen	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 0:04	W4B0283	
Salicylic Acid	ND		50	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 0:04	W4B0283	
Triclosan	ND		2.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 0:04	W4B0283	

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Lab Sample ID: 4B05034-01 **Sample ID: 14A1714-01 Santa Margarita ASR MW-1 Pacific** **Matrix:** Water
Sampled by: Client **Sampled: 01/30/14 14:50**

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
Acetaminophen	ND		20	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
Amoxicillin	ND		10	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
Atenolol	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
Atorvastatin	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
Azithromycin	ND		10	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
Caffeine	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
Carbamazepine	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
Ciprofloxacin	ND		5.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
Cotinine	ND		2.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
DEET	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
Diazepam	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
Fluoxetine	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
Meprobamate	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
Methadone	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
Oxybenzone	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
Phenytoin	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
Primidone	ND		10	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	R-01
Sucralose	ND		5.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
Sulfamethoxazole	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
TCEP	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
TCPP	**1.6**		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	B
TDCPP	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	
Trimethoprim	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 0:31	W4B0282	

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Quality Control Section

Nitrosamines by isotopic dilution GC/MS CI Mode - Quality Control

Batch W4B0247 - EPA 1625M

Blank (W4B0247-BLK1) — **Prepared: 02/06/14 Analyzed: 02/07/14 14:20**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine		ND		ng/l					
N-Nitrosomethylethylamine		ND		ng/l					
N-Nitrosodiethylamine		ND		ng/l					
N-Nitrosodi-n-propylamine		ND		ng/l					
N-Nitrosomorpholine		ND		ng/l					
N-Nitrosopyrrolidine		ND		ng/l					
N-Nitrosopiperidine		ND		ng/l					
N-Nitrosodi-n-butylamine		7.00	B-06	ng/l					

LCS (W4B0247-BS1) — **Prepared: 02/06/14 Analyzed: 02/07/14 13:55**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine		3.23		ng/l	3.00	108	50-150		
N-Nitrosomethylethylamine		2.82		ng/l	3.00	94	50-150		
N-Nitrosodiethylamine		3.38		ng/l	3.00	113	50-150		
N-Nitrosodi-n-propylamine		3.26		ng/l	3.00	109	50-150		
N-Nitrosomorpholine		2.75		ng/l	3.00	92	50-150		
N-Nitrosopyrrolidine		2.77		ng/l	3.00	92	50-150		
N-Nitrosopiperidine		2.99		ng/l	3.00	100	50-150		
N-Nitrosodi-n-butylamine		11.0	Q-08	ng/l	3.00	367	50-150		

LCS Dup (W4B0247-BSD1) — **Prepared: 02/06/14 Analyzed: 02/07/14 13:29**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine		3.40		ng/l	3.00	113	50-150	5	30
N-Nitrosomethylethylamine		3.05		ng/l	3.00	102	50-150	8	30
N-Nitrosodiethylamine		3.18		ng/l	3.00	106	50-150	6	30
N-Nitrosodi-n-propylamine		2.99		ng/l	3.00	100	50-150	9	30
N-Nitrosomorpholine		4.10	Q-12	ng/l	3.00	137	50-150	39	30
N-Nitrosopyrrolidine		3.24		ng/l	3.00	108	50-150	16	30
N-Nitrosopiperidine		3.73		ng/l	3.00	124	50-150	22	30
N-Nitrosodi-n-butylamine		11.2	Q-08	ng/l	3.00	373	50-150	2	30

PPCPs - Pharmaceuticals by LC/MSMS-ESI+ - Quality Control

Batch W4B0282 - EPA 1694M-ESI+

Blank (W4B0282-BLK1) — **Prepared: 02/07/14 Analyzed: 02/18/14 22:39**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Acetaminophen		ND		ng/l					
Caffeine		ND		ng/l					
Sulfamethoxazole		ND		ng/l					
Trimethoprim		ND		ng/l					
Azithromycin		ND		ng/l					
Cotinine		ND		ng/l					

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PPCPs - Pharmaceuticals by LC/MSMS-ESI+ - Quality Control

Batch W4B0282 - EPA 1694M-ESI+

Blank (W4B0282-BLK1) — **Prepared: 02/07/14 Analyzed: 02/18/14 22:39**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Atenolol		ND		ng/l					
Ciprofloxacin		ND		ng/l					
Carbamazepine		ND		ng/l					
DEET		ND		ng/l					
Fluoxetine		ND		ng/l					
Atorvastatin		ND		ng/l					
Methadone		ND		ng/l					
Primidone		ND		ng/l					
Diazepam		ND		ng/l					
TCPP		2.23	B	ng/l					
TCEP		ND		ng/l					
TDCPP		ND		ng/l					
Phenytoin		ND		ng/l					
Amoxicillin		ND		ng/l					
Meprobamate		ND		ng/l					
Sucralose		ND		ng/l					
Oxybenzone		ND		ng/l					

LCS (W4B0282-BS1) — **Prepared: 02/07/14 Analyzed: 02/18/14 22:53**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Acetaminophen		435		ng/l	400	109	66-156		
Caffeine		17.4		ng/l	20.0	87	55-152		
Sulfamethoxazole		17.6		ng/l	20.0	88	60-133		
Trimethoprim		18.6		ng/l	20.0	93	67-139		
Azithromycin		199		ng/l	200	100	52-166		
Cotinine		22.6		ng/l	20.0	113	68-155		
Atenolol		21.0		ng/l	20.0	105	56-164		
Ciprofloxacin		83.8		ng/l	100	84	51-168		
Carbamazepine		19.3		ng/l	20.0	96	60-135		
DEET		15.5		ng/l	20.0	78	45-135		
Fluoxetine		23.8		ng/l	20.0	119	55-150		
Atorvastatin		16.3		ng/l	20.0	82	0.1-173		
Methadone		19.0		ng/l	20.0	95	62-137		
Primidone		17.1		ng/l	20.0	86	54-147		
Diazepam		18.3		ng/l	20.0	92	58-127		
TCPP		18.1		ng/l	20.0	90	24-149		
TCEP		17.5		ng/l	20.0	88	25-149		
TDCPP		17.7		ng/l	20.0	88	20-158		
Phenytoin		18.2		ng/l	20.0	91	69-138		
Amoxicillin		164		ng/l	200	82	14-167		
Meprobamate		20.5		ng/l	20.0	102	11-166		
Sucralose		95.7		ng/l	100	96	50-150		
Oxybenzone		15.4		ng/l	20.0	77	50-150		

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PPCPs - Pharmaceuticals by LC/MSMS-ESI+ - Quality Control

Batch W4B0282 - EPA 1694M-ESI+

LCS Dup (W4B0282-BSD1) — **Prepared: 02/07/14 Analyzed: 02/18/14 23:07**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Acetaminophen		499		ng/l	400	125	66-156	14	30
Caffeine		18.2		ng/l	20.0	91	55-152	4	30
Sulfamethoxazole		19.4		ng/l	20.0	97	60-133	10	30
Trimethoprim		18.4		ng/l	20.0	92	67-139	1	30
Azithromycin		206		ng/l	200	103	52-166	3	30
Cotinine		26.7		ng/l	20.0	134	68-155	17	30
Atenolol		23.0		ng/l	20.0	115	56-164	9	30
Ciprofloxacin		83.4		ng/l	100	83	51-168	0.5	30
Carbamazepine		19.7		ng/l	20.0	98	60-135	2	30
DEET		16.4		ng/l	20.0	82	45-135	6	30
Fluoxetine		22.8		ng/l	20.0	114	55-150	4	30
Atorvastatin		15.1		ng/l	20.0	76	0.1-173	8	30
Methadone		19.1		ng/l	20.0	96	62-137	0.5	30
Primidone		16.2		ng/l	20.0	81	54-147	5	30
Diazepam		18.9		ng/l	20.0	94	58-127	3	30
TCPP		21.0		ng/l	20.0	105	24-149	15	30
TCEP		20.6		ng/l	20.0	103	25-149	16	30
TDCPP		18.9		ng/l	20.0	94	20-158	7	30
Phenytoin		18.4		ng/l	20.0	92	69-138	1	30
Amoxicillin		164		ng/l	200	82	14-167	0	30
Meprobamate		20.6		ng/l	20.0	103	11-166	0.5	30
Sucralose		93.0		ng/l	100	93	50-150	3	30
Oxybenzone		18.3		ng/l	20.0	92	50-150	17	30

PPCPs - Pharmaceuticals by LC/MSMS-ESI- - Quality Control

Batch W4B0283 - EPA 1694M-ESI-

Blank (W4B0283-BLK1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:08**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Bisphenol A		1.99	B	ng/l					
Gemfibrozil		ND		ng/l					
Ibuprofen		ND		ng/l					
Naproxen		ND		ng/l					
Salicylic Acid		ND		ng/l					
Triclosan		ND		ng/l					
Iopromide		ND		ng/l					

LCS (W4B0283-BS1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:22**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Bisphenol A		19.5		ng/l	20.0	98	53-168		
Gemfibrozil		18.0		ng/l	20.0	90	76-122		
Ibuprofen		17.7		ng/l	20.0	88	67-139		
Naproxen		17.3		ng/l	20.0	86	64-138		
Salicylic Acid		171		ng/l	200	86	56-229		

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PPCPs - Pharmaceuticals by LC/MSMS-ESI- - Quality Control

Batch W4B0283 - EPA 1694M-ESI-

LCS (W4B0283-BS1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:22**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Triclosan		38.9		ng/l	40.0	97	76-139		
Iopromide		114		ng/l	100	114	0.1-163		

LCS Dup (W4B0283-BSD1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:37**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Bisphenol A		18.4		ng/l	20.0	92	53-168	6	30
Gemfibrozil		18.3		ng/l	20.0	92	76-122	2	30
Ibuprofen		19.8		ng/l	20.0	99	67-139	11	30
Naproxen		19.1		ng/l	20.0	96	64-138	10	30
Salicylic Acid		183		ng/l	200	92	56-229	7	30
Triclosan		40.5		ng/l	40.0	101	76-139	4	30
Iopromide		104		ng/l	100	104	0.1-163	9	30

PPCPs - Hormones by LC/MSMS-APCI - Quality Control

Batch W4B0281 - EPA 1694M-APCI

Blank (W4B0281-BLK1) — **Prepared: 02/07/14 Analyzed: 02/19/14 16:58**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
17-a-Ethynylestradiol		ND		ng/l					
17-b-Estradiol		ND		ng/l					
Estrone		ND		ng/l					
Progesterone		ND		ng/l					
Testosterone		ND		ng/l					

LCS (W4B0281-BS1) — **Prepared: 02/07/14 Analyzed: 02/19/14 17:15**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
17-a-Ethynylestradiol		19.1		ng/l	20.0	96	68-159		
17-b-Estradiol		18.0		ng/l	20.0	90	65-146		
Estrone		17.6		ng/l	20.0	88	59-141		
Progesterone		17.8		ng/l	20.0	89	58-154		
Testosterone		24.8		ng/l	20.0	124	60-172		

LCS Dup (W4B0281-BSD1) — **Prepared: 02/07/14 Analyzed: 02/19/14 17:31**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
17-a-Ethynylestradiol		18.9		ng/l	20.0	94	68-159	1	30
17-b-Estradiol		18.4		ng/l	20.0	92	65-146	2	30
Estrone		18.3		ng/l	20.0	92	59-141	4	30
Progesterone		18.1		ng/l	20.0	90	58-154	2	30
Testosterone		26.0		ng/l	20.0	130	60-172	5	30

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Notes:
The Chain of Custody document is part of the analytical report.
Any remaining sample(s) for testing will be disposed of one month from the final report date unless other arrangements are made in advance.
All results are expressed on wet weight basis unless otherwise specified.

An Absence of Total Coliform meets the drinking water standards as established by the State of California Department of Health Services.
The Reporting Limit (RL) is referenced as laboratory's Practical Quantitation Limit (PQL).
For Potable water analysis, the Reporting Limit (RL) is referenced as Detection Limit for reporting purposes (DLRs) defined by EPA.

If sample collected by Weck Laboratories, sampled in accordance to lab SOP MIS002

Authorized Signature
Contact: Kim G Tu
(Project Manager)

ELAP # 1132
LACSD # 10143
NELAC # 04229CA

The results in this report apply to the samples analyzed in accordance with the chain of custody document. Weck Laboratories certifies that the test results meet all requirements of NELAC unless noted in the Case Narrative. This analytical report must be reproduced in its entirety.

Flags for Data Qualifiers:

B	Blank contamination. The analyte was found in the associated blank as well as in the sample.
B-06	This analyte was found in the method blank, which was possibly contaminated during sample preparation. The batch was accepted since this analyte was either not detected or more than 10 times of the blank value for all the samples in the batch.
Q-08	High bias in the QC sample does not affect sample result since analyte was not detected or below the reporting limit.
Q-12	The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on the percent recoveries and/or other acceptable QC data.
R-01	The Reporting Limit for this analyte has been raised to account for matrix interference.
ND	NOT DETECTED at or above the Reporting Limit. If J-value reported, then NOT DETECTED at or above the Method Detection Limit (MDL).
Sub	Subcontracted analysis, original report enclosed.
DL	Method Detection Limit
RL	Method Reporting Limit
MDA	Minimum Detectable Activity
NR	Not Reportable

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ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Water Analysis

Lab Number: 410667 Job Number: 24232 IS-69368

Sample Name: SANTA MARGARITA ASR MW-1

Company Lab #:

Company Job #:

Company: Alpha Analytical, Inc.

API/Well:

Field or Site: WO 14A1714

Location:

Depth/Formation:

Container Type: 1 Liter Plastic Bottle

Date Sampled: 1/30/2014 Date Received 2/05/2014 Date Reported: 2/26/2014

δD of water	----------	na
$\delta^{18}O$ of water	----------	na
Tritium content of water	----------	< 1.00 TU
$\delta^{13}C$ of DIC	----------	na
^{14}C content of DIC	----------	na
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na

Remarks:

NELAC NARRATIVE PAGE

Client: Alpha Analytical Report #: 310984NP

Underwriters Laboratories is a NELAP accredited laboratory. All reported results meet the requirements of the NELAC standards, unless otherwise noted.

UL contact person: James Van Fleit

NELAP requires complete reporting of deviations from method requirements, regardless of the suspected impact on the data. Quality control failures not reported within the report summary are noted here.

There were no quality control failures.

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Authorized Signature Title Date

UL LLC
110 S. Hill St., South Bend, IN 46617-2702 USA
T: 800.332.4345 / F: 574.233.8207 / W: UL.com

Laboratory Report

Client:	Alpha Analytical	Report:	310984
Attn:	David Pingatore 6398 Dougherty Road, Suite 35 Dublin, CA 94568	Priority:	Standard Written
		Status:	Final
		PWS ID:	Not Supplied
Copies to:	None		

Sample Information

UL ID #	Client ID	Method	Collected Date / Time	Collected By:	Received Date / Time
2967003	14A1714-01	905.0	01/30/14 14:50	Client	02/04/14 11:45
2967004	14A1714-01	7110 B	01/30/14 14:50	Client	02/04/14 11:45
2967005	14A1714-01	1613	01/30/14 14:50	Client	02/04/14 11:45
2967006	14A1714-01	7500-Ra B	01/30/14 14:50	Client	02/04/14 11:45
2967006	14A1714-01	7500-Ra D	01/30/14 14:50	Client	02/04/14 11:45
2967007	14A1714-01	300.1	01/30/14 14:50	Client	02/04/14 11:45
2967008	14A1714-01	300.0	01/30/14 14:50	Client	02/04/14 11:45

Report Summary

Note: See attached page for additional comments.

Note: Sample containers were provided by the client except for Methods 300.0 and 300.1.

Note: Strontium-90 analysis was performed by General Engineering Laboratories, Charleston, SC.

Detailed quantitative results are presented on the following pages. The results presented relate only to the samples provided for analysis.

We appreciate the opportunity to provide you with this analysis. If you have any questions concerning this report, please do not hesitate to call James Van Fleit at (574) 233-4777.

Note: This report may not be reproduced, except in full, without written approval from UL. UL is accredited by the National Environmental Laboratory Accreditation Program (NELAP).

Authorized Signature | Title | Date

Client Name: Alpha Analytical
Report #: 310984

UL LLC
110 S. Hill St., South Bend, IN 46617-2702 USA
T: 800.332.4345 / F: 574.233.8207 / W: UL.com

Client Name: Alpha Analytical

Report #: 310984

Sampling Point: 14A1714-01

PWS ID: Not Supplied

General Chemistry

Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	UL ID #
14998-27-7	Chlorite	300.0	1000 *	20	< 20	ug/L	---	02/06/14 21:42	2967008
15541-45-4	Bromate	300.1	10 *	5.0	< 5.0	ug/L	---	02/05/14 00:22	2967007

Radionuclides

Analyte ID #	Analyte	Method	Reg Limit	DL**	Result	Units	Preparation Date	Analyzed	UL ID #
---	Gross Alpha	7110 B	15 *	3.0	**8.7 ± 1.2**	pCi/L	02/21/14 07:49	02/27/14 10:40	2967004
---	Gross Beta	7110 B	50 *	4.0	**8.8 ± 0.9**	pCi/L	02/21/14 07:49	02/27/14 10:40	2967004
13982-63-3	Radium-226	7500-Ra B	3 *	1.0	**1.9 ± 0.9**	pCi/L	02/18/14 09:45	03/02/14 11:36	2967006
15262-20-1	Radium-228	7500-Ra D	2 *	1.0	**2.2 ± 0.7**	pCi/L	02/18/14 09:45	02/26/14 16:02	2967006
---	Combined Radium	calc.	5 *	1.0	**4.1 ± 1.2**	pCi/L	02/18/14 09:45	03/02/14 11:36	2967006

** Detection Limit (DL) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Semi-volatile Organic Chemicals

Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	UL ID #
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-Dioxin	1613	30 *	5.0	< 5.0	pg/L	02/12/14 07:40	02/13/14 19:18	2967005

Reference Lab Tests

Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	UL ID #
---	Strontium-90	905.0	8 *	2.00	**-1.27 ± 0.850**	pCi/L	---	02/20/14 08:04	2967003

† UL has demonstrated it can achieve these report limits in reagent water, but can not document them in all sample matrices.

Reg Limit Type:	MCL	SMCL	AL
Symbol:	*	^	!

Lab Definitions

Continuing Calibration Check Standard (CCC) / Continuing Calibration Verification (CCV) / Initial Calibration Verification Standard (ICV) / Initial Performance Check (IPC) - is a standard containing one or more of the target analytes that is prepared from the same standards used to calibrate the instrument. This standard is used to verify the calibration curve at the beginning of each analytical sequence, and may also be analyzed throughout and at the end of the sequence. The concentration of continuing standards may be varied, when prescribed by the reference method, so that the range of the calibration curve is verified on a regular basis.

Internal Standards (IS) - are pure compounds with properties similar to the analytes of interest, which are added to field samples or extracts, calibration standards, and quality control standards at a known concentration. They are used to measure the relative responses of the analytes of interest and surrogates in the sample, calibration standard or quality control standard.

Laboratory Duplicate (LD) - is a field sample aliquot taken from the same sample container in the laboratory and analyzed separately using identical procedures. Analysis of laboratory duplicates provides a measure of the precision of the laboratory procedures.

Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS) - is an aliquot of reagent water to which known concentrations of the analytes of interest are added. The LFB is analyzed exactly the same as the field samples. LFBs are used to determine whether the method is in control.

Laboratory Method Blank (LMB) / Laboratory Reagent Blank (LRB) - is a sample of reagent water included in the sample batch analyzed in the same way as the associated field samples. The LMB is used to determine if method analytes or other background contamination have been introduced during the preparation or analytical procedure. The LMB is analyzed exactly the same as the field samples.

Laboratory Trip Blank (LTB) / Field Reagent Blank (FRB) - is a sample of laboratory reagent water placed in a sample container in the laboratory and treated as a field sample, including storage, preservation, and all analytical procedures. The FRB/LTB container follows the collection bottles to and from the collection site, but the FRB/LTB is not opened at any time during the trip. The FRB/LTB is primarily a travel blank used to verify that the samples were not contaminated during shipment.

Matrix Spike Duplicate Sample (MSD) / Laboratory Fortified Sample Matrix Duplicate (LFSMD) - is a sample aliquot taken from the same field sample source as the Matrix Spike Sample to which known quantities of the analytes of interest are added in the laboratory. The MSD is analyzed exactly the same as the field samples. Analysis of the MSD provides a measure of the precision of the laboratory procedures in a specific matrix.

Matrix Spike Sample (MS) / Laboratory Fortified Sample Matrix (LFSM) - is a sample aliquot taken from field sample source to which known quantities of the analytes of interest are added in the laboratory. The MS is analyzed exactly the same as the field samples. The purpose is to demonstrate recovery of the analytes from a sample matrix to determine if the specific matrix contributes bias to the analytical results.

Quality Control Standard (QCS) / Second Source Calibration Verification (SSCV) - is a solution containing known concentrations of the analytes of interest prepared from a source different from the source of the calibration standards. The solution is obtained from a second manufacturer or lot if the lot can be demonstrated by the manufacturer as prepared independently from other lots. The QCS sample is analyzed using the same procedures as field samples. The QCS is used as a check on the calibration standards used in the method on a routine basis.

Reporting Limit Check (RLC) / Initial Calibration Check Standard (ICCS) - is a procedural standard that is analyzed each day to evaluate instrument performance at or below the minimum reporting limit (MRL).

Surrogate Standard (SS) / Surrogate Analyte (SUR) - is a pure compound with properties similar to the analytes of interest, which is highly unlikely to be found in any field sample, that is added to the field samples, calibration standards, blanks and quality control standards before sample preparation. The SS is used to evaluate the efficiency of the sample preparation process.

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

14A1714

SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: David S. Pingatore

RECEIVING LABORATORY:

Zymax
600 S. Andreasen Drive, Suite B
Escondido, CA 92029
Phone :(760) 781-3338
Fax: (760) 781-3339
Terms: Net 30

1 ice Chest

Analysis	Due	Expires	Comments
14A1714-01 Santa Margarita ASR MW-1 [Water] Sampled 01/30/14 14:50 Pacific			43452-1
N and O Isotopes of Nitrate	02/14/14 12:00	02/06/14 14:50	
Oxygen 18 - Isotope / Hydroger	02/14/14 12:00	07/29/14 14:50	

Containers Supplied:

250 mL Poly Unpres (AQ) 250 mL Poly Unpres (AR)

☐ *Report to State*

System Name: _____ **Employed by:** _____

User ID: _____ **Sampler:** _____

System Number: _____

+QC

Released By	Date	Received By	Date
			2/5/14 9:05
Released By	Date	Received By	Date

David S. Pingatore
Project Manager
Alpha Analytical Laboratories, Inc.
208 Mason Street
Ukiah, CA 95482
Tel: 707.468.0401
Fax: 707.468.5267
Project: 14A1714
Email: david @ alpha.com

Dr. Yi Wang
Director of ZymaX Forensics Isotope
Senior Environmental Geochemist, PACE
600 S. Andreasen Dr., Suite B
Escondido, CA 92029
Tel: 760.781.3338 ext 202
Fax: 760.781.3339
Cell: 609.721.2843
Email: yi.wang@zymaxusa.com

REPORT OF ENVIRONMENTAL FORENSICS ISOTOPE ANALYSES

Date Received: February 5th, 2014
Date Reported: March 20th, 2014

Sample from Alpha Analytical Labs for $\delta^{15}N$ (‰ Air), $\delta^{18}O$ and δD (‰ VSMOW) stable isotope analysis

ZymaX ID	Client ID/Sample Description	$\delta^{18}O_{H2O}$	δD_{H2O}	$\delta^{15}N_{NO3}$	$\delta^{18}O_{NO3}$
43452-1	14A1714-01 Santa Margarita ASR MW-1	-6.24	-45.90	U -	U -
	Analytical precision (1σ)	0.06	0.32	0.2	0.4

U - Either there was no peak corresponding to the target analyte or that such a peak did not produce a reliable CSIA result

ZymaX ID	$\delta^{18}O_{H2O}$	δD_{H2O}	$\delta^{15}N_{NO3}$	$\delta^{18}O_{NO3}$
QC-01	-5.89	-41.12	4.5	25.3
QC-02	-5.98	-41.57	4.8	25.9
Mean	-5.94	-41.35	4.7	25.6
Analytical Precision (1σ)	0.06	0.32	0.2	0.4

ZymaX Forensics Isotope Services

Product or Dissolved Organics: Chlorinated Solvents, Oil, Extract, Fraction and Kerogen
3D-CSIA of ^{13}C, ^{37}Cl, and ^{2}H for PCE, TCE, DCE, MTBE, BTEX, PAHs, Pesticides, Alkanes, Gasoline and Oil; Bulk ^{13}C, ^{2}H, ^{18}O, ^{34}S, and ^{15}N
Gas Sample
Gas Composition and 2D-CSIA of ^{13}C and ^{2}H of C1 to C5; ^{13}C of CO_2; ^{14}C of C1 and CO_2; ^{34}S of H_2S; ^{15}N and ^{18}O of N_2O gas
Water and Dissolved Inorganics
^{2}H, ^{3}H and ^{18}O; ^{34}S and ^{18}O of dissolved sulfate; ^{34}S of dissolved H_2S
^{15}N and ^{18}O of dissolved Nitrate; ^{15}N of Ammonia; ^{13}C of dissolved CO_2 and Carbonate/Bicarbonate
Soil and Minerals
^{13}C, ^{18}O, ^{15}N, ^{34}S, D/H; ^{14}C of carbonate or organics
Post-Analysis Forensic Isotope Data Interpretation

Laboratory Order - Summary

analytical chemistry for a better environment

Report To:	David S. Pingatore Alpha Analytical Laboratories, Inc. 208 Mason St. Ukiah, CA. 95482	Date Received: Date Due: Project:	02/05/2014 04/24/2014 14A1714	9:05AM 12:00AM
Phone: Fax:	(707) 468-0401 (707) 468-5267	Project Number:		

Lab Number	Description	Analysis	Dept
43452-1	14A1714-01 Santa Margarita ASR MW-	d15N and d18O of NO3	M6
		d18O+dD of H2O	M6

Notes/Special Instructions	SC Login/Computer Login CY/CY	DPRA PM: YW

ZymaX FORENSICS

Condition Upon Reciept

Lab Number: 43452 Client: AAL

Sample Temprature (should be 2-6 degrees C): 1.9°C

Do the sample descriptions on the containers match the discriptions on the COC? ☒ Yes ☐ No

Do the sample dates on the containers match the sample dates on the COC? ☒ Yes ☐ No

Are the samples within holding time for each analysis at time of reciept? ☒ Yes ☐ No ☐ N/A

Do the number of containers received match the number listed on the COC, and are all of the necessary containers for the required analysis available? ☒ Yes ☐ No ☐ N/A

Does the preservation of the samples match the notation on the COC, and is the preservation correct for requested analysis? ☐ Yes ☐ No ☐ N/A ☒ Zymax

Are all of the samples intact with no headspace, if required for analysis? ☒ Yes ☐ No

Did samples arrive with custody seal intact? ☒ Yes ☐ No ☐ N/A

Sample Control Signature: [signature] Date: 2/5/14 Time: 9:05

Client Discrepancies

Contacted: _____ Date: _____ Sample Control Initials: _____

Discrepancy: _____

Solution: _____

Contacted: _____ Date: _____ Sample Control Initials: _____

Discrepancy: _____

Solution: _____

Contacted: _____ Date: _____ Sample Control Initials: _____

Discrepancy: _____

Solution: _____

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com

Laboratory & Corporate: 208 Mason Street, Ukiah, CA 95482
707-468-0401 Fax: 707-468-5267

Service Center & Micro Lab: 6398 Dougherty Rd, Ste 35, Dublin, CA 94568
925-828-6226 Fax: 925-828-6309

Chain of Custody Record

Reports and Invoices will be delivered by email in .pdf format.

Lab No. 14A1714

Report to:
Company: Todd Engineers
Attn: Dr. Bill Motzer
Address: 2490 Mariner Square Loop, Suite 215, Alameda, CA 94501
Phone/Fax: 510.747.6920 / 510.747.6921
Email Address: bmotzer@toddengineers.com

Invoice to (if different):
Company:
Attn:
Address:
Phone/Fax:
Email Address:

Project Info for Report:
Project ID: Groundwater Reuse Project
Project No: Project # 60408
PO/Reference :

Signature below authorizes work under terms stated on reverse side.

Samplers Signature:
Print:

Sample Identification	Sampled: Date	Sampled: Time	40ml VOA	Poly	Amber glass	Soil jar		NaOH	HNO3	H2SO4	Other	None	Water	Soil		Total Number of Containers	Inorganics Scan, DU-General Physical Scan	200.7 - Ca, K, Mg, Na	200.8 - Ag, B, Cu, Fe, Mn, U, V, Zn	Bicarbonate, Chloride, Conductivity	MBAS, Perchlorate, TDS, Sulfate	HAA5, TOC	507, 508, 515, 525 DHS, 531, 547, 548, 549	504.1, 524.2 Sample Traps scan	Asbestos DW (sub TEM Lab)	Cr6 218.6 DW (sub MAI) - DU Reader	Dioxin 2,3,7,8 TCDD DW (sub UL)	Sample Notes or CDPH Source Numbers:
~~Seaside Middle School (deep)~~	1-30-14	1450		x	x			x	x			x	x			4	x	x	x	x	x							
SANTA MARGARITA ASR MW-1			x		x						x		x			3						x						
				x	x						x	x	x			10							x					(507/508/515.1 = one 1L BRA ea)
			x								x		x			7								x				
					x							x	x			2									x			
				x							x		x			1										x		
					x							x	x			2											x	
Trip blank ($0.00 analysis)			x								x	x	x			2								x				

TAT: 10 days ● RUSH: 5 days ○ 48 hours ○ Other: ___ days ○

Lab Approval Required For Rush TATs

Sample Notes (lab use only)
Temperature: 1.2° 4 deg. C
Shipment Method:
Custody Seals: Y / N

Relinquished by:	Received by:	Date:	Time:
[signature]	[signature]	1-30-14	15:00
[signature]	[signature]	1/30/14	1725
[signature]	[signature]	1-30-14	1900
[signature]	LAB [signature]	1-30-14	9:25

CDPH Write On EDT Transmission? ○ Yes ○ No
State System Number:
If "Y" please enter the Source Number(s) in the column above

CA Geotracker EDF Report? ○ Yes ○ No
Global ID:
Sampling Company Log Code:
EDF to (Email Address):
Travel and Site Time:
Mileage:
Misc. Supplies:

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com

Laboratory & Corporate: 208 Mason Street, Ukiah, CA 95482
707-468-0401 Fax: 707-468-5267

Service Center & Micro Lab: 6398 Dougherty Rd, Ste 35, Dublin, CA 94568
925-828-6226 Fax: 925-828-6309

Chain of Custody Record

Reports and Invoices will be delivered by email in .pdf format.

Lab No. 14A1714

Report to:	Invoice to (if different):	Project Info for Report:
Company: Todd Engineers	Company:	Project ID: Groundwater Reuse Project
Attn: Dr. Bill Motzer	Attn:	
Address: 2490 Mariner Square Loop, Suite 215, Alameda, CA 94501	Address:	Project No: Project # 60408
Phone/Fax: 510.747.6920 / 510.747.6921	Phone/Fax:	PO/Reference :
Email Address: bmotzer@toddengineers.com	Email Address:	

Signature below authorizes work under terms stated on reverse side.

Samplers Signature:

Print:

TAT: 10 days ● RUSH: 5 days ○ 48 hours ○ Other: ___days ○

Lab Approval Required For Rush TATs

Sample Notes (lab use only): Temperature: 4 deg. C; Shipment Method:; Custody Seals: Y / N

Sample Identification	Sampled: Date	Sampled: Time	Container: 40ml VOA	Poly	Amber glass	Soil jar		Preservative: HCL	HNO3	H2SO4	Other	None	Matrix: Water	Soil		Total Number of Containers	8330B Explosives (sub ALS)	PPCP Hormones 1694M (sub Weck)	PPCP Negative Pharmas 1694M (sub Weck)	PPCP Positive Pharmas 1694M (sub Weck)	Nitrosamines LL 1625M (sub Weck)	Gross A & B, R226 &R228, Sr 90 (sub UL)	Bromate 300.1, Chlorite 300.0 (sub UL)	Tritium, Enriched (sub Isotech)	Oxygen 18 Isotope (sub Zymax)	N and O Isotopes of NO3 (sub Zymax)	j-flag MDL reporting + Standard excel EDD	Sample Notes or CDPH Source Numbers:
~~Seaside Middle School (deep)~~	1-30-14	1450			x							x	x			2	x										x	
Santa Margarita ASR MW-1					x						x		x			2		x	x	x								
					x							x	x			2					x							
				x					x				x			4						x						
				x							x		x			2							x					
				x								x	x			1								x				
				x								x	x			1									x			
				x								x	x			1										x		

Relinquished by:	Received by:	Date:	Time:
[signature]	[signature]	1-30-14	15:00
[signature]	[signature]	1-30-14	1900
[signature]	[signature]	1-30-14	3125

CDPH Write On EDT Transmission? ○ Yes ○ No

State System Number: _____

If "Y" please enter the Source Number(s) in the column above

CA Geotracker EDF Report? ○ Yes ○ No

Global ID: Sampling Company Log Code:

EDF to (Email Address):

Travel and Site Time: Mileage: Misc. Supplies:

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com
Corporate: 208 Mason St., Ukiah, CA 95482 • Phone: (707) 468-0401 • Fax: (707) 468-5267
Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

ELAP Certificate Numbers 1551 and 2728

18 February 2014

Todd Groundwater
Attn: Dr. Bill Motzer
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501
RE: Groundwater Reuse Project
Work Order: 14B0093

Enclosed are the results of analyses for samples received by the laboratory on 02/03/14 21:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jeanette Poplin

Jeanette L. Poplin For David S. Pingatore
Project Manager

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com
Corporate: 208 Mason St., Ukiah, CA 95482 • Phone: (707) 468-0401 • Fax: (707) 468-5267
Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Project: Project Number:	Dr. Bill Motzer Groundwater Reuse Project 60408	Reported: 02/18/14 14:08

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
City Of Seaside #4	14B0093-01	Water	02/03/14 15:00	02/03/14 21:30
Trip Blank	14B0093-02	Water	02/03/14 15:00	02/03/14 21:30

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com
Corporate: 208 Mason St., Ukiah, CA 95482 • Phone: (707) 468-0401 • Fax: (707) 468-5267
Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Metals (Drinking Water) by EPA 200 Series Methods
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
Mercury	ND	0.060	1.0	ug/l	1	AB40532	02/10/14 10:00	02/11/14 11:53	EPA 245.1	U

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com
Corporate: 208 Mason St., Ukiah, CA 95482 • Phone: (707) 468-0401 • Fax: (707) 468-5267
Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Metals by EPA 200 Series Methods
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
Calcium	**14**	0.010	1.0	mg/l	1	AB40524	02/05/14 10:04	02/10/14 12:51	EPA 200.7	
Magnesium	**6.5**	0.0080	1.0	"	"	"	"	"	"	
Potassium	**2.0**	0.0080	1.0	"	"	"	"	"	"	
Sodium	**43**	0.020	1.0	"	"	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com
Corporate: 208 Mason St., Ukiah, CA 95482 • Phone: (707) 468-0401 • Fax: (707) 468-5267
Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Metals by EPA Method 200.8 ICP/MS
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
Aluminum	ND	8.0	50	ug/l	4	AB40328	02/05/14 09:28	02/10/14 16:20	EPA 200.8	U
Antimony	ND	0.080	6.0	"	"	"	"	"	"	U
Arsenic	**1.2**	0.28	2.0	"	"	"	"	"	"	J
Barium	**26**	0.12	100	"	"	"	"	"	"	J
Beryllium	ND	0.080	1.0	"	"	"	"	"	"	U
Boron	**42**	24	50	"	"	"	"	"	"	J
Cadmium	ND	0.080	1.0	"	"	"	"	"	"	U
Chromium	**3.6**	0.32	10	"	"	"	"	"	"	J
Copper	**1.1**	0.16	2.0	"	"	"	"	"	"	R-01, J
Iron	ND	7.2	200	"	"	"	"	"	"	R-01, U
Lead	ND	0.080	5.0	"	"	"	"	"	"	U
Manganese	**0.25**	0.12	5.0	"	"	"	"	"	"	R-01, J
Nickel	**0.54**	0.24	10	"	"	"	"	"	"	J
Selenium	**0.66**	0.28	5.0	"	"	"	"	"	"	J
Silver	ND	0.080	0.40	"	"	"	"	"	"	R-01, U
Thallium	ND	0.080	1.0	"	"	"	"	"	"	U
Uranium	ND	0.080	1.0	pCi/l	"	"	"	"	"	U
Vanadium	**2.5**	1.2	4.0	ug/l	"	"	"	"	"	R-01, J
Zinc	**2.9**	2.0	20	"	"	"	"	"	"	J

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Conventional Chemistry Parameters by APHA/EPA Methods
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
Bicarbonate	**66**	0.060	5.0	mg/l	1	AB41221	02/12/14 07:35	02/12/14 17:00	SM2320B	
Color	ND	3.0	5.0	Color Units	"	AB40438	02/03/14 18:30	02/03/14 18:30	SM2120B	U
MBAS, calculated as LAS, mw 340	ND	0.030	0.050	mg/l	"	AB40528	02/05/14 11:20	02/12/14 12:02	SM5540C	U
Odor	ND		1.0	T.O.N.	"	AB40438	02/03/14 18:30	02/03/14 18:30	EPA 140.1	U
Perchlorate	ND	0.90	4.0	ug/l	"	AB41141	02/11/14 09:49	02/11/14 14:52	EPA 314.0	U
Specific Conductance (EC)	**340**	1.0	20	umhos/cm	"	AB40448	02/04/14 13:00	02/04/14 17:00	SM2510B	
Total Dissolved Solids	**250**	5.0	10	mg/l	"	AB40515	02/05/14 09:15	02/10/14 13:00	SM2540C	
Turbidity	**0.32**	0.040	0.10	NTU	"	AB40440	02/03/14 18:30	02/03/14 18:30	SM2130B	
Nitrate + Nitrite as N	**3.0**	0.0086	0.40	mg/l	"	AB41339	02/13/14 10:39	02/13/14 11:18	EPA 300.0	
Total Organic Carbon	**0.274**	0.100	0.300	"	"	AB40803	02/08/14 12:46	02/08/14 23:03	SM5310C	J

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Miscellaneous Physical/Conventional Chemistry Parameters
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
Cyanide (total)	**0.0028**	0.0020	0.10	mg/l	1	AB40428	02/04/14 09:46	02/05/14 15:29	10-204-00-1X	J

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Anions by EPA Method 300.0
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
Nitrate as NO3	**13**	0.20	2.0	mg/l	1	AB40426	02/04/14 09:20	02/04/14 14:37	EPA 300.0	
Chloride	**59**	0.15	2.5	"	5	"	"	02/04/14 14:22	"	
Fluoride	ND	0.070	0.10	"	1	"	"	02/04/14 14:37	"	U
Nitrite as N	ND	0.020	0.40	"	"	"	"	"	"	U
Sulfate as SO4	**14**	0.090	0.50	"	"	"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
Acetone	ND	0.80	5.0	ug/l	1	AB40725	02/04/14 11:57	02/06/14 17:52	EPA 524.2	U
Acrylonitrile	ND	0.20	5.0	"	"	"	"	"	"	U
Benzene	ND	0.20	0.30	"	"	"	"	"	"	U
Bromobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Bromochloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Bromodichloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
Bromoform	ND	0.50	0.50	"	"	"	"	"	"	U
Bromomethane	ND	0.20	0.50	"	"	"	"	"	"	U
n-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
sec-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
tert-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Carbon disulfide	ND	0.20	0.50	"	"	"	"	"	"	U
Carbon tetrachloride	ND	0.30	0.50	"	"	"	"	"	"	U
Chlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Chloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
Chloroform	ND	0.50	0.50	"	"	"	"	"	"	U
Chloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
2-Chlorotoluene	ND	0.20	0.50	"	"	"	"	"	"	U
4-Chlorotoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Dibromochloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
1,2-Dibromo-3-chloropropane	ND	0.36	0.50	"	"	"	"	"	"	U
1,2-Dibromoethane (EDB)	ND	0.14	0.50	"	"	"	"	"	"	U
Dibromomethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,2-Dichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,4-Dichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
trans-1,4-Dichloro-2-butene	ND	0.095	5.0	"	"	"	"	"	"	U
Dichlorodifluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
1,2-Dichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethene	ND	0.10	0.30	"	"	"	"	"	"	U
cis-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
1,2-Dichloropropane	ND	0.20	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
1,3-Dichloropropane	ND	0.20	0.50	ug/l	1	AB40725	02/04/14 11:57	02/06/14 17:52	EPA 524.2	U
2,2-Dichloropropane	ND	0.10	0.50	"	"	"	"	"	"	U
1,1-Dichloropropene	ND	0.10	0.50	"	"	"	"	"	"	U
cis-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichloropropene (total)	ND	0.20	0.50	"	"	"	"	"	"	U
2-Hexanone	ND	0.097	5.0	"	"	"	"	"	"	U
Ethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Hexachlorobutadiene	ND	0.30	0.50	"	"	"	"	"	"	U
Isopropylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
p-Isopropyltoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Methyl ethyl ketone	ND	0.40	1.0	"	"	"	"	"	"	U
Methyl iodide	ND	0.12	2.0	"	"	"	"	"	"	U
Methyl isobutyl ketone	ND	0.30	1.0	"	"	"	"	"	"	U
Methylene chloride	ND	0.40	0.50	"	"	"	"	"	"	U
Naphthalene	ND	0.20	0.50	"	"	"	"	"	"	U
n-Propylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Styrene	ND	0.10	0.50	"	"	"	"	"	"	U
1,1,1,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Tetrachloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Toluene	ND	0.10	0.50	"	"	"	"	"	"	U
1,2,3-Trichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
1,2,4-Trichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,1-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorofluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorotrifluoroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,2,3-Trichloropropane	ND	0.13	0.50	"	"	"	"	"	"	U
1,2,4-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
1,3,5-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Vinyl chloride	ND	0.10	0.50	"	"	"	"	"	"	U
m,p-Xylene	ND	0.20	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
o-Xylene	ND	0.10	0.50	ug/l	1	AB40725	02/04/14 11:57	02/06/14 17:52	EPA 524.2	U
Xylenes (total)	ND	0.20	0.50	"	"	"	"	"	"	U
Trihalomethanes (total)	ND	0.50	0.50	"	"	"	"	"	"	U
Methyl tert-butyl ether	ND	0.50	0.50	"	"	"	"	"	"	U
Ethyl tert-butyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Tert-amyl methyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Surrogate: Bromofluorobenzene		*99.0 %*	*70-130*			"	"	"	"	
Surrogate: Dibromofluoromethane		*98.0 %*	*70-130*			"	"	"	"	
Surrogate: Toluene-d8		*101 %*	*70-130*			"	"	"	"	
Trip Blank (14B0093-02) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
Acetone	ND	0.80	5.0	ug/l	1	AB40725	02/04/14 11:57	02/06/14 18:29	EPA 524.2	U
Acrylonitrile	ND	0.20	5.0	"	"	"	"	"	"	U
Benzene	ND	0.20	0.30	"	"	"	"	"	"	U
Bromobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Bromochloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Bromodichloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
Bromoform	ND	0.50	0.50	"	"	"	"	"	"	U
Bromomethane	ND	0.20	0.50	"	"	"	"	"	"	U
n-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
sec-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
tert-Butylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Carbon disulfide	ND	0.20	0.50	"	"	"	"	"	"	U
Carbon tetrachloride	ND	0.30	0.50	"	"	"	"	"	"	U
Chlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Chloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
Chloroform	ND	0.50	0.50	"	"	"	"	"	"	U
Chloromethane	ND	0.20	0.50	"	"	"	"	"	"	U
2-Chlorotoluene	ND	0.20	0.50	"	"	"	"	"	"	U
4-Chlorotoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Dibromochloromethane	ND	0.50	0.50	"	"	"	"	"	"	U
1,2-Dibromo-3-chloropropane	ND	0.36	0.50	"	"	"	"	"	"	U
1,2-Dibromoethane (EDB)	ND	0.14	0.50	"	"	"	"	"	"	U
Dibromomethane	ND	0.20	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Trip Blank (14B0093-02) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
1,2-Dichlorobenzene	ND	0.20	0.50	ug/l	1	AB40725	02/04/14 11:57	02/06/14 18:29	EPA 524.2	U
1,3-Dichlorobenzene	ND	0.20	0.50	"	"	"	"	"	"	U
1,4-Dichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U
trans-1,4-Dichloro-2-butene	ND	0.095	5.0	"	"	"	"	"	"	U
Dichlorodifluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethane	ND	0.10	0.50	"	"	"	"	"	"	U
1,2-Dichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1-Dichloroethene	ND	0.10	0.30	"	"	"	"	"	"	U
cis-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,2-Dichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
1,2-Dichloropropane	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichloropropane	ND	0.20	0.50	"	"	"	"	"	"	U
2,2-Dichloropropane	ND	0.10	0.50	"	"	"	"	"	"	U
1,1-Dichloropropene	ND	0.10	0.50	"	"	"	"	"	"	U
cis-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
trans-1,3-Dichloropropene	ND	0.20	0.50	"	"	"	"	"	"	U
1,3-Dichloropropene (total)	ND	0.20	0.50	"	"	"	"	"	"	U
2-Hexanone	ND	0.097	5.0	"	"	"	"	"	"	U
Ethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Hexachlorobutadiene	ND	0.30	0.50	"	"	"	"	"	"	U
Isopropylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
p-Isopropyltoluene	ND	0.10	0.50	"	"	"	"	"	"	U
Methyl ethyl ketone	ND	0.40	1.0	"	"	"	"	"	"	U
Methyl iodide	ND	0.12	2.0	"	"	"	"	"	"	U
Methyl isobutyl ketone	ND	0.30	1.0	"	"	"	"	"	"	U
Methylene chloride	ND	0.40	0.50	"	"	"	"	"	"	U
Naphthalene	ND	0.20	0.50	"	"	"	"	"	"	U
n-Propylbenzene	ND	0.20	0.50	"	"	"	"	"	"	U
Styrene	ND	0.10	0.50	"	"	"	"	"	"	U
1,1,1,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2,2-Tetrachloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Tetrachloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Toluene	ND	0.10	0.50	"	"	"	"	"	"	U
1,2,3-Trichlorobenzene	ND	0.10	0.50	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Volatile Organic Compounds by EPA Method 524.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Trip Blank (14B0093-02) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
1,2,4-Trichlorobenzene	ND	0.20	0.50	ug/l	1	AB40725	02/04/14 11:57	02/06/14 18:29	EPA 524.2	U
1,1,1-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,1,2-Trichloroethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichloroethene	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorofluoromethane	ND	0.20	0.50	"	"	"	"	"	"	U
Trichlorotrifluoroethane	ND	0.20	0.50	"	"	"	"	"	"	U
1,2,3-Trichloropropane	ND	0.13	0.50	"	"	"	"	"	"	U
1,2,4-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
1,3,5-Trimethylbenzene	ND	0.10	0.50	"	"	"	"	"	"	U
Vinyl chloride	ND	0.10	0.50	"	"	"	"	"	"	U
m,p-Xylene	ND	0.20	0.50	"	"	"	"	"	"	U
o-Xylene	ND	0.10	0.50	"	"	"	"	"	"	U
Xylenes (total)	ND	0.20	0.50	"	"	"	"	"	"	U
Trihalomethanes (total)	ND	0.50	0.50	"	"	"	"	"	"	U
Methyl tert-butyl ether	ND	0.50	0.50	"	"	"	"	"	"	U
Ethyl tert-butyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Tert-amyl methyl ether	ND	0.20	0.50	"	"	"	"	"	"	U
Surrogate: Bromofluorobenzene		*96.4 %*	*70-130*			"	"	"	"	
Surrogate: Dibromofluoromethane		*98.7 %*	*70-130*			"	"	"	"	
Surrogate: Toluene-d8		*98.5 %*	*70-130*			"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Chlorinated Pesticides and PCBs by EPA Method 508
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
Aldrin	ND	0.010	0.050	ug/l	1	AB40514	02/05/14 08:08	02/12/14 02:13	EPA 508	U
Chloroneb	ND	0.20	0.50	"	"	"	"	"	"	U
Chlorobenzilate	ND	2.0	5.0	"	"	"	"	"	"	U
Chlorothalonil	ND	0.030	0.10	"	"	"	"	"	"	U
DCPA	ND	0.020	0.040	"	"	"	"	"	"	U
4,4´-DDD	ND	0.020	0.050	"	"	"	"	"	"	U
4,4´-DDE	ND	0.020	0.050	"	"	"	"	"	"	U
4,4´-DDT	ND	0.020	0.020	"	"	"	"	"	"	U
Dieldrin	ND	0.010	0.010	"	"	"	"	"	"	U
Endosulfan I	ND	0.020	0.050	"	"	"	"	"	"	U
Endosulfan II	ND	0.020	0.050	"	"	"	"	"	"	U
Endosulfan sulfate	ND	0.020	0.020	"	"	"	"	"	"	U
Endrin	ND	0.030	0.10	"	"	"	"	"	"	U
Endrin aldehyde	ND	0.020	0.050	"	"	"	"	"	"	U
HCH-alpha	ND	0.010	0.050	"	"	"	"	"	"	U
HCH-beta	ND	0.020	0.050	"	"	"	"	"	"	U
HCH-delta	ND	0.030	0.050	"	"	"	"	"	"	U
HCH-gamma (Lindane)	ND	0.010	0.010	"	"	"	"	"	"	U
Heptachlor	ND	0.010	0.010	"	"	"	"	"	"	U
Heptachlor epoxide	ND	0.010	0.010	"	"	"	"	"	"	U
Hexachlorobenzene	ND	0.010	0.040	"	"	"	"	"	"	U
Hexachlorocyclopentadiene	ND	0.040	0.40	"	"	"	"	"	"	U
Methoxychlor	ND	0.020	0.020	"	"	"	"	"	"	U
cis-Permethrin	ND	0.070	0.20	"	"	"	"	"	"	U
trans-Permethrin	ND	0.090	0.20	"	"	"	"	"	"	U
Propachlor	ND	0.070	0.20	"	"	"	"	"	"	U
Trifluralin	ND	0.020	0.040	"	"	"	"	"	"	U
PCB-1016	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1221	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1232	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1242	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1248	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1254	ND	0.030	0.50	"	"	"	"	"	"	U
PCB-1260	ND	0.030	0.50	"	"	"	"	"	"	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Chlorinated Pesticides and PCBs by EPA Method 508
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
Total PCBs	ND	0.30	0.50	ug/l	1	AB40514	02/05/14 08:08	02/12/14 02:13	EPA 508	U
Toxaphene	ND	0.40	0.50	"	"	"	"	"	"	U
Chlordane (tech)	ND	0.030	0.050	"	"	"	"	"	"	U
Surrogate: Dibutylchlorendate		*106 %*	*70-130*			"	"	"	"	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Nitrogen- and Phosphorus- Pesticides by EPA Method 507
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
Alachlor	ND	0.50	0.50	ug/l	1	AB40730	02/08/14 15:03	02/11/14 14:05	EPA 507	U
Atrazine	ND	0.30	0.50	"	"	"	"	"	"	U
Bromacil	ND	0.50	5.0	"	"	"	"	"	"	U
Butachlor	ND	0.40	0.50	"	"	"	"	"	"	U
Dimethoate	ND	0.20	1.0	"	"	"	"	"	"	U
Metolachlor	ND	0.30	0.50	"	"	"	"	"	"	U
Metribuzin	ND	0.40	0.50	"	"	"	"	"	"	U
Molinate	ND	0.20	0.50	"	"	"	"	"	"	U
Prometryn	ND	0.50	0.50	"	"	"	"	"	"	U
Propachlor	ND	0.30	0.50	"	"	"	"	"	"	U
Simazine	ND	0.30	0.50	"	"	"	"	"	"	U
Thiobencarb	ND	0.20	1.0	"	"	"	"	"	"	U
Surrogate: 1,3-Dimethyl-2-nitrobenzene		*86.6 %*	*70-130*			*"*	*"*	*"*	*"*	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Organic Analytes by EPA Method 504.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
1,2-Dibromo-3-chloropropane	ND	0.0040	0.010	ug/l	1	AB40703	02/07/14 08:14	02/08/14 00:33	EPA 504.1	U
1,2-Dibromoethane (EDB)	ND	0.0050	0.020	"	"	"	"	"	"	U
Trip Blank (14B0093-02) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
1,2-Dibromo-3-chloropropane	ND	0.0040	0.010	ug/l	1	AB40703	02/07/14 08:14	02/08/14 01:08	EPA 504.1	U
1,2-Dibromoethane (EDB)	ND	0.0050	0.020	"	"	"	"	"	"	U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Chlorinated Acids by EPA Method 515.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
Acifluorfen	ND	0.50	1.0	ug/l	1	AB41155	02/12/14 14:27	02/15/14 01:07	EPA 515.1	U
Bentazon	ND	0.40	0.40	"	"	"	"	"	"	U
2,4-D	ND	0.80	1.0	"	"	"	"	"	"	U
Dalapon	ND	6.0	6.0	"	"	"	"	"	"	U
2,4-DB	ND	4.0	5.0	"	"	"	"	"	"	U
Dicamba	ND	0.40	0.40	"	"	"	"	"	"	U
Dichlorprop	ND	1.0	1.0	"	"	"	"	"	"	U
Dinoseb	ND	0.80	1.0	"	"	"	"	"	"	U
4-Nitrophenol	ND	0.70	1.0	"	"	"	"	"	"	U
Pentachlorophenol	ND	0.20	0.20	"	"	"	"	"	"	U
Picloram	ND	0.50	1.0	"	"	"	"	"	"	U
2,4,5-T	ND	0.40	0.50	"	"	"	"	"	"	U
2,4,5-TP (Silvex)	ND	0.50	0.50	"	"	"	"	"	"	U
Surrogate: DCAA		*98.3 %*	*70-130*			*"*	*"*	*"*	*"*	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Carbamates by EPA Method 531.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
Aldicarb	ND	0.70	3.0	ug/l	1	AB41142	02/11/14 10:07	02/12/14 15:04	EPA 531.1	U
Aldicarb sulfone	ND	0.70	4.0	"	"	"	"	"	"	U
Aldicarb sulfoxide	ND	0.80	3.0	"	"	"	"	"	"	U
Carbaryl	ND	0.70	5.0	"	"	"	"	"	"	U
Carbofuran	ND	2.0	5.0	"	"	"	"	"	"	U
3-Hydroxycarbofuran	ND	0.90	3.0	"	"	"	"	"	"	U
Methiocarb	ND	2.0	5.0	"	"	"	"	"	"	U
Methomyl	ND	2.0	2.0	"	"	"	"	"	"	U
Oxamyl	ND	0.80	20	"	"	"	"	"	"	U
Propoxur	ND	2.0	5.0	"	"	"	"	"	"	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Endothall by EPA Method 548.1
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
Endothall	ND	2.0	45	ug/l	1	AB40801	02/10/14 09:16	02/11/14 14:47	EPA 548.1	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Glyphosate by EPA Method 547
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
Glyphosate	ND	3.0	10	ug/l	1	AB40427	02/04/14 09:22	02/05/14 06:03	EPA 547	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Diquat by EPA Method 549.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
Diquat	ND	2.0	2.0	ug/l	1	AB40717	02/07/14 10:11	02/11/14 01:20	EPA 549.2	U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Haloacetic Acids by EPA Method 552.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
Monobromoacetic Acid	ND	0.8	1.0	ug/l	1	AB41050	02/11/14 13:22	02/12/14 19:55	EPA 552.2	U
Monochloroacetic Acid	ND	1.1	2.0	"	"	"	"	"	"	U
Dibromoacetic Acid	ND	0.8	1.0	"	"	"	"	"	"	U
Dichloroacetic Acid	ND	1.0	1.0	"	"	"	"	"	"	U
Trichloroacetic Acid	ND	1.0	1.0	"	"	"	"	"	"	U
Total Haloacetic Acids (HAA5)	ND	1.0	1.0	"	"	"	"	"	"	U
Surrogate: 2,3-Dibromopropionic Acid		*83.7 %*	*70-130*			*"*	*"*	*"*	*"*	
Surrogate: 2-Bromopropionic Acid		*76.9 %*	*70-130*			*"*	*"*	*"*	*"*	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Semivolatile Organic Compounds by EPA Method 525.2
Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
City Of Seaside #4 (14B0093-01) Water Sampled: 02/03/14 15:00 Received: 02/03/14 21:30										
Benzo (a) pyrene	ND	0.080	0.10	ug/l	1	AB40727	02/08/14 13:35	02/13/14 20:01	EPA 525.2	U
Di(2-ethylhexyl)adipate	ND	0.40	5.0	"	"	"	"	"	"	U
Di(2-ethylhexyl)phthalate	ND	0.20	3.0	"	"	"	"	"	"	U
Surrogate: 1,3-Dimethyl-2-nitrobenzene		*101 %*	*70-130*			"	"	"	"	
Surrogate: Perylene-d12		*97.2 %*	*70-130*			"	"	"	"	
Surrogate: Triphenyl phosphate		*109 %*	*70-130*			"	"	"	"	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Metals (Drinking Water) by EPA 200 Series Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40532 - EPA 245.1 Hg Water											
Blank (AB40532-BLK1)					Prepared: 02/06/14 Analyzed: 02/07/14						
Mercury	ND	0.060	1.0	ug/l							U
LCS (AB40532-BS1)					Prepared: 02/06/14 Analyzed: 02/07/14						
Mercury	2.32	0.060	1.0	ug/l	2.50		92.8	80-120			
Duplicate (AB40532-DUP1)		**Source: 14B0232-01**			Prepared: 02/10/14 Analyzed: 02/11/14						
Mercury	ND	0.060	1.0	ug/l		ND				20	U
Matrix Spike (AB40532-MS1)		**Source: 14B0232-01**			Prepared: 02/10/14 Analyzed: 02/11/14						
Mercury	2.54	0.060	1.0	ug/l	2.50	ND	102	60-140			
Matrix Spike (AB40532-MS2)		**Source: 14B0093-01**			Prepared: 02/10/14 Analyzed: 02/11/14						
Mercury	2.52	0.060	1.0	ug/l	2.50	ND	101	60-140			
Matrix Spike Dup (AB40532-MSD1)		**Source: 14B0232-01**			Prepared: 02/10/14 Analyzed: 02/11/14						
Mercury	2.55	0.060	1.0	ug/l	2.50	ND	102	60-140	0.393	20	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Metals by EPA 200 Series Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40524 - Metals Digest											
Blank (AB40524-BLK1)					Prepared: 02/05/14 Analyzed: 02/07/14						
Calcium	ND	0.010	1.0	mg/l							U
Magnesium	ND	0.0080	1.0	"							U
Potassium	0.0126	0.0080	1.0	"							J
Sodium	0.0265	0.020	1.0	"							J
LCS (AB40524-BS1)					Prepared: 02/05/14 Analyzed: 02/07/14						
Calcium	5.56	0.010	1.0	mg/l	5.88		94.5	85-115			
Magnesium	7.59	0.0080	1.0	"	8.00		94.9	85-115			
Potassium	7.84	0.0080	1.0	"	8.00		98.0	85-115			
Sodium	7.76	0.020	1.0	"	8.00		97.0	85-115			
Duplicate (AB40524-DUP1)		**Source: 14B0094-01**			Prepared: 02/05/14 Analyzed: 02/07/14						
Calcium	17.9	0.010	1.0	mg/l		19.2			7.01	20	
Magnesium	8.60	0.0080	1.0	"		7.91			8.38	20	
Potassium	10.5	0.0080	1.0	"		11.1			5.86	20	
Sodium	66.8	0.020	1.0	"		74.1			10.5	20	
Matrix Spike (AB40524-MS1)		**Source: 14B0094-01**			Prepared: 02/05/14 Analyzed: 02/07/14						
Calcium	22.6	0.010	1.0	mg/l	5.88	19.2	58.3	70-130			QM-01
Magnesium	14.5	0.0080	1.0	"	8.00	7.91	82.2	70-130			
Potassium	17.1	0.0080	1.0	"	8.00	11.1	74.7	70-130			
Sodium	73.2	0.020	1.0	"	8.00	74.1	NR	70-130			QM-4X
Matrix Spike (AB40524-MS2)		**Source: 14B0174-01**			Prepared: 02/05/14 Analyzed: 02/07/14						
Calcium	5.85	0.010	1.0	mg/l	5.88	0.483	91.3	70-130			
Magnesium	8.39	0.0080	1.0	"	8.00	1.19	89.9	70-130			
Potassium	8.03	0.0080	1.0	"	8.00	0.312	96.5	70-130			
Sodium	13.9	0.020	1.0	"	8.00	6.35	94.9	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Metals by EPA 200 Series Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40524 - Metals Digest											
Matrix Spike Dup (AB40524-MSD1)		**Source: 14B0094-01**			Prepared: 02/05/14 Analyzed: 02/07/14						
Calcium	22.0	0.010	1.0	mg/l	5.88	19.2	48.1	70-130	2.69	20	QM-01
Magnesium	13.5	0.0080	1.0	"	8.00	7.91	69.6	70-130	7.22	20	
Potassium	16.9	0.0080	1.0	"	8.00	11.1	71.9	70-130	1.29	20	
Sodium	68.2	0.020	1.0	"	8.00	74.1	NR	70-130	6.98	20	QM-4X

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40328 - EPA 200.8											
Blank (AB40328-BLK1)					Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	ND	2.0	50	ug/l							U
Antimony	ND	0.020	6.0	"							U
Arsenic	ND	0.070	2.0	"							U
Barium	ND	0.030	100	"							U
Beryllium	ND	0.020	1.0	"							U
Boron	17.8	6.0	50	"							J
Cadmium	ND	0.020	1.0	"							U
Chromium	ND	0.080	10	"							U
Copper	ND	0.040	0.50	"							U
Iron	ND	1.8	50	"							U
Lead	ND	0.020	5.0	"							U
Manganese	ND	0.030	5.0	"							U
Nickel	ND	0.060	10	"							U
Selenium	0.0754	0.070	5.0	"							J
Silver	ND	0.020	0.10	"							U
Thallium	ND	0.020	1.0	"							U
Uranium	ND	0.020	1.0	pCi/l							U
Vanadium	ND	0.30	1.0	ug/l							U
Zinc	1.13	0.50	5.0	"							J
LCS (AB40328-BS1)					Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	483	2.0	50	ug/l	520		92.8	85-115			
Antimony	20.1	0.020	6.0	"	20.0		100	85-115			
Arsenic	19.7	0.070	2.0	"	20.0		98.7	85-115			
Barium	19.1	0.030	100	"	20.0		95.4	85-115			J
Beryllium	18.8	0.020	1.0	"	20.0		94.1	85-115			
Boron	110	6.0	50	"	100		110	85-115			
Cadmium	18.8	0.020	1.0	"	20.0		94.0	85-115			
Chromium	19.3	0.080	10	"	20.0		96.6	85-115			
Copper	19.0	0.040	0.50	"	20.0		95.1	85-115			
Iron	502	1.8	50	"	520		96.6	85-115			
Lead	17.5	0.020	5.0	"	20.0		87.5	85-115			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40328 - EPA 200.8											
LCS (AB40328-BS1)					Prepared: 02/03/14 Analyzed: 02/04/14						
Manganese	18.8	0.030	5.0	ug/l	20.0		94.2	85-115			
Nickel	19.3	0.060	10	"	20.0		96.6	85-115			
Selenium	20.1	0.070	5.0	"	20.0		100	85-115			
Silver	18.1	0.020	0.10	"	20.0		90.4	85-115			
Thallium	17.1	0.020	1.0	"	20.0		85.6	85-115			
Uranium	11.5	0.020	1.0	pCi/l	13.4		85.5	85-115			
Vanadium	19.8	0.30	1.0	ug/l	20.0		99.0	85-115			
Zinc	98.6	0.50	5.0	"	100		98.6	85-115			
Duplicate (AB40328-DUP1)		**Source: 14A1755-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	1120	2.0	50	ug/l		1150			1.98	20	
Antimony	0.0754	0.020	6.0	"		0.0744			1.34	20	J
Arsenic	1.08	0.070	2.0	"		1.15			6.89	20	J
Barium	70.3	0.030	100	"		68.3			2.85	20	J
Beryllium	0.0788	0.020	1.0	"		0.0838			6.24	20	J
Boron	37.9	6.0	50	"		36.2			4.75	20	J
Cadmium	0.0848	0.020	1.0	"		0.0857			1.11	20	J
Chromium	0.470	0.080	10	"		0.382			20.5	20	J
Copper	12.8	0.040	0.50	"		12.3			3.69	20	
Iron	412	1.8	50	"		408			0.910	20	
Lead	1.06	0.020	5.0	"		1.12			4.92	20	J
Manganese	6.46	0.030	5.0	"		7.23			11.3	20	
Nickel	1.21	0.060	10	"		1.20			1.54	20	J
Selenium	0.159	0.070	5.0	"		0.171			7.50	20	J
Silver	0.0362	0.020	0.10	"		0.0220			48.8	20	J
Thallium	0.105	0.020	1.0	"		0.0948			9.86	20	J
Uranium	0.249	0.020	1.0	pCi/l		0.265			6.25	20	J
Vanadium	1.52	0.30	1.0	ug/l		1.64			7.56	20	
Zinc	6.79	0.50	5.0	"		6.73			0.780	20	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40328 - EPA 200.8											
Matrix Spike (AB40328-MS1)		**Source: 14A1755-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	1570	2.0	50	ug/l	520	1150	81.5	70-130			
Antimony	18.9	0.020	6.0	"	20.0	0.0744	94.1	70-130			
Arsenic	19.9	0.070	2.0	"	20.0	1.15	93.5	70-130			
Barium	85.5	0.030	100	"	20.0	68.3	85.8	70-130			J
Beryllium	17.8	0.020	1.0	"	20.0	0.0838	88.5	70-130			
Boron	114	6.0	50	"	100	36.2	78.1	70-130			
Cadmium	18.7	0.020	1.0	"	20.0	0.0857	93.0	70-130			
Chromium	17.4	0.080	10	"	20.0	0.382	85.1	70-130			
Copper	29.6	0.040	0.50	"	20.0	12.3	86.4	70-130			
Iron	858	1.8	50	"	520	408	86.4	70-130			
Lead	19.8	0.020	5.0	"	20.0	1.12	93.4	70-130			
Manganese	23.4	0.030	5.0	"	20.0	7.23	80.7	70-130			
Nickel	18.2	0.060	10	"	20.0	1.20	85.0	70-130			
Selenium	18.7	0.070	5.0	"	20.0	0.171	92.7	70-130			
Silver	17.9	0.020	0.10	"	20.0	0.0220	89.3	70-130			
Thallium	18.5	0.020	1.0	"	20.0	0.0948	92.1	70-130			
Uranium	13.5	0.020	1.0	pCi/l	13.4	0.265	98.5	70-130			
Vanadium	19.1	0.30	1.0	ug/l	20.0	1.64	87.4	70-130			
Zinc	98.9	0.50	5.0	"	100	6.73	92.1	70-130			
Matrix Spike (AB40328-MS2)		**Source: 14B0124-02**			Prepared: 02/05/14 Analyzed: 02/06/14						
Aluminum	529	2.0	50	ug/l	520	70.3	88.1	70-130			
Antimony	20.4	0.020	6.0	"	20.0	0.0711	102	70-130			
Arsenic	21.4	0.070	2.0	"	20.0	2.13	96.2	70-130			
Barium	35.8	0.030	100	"	20.0	16.9	94.7	70-130			J
Beryllium	19.3	0.020	1.0	"	20.0	ND	96.4	70-130			
Boron	150	6.0	50	"	100	63.0	87.0	70-130			
Cadmium	19.4	0.020	1.0	"	20.0	ND	97.0	70-130			
Chromium	20.0	0.080	10	"	20.0	0.590	97.0	70-130			
Copper	19.6	0.040	0.50	"	20.0	1.39	90.9	70-130			
Iron	602	1.8	50	"	520	91.5	98.1	70-130			
Lead	20.2	0.020	5.0	"	20.0	0.0825	101	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Metals by EPA Method 200.8 ICP/MS - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40328 - EPA 200.8											
Matrix Spike (AB40328-MS2)		**Source: 14B0124-02**			Prepared: 02/05/14 Analyzed: 02/06/14						
Manganese	26.7	0.030	5.0	ug/l	20.0	7.07	98.0	70-130			
Nickel	19.5	0.060	10	"	20.0	0.983	92.8	70-130			
Selenium	19.2	0.070	5.0	"	20.0	0.207	95.2	70-130			
Silver	19.4	0.020	0.10	"	20.0	ND	97.2	70-130			
Thallium	19.8	0.020	1.0	"	20.0	ND	99.0	70-130			
Uranium	14.2	0.020	1.0	pCi/l	13.4	0.107	105	70-130			
Vanadium	24.6	0.30	1.0	ug/l	20.0	5.40	95.9	70-130			
Zinc	99.9	0.50	5.0	"	100	3.69	96.2	70-130			
Matrix Spike Dup (AB40328-MSD1)		**Source: 14A1755-01**			Prepared: 02/03/14 Analyzed: 02/04/14						
Aluminum	1580	2.0	50	ug/l	520	1150	83.4	70-130	0.635	20	
Antimony	19.7	0.020	6.0	"	20.0	0.0744	98.1	70-130	4.13	20	
Arsenic	20.5	0.070	2.0	"	20.0	1.15	96.6	70-130	3.05	20	
Barium	88.4	0.030	100	"	20.0	68.3	100	70-130	3.29	20	J
Beryllium	19.1	0.020	1.0	"	20.0	0.0838	95.3	70-130	7.32	20	
Boron	125	6.0	50	"	100	36.2	88.8	70-130	8.99	20	
Cadmium	19.7	0.020	1.0	"	20.0	0.0857	98.0	70-130	5.25	20	
Chromium	18.0	0.080	10	"	20.0	0.382	88.1	70-130	3.40	20	
Copper	30.7	0.040	0.50	"	20.0	12.3	91.9	70-130	3.64	20	
Iron	860	1.8	50	"	520	408	86.8	70-130	0.291	20	
Lead	21.5	0.020	5.0	"	20.0	1.12	102	70-130	8.35	20	
Manganese	23.8	0.030	5.0	"	20.0	7.23	83.1	70-130	2.03	20	
Nickel	18.6	0.060	10	"	20.0	1.20	87.2	70-130	2.36	20	
Selenium	19.1	0.070	5.0	"	20.0	0.171	94.8	70-130	2.29	20	
Silver	19.1	0.020	0.10	"	20.0	0.0220	95.5	70-130	6.75	20	
Thallium	20.0	0.020	1.0	"	20.0	0.0948	99.5	70-130	7.72	20	
Uranium	14.5	0.020	1.0	pCi/l	13.4	0.265	107	70-130	7.74	20	
Vanadium	19.8	0.30	1.0	ug/l	20.0	1.64	91.0	70-130	3.68	20	
Zinc	105	0.50	5.0	"	100	6.73	97.9	70-130	5.71	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40440 - General Preparation											
Blank (AB40440-BLK1)					Prepared & Analyzed: 02/03/14						
Turbidity	ND	0.040	0.10	NTU							U
Duplicate (AB40440-DUP1)		**Source: 14B0115-02**			Prepared & Analyzed: 02/03/14						
Turbidity	2.42	0.040	0.10	NTU		2.42			0.00	30	
Batch AB40448 - General Preparation											
Duplicate (AB40448-DUP1)		**Source: 14B0118-01**			Prepared & Analyzed: 02/04/14						
Specific Conductance (EC)	197	1.0	20	umhos/cm		200			1.51	10	
Batch AB40515 - General Preparation											
Blank (AB40515-BLK1)					Prepared: 02/05/14 Analyzed: 02/10/14						
Total Dissolved Solids	ND	5.0	10	mg/l							U
Duplicate (AB40515-DUP1)		**Source: 14B0089-01**			Prepared: 02/05/14 Analyzed: 02/10/14						
Total Dissolved Solids	464	5.0	10	mg/l		464			0.00	30	
Duplicate (AB40515-DUP2)		**Source: 14B0098-03**			Prepared: 02/05/14 Analyzed: 02/10/14						
Total Dissolved Solids	496	5.0	10	mg/l		526			5.87	30	
Batch AB40528 - General Preparation											
Blank (AB40528-BLK1)					Prepared: 02/05/14 Analyzed: 02/12/14						
MBAS, calculated as LAS, mw 340	ND	0.030	0.050	mg/l							U

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40528 - General Preparation											
LCS (AB40528-BS1)					Prepared: 02/05/14 Analyzed: 02/12/14						
MBAS, calculated as LAS, mw 340	0.215	0.030	0.050	mg/l	0.200		108	80-120			
Duplicate (AB40528-DUP1)		**Source: 14B0089-01**			Prepared: 02/05/14 Analyzed: 02/12/14						
MBAS, calculated as LAS, mw 340	ND	0.030	0.050	mg/l		ND				20	U
Matrix Spike (AB40528-MS1)		**Source: 14B0089-01**			Prepared: 02/05/14 Analyzed: 02/12/14						
MBAS, calculated as LAS, mw 340	0.212	0.030	0.050	mg/l	0.200	ND	106	80-120			
Matrix Spike Dup (AB40528-MSD1)		**Source: 14B0089-01**			Prepared: 02/05/14 Analyzed: 02/12/14						
MBAS, calculated as LAS, mw 340	0.208	0.030	0.050	mg/l	0.200	ND	104	80-120	1.63	20	
Batch AB40803 - General Prep											
Blank (AB40803-BLK1)					Prepared & Analyzed: 02/08/14						
Total Organic Carbon	ND	0.100	0.300	mg/l							U
LCS (AB40803-BS1)					Prepared & Analyzed: 02/08/14						
Total Organic Carbon	10.6	0.100	0.300	mg/l	10.0		106	85-115			
LCS Dup (AB40803-BSD1)					Prepared & Analyzed: 02/08/14						
Total Organic Carbon	10.5	0.100	0.300	mg/l	10.0		105	85-115	1.20	20	
Duplicate (AB40803-DUP1)		**Source: 14B0427-01**			Prepared & Analyzed: 02/08/14						
Total Organic Carbon	ND	0.100	0.300	mg/l		0.112				20	U
Matrix Spike (AB40803-MS1)		**Source: 14B0427-01**			Prepared & Analyzed: 02/08/14						
Total Organic Carbon	10.7	0.100	0.300	mg/l	10.0	0.112	106	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40803 - General Prep											
Matrix Spike Dup (AB40803-MSD1)		**Source: 14B0427-01**			Prepared & Analyzed: 02/08/14						
Total Organic Carbon	10.4	0.100	0.300	mg/l	10.0	0.112	102	70-130	3.54	20	
Batch AB41141 - General Preparation											
Blank (AB41141-BLK1)					Prepared & Analyzed: 02/11/14						
Perchlorate	0.967	0.90	4.0	ug/l							J
LCS (AB41141-BS1)					Prepared & Analyzed: 02/11/14						
Perchlorate	23.9	0.90	4.0	ug/l	25.0		95.5	85-115			
Duplicate (AB41141-DUP1)		**Source: 14A1643-01**			Prepared & Analyzed: 02/11/14						
Perchlorate	ND	0.90	4.0	ug/l		ND				15	U
Matrix Spike (AB41141-MS1)		**Source: 14A1643-01**			Prepared & Analyzed: 02/11/14						
Perchlorate	25.9	0.90	4.0	ug/l	25.0	ND	104	70-130			
Matrix Spike Dup (AB41141-MSD1)		**Source: 14A1643-01**			Prepared & Analyzed: 02/11/14						
Perchlorate	25.9	0.90	4.0	ug/l	25.0	ND	104	70-130	0.00386	15	
Batch AB41221 - General Preparation											
Duplicate (AB41221-DUP1)		**Source: 14B0313-04**			Prepared & Analyzed: 02/12/14						
Bicarbonate	354	0.060	5.0	mg/l		360			1.71	20	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Miscellaneous Physical/Conventional Chemistry Parameters - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40428 - General Preparation											
Blank (AB40428-BLK1)					Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	ND	0.0020	0.10	mg/l							U
LCS (AB40428-BS1)					Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.202	0.0020	0.10	mg/l	0.200		101	85-115			
Duplicate (AB40428-DUP1)		**Source: 14A1492-02**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	ND	0.0020	0.10	mg/l		ND				25	U
Matrix Spike (AB40428-MS1)		**Source: 14A1492-02**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.188	0.0020	0.10	mg/l	0.200	ND	93.9	85-115			
Matrix Spike (AB40428-MS2)		**Source: 14A1635-01**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.220	0.0020	0.10	mg/l	0.200	ND	110	85-115			
Matrix Spike Dup (AB40428-MSD1)		**Source: 14A1492-02**			Prepared: 02/04/14 Analyzed: 02/05/14						
Cyanide (total)	0.186	0.0020	0.10	mg/l	0.200	ND	92.8	85-115	1.23	25	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Anions by EPA Method 300.0 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40426 - General Preparation											
Blank (AB40426-BLK1)					Prepared & Analyzed: 02/04/14						
Nitrate as NO3	ND	0.20	2.0	mg/l							U
Sulfate as SO4	ND	0.090	0.50	"							U
Nitrite as N	ND	0.020	0.40	"							U
Fluoride	ND	0.070	0.10	"							U
Chloride	ND	0.030	0.50	"							U
LCS (AB40426-BS1)					Prepared & Analyzed: 02/04/14						
Nitrate as NO3	23	0.20	2.0	mg/l	22.2		102	90-110			
Sulfate as SO4	20.2	0.090	0.50	"	20.0		101	90-110			
Chloride	10.2	0.030	0.50	"	10.0		102	90-110			
Fluoride	5.18	0.070	0.10	"	5.00		104	90-110			
Nitrite as N	5.22	0.020	0.40	"	5.00		104	90-110			
Duplicate (AB40426-DUP1)		**Source: 14B0093-01**			Prepared & Analyzed: 02/04/14						
Nitrate as NO3	13	0.20	2.0	mg/l		13			0.107	20	
Sulfate as SO4	13.8	0.090	0.50	"		13.8			0.0434	20	
Chloride	59.0	0.15	2.5	"		59.0			0.0678	20	
Fluoride	ND	0.070	0.10	"		ND				20	U
Nitrite as N	ND	0.020	0.40	"		ND				20	U
Matrix Spike (AB40426-MS1)		**Source: 14B0093-01**			Prepared & Analyzed: 02/04/14						
Nitrate as NO3	37	1.0	10	mg/l	24.7	13	95.4	80-120			
Nitrite as N	5.39	0.10	2.0	"	5.56	ND	97.0	80-120			
Chloride	70.5	0.15	2.5	"	11.1	59.0	104	80-120			
Fluoride	4.92	0.35	0.50	"	5.56	ND	88.6	80-120			
Sulfate as SO4	34.8	0.45	2.5	"	22.2	13.8	94.4	80-120			
Matrix Spike (AB40426-MS2)		**Source: 14B0115-02**			Prepared & Analyzed: 02/04/14						
Nitrate as NO3	24	1.0	10	mg/l	24.7	0.67	96.5	80-120			
Sulfate as SO4	53.5	0.45	2.5	"	22.2	32.9	92.7	80-120			
Nitrite as N	5.44	0.10	2.0	"	5.56	ND	98.0	80-120			
Fluoride	5.07	0.35	0.50	"	5.56	0.107	89.4	80-120			
Chloride	20.9	0.15	2.5	"	11.1	9.42	103	80-120			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Anions by EPA Method 300.0 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40426 - General Preparation											
Matrix Spike Dup (AB40426-MSD1)		**Source: 14B0093-01**		Prepared & Analyzed: 02/04/14							
Nitrate as NO3	37	1.0	10	mg/l	24.7	13	95.6	80-120	0.136	20	
Nitrite as N	5.42	0.10	2.0	"	5.56	ND	97.5	80-120	0.514	20	
Sulfate as SO4	34.9	0.45	2.5	"	22.2	13.8	94.7	80-120	0.223	20	
Chloride	70.5	0.15	2.5	"	11.1	59.0	104	80-120	0.0473	20	
Fluoride	4.94	0.35	0.50	"	5.56	ND	89.0	80-120	0.450	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Blank (AB40725-BLK1)					Prepared & Analyzed: 02/04/14						
Acetone	ND	0.80	5.0	ug/l							U
Acrylonitrile	ND	0.20	5.0	"							U
Benzene	ND	0.20	0.30	"							U
Bromobenzene	ND	0.10	0.50	"							U
Bromochloromethane	ND	0.20	0.50	"							U
Bromodichloromethane	ND	0.50	0.50	"							U
Bromoform	ND	0.50	0.50	"							U
Bromomethane	ND	0.20	0.50	"							U
n-Butylbenzene	ND	0.10	0.50	"							U
sec-Butylbenzene	ND	0.10	0.50	"							U
tert-Butylbenzene	ND	0.10	0.50	"							U
Carbon disulfide	ND	0.20	0.50	"							U
Carbon tetrachloride	ND	0.30	0.50	"							U
Chlorobenzene	ND	0.20	0.50	"							U
Chloroethane	ND	0.10	0.50	"							U
Chloroform	ND	0.50	0.50	"							U
Chloromethane	ND	0.20	0.50	"							U
2-Chlorotoluene	ND	0.20	0.50	"							U
4-Chlorotoluene	ND	0.10	0.50	"							U
Dibromochloromethane	ND	0.50	0.50	"							U
1,2-Dibromo-3-chloropropane	ND	0.36	0.50	"							U
1,2-Dibromoethane (EDB)	ND	0.14	0.50	"							U
Dibromomethane	ND	0.20	0.50	"							U
1,2-Dichlorobenzene	ND	0.20	0.50	"							U
1,3-Dichlorobenzene	ND	0.20	0.50	"							U
trans-1,4-Dichloro-2-butene	ND	0.095	5.0	"							U
1,4-Dichlorobenzene	ND	0.10	0.50	"							U
Dichlorodifluoromethane	ND	0.20	0.50	"							U
1,1-Dichloroethane	ND	0.10	0.50	"							U
1,2-Dichloroethane	ND	0.20	0.50	"							U
1,1-Dichloroethene	ND	0.10	0.30	"							U
cis-1,2-Dichloroethene	ND	0.20	0.50	"							U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Blank (AB40725-BLK1)					Prepared & Analyzed: 02/04/14						
trans-1,2-Dichloroethene	ND	0.20	0.50	ug/l							U
1,2-Dichloropropane	ND	0.20	0.50	"							U
1,3-Dichloropropane	ND	0.20	0.50	"							U
2,2-Dichloropropane	ND	0.10	0.50	"							U
1,1-Dichloropropene	ND	0.10	0.50	"							U
cis-1,3-Dichloropropene	ND	0.20	0.50	"							U
trans-1,3-Dichloropropene	ND	0.20	0.50	"							U
Ethylbenzene	ND	0.10	0.50	"							U
1,3-Dichloropropene (total)	ND	0.20	0.50	"							U
2-Hexanone	ND	0.097	5.0	"							U
Hexachlorobutadiene	ND	0.30	0.50	"							U
Isopropylbenzene	ND	0.20	0.50	"							U
p-Isopropyltoluene	ND	0.10	0.50	"							U
Methyl ethyl ketone	ND	0.40	1.0	"							U
Methyl iodide	ND	0.12	2.0	"							U
Methyl isobutyl ketone	ND	0.30	1.0	"							U
Methylene chloride	ND	0.40	0.50	"							U
Naphthalene	ND	0.20	0.50	"							U
n-Propylbenzene	ND	0.20	0.50	"							U
Styrene	ND	0.10	0.50	"							U
1,1,1,2-Tetrachloroethane	ND	0.20	0.50	"							U
1,1,2,2-Tetrachloroethane	ND	0.20	0.50	"							U
Tetrachloroethene	ND	0.20	0.50	"							U
Toluene	ND	0.10	0.50	"							U
1,2,3-Trichlorobenzene	ND	0.10	0.50	"							U
1,2,4-Trichlorobenzene	ND	0.20	0.50	"							U
1,1,1-Trichloroethane	ND	0.20	0.50	"							U
1,1,2-Trichloroethane	ND	0.20	0.50	"							U
Trichloroethene	ND	0.20	0.50	"							U
Trichlorofluoromethane	ND	0.20	0.50	"							U
Trichlorotrifluoroethane	ND	0.20	0.50	"							U
1,2,3-Trichloropropane	ND	0.13	0.50	"							U

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Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Blank (AB40725-BLK1)					Prepared & Analyzed: 02/04/14						
1,2,4-Trimethylbenzene	ND	0.10	0.50	ug/l							U
1,3,5-Trimethylbenzene	ND	0.10	0.50	"							U
Vinyl chloride	ND	0.10	0.50	"							U
m,p-Xylene	ND	0.20	0.50	"							U
o-Xylene	ND	0.10	0.50	"							U
Xylenes (total)	ND	0.20	0.50	"							U
Trihalomethanes (total)	ND	0.50	0.50	"							U
Methyl tert-butyl ether	ND	0.50	0.50	"							U
Ethyl tert-butyl ether	ND	0.20	0.50	"							U
Tert-amyl methyl ether	ND	0.20	0.50	"							U
Surrogate: Bromofluorobenzene	*25.0*			*"*	*25.0*		*99.8*	*70-130*			
Surrogate: Dibromofluoromethane	*24.0*			*"*	*25.0*		*95.9*	*70-130*			
Surrogate: Toluene-d8	*25.4*			*"*	*25.0*		*102*	*70-130*			
LCS (AB40725-BS1)					Prepared & Analyzed: 02/04/14						
Acetone	24.1	0.80	5.0	ug/l	20.0		120	70-130			
Acrylonitrile	5.73	0.20	5.0	"	5.00		115	70-130			
Benzene	4.88	0.20	0.30	"	5.00		97.6	70-130			
Bromobenzene	5.19	0.10	0.50	"	5.00		104	70-130			
Bromochloromethane	5.11	0.20	0.50	"	5.00		102	70-130			
Bromodichloromethane	4.65	0.50	0.50	"	5.00		93.0	70-130			
Bromoform	4.58	0.50	0.50	"	5.00		91.6	70-130			
Bromomethane	5.43	0.20	0.50	"	5.00		109	70-130			
n-Butylbenzene	5.09	0.10	0.50	"	5.00		102	70-130			
sec-Butylbenzene	5.06	0.10	0.50	"	5.00		101	70-130			
tert-Butylbenzene	5.24	0.10	0.50	"	5.00		105	70-130			
Carbon disulfide	4.99	0.20	0.50	"	5.00		99.8	70-130			
Carbon tetrachloride	4.76	0.30	0.50	"	5.00		95.2	70-130			
Chlorobenzene	5.07	0.20	0.50	"	5.00		101	70-130			
Chloroethane	5.33	0.10	0.50	"	5.00		107	70-130			
Chloroform	4.92	0.50	0.50	"	5.00		98.4	70-130			
Chloromethane	6.12	0.20	0.50	"	5.00		122	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS (AB40725-BS1)					Prepared & Analyzed: 02/04/14						
2-Chlorotoluene	5.26	0.20	0.50	ug/l	5.00		105	70-130			
4-Chlorotoluene	4.99	0.10	0.50	"	5.00		99.8	70-130			
Dibromochloromethane	4.81	0.50	0.50	"	5.00		96.2	70-130			
1,2-Dibromo-3-chloropropane	4.94	0.36	0.50	"	5.00		98.8	70-130			
1,2-Dibromoethane (EDB)	5.23	0.14	0.50	"	5.00		105	70-130			
Dibromomethane	4.94	0.20	0.50	"	5.00		98.8	70-130			
1,2-Dichlorobenzene	4.86	0.20	0.50	"	5.00		97.2	70-130			
1,3-Dichlorobenzene	5.18	0.20	0.50	"	5.00		104	70-130			
1,4-Dichlorobenzene	4.96	0.10	0.50	"	5.00		99.2	70-130			
trans-1,4-Dichloro-2-butene	4.74	0.095	5.0	"	5.00		94.8	70-130			J
Dichlorodifluoromethane	6.14	0.20	0.50	"	5.00		123	70-130			
1,1-Dichloroethane	5.10	0.10	0.50	"	5.00		102	70-130			
1,2-Dichloroethane	4.93	0.20	0.50	"	5.00		98.6	70-130			
1,1-Dichloroethene	4.96	0.10	0.30	"	5.00		99.2	70-130			
cis-1,2-Dichloroethene	5.01	0.20	0.50	"	5.00		100	70-130			
trans-1,2-Dichloroethene	4.99	0.20	0.50	"	5.00		99.8	70-130			
1,2-Dichloropropane	4.83	0.20	0.50	"	5.00		96.6	70-130			
1,3-Dichloropropane	5.09	0.20	0.50	"	5.00		102	70-130			
2,2-Dichloropropane	4.57	0.10	0.50	"	5.00		91.4	70-130			
1,1-Dichloropropene	4.65	0.10	0.50	"	5.00		93.0	70-130			
cis-1,3-Dichloropropene	4.66	0.20	0.50	"	5.00		93.2	70-130			
trans-1,3-Dichloropropene	4.58	0.20	0.50	"	5.00		91.6	70-130			
Ethylbenzene	5.06	0.10	0.50	"	5.00		101	70-130			
2-Hexanone	5.38	0.097	5.0	"	5.00		108	70-130			
Hexachlorobutadiene	4.93	0.30	0.50	"	5.00		98.6	70-130			
Isopropylbenzene	5.33	0.20	0.50	"	5.00		107	70-130			
p-Isopropyltoluene	5.25	0.10	0.50	"	5.00		105	70-130			
Methyl ethyl ketone	10.5	0.40	1.0	"	10.0		105	70-130			
Methyl iodide	5.04	0.12	2.0	"	5.00		101	70-130			
Methyl isobutyl ketone	10.3	0.30	1.0	"	10.0		103	70-130			
Methylene chloride	4.10	0.40	0.50	"	5.00		82.0	70-130			
Naphthalene	5.01	0.20	0.50	"	5.00		100	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS (AB40725-BS1)					Prepared & Analyzed: 02/04/14						
n-Propylbenzene	5.43	0.20	0.50	ug/l	5.00		109	70-130			
Styrene	5.32	0.10	0.50	"	5.00		106	70-130			
1,1,1,2-Tetrachloroethane	4.86	0.20	0.50	"	5.00		97.2	70-130			
1,1,2,2-Tetrachloroethane	5.08	0.20	0.50	"	5.00		102	70-130			
Tetrachloroethene	5.11	0.20	0.50	"	5.00		102	70-130			
Toluene	5.21	0.10	0.50	"	5.00		104	70-130			
1,2,3-Trichlorobenzene	5.08	0.10	0.50	"	5.00		102	70-130			
1,2,4-Trichlorobenzene	5.00	0.20	0.50	"	5.00		100	70-130			
1,1,1-Trichloroethane	4.89	0.20	0.50	"	5.00		97.8	70-130			
1,1,2-Trichloroethane	5.09	0.20	0.50	"	5.00		102	70-130			
Trichloroethene	4.93	0.20	0.50	"	5.00		98.6	70-130			
Trichlorofluoromethane	5.14	0.20	0.50	"	5.00		103	70-130			
Trichlorotrifluoroethane	5.56	0.20	0.50	"	5.00		111	70-130			
1,2,3-Trichloropropane	5.03	0.13	0.50	"	5.00		101	70-130			
1,2,4-Trimethylbenzene	5.36	0.10	0.50	"	5.00		107	70-130			
1,3,5-Trimethylbenzene	5.36	0.10	0.50	"	5.00		107	70-130			
Vinyl chloride	5.40	0.10	0.50	"	5.00		108	70-130			
m,p-Xylene	10.2	0.20	0.50	"	10.0		102	70-130			
o-Xylene	5.24	0.10	0.50	"	5.00		105	70-130			
Xylenes (total)	15.4	0.20	0.50	"	15.0		103	70-130			
Methyl tert-butyl ether	4.89	0.50	0.50	"	5.00		97.8	70-130			
Ethyl tert-butyl ether	4.85	0.20	0.50	"	5.00		97.0	70-130			
Tert-amyl methyl ether	4.93	0.20	0.50	"	5.00		98.6	70-130			
Surrogate: Bromofluorobenzene	*25.6*			*"*	*25.0*		*102*	*70-130*			
Surrogate: Dibromofluoromethane	*24.7*			*"*	*25.0*		*98.7*	*70-130*			
Surrogate: Toluene-d8	*25.3*			*"*	*25.0*		*101*	*70-130*			
LCS Dup (AB40725-BSD1)					Prepared & Analyzed: 02/04/14						
Acetone	22.4	0.80	5.0	ug/l	20.0		112	70-130	7.28	30	
Acrylonitrile	5.77	0.20	5.0	"	5.00		115	70-130	0.696	30	
Benzene	4.70	0.20	0.30	"	5.00		94.0	70-130	3.76	30	
Bromobenzene	5.09	0.10	0.50	"	5.00		102	70-130	1.95	30	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS Dup (AB40725-BSD1)					Prepared & Analyzed: 02/04/14						
Bromochloromethane	4.92	0.20	0.50	ug/l	5.00		98.4	70-130	3.79	30	
Bromodichloromethane	4.56	0.50	0.50	"	5.00		91.2	70-130	1.95	30	
Bromoform	4.71	0.50	0.50	"	5.00		94.2	70-130	2.80	30	
Bromomethane	5.46	0.20	0.50	"	5.00		109	70-130	0.551	30	
n-Butylbenzene	4.88	0.10	0.50	"	5.00		97.6	70-130	4.21	30	
sec-Butylbenzene	5.00	0.10	0.50	"	5.00		100	70-130	1.19	30	
tert-Butylbenzene	5.15	0.10	0.50	"	5.00		103	70-130	1.73	30	
Carbon disulfide	4.83	0.20	0.50	"	5.00		96.6	70-130	3.26	30	
Carbon tetrachloride	4.64	0.30	0.50	"	5.00		92.8	70-130	2.55	30	
Chlorobenzene	5.01	0.20	0.50	"	5.00		100	70-130	1.19	30	
Chloroethane	5.12	0.10	0.50	"	5.00		102	70-130	4.02	30	
Chloroform	4.84	0.50	0.50	"	5.00		96.8	70-130	1.64	30	
Chloromethane	5.86	0.20	0.50	"	5.00		117	70-130	4.34	30	
2-Chlorotoluene	5.27	0.20	0.50	"	5.00		105	70-130	0.190	30	
4-Chlorotoluene	5.07	0.10	0.50	"	5.00		101	70-130	1.59	30	
Dibromochloromethane	4.72	0.50	0.50	"	5.00		94.4	70-130	1.89	30	
1,2-Dibromo-3-chloropropane	4.95	0.36	0.50	"	5.00		99.0	70-130	0.202	25	
1,2-Dibromoethane (EDB)	5.17	0.14	0.50	"	5.00		103	70-130	1.15	25	
Dibromomethane	5.07	0.20	0.50	"	5.00		101	70-130	2.60	30	
1,2-Dichlorobenzene	4.70	0.20	0.50	"	5.00		94.0	70-130	3.35	30	
1,3-Dichlorobenzene	5.10	0.20	0.50	"	5.00		102	70-130	1.56	30	
1,4-Dichlorobenzene	4.87	0.10	0.50	"	5.00		97.4	70-130	1.83	30	
trans-1,4-Dichloro-2-butene	4.90	0.095	5.0	"	5.00		98.0	70-130	3.32	25	J
Dichlorodifluoromethane	5.94	0.20	0.50	"	5.00		119	70-130	3.31	30	
1,1-Dichloroethane	4.86	0.10	0.50	"	5.00		97.2	70-130	4.82	30	
1,2-Dichloroethane	4.84	0.20	0.50	"	5.00		96.8	70-130	1.84	30	
1,1-Dichloroethene	4.67	0.10	0.30	"	5.00		93.4	70-130	6.02	30	
cis-1,2-Dichloroethene	4.85	0.20	0.50	"	5.00		97.0	70-130	3.25	30	
trans-1,2-Dichloroethene	4.78	0.20	0.50	"	5.00		95.6	70-130	4.30	30	
1,2-Dichloropropane	4.88	0.20	0.50	"	5.00		97.6	70-130	1.03	30	
1,3-Dichloropropane	5.07	0.20	0.50	"	5.00		101	70-130	0.394	30	
2,2-Dichloropropane	4.36	0.10	0.50	"	5.00		87.2	70-130	4.70	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS Dup (AB40725-BSD1)					Prepared & Analyzed: 02/04/14						
1,1-Dichloropropene	4.56	0.10	0.50	ug/l	5.00		91.2	70-130	1.95	30	
cis-1,3-Dichloropropene	4.68	0.20	0.50	"	5.00		93.6	70-130	0.428	30	
trans-1,3-Dichloropropene	4.74	0.20	0.50	"	5.00		94.8	70-130	3.43	30	
Ethylbenzene	4.96	0.10	0.50	"	5.00		99.2	70-130	2.00	30	
2-Hexanone	5.44	0.097	5.0	"	5.00		109	70-130	1.11	25	
Hexachlorobutadiene	4.64	0.30	0.50	"	5.00		92.8	70-130	6.06	30	
Isopropylbenzene	5.24	0.20	0.50	"	5.00		105	70-130	1.70	30	
p-Isopropyltoluene	5.08	0.10	0.50	"	5.00		102	70-130	3.29	30	
Methyl ethyl ketone	11.0	0.40	1.0	"	10.0		110	70-130	4.74	30	
Methyl iodide	4.90	0.12	2.0	"	5.00		98.0	70-130	2.82	25	
Methyl isobutyl ketone	10.4	0.30	1.0	"	10.0		104	70-130	0.679	30	
Methylene chloride	4.06	0.40	0.50	"	5.00		81.2	70-130	0.980	30	
Naphthalene	4.96	0.20	0.50	"	5.00		99.2	70-130	1.00	30	
n-Propylbenzene	5.47	0.20	0.50	"	5.00		109	70-130	0.734	30	
Styrene	5.28	0.10	0.50	"	5.00		106	70-130	0.755	30	
1,1,1,2-Tetrachloroethane	4.77	0.20	0.50	"	5.00		95.4	70-130	1.87	30	
1,1,2,2-Tetrachloroethane	5.14	0.20	0.50	"	5.00		103	70-130	1.17	30	
Tetrachloroethene	4.82	0.20	0.50	"	5.00		96.4	70-130	5.84	30	
Toluene	5.15	0.10	0.50	"	5.00		103	70-130	1.16	30	
1,2,3-Trichlorobenzene	4.99	0.10	0.50	"	5.00		99.8	70-130	1.79	30	
1,2,4-Trichlorobenzene	4.83	0.20	0.50	"	5.00		96.6	70-130	3.46	30	
1,1,1-Trichloroethane	4.70	0.20	0.50	"	5.00		94.0	70-130	3.96	30	
1,1,2-Trichloroethane	5.20	0.20	0.50	"	5.00		104	70-130	2.14	30	
Trichloroethene	4.67	0.20	0.50	"	5.00		93.4	70-130	5.42	30	
Trichlorofluoromethane	5.01	0.20	0.50	"	5.00		100	70-130	2.56	30	
Trichlorotrifluoroethane	5.29	0.20	0.50	"	5.00		106	70-130	4.98	30	
1,2,3-Trichloropropane	5.09	0.13	0.50	"	5.00		102	70-130	1.19	25	
1,2,4-Trimethylbenzene	5.28	0.10	0.50	"	5.00		106	70-130	1.50	30	
1,3,5-Trimethylbenzene	5.28	0.10	0.50	"	5.00		106	70-130	1.50	30	
Vinyl chloride	5.27	0.10	0.50	"	5.00		105	70-130	2.44	30	
m,p-Xylene	10.1	0.20	0.50	"	10.0		101	70-130	0.888	30	
o-Xylene	5.11	0.10	0.50	"	5.00		102	70-130	2.51	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
LCS Dup (AB40725-BSD1)					Prepared & Analyzed: 02/04/14						
Xylenes (total)	15.2	0.20	0.50	ug/l	15.0		101	70-130	1.44	30	
Methyl tert-butyl ether	4.81	0.50	0.50	"	5.00		96.2	70-130	1.65	30	
Ethyl tert-butyl ether	5.20	0.20	0.50	"	5.00		104	70-130	6.97	30	
Tert-amyl methyl ether	4.85	0.20	0.50	"	5.00		97.0	70-130	1.64	30	
Surrogate: Bromofluorobenzene	*25.4*			*"*	*25.0*		*102*	*70-130*			
Surrogate: Dibromofluoromethane	*24.0*			*"*	*25.0*		*96.1*	*70-130*			
Surrogate: Toluene-d8	*25.2*			*"*	*25.0*		*101*	*70-130*			
Matrix Spike (AB40725-MS1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
Acetone	26.9	0.80	5.0	ug/l	20.0	1.79	126	70-130			
Acrylonitrile	5.81	0.20	5.0	"	5.00	ND	116	70-130			
Benzene	5.43	0.20	0.30	"	5.00	ND	109	70-130			
Bromobenzene	5.48	0.10	0.50	"	5.00	ND	110	70-130			
Bromochloromethane	5.55	0.20	0.50	"	5.00	ND	111	70-130			
Bromodichloromethane	10.0	0.50	0.50	"	5.00	4.42	112	70-130			
Bromoform	4.44	0.50	0.50	"	5.00	ND	88.8	70-130			
Bromomethane	6.20	0.20	0.50	"	5.00	ND	124	70-130			
n-Butylbenzene	5.03	0.10	0.50	"	5.00	ND	101	70-130			
sec-Butylbenzene	5.41	0.10	0.50	"	5.00	ND	108	70-130			
tert-Butylbenzene	5.60	0.10	0.50	"	5.00	ND	112	70-130			
Carbon disulfide	5.36	0.20	0.50	"	5.00	ND	107	70-130			
Carbon tetrachloride	4.97	0.30	0.50	"	5.00	ND	99.4	70-130			
Chlorobenzene	5.35	0.20	0.50	"	5.00	ND	107	70-130			
Chloroethane	6.00	0.10	0.50	"	5.00	ND	120	70-130			
Chloroform	35.3	0.50	0.50	"	5.00	31.5	76.2	70-130			
Chloromethane	6.60	0.20	0.50	"	5.00	ND	132	70-130			QM-05
2-Chlorotoluene	5.65	0.20	0.50	"	5.00	ND	113	70-130			
4-Chlorotoluene	5.61	0.10	0.50	"	5.00	ND	112	70-130			
Dibromochloromethane	4.80	0.50	0.50	"	5.00	ND	96.0	70-130			
1,2-Dibromo-3-chloropropane	4.62	0.36	0.50	"	5.00	ND	92.4	70-130			
1,2-Dibromoethane (EDB)	5.29	0.14	0.50	"	5.00	ND	106	70-130			
Dibromomethane	5.47	0.20	0.50	"	5.00	ND	109	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike (AB40725-MS1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
1,2-Dichlorobenzene	4.95	0.20	0.50	ug/l	5.00	ND	99.0	70-130			
1,3-Dichlorobenzene	5.47	0.20	0.50	"	5.00	ND	109	70-130			
1,4-Dichlorobenzene	5.16	0.10	0.50	"	5.00	ND	103	70-130			
trans-1,4-Dichloro-2-butene	5.53	0.095	5.0	"	5.00	ND	111	70-130			
Dichlorodifluoromethane	6.69	0.20	0.50	"	5.00	ND	134	70-130			QM-05
1,1-Dichloroethane	5.61	0.10	0.50	"	5.00	ND	112	70-130			
1,2-Dichloroethane	5.51	0.20	0.50	"	5.00	ND	110	70-130			
1,1-Dichloroethene	5.37	0.10	0.30	"	5.00	ND	107	70-130			
cis-1,2-Dichloroethene	5.51	0.20	0.50	"	5.00	ND	110	70-130			
trans-1,2-Dichloroethene	5.31	0.20	0.50	"	5.00	ND	106	70-130			
1,2-Dichloropropane	5.29	0.20	0.50	"	5.00	ND	106	70-130			
1,3-Dichloropropane	5.45	0.20	0.50	"	5.00	ND	109	70-130			
2,2-Dichloropropane	4.58	0.10	0.50	"	5.00	ND	91.6	70-130			
1,1-Dichloropropene	5.13	0.10	0.50	"	5.00	ND	103	70-130			
cis-1,3-Dichloropropene	4.84	0.20	0.50	"	5.00	ND	96.8	70-130			
trans-1,3-Dichloropropene	4.50	0.20	0.50	"	5.00	ND	90.0	70-130			
2-Hexanone	5.62	0.097	5.0	"	5.00	ND	112	70-130			
Ethylbenzene	5.30	0.10	0.50	"	5.00	ND	106	70-130			
Hexachlorobutadiene	4.84	0.30	0.50	"	5.00	ND	96.8	70-130			
Isopropylbenzene	5.74	0.20	0.50	"	5.00	ND	115	70-130			
p-Isopropyltoluene	5.59	0.10	0.50	"	5.00	ND	112	70-130			
Methyl ethyl ketone	12.3	0.40	1.0	"	10.0	ND	123	70-130			
Methyl iodide	5.66	0.12	2.0	"	5.00	ND	113	70-130			
Methyl isobutyl ketone	10.7	0.30	1.0	"	10.0	ND	107	70-130			
Methylene chloride	4.34	0.40	0.50	"	5.00	ND	86.8	70-130			
Naphthalene	5.02	0.20	0.50	"	5.00	ND	100	70-130			
n-Propylbenzene	5.74	0.20	0.50	"	5.00	ND	115	70-130			
Styrene	5.53	0.10	0.50	"	5.00	ND	111	70-130			
1,1,1,2-Tetrachloroethane	4.62	0.20	0.50	"	5.00	ND	92.4	70-130			
1,1,2,2-Tetrachloroethane	5.37	0.20	0.50	"	5.00	ND	107	70-130			
Tetrachloroethene	5.41	0.20	0.50	"	5.00	ND	108	70-130			
Toluene	5.51	0.10	0.50	"	5.00	ND	110	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike (AB40725-MS1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
1,2,3-Trichlorobenzene	5.07	0.10	0.50	ug/l	5.00	ND	101	70-130			
1,2,4-Trichlorobenzene	4.77	0.20	0.50	"	5.00	ND	95.4	70-130			
1,1,1-Trichloroethane	5.12	0.20	0.50	"	5.00	ND	102	70-130			
1,1,2-Trichloroethane	5.46	0.20	0.50	"	5.00	ND	109	70-130			
Trichloroethene	5.13	0.20	0.50	"	5.00	ND	103	70-130			
Trichlorofluoromethane	5.52	0.20	0.50	"	5.00	ND	110	70-130			
Trichlorotrifluoroethane	6.04	0.20	0.50	"	5.00	ND	121	70-130			
1,2,3-Trichloropropane	5.35	0.13	0.50	"	5.00	ND	107	70-130			
1,2,4-Trimethylbenzene	5.57	0.10	0.50	"	5.00	ND	111	70-130			
1,3,5-Trimethylbenzene	5.57	0.10	0.50	"	5.00	ND	111	70-130			
Vinyl chloride	6.10	0.10	0.50	"	5.00	ND	122	70-130			
m,p-Xylene	11.0	0.20	0.50	"	10.0	ND	110	70-130			
o-Xylene	5.54	0.10	0.50	"	5.00	ND	111	70-130			
Xylenes (total)	16.6	0.20	0.50	"	15.0	ND	110	70-130			
Methyl tert-butyl ether	4.80	0.50	0.50	"	5.00	ND	96.0	70-130			
Ethyl tert-butyl ether	5.52	0.20	0.50	"	5.00	ND	110	70-130			
Tert-amyl methyl ether	4.93	0.20	0.50	"	5.00	ND	98.6	70-130			
Surrogate: Bromofluorobenzene	*25.3*			*"*	*25.0*		*101*	*70-130*			
Surrogate: Dibromofluoromethane	*24.5*			*"*	*25.0*		*98.1*	*70-130*			
Surrogate: Toluene-d8	*25.0*			*"*	*25.0*		*99.9*	*70-130*			
Matrix Spike Dup (AB40725-MSD1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
Acetone	26.1	0.80	5.0	ug/l	20.0	1.79	122	70-130	2.87	30	
Acrylonitrile	5.35	0.20	5.0	"	5.00	ND	107	70-130	8.24	30	
Benzene	4.92	0.20	0.30	"	5.00	ND	98.4	70-130	9.86	30	
Bromobenzene	5.04	0.10	0.50	"	5.00	ND	101	70-130	8.37	30	
Bromochloromethane	5.02	0.20	0.50	"	5.00	ND	100	70-130	10.0	30	
Bromodichloromethane	9.77	0.50	0.50	"	5.00	4.42	107	70-130	2.43	30	
Bromoform	4.34	0.50	0.50	"	5.00	ND	86.8	70-130	2.28	30	
Bromomethane	5.65	0.20	0.50	"	5.00	ND	113	70-130	9.28	30	
n-Butylbenzene	4.55	0.10	0.50	"	5.00	ND	91.0	70-130	10.0	30	
sec-Butylbenzene	5.00	0.10	0.50	"	5.00	ND	100	70-130	7.88	30	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike Dup (AB40725-MSD1)		**Source: 14B0115-02**		Prepared: 02/04/14 Analyzed: 02/06/14							
tert-Butylbenzene	5.08	0.10	0.50	ug/l	5.00	ND	102	70-130	9.74	30	
Carbon disulfide	4.92	0.20	0.50	"	5.00	ND	98.4	70-130	8.56	30	
Carbon tetrachloride	4.66	0.30	0.50	"	5.00	ND	93.2	70-130	6.44	30	
Chlorobenzene	5.02	0.20	0.50	"	5.00	ND	100	70-130	6.36	30	
Chloroethane	5.44	0.10	0.50	"	5.00	ND	109	70-130	9.79	30	
Chloroform	35.4	0.50	0.50	"	5.00	31.5	77.4	70-130	0.170	30	
Chloromethane	6.07	0.20	0.50	"	5.00	ND	121	70-130	8.37	30	
2-Chlorotoluene	5.19	0.20	0.50	"	5.00	ND	104	70-130	8.49	30	
4-Chlorotoluene	4.85	0.10	0.50	"	5.00	ND	97.0	70-130	14.5	30	
Dibromochloromethane	4.76	0.50	0.50	"	5.00	ND	95.2	70-130	0.837	30	
1,2-Dibromo-3-chloropropane	4.49	0.36	0.50	"	5.00	ND	89.8	70-130	2.85	25	
1,2-Dibromoethane (EDB)	4.82	0.14	0.50	"	5.00	ND	96.4	70-130	9.30	25	
Dibromomethane	5.04	0.20	0.50	"	5.00	ND	101	70-130	8.18	30	
1,2-Dichlorobenzene	4.59	0.20	0.50	"	5.00	ND	91.8	70-130	7.55	30	
1,3-Dichlorobenzene	5.02	0.20	0.50	"	5.00	ND	100	70-130	8.58	30	
1,4-Dichlorobenzene	4.76	0.10	0.50	"	5.00	ND	95.2	70-130	8.06	30	
trans-1,4-Dichloro-2-butene	5.09	0.095	5.0	"	5.00	ND	102	70-130	8.29	25	
Dichlorodifluoromethane	6.09	0.20	0.50	"	5.00	ND	122	70-130	9.39	30	
1,1-Dichloroethane	5.17	0.10	0.50	"	5.00	ND	103	70-130	8.16	30	
1,2-Dichloroethane	5.08	0.20	0.50	"	5.00	ND	102	70-130	8.12	30	
1,1-Dichloroethene	4.99	0.10	0.30	"	5.00	ND	99.8	70-130	7.34	30	
cis-1,2-Dichloroethene	5.09	0.20	0.50	"	5.00	ND	102	70-130	7.92	30	
trans-1,2-Dichloroethene	4.93	0.20	0.50	"	5.00	ND	98.6	70-130	7.42	30	
1,2-Dichloropropane	4.86	0.20	0.50	"	5.00	ND	97.2	70-130	8.47	30	
1,3-Dichloropropane	5.15	0.20	0.50	"	5.00	ND	103	70-130	5.66	30	
2,2-Dichloropropane	4.28	0.10	0.50	"	5.00	ND	85.6	70-130	6.77	30	
1,1-Dichloropropene	4.75	0.10	0.50	"	5.00	ND	95.0	70-130	7.69	30	
cis-1,3-Dichloropropene	4.62	0.20	0.50	"	5.00	ND	92.4	70-130	4.65	30	
trans-1,3-Dichloropropene	4.22	0.20	0.50	"	5.00	ND	84.4	70-130	6.42	30	
2-Hexanone	5.28	0.097	5.0	"	5.00	ND	106	70-130	6.24	25	
Ethylbenzene	4.83	0.10	0.50	"	5.00	ND	96.6	70-130	9.28	30	
Hexachlorobutadiene	4.48	0.30	0.50	"	5.00	ND	89.6	70-130	7.73	30	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike Dup (AB40725-MSD1)		**Source: 14B0115-02**		Prepared: 02/04/14 Analyzed: 02/06/14							
Isopropylbenzene	5.21	0.20	0.50	ug/l	5.00	ND	104	70-130	9.68	30	
p-Isopropyltoluene	4.91	0.10	0.50	"	5.00	ND	98.2	70-130	13.0	30	
Methyl ethyl ketone	11.8	0.40	1.0	"	10.0	ND	118	70-130	3.89	30	
Methyl iodide	5.13	0.12	2.0	"	5.00	ND	103	70-130	9.82	25	
Methyl isobutyl ketone	9.80	0.30	1.0	"	10.0	ND	98.0	70-130	8.69	30	
Methylene chloride	3.66	0.40	0.50	"	5.00	ND	73.2	70-130	17.0	30	
Naphthalene	4.66	0.20	0.50	"	5.00	ND	93.2	70-130	7.44	30	
n-Propylbenzene	5.17	0.20	0.50	"	5.00	ND	103	70-130	10.4	30	
Styrene	5.04	0.10	0.50	"	5.00	ND	101	70-130	9.27	30	
1,1,1,2-Tetrachloroethane	4.34	0.20	0.50	"	5.00	ND	86.8	70-130	6.25	30	
1,1,2,2-Tetrachloroethane	4.95	0.20	0.50	"	5.00	ND	99.0	70-130	8.14	30	
Tetrachloroethene	4.90	0.20	0.50	"	5.00	ND	98.0	70-130	9.89	30	
Toluene	5.03	0.10	0.50	"	5.00	ND	101	70-130	9.11	30	
1,2,3-Trichlorobenzene	4.89	0.10	0.50	"	5.00	ND	97.8	70-130	3.61	30	
1,2,4-Trichlorobenzene	4.38	0.20	0.50	"	5.00	ND	87.6	70-130	8.52	30	
1,1,1-Trichloroethane	4.75	0.20	0.50	"	5.00	ND	95.0	70-130	7.50	30	
1,1,2-Trichloroethane	5.07	0.20	0.50	"	5.00	ND	101	70-130	7.41	30	
Trichloroethene	4.86	0.20	0.50	"	5.00	ND	97.2	70-130	5.41	30	
Trichlorofluoromethane	4.90	0.20	0.50	"	5.00	ND	98.0	70-130	11.9	30	
Trichlorotrifluoroethane	5.57	0.20	0.50	"	5.00	ND	111	70-130	8.10	30	
1,2,3-Trichloropropane	4.93	0.13	0.50	"	5.00	ND	98.6	70-130	8.17	25	
1,2,4-Trimethylbenzene	5.11	0.10	0.50	"	5.00	ND	102	70-130	8.61	30	
1,3,5-Trimethylbenzene	5.11	0.10	0.50	"	5.00	ND	102	70-130	8.61	30	
Vinyl chloride	5.41	0.10	0.50	"	5.00	ND	108	70-130	12.0	30	
m,p-Xylene	9.99	0.20	0.50	"	10.0	ND	99.9	70-130	9.71	30	
o-Xylene	5.07	0.10	0.50	"	5.00	ND	101	70-130	8.86	30	
Xylenes (total)	15.1	0.20	0.50	"	15.0	ND	100	70-130	9.43	30	
Methyl tert-butyl ether	4.31	0.50	0.50	"	5.00	ND	86.2	70-130	10.8	30	
Ethyl tert-butyl ether	5.09	0.20	0.50	"	5.00	ND	102	70-130	8.11	30	
Tert-amyl methyl ether	4.48	0.20	0.50	"	5.00	ND	89.6	70-130	9.56	30	
Surrogate: Bromofluorobenzene	*25.4*			*"*	*25.0*		*101*	*70-130*			
Surrogate: Dibromofluoromethane	*24.2*			*"*	*25.0*		*97.0*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40725 - VOAs in Water GCMS											
Matrix Spike Dup (AB40725-MSD1)		**Source: 14B0115-02**			Prepared: 02/04/14 Analyzed: 02/06/14						
Surrogate: Toluene-d8	*24.8*			*ug/l*	*25.0*		*99.0*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
Blank (AB40514-BLK1)					Prepared: 02/05/14 Analyzed: 02/11/14						
Aldrin	ND	0.010	0.050	ug/l							U
Chloroneb	ND	0.20	0.50	"							U
Chlorobenzilate	ND	2.0	5.0	"							U
Chlorothalonil	ND	0.030	0.10	"							U
DCPA	ND	0.020	0.040	"							U
4,4´-DDD	ND	0.020	0.050	"							U
4,4´-DDE	ND	0.020	0.050	"							U
4,4´-DDT	ND	0.020	0.020	"							U
Dieldrin	ND	0.010	0.010	"							U
Endosulfan I	ND	0.020	0.050	"							U
Endosulfan II	ND	0.020	0.050	"							U
Endosulfan sulfate	ND	0.020	0.020	"							U
Endrin	ND	0.030	0.10	"							U
Endrin aldehyde	ND	0.020	0.050	"							U
HCH-alpha	ND	0.010	0.050	"							U
HCH-beta	ND	0.020	0.050	"							U
HCH-delta	ND	0.030	0.050	"							U
HCH-gamma (Lindane)	ND	0.010	0.010	"							U
Heptachlor	ND	0.010	0.010	"							U
Heptachlor epoxide	ND	0.010	0.010	"							U
Hexachlorocyclopentadiene	ND	0.040	0.40	"							U
Hexachlorobenzene	ND	0.010	0.040	"							U
Methoxychlor	ND	0.020	0.020	"							U
cis-Permethrin	ND	0.070	0.20	"							U
trans-Permethrin	ND	0.090	0.20	"							U
Propachlor	ND	0.070	0.20	"							U
Trifluralin	ND	0.020	0.040	"							U
PCB-1016	ND	0.030	0.50	"							U
PCB-1221	ND	0.030	0.50	"							U
PCB-1232	ND	0.030	0.50	"							U
PCB-1242	ND	0.030	0.50	"							U
PCB-1248	ND	0.030	0.50	"							U

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
Blank (AB40514-BLK1)					Prepared: 02/05/14 Analyzed: 02/11/14						
PCB-1254	ND	0.030	0.50	ug/l							U
PCB-1260	ND	0.030	0.50	"							U
Total PCBs	ND	0.30	0.50	"							U
Toxaphene	ND	0.40	0.50	"							U
Chlordane (tech)	ND	0.030	0.050	"							U
Surrogate: Dibutylchlorendate	*1.05*			*"*	*0.952*		*110*	*70-130*			
LCS (AB40514-BS1)					Prepared: 02/05/14 Analyzed: 02/11/14						
Aldrin	0.263	0.010	0.050	ug/l	0.280		94.1	70-130			
Chloroneb	2.73	0.20	0.50	"	2.80		97.5	70-130			
Chlorobenzilate	3.29	2.0	5.0	"	2.80		117	70-130			J
Chlorothalonil	0.313	0.030	0.10	"	0.280		112	70-130			
DCPA	0.289	0.020	0.040	"	0.280		103	70-130			
4,4´-DDD	0.203	0.020	0.050	"	0.280		72.3	70-130			
4,4´-DDE	0.279	0.020	0.050	"	0.280		99.6	70-130			
4,4´-DDT	0.290	0.020	0.020	"	0.280		104	70-130			
Dieldrin	0.283	0.010	0.010	"	0.280		101	70-130			
Endosulfan I	0.285	0.020	0.050	"	0.280		102	70-130			
Endosulfan II	0.277	0.020	0.050	"	0.280		98.9	70-130			
Endosulfan sulfate	0.306	0.020	0.020	"	0.280		109	70-130			
Endrin	0.319	0.030	0.10	"	0.280		114	70-130			
Endrin aldehyde	0.267	0.020	0.050	"	0.280		95.3	70-130			
HCH-alpha	0.269	0.010	0.050	"	0.280		96.1	70-130			
HCH-beta	0.279	0.020	0.050	"	0.280		99.7	70-130			
HCH-delta	0.286	0.030	0.050	"	0.280		102	70-130			
HCH-gamma (Lindane)	0.273	0.010	0.010	"	0.280		97.7	70-130			
Heptachlor	0.273	0.010	0.010	"	0.280		97.6	70-130			
Heptachlor epoxide	0.279	0.010	0.010	"	0.280		99.5	70-130			
Hexachlorobenzene	0.237	0.010	0.040	"	0.280		84.7	70-130			
Hexachlorocyclopentadiene	0.409	0.040	0.40	"	0.560		73.1	15-90			
Methoxychlor	0.301	0.020	0.020	"	0.280		107	70-130			
cis-Permethrin	1.59	0.070	0.20	"	1.40		114	70-130			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
LCS (AB40514-BS1)					Prepared: 02/05/14 Analyzed: 02/11/14						
trans-Permethrin	1.60	0.090	0.20	ug/l	1.40		114	70-130			
Propachlor	0.306	0.070	0.20	"	0.280		109	70-130			
Trifluralin	0.416	0.020	0.040	"	0.420		99.0	70-130			
Surrogate: Dibutylchlorendate	*1.05*			*"*	*0.952*		*110*	*70-130*			
LCS Dup (AB40514-BSD1)					Prepared: 02/05/14 Analyzed: 02/11/14						
Aldrin	0.276	0.010	0.050	ug/l	0.280		98.7	70-130	4.77	25	
Chloroneb	2.84	0.20	0.50	"	2.80		101	70-130	3.76	25	
Chlorobenzilate	3.51	2.0	5.0	"	2.80		125	70-130	6.58	25	J
Chlorothalonil	0.334	0.030	0.10	"	0.280		119	70-130	6.41	25	
DCPA	0.304	0.020	0.040	"	0.280		109	70-130	5.05	25	
4,4´-DDD	0.208	0.020	0.050	"	0.280		74.3	70-130	2.71	25	
4,4´-DDE	0.299	0.020	0.050	"	0.280		107	70-130	7.17	25	
4,4´-DDT	0.307	0.020	0.020	"	0.280		109	70-130	5.49	25	
Dieldrin	0.301	0.010	0.010	"	0.280		108	70-130	6.30	25	
Endosulfan I	0.300	0.020	0.050	"	0.280		107	70-130	5.34	25	
Endosulfan II	0.287	0.020	0.050	"	0.280		103	70-130	3.69	25	
Endosulfan sulfate	0.324	0.020	0.020	"	0.280		116	70-130	5.53	25	
Endrin	0.336	0.030	0.10	"	0.280		120	70-130	5.28	25	
Endrin aldehyde	0.309	0.020	0.050	"	0.280		110	70-130	14.8	25	
HCH-alpha	0.280	0.010	0.050	"	0.280		99.9	70-130	3.84	25	
HCH-beta	0.294	0.020	0.050	"	0.280		105	70-130	5.16	25	
HCH-delta	0.303	0.030	0.050	"	0.280		108	70-130	5.61	25	
HCH-gamma (Lindane)	0.286	0.010	0.010	"	0.280		102	70-130	4.33	25	
Heptachlor	0.282	0.010	0.010	"	0.280		101	70-130	3.11	25	
Heptachlor epoxide	0.289	0.010	0.010	"	0.280		103	70-130	3.81	25	
Hexachlorobenzene	0.243	0.010	0.040	"	0.280		86.8	70-130	2.40	25	
Hexachlorocyclopentadiene	0.434	0.040	0.40	"	0.560		77.6	15-90	5.97	50	
Methoxychlor	0.326	0.020	0.020	"	0.280		116	70-130	8.17	25	
cis-Permethrin	1.62	0.070	0.20	"	1.40		116	70-130	1.95	25	
trans-Permethrin	1.67	0.090	0.20	"	1.40		119	70-130	4.72	25	
Propachlor	0.334	0.070	0.20	"	0.280		119	70-130	8.68	25	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
LCS Dup (AB40514-BSD1)					Prepared: 02/05/14 Analyzed: 02/11/14						
Trifluralin	0.437	0.020	0.040	ug/l	0.420		104	70-130	5.02	25	
Surrogate: Dibutylchlorendate	*1.07*			*"*	*0.952*		*112*	*70-130*			
Matrix Spike (AB40514-MS1)		**Source: 14A1713-01**			Prepared: 02/05/14 Analyzed: 02/12/14						
Aldrin	0.269	0.010	0.050	ug/l	0.280	ND	96.0	70-130			
Chloroneb	2.86	0.20	0.50	"	2.80	ND	102	70-130			
Chlorobenzilate	3.57	2.0	5.0	"	2.80	ND	127	70-130			J
Chlorothalonil	0.329	0.030	0.10	"	0.280	ND	117	70-130			
DCPA	0.303	0.020	0.040	"	0.280	ND	108	70-130			
4,4´-DDD	0.212	0.020	0.050	"	0.280	ND	75.7	70-130			
4,4´-DDE	0.288	0.020	0.050	"	0.280	ND	103	70-130			
4,4´-DDT	0.300	0.020	0.020	"	0.280	ND	107	70-130			
Dieldrin	0.295	0.010	0.010	"	0.280	ND	105	70-130			
Endosulfan I	0.298	0.020	0.050	"	0.280	ND	106	70-130			
Endosulfan II	0.298	0.020	0.050	"	0.280	ND	106	70-130			
Endosulfan sulfate	0.318	0.020	0.020	"	0.280	ND	113	70-130			
Endrin	0.354	0.030	0.10	"	0.280	ND	126	70-130			
Endrin aldehyde	0.299	0.020	0.050	"	0.280	ND	107	70-130			
HCH-alpha	0.285	0.010	0.050	"	0.280	ND	102	70-130			
HCH-beta	0.290	0.020	0.050	"	0.280	ND	104	70-130			
HCH-delta	0.300	0.030	0.050	"	0.280	ND	107	70-130			
HCH-gamma (Lindane)	0.291	0.010	0.010	"	0.280	ND	104	70-130			
Heptachlor	0.280	0.010	0.010	"	0.280	ND	100	70-130			
Heptachlor epoxide	0.286	0.010	0.010	"	0.280	ND	102	70-130			
Hexachlorobenzene	0.255	0.010	0.040	"	0.280	ND	91.0	70-130			
Hexachlorocyclopentadiene	0.486	0.040	0.40	"	0.560	ND	86.7	15-90			
Methoxychlor	0.323	0.020	0.020	"	0.280	ND	116	70-130			
cis-Permethrin	1.78	0.070	0.20	"	1.40	ND	127	70-130			
trans-Permethrin	1.78	0.090	0.20	"	1.40	ND	127	70-130			
Propachlor	0.336	0.070	0.20	"	0.280	ND	120	70-130			
Trifluralin	0.436	0.020	0.040	"	0.420	ND	104	70-130			
Surrogate: Dibutylchlorendate	*1.09*			*"*	*0.952*		*115*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40514 - SVOAs in Water GC											
Matrix Spike Dup (AB40514-MSD1)		**Source: 14A1713-01**		Prepared: 02/05/14 Analyzed: 02/12/14							
Aldrin	0.260	0.010	0.050	ug/l	0.280	ND	92.8	70-130	3.40	25	
Chloroneb	2.76	0.20	0.50	"	2.80	ND	98.6	70-130	3.61	25	
Chlorobenzilate	3.40	2.0	5.0	"	2.80	ND	121	70-130	4.87	25	J
Chlorothalonil	0.313	0.030	0.10	"	0.280	ND	112	70-130	4.86	25	
DCPA	0.290	0.020	0.040	"	0.280	ND	103	70-130	4.52	25	
4,4´-DDD	0.210	0.020	0.050	"	0.280	ND	74.9	70-130	1.06	25	
4,4´-DDE	0.275	0.020	0.050	"	0.280	ND	98.1	70-130	4.80	25	
4,4´-DDT	0.289	0.020	0.020	"	0.280	ND	103	70-130	3.94	25	
Dieldrin	0.283	0.010	0.010	"	0.280	ND	101	70-130	4.34	25	
Endosulfan I	0.285	0.020	0.050	"	0.280	ND	102	70-130	4.19	25	
Endosulfan II	0.288	0.020	0.050	"	0.280	ND	103	70-130	3.14	25	
Endosulfan sulfate	0.302	0.020	0.020	"	0.280	ND	108	70-130	5.03	25	
Endrin	0.320	0.030	0.10	"	0.280	ND	114	70-130	10.1	25	
Endrin aldehyde	0.275	0.020	0.050	"	0.280	ND	98.2	70-130	8.56	25	
HCH-alpha	0.271	0.010	0.050	"	0.280	ND	96.8	70-130	4.94	25	
HCH-beta	0.282	0.020	0.050	"	0.280	ND	101	70-130	2.62	25	
HCH-delta	0.290	0.030	0.050	"	0.280	ND	104	70-130	3.17	25	
HCH-gamma (Lindane)	0.279	0.010	0.010	"	0.280	ND	99.5	70-130	4.43	25	
Heptachlor	0.267	0.010	0.010	"	0.280	ND	95.4	70-130	4.78	25	
Heptachlor epoxide	0.277	0.010	0.010	"	0.280	ND	99.0	70-130	3.09	25	
Hexachlorobenzene	0.238	0.010	0.040	"	0.280	ND	85.1	70-130	6.62	25	
Hexachlorocyclopentadiene	0.433	0.040	0.40	"	0.560	ND	77.3	15-90	11.5	50	
Methoxychlor	0.309	0.020	0.020	"	0.280	ND	110	70-130	4.66	25	
cis-Permethrin	1.72	0.070	0.20	"	1.40	ND	123	70-130	3.19	25	
trans-Permethrin	1.68	0.090	0.20	"	1.40	ND	120	70-130	5.53	25	
Propachlor	0.320	0.070	0.20	"	0.280	ND	114	70-130	4.81	25	
Trifluralin	0.420	0.020	0.040	"	0.420	ND	100	70-130	3.78	25	
Surrogate: Dibutylchlorendate	*1.03*			*"*	*0.952*		*108*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40730 - SVOAs in Water GC											
Blank (AB40730-BLK1)					Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	ND	0.50	0.50	ug/l							U
Atrazine	ND	0.30	0.50	"							U
Bromacil	ND	0.50	5.0	"							U
Butachlor	ND	0.40	0.50	"							U
Dimethoate	ND	0.20	1.0	"							U
Metolachlor	ND	0.30	0.50	"							U
Metribuzin	ND	0.40	0.50	"							U
Molinate	ND	0.20	0.50	"							U
Prometryn	ND	0.50	0.50	"							U
Propachlor	ND	0.30	0.50	"							U
Simazine	ND	0.30	0.50	"							U
Thiobencarb	ND	0.20	1.0	"							U
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.69*			*"*	*2.00*		*84.3*	*70-130*			
LCS (AB40730-BS1)					Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	1.88	0.50	0.50	ug/l	2.00		94.2	62-128			
Atrazine	1.92	0.30	0.50	"	2.00		96.1	62-122			
Bromacil	1.94	0.50	5.0	"	2.00		96.9	61-121			J
Butachlor	1.99	0.40	0.50	"	2.00		99.3	66-126			
Dimethoate	1.97	0.20	1.0	"	2.00		98.3	67-127			
Metolachlor	1.93	0.30	0.50	"	2.00		96.6	63-123			
Metribuzin	1.91	0.40	0.50	"	2.00		95.4	71-131			
Molinate	1.95	0.20	0.50	"	2.00		97.4	44-137			
Prometryn	1.95	0.50	0.50	"	2.00		97.6	63-123			
Propachlor	1.95	0.30	0.50	"	2.00		97.3	66-126			
Simazine	1.94	0.30	0.50	"	2.00		96.9	70-130			
Thiobencarb	2.01	0.20	1.0	"	2.00		100	69-129			
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.80*			*"*	*2.00*		*89.8*	*70-130*			

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Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40730 - SVOAs in Water GC											
LCS Dup (AB40730-BSD1)					Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	2.02	0.50	0.50	ug/l	2.00		101	62-128	6.95	30	
Atrazine	2.01	0.30	0.50	"	2.00		100	62-122	4.47	30	
Bromacil	2.14	0.50	5.0	"	2.00		107	61-121	10.0	30	J
Butachlor	2.09	0.40	0.50	"	2.00		105	66-126	5.23	30	
Dimethoate	2.17	0.20	1.0	"	2.00		108	67-127	9.82	30	
Metolachlor	2.02	0.30	0.50	"	2.00		101	63-123	4.37	30	
Metribuzin	2.04	0.40	0.50	"	2.00		102	71-131	6.92	30	
Molinate	1.94	0.20	0.50	"	2.00		96.8	44-137	0.569	30	
Prometryn	2.07	0.50	0.50	"	2.00		103	63-123	5.75	30	
Propachlor	2.00	0.30	0.50	"	2.00		100	66-126	2.80	30	
Simazine	2.09	0.30	0.50	"	2.00		105	70-130	7.61	30	
Thiobencarb	2.19	0.20	1.0	"	2.00		109	69-129	8.57	30	
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.85*			*"*	*2.00*		*92.6*	*70-130*			
Matrix Spike (AB40730-MS1)		**Source: 14A1588-01**			Prepared: 02/08/14 Analyzed: 02/11/14						
Alachlor	1.81	0.50	0.50	ug/l	2.00	ND	90.7	62-128			
Atrazine	1.79	0.30	0.50	"	2.00	ND	89.7	62-122			
Bromacil	1.75	0.50	5.0	"	2.00	ND	87.5	61-121			J
Butachlor	1.85	0.40	0.50	"	2.00	ND	92.6	66-126			
Dimethoate	1.70	0.20	1.0	"	2.00	ND	84.9	67-127			
Metolachlor	1.82	0.30	0.50	"	2.00	ND	91.2	63-123			
Metribuzin	1.78	0.40	0.50	"	2.00	ND	89.2	71-131			
Molinate	1.87	0.20	0.50	"	2.00	ND	93.4	44-137			
Prometryn	1.68	0.50	0.50	"	2.00	ND	83.9	63-123			
Propachlor	1.93	0.30	0.50	"	2.00	ND	96.6	66-126			
Simazine	1.85	0.30	0.50	"	2.00	ND	92.5	70-130			
Thiobencarb	1.90	0.20	1.0	"	2.00	ND	95.2	69-129			
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.51*			*"*	*2.00*		*75.3*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40730 - SVOAs in Water GC											
Matrix Spike Dup (AB40730-MSD1)		**Source: 14A1588-01**		Prepared: 02/08/14 Analyzed: 02/11/14							
Alachlor	1.91	0.50	0.50	ug/l	2.00	ND	95.3	62-128	4.97	30	
Atrazine	1.96	0.30	0.50	"	2.00	ND	98.2	62-122	9.04	30	
Bromacil	2.13	0.50	5.0	"	2.00	ND	107	61-121	19.7	30	J
Butachlor	2.02	0.40	0.50	"	2.00	ND	101	66-126	8.67	30	
Dimethoate	2.14	0.20	1.0	"	2.00	ND	107	67-127	23.0	30	
Metolachlor	1.96	0.30	0.50	"	2.00	ND	97.9	63-123	7.12	30	
Metribuzin	2.02	0.40	0.50	"	2.00	ND	101	71-131	12.3	30	
Molinate	1.79	0.20	0.50	"	2.00	ND	89.6	44-137	4.16	30	
Prometryn	2.02	0.50	0.50	"	2.00	ND	101	63-123	18.4	30	
Propachlor	1.93	0.30	0.50	"	2.00	ND	96.4	66-126	0.171	30	
Simazine	2.07	0.30	0.50	"	2.00	ND	104	70-130	11.3	30	
Thiobencarb	1.96	0.20	1.0	"	2.00	ND	97.8	69-129	2.64	30	
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*1.60*			*"*	*2.00*		*79.9*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Organic Analytes by EPA Method 504.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40703 - EPA 504.1											
Blank (AB40703-BLK1)					Prepared & Analyzed: 02/07/14						
1,2-Dibromo-3-chloropropane	ND	0.0040	0.010	ug/l							U
1,2-Dibromoethane (EDB)	ND	0.0050	0.020	"							U
LCS (AB40703-BS1)					Prepared & Analyzed: 02/07/14						
1,2-Dibromo-3-chloropropane	0.299	0.0040	0.010	ug/l	0.250		119	70-130			
1,2-Dibromoethane (EDB)	0.279	0.0050	0.020	"	0.250		112	70-130			
LCS Dup (AB40703-BSD1)					Prepared & Analyzed: 02/07/14						
1,2-Dibromo-3-chloropropane	0.314	0.0040	0.010	ug/l	0.250		126	70-130	5.15	25	
1,2-Dibromoethane (EDB)	0.292	0.0050	0.020	"	0.250		117	70-130	4.42	25	
Matrix Spike (AB40703-MS1)		**Source: 14B0336-01**			Prepared & Analyzed: 02/07/14						
1,2-Dibromo-3-chloropropane	0.381	0.0040	0.010	ug/l	0.250	0.111	108	70-130			
1,2-Dibromoethane (EDB)	0.265	0.0050	0.020	"	0.250	ND	106	70-130			
Matrix Spike Dup (AB40703-MSD1)		**Source: 14B0336-01**			Prepared & Analyzed: 02/07/14						
1,2-Dibromo-3-chloropropane	0.357	0.0040	0.010	ug/l	0.250	0.111	98.0	70-130	6.77	25	
1,2-Dibromoethane (EDB)	0.235	0.0050	0.020	"	0.250	ND	94.0	70-130	12.0	25	

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Chlorinated Acids by EPA Method 515.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41155 - EPA 515.1											
Blank (AB41155-BLK1)					Prepared: 02/12/14 Analyzed: 02/14/14						
Acifluorfen	ND	0.50	1.0	ug/l							U
Bentazon	ND	0.40	0.40	"							U
2,4-D	ND	0.80	1.0	"							U
Dalapon	ND	6.0	6.0	"							U
2,4-DB	ND	4.0	5.0	"							U
Dicamba	ND	0.40	0.40	"							U
Dichlorprop	ND	1.0	1.0	"							U
Dinoseb	ND	0.80	1.0	"							U
4-Nitrophenol	ND	0.70	1.0	"							U
Pentachlorophenol	ND	0.20	0.20	"							U
Picloram	ND	0.50	1.0	"							U
2,4,5-T	ND	0.40	0.50	"							U
2,4,5-TP (Silvex)	ND	0.50	0.50	"							U
Surrogate: DCAA	*13.8*			*"*	*14.2*		*97.0*	*70-130*			
LCS (AB41155-BS1)					Prepared: 02/12/14 Analyzed: 02/14/14						
Acifluorfen	0.895	0.50	1.0	ug/l	0.960		93.2	70-130			J
Bentazon	1.68	0.40	0.40	"	1.92		87.7	70-130			
2,4-D	1.62	0.80	1.0	"	1.92		84.5	48-124			
Dalapon	10.9	6.0	6.0	"	12.5		87.5	40-112			
2,4-DB	7.43	4.0	5.0	"	7.68		96.8	54-123			
Dicamba	0.861	0.40	0.40	"	0.960		89.7	70-130			
Dichlorprop	2.88	1.0	1.0	"	2.88		100	54-106			
Dinoseb	5.06	0.80	1.0	"	6.42		78.7	20-105			
4-Nitrophenol	0.759	0.70	1.0	"	0.960		79.0	60-202			J
Pentachlorophenol	0.816	0.20	0.20	"	0.960		85.0	70-130			
Picloram	0.929	0.50	1.0	"	0.960		96.7	70-130			J
2,4,5-T	0.918	0.40	0.50	"	0.960		95.6	68-166			
2,4,5-TP (Silvex)	0.969	0.50	0.50	"	0.960		101	70-130			
Surrogate: DCAA	*14.7*			*"*	*14.2*		*103*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Chlorinated Acids by EPA Method 515.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41155 - EPA 515.1											
LCS Dup (AB41155-BSD1)					Prepared: 02/12/14 Analyzed: 02/14/14						
Acifluorfen	0.947	0.50	1.0	ug/l	0.960		98.7	70-130	5.68	50	J
Bentazon	1.74	0.40	0.40	"	1.92		90.5	70-130	3.16	50	
2,4-D	1.34	0.80	1.0	"	1.92		69.7	48-124	19.2	50	
Dalapon	10.6	6.0	6.0	"	12.5		85.2	40-112	2.63	50	
2,4-DB	7.11	4.0	5.0	"	7.68		92.6	54-123	4.37	50	
Dicamba	0.872	0.40	0.40	"	0.960		90.8	70-130	1.23	50	
Dichlorprop	2.46	1.0	1.0	"	2.88		85.2	54-106	15.9	50	
Dinoseb	5.84	0.80	1.0	"	6.42		90.9	20-105	14.4	50	
4-Nitrophenol	0.982	0.70	1.0	"	0.960		102	60-202	25.6	50	J
Pentachlorophenol	0.871	0.20	0.20	"	0.960		90.7	70-130	6.49	50	
Picloram	0.976	0.50	1.0	"	0.960		102	70-130	4.94	50	J
2,4,5-T	0.681	0.40	0.50	"	0.960		70.9	68-166	29.7	50	
2,4,5-TP (Silvex)	0.783	0.50	0.50	"	0.960		81.5	70-130	21.3	50	
Surrogate: DCAA	*13.7*			*"*	*14.2*		*96.4*	*70-130*			
Matrix Spike (AB41155-MS1)		**Source: 14B0093-01**			Prepared: 02/12/14 Analyzed: 02/15/14						
Acifluorfen	0.842	0.50	1.0	ug/l	0.960	ND	87.7	70-130			J
Bentazon	1.55	0.40	0.40	"	1.92	ND	80.9	70-130			
2,4-D	1.44	0.80	1.0	"	1.92	ND	75.1	48-124			
Dalapon	11.9	6.0	6.0	"	12.5	ND	95.4	40-112			
2,4-DB	5.89	4.0	5.0	"	7.68	ND	76.7	54-123			
Dicamba	0.889	0.40	0.40	"	0.960	ND	92.6	70-130			
Dichlorprop	2.46	1.0	1.0	"	2.88	ND	85.2	54-106			
Dinoseb	4.86	0.80	1.0	"	6.42	ND	75.7	20-105			
4-Nitrophenol	1.02	0.70	1.0	"	0.960	ND	107	60-202			
Pentachlorophenol	0.822	0.20	0.20	"	0.960	ND	85.6	70-130			
Picloram	0.865	0.50	1.0	"	0.960	ND	90.1	70-130			J
2,4,5-T	0.730	0.40	0.50	"	0.960	ND	76.0	68-166			
2,4,5-TP (Silvex)	0.805	0.50	0.50	"	0.960	ND	83.9	70-130			
Surrogate: DCAA	*12.7*			*"*	*14.2*		*89.6*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Chlorinated Acids by EPA Method 515.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41155 - EPA 515.1											
Matrix Spike Dup (AB41155-MSD1)		**Source: 14B0093-01**		Prepared: 02/12/14 Analyzed: 02/15/14							
Acifluorfen	0.798	0.50	1.0	ug/l	0.960	ND	83.2	70-130	5.34	50	J
Bentazon	1.71	0.40	0.40	"	1.92	ND	89.0	70-130	9.58	50	
2,4-D	1.27	0.80	1.0	"	1.92	ND	66.0	48-124	12.8	50	
Dalapon	11.2	6.0	6.0	"	12.5	ND	89.6	40-112	6.23	50	
2,4-DB	5.76	4.0	5.0	"	7.68	ND	75.0	54-123	2.16	50	
Dicamba	0.837	0.40	0.40	"	0.960	ND	87.2	70-130	6.01	50	
Dichlorprop	2.39	1.0	1.0	"	2.88	ND	83.0	54-106	2.62	50	
Dinoseb	4.47	0.80	1.0	"	6.42	ND	69.6	20-105	8.43	50	
4-Nitrophenol	1.42	0.70	1.0	"	0.960	ND	148	60-202	32.4	50	
Pentachlorophenol	0.808	0.20	0.20	"	0.960	ND	84.2	70-130	1.62	50	
Picloram	0.847	0.50	1.0	"	0.960	ND	88.2	70-130	2.10	50	J
2,4,5-T	0.628	0.40	0.50	"	0.960	ND	65.5	68-166	14.9	50	QM-07
2,4,5-TP (Silvex)	0.725	0.50	0.50	"	0.960	ND	75.5	70-130	10.5	50	
Surrogate: DCAA	*12.5*			*"*	*14.2*		*88.2*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Carbamates by EPA Method 531.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41142 - HPLC											
Blank (AB41142-BLK1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	ND	0.70	3.0	ug/l							U
Aldicarb sulfone	ND	0.70	4.0	"							U
Aldicarb sulfoxide	ND	0.80	3.0	"							U
Carbaryl	ND	0.70	5.0	"							U
Carbofuran	ND	2.0	5.0	"							U
3-Hydroxycarbofuran	ND	0.90	3.0	"							U
Methiocarb	ND	2.0	5.0	"							U
Methomyl	ND	2.0	2.0	"							U
Oxamyl	ND	0.80	20	"							U
Propoxur	ND	2.0	5.0	"							U
LCS (AB41142-BS1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	20.0	0.70	3.0	ug/l	20.0		99.9	80-120			
Aldicarb sulfone	20.1	0.70	4.0	"	19.0		106	80-120			
Aldicarb sulfoxide	19.2	0.80	3.0	"	19.8		97.0	80-120			
Carbaryl	20.4	0.70	5.0	"	20.0		102	80-120			
Carbofuran	19.5	2.0	5.0	"	20.0		97.7	80-120			
3-Hydroxycarbofuran	20.7	0.90	3.0	"	20.0		103	80-120			
Methiocarb	18.6	2.0	5.0	"	20.0		93.2	80-120			
Methomyl	21.1	2.0	2.0	"	20.0		105	80-120			
Oxamyl	20.5	0.80	20	"	20.0		102	80-120			
Propoxur	20.2	2.0	5.0	"	20.0		101	80-120			
LCS Dup (AB41142-BSD1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	19.3	0.70	3.0	ug/l	20.0		96.6	80-120	3.34	20	
Aldicarb sulfone	19.3	0.70	4.0	"	19.0		102	80-120	3.93	20	
Aldicarb sulfoxide	18.6	0.80	3.0	"	19.8		93.7	80-120	3.45	20	
Carbaryl	18.8	0.70	5.0	"	20.0		94.1	80-120	8.11	20	
Carbofuran	19.4	2.0	5.0	"	20.0		97.1	80-120	0.645	20	
3-Hydroxycarbofuran	19.0	0.90	3.0	"	20.0		95.1	80-120	8.35	20	
Methiocarb	19.1	2.0	5.0	"	20.0		95.7	80-120	2.65	20	
Methomyl	19.5	2.0	2.0	"	20.0		97.7	80-120	7.69	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Carbamates by EPA Method 531.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41142 - HPLC											
LCS Dup (AB41142-BSD1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Oxamyl	19.2	0.80	20	ug/l	20.0		95.8	80-120	6.62	20	J
Propoxur	19.0	2.0	5.0	"	20.0		94.8	80-120	6.54	20	
Matrix Spike (AB41142-MS1)		**Source: 14B0426-01**			Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	18.7	0.70	3.0	ug/l	20.0	ND	93.3	80-120			
Aldicarb sulfone	20.1	0.70	4.0	"	19.0	ND	106	80-120			
Aldicarb sulfoxide	20.1	0.80	3.0	"	19.8	ND	102	80-120			
Carbaryl	20.0	0.70	5.0	"	20.0	ND	99.8	80-120			
Carbofuran	19.3	2.0	5.0	"	20.0	ND	96.6	80-120			
3-Hydroxycarbofuran	20.7	0.90	3.0	"	20.0	ND	103	80-120			
Methiocarb	18.2	2.0	5.0	"	20.0	ND	91.2	80-120			
Methomyl	21.0	2.0	2.0	"	20.0	ND	105	80-120			
Oxamyl	20.3	0.80	20	"	20.0	ND	102	80-120			
Propoxur	19.2	2.0	5.0	"	20.0	ND	95.9	80-120			
Matrix Spike Dup (AB41142-MSD1)		**Source: 14B0426-01**			Prepared: 02/11/14 Analyzed: 02/12/14						
Aldicarb	17.4	0.70	3.0	ug/l	20.0	ND	87.1	80-120	6.84	20	
Aldicarb sulfone	19.0	0.70	4.0	"	19.0	ND	100	80-120	5.57	20	
Aldicarb sulfoxide	18.8	0.80	3.0	"	19.8	ND	94.8	80-120	6.85	20	
Carbaryl	19.4	0.70	5.0	"	20.0	ND	97.1	80-120	2.76	20	
Carbofuran	19.4	2.0	5.0	"	20.0	ND	96.9	80-120	0.339	20	
3-Hydroxycarbofuran	19.8	0.90	3.0	"	20.0	ND	98.9	80-120	4.29	20	
Methiocarb	18.9	2.0	5.0	"	20.0	ND	94.6	80-120	3.68	20	
Methomyl	20.6	2.0	2.0	"	20.0	ND	103	80-120	1.83	20	
Oxamyl	19.2	0.80	20	"	20.0	ND	95.8	80-120	5.89	20	J
Propoxur	19.5	2.0	5.0	"	20.0	ND	97.3	80-120	1.47	20	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Endothall by EPA Method 548.1 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40801 - EPA 548.1											
Blank (AB40801-BLK1)					Prepared: 02/10/14 Analyzed: 02/11/14						
Endothall	ND	2.0	45	ug/l							U
LCS (AB40801-BS1)					Prepared: 02/10/14 Analyzed: 02/11/14						
Endothall	201	2.0	45	ug/l	200		100	80-120			
LCS Dup (AB40801-BSD1)					Prepared: 02/10/14 Analyzed: 02/11/14						
Endothall	204	2.0	45	ug/l	200		102	80-120	1.53	30	
Matrix Spike (AB40801-MS1)		**Source: 14B0089-01**			Prepared: 02/10/14 Analyzed: 02/11/14						
Endothall	190	2.0	45	ug/l	200	ND	94.8	80-120			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Glyphosate by EPA Method 547 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40427 - HPLC											
Blank (AB40427-BLK1)					Prepared & Analyzed: 02/04/14						
Glyphosate	ND	3.0	10	ug/l							U
LCS (AB40427-BS1)					Prepared & Analyzed: 02/04/14						
Glyphosate	111	3.0	10	ug/l	120		92.7	66-126			
LCS Dup (AB40427-BSD1)					Prepared & Analyzed: 02/04/14						
Glyphosate	112	3.0	10	ug/l	120		93.7	66-126	1.08	30	
Matrix Spike (AB40427-MS1)		**Source: 14B0093-01**			Prepared: 02/04/14 Analyzed: 02/05/14						
Glyphosate	111	3.0	10	ug/l	120	ND	92.7	66-126			
Matrix Spike Dup (AB40427-MSD1)		**Source: 14B0093-01**			Prepared: 02/04/14 Analyzed: 02/05/14						
Glyphosate	110	3.0	10	ug/l	120	ND	92.0	66-126	0.801	30	

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Diquat by EPA Method 549.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40717 - HPLC											
Blank (AB40717-BLK1)					Prepared: 02/07/14 Analyzed: 02/10/14						
Diquat	ND	2.0	2.0	ug/l							U
LCS (AB40717-BS1)					Prepared: 02/07/14 Analyzed: 02/11/14						
Diquat	17.4	2.0	2.0	ug/l	19.8		87.8	70-130			
LCS Dup (AB40717-BSD1)					Prepared: 02/07/14 Analyzed: 02/11/14						
Diquat	18.0	2.0	2.0	ug/l	19.8		90.5	70-130	3.10	25	
Matrix Spike (AB40717-MS1)		**Source: 14B0426-01**			Prepared: 02/07/14 Analyzed: 02/11/14						
Diquat	19.8	2.0	2.0	ug/l	19.8	ND	99.9	70-130			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Haloacetic Acids by EPA Method 552.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41050 - EPA 552.2											
Blank (AB41050-BLK1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Monobromoacetic Acid	ND	0.8	1.0	ug/l							U
Monochloroacetic Acid	ND	1.1	2.0	"							U
Dibromoacetic Acid	ND	0.8	1.0	"							U
Dichloroacetic Acid	ND	1.0	1.0	"							U
Trichloroacetic Acid	ND	1.0	1.0	"							U
Total Haloacetic Acids (HAA5)	ND	1.0	1.0	"							U
Surrogate: 2,3-Dibromopropionic Acid	*9.59*			*"*	*10.0*		*95.9*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*11.7*			*"*	*10.0*		*117*	*70-130*			
LCS (AB41050-BS1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Monobromoacetic Acid	25.5	0.8	1.0	ug/l	25.0		102	70-130			
Monochloroacetic Acid	26.9	1.1	2.0	"	25.0		107	70-130			
Dibromoacetic Acid	26.8	0.8	1.0	"	25.0		107	70-130			
Dichloroacetic Acid	26.0	1.0	1.0	"	25.0		104	70-130			
Trichloroacetic Acid	26.6	1.0	1.0	"	25.0		106	70-130			
Surrogate: 2,3-Dibromopropionic Acid	*11.0*			*"*	*10.0*		*110*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*10.1*			*"*	*10.0*		*101*	*70-130*			
MRL Check (AB41050-MRL1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Monobromoacetic Acid	1.07	0.8	1.0	ug/l	1.00		107	0-200			
Monochloroacetic Acid	ND	1.1	2.0	"	1.00			0-200			U
Dibromoacetic Acid	1.37	0.8	1.0	"	1.00		137	0-200			
Dichloroacetic Acid	ND	1.0	1.0	"	1.00			0-200			U
Trichloroacetic Acid	1.05	1.0	1.0	"	1.00		105	0-200			
Surrogate: 2,3-Dibromopropionic Acid	*1.40*			*"*	*1.00*		*140*	*0-200*			
Surrogate: 2-Bromopropionic Acid	*1.14*			*"*	*1.00*		*114*	*0-200*			
Matrix Spike (AB41050-MS1)		**Source: 14A1713-01**			Prepared: 02/11/14 Analyzed: 02/13/14						
Monobromoacetic Acid	24.9	0.8	1.0	ug/l	25.0	ND	99.7	70-130			
Monochloroacetic Acid	26.6	1.1	2.0	"	25.0	ND	106	70-130			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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e-mail: clientservices@alpha-labs.com
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Satellite Laboratory: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309

Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Dr. Bill Motzer Project: Groundwater Reuse Project Project Number: 60408	Reported: 02/18/14 14:08

Haloacetic Acids by EPA Method 552.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB41050 - EPA 552.2											
Matrix Spike (AB41050-MS1)		**Source: 14A1713-01**			Prepared: 02/11/14 Analyzed: 02/13/14						
Dibromoacetic Acid	32.2	0.8	1.0	ug/l	25.0	ND	129	70-130			
Dichloroacetic Acid	25.1	1.0	1.0	"	25.0	ND	100	70-130			
Trichloroacetic Acid	29.9	1.0	1.0	"	25.0	ND	120	70-130			
Surrogate: 2,3-Dibromopropionic Acid	*12.1*			*"*	*10.0*		*121*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*9.42*			*"*	*10.0*		*94.2*	*70-130*			
Matrix Spike (AB41050-MS2)		**Source: 14B0089-01**			Prepared: 02/11/14 Analyzed: 02/13/14						
Monobromoacetic Acid	24.4	0.8	1.0	ug/l	25.0	ND	97.6	70-130			
Monochloroacetic Acid	25.3	1.1	2.0	"	25.0	ND	101	70-130			
Dibromoacetic Acid	31.9	0.8	1.0	"	25.0	ND	128	70-130			
Dichloroacetic Acid	24.0	1.0	1.0	"	25.0	ND	96.0	70-130			
Trichloroacetic Acid	31.1	1.0	1.0	"	25.0	ND	124	70-130			
Surrogate: 2,3-Dibromopropionic Acid	*13.9*			*"*	*10.0*		*139*	*70-130*			*S-GC*
Surrogate: 2-Bromopropionic Acid	*10.9*			*"*	*10.0*		*109*	*70-130*			
Reference (AB41050-SRM1)					Prepared: 02/11/14 Analyzed: 02/12/14						
Monobromoacetic Acid	25.1	0.8	1.0	ug/l	25.0		100	0-200			
Monochloroacetic Acid	26.7	1.1	2.0	"	25.0		107	0-200			
Dibromoacetic Acid	25.6	0.8	1.0	"	25.0		103	0-200			
Dichloroacetic Acid	24.9	1.0	1.0	"	25.0		99.7	0-200			
Trichloroacetic Acid	25.8	1.0	1.0	"	25.0		103	0-200			
Surrogate: 2,3-Dibromopropionic Acid	*10.6*			*"*	*10.0*		*106*	*70-130*			
Surrogate: 2-Bromopropionic Acid	*9.92*			*"*	*10.0*		*99.2*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Semivolatile Organic Compounds by EPA Method 525.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40727 - EPA 525.2											
Blank (AB40727-BLK1)					Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	ND	0.080	0.10	ug/l							U
Di(2-ethylhexyl)adipate	ND	0.40	5.0	"							U
Di(2-ethylhexyl)phthalate	ND	0.20	3.0	"							U
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.23*			*"*	*5.00*		*105*	*70-130*			
Surrogate: Perylene-d12	*3.73*			*"*	*5.00*		*74.6*	*70-130*			
Surrogate: Triphenyl phosphate	*4.72*			*"*	*5.00*		*94.4*	*70-130*			
LCS (AB40727-BS1)					Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	2.13	0.080	0.10	ug/l	3.00		71.0	70-130			
Di(2-ethylhexyl)adipate	2.49	0.40	5.0	"	3.00		83.0	70-130			J
Di(2-ethylhexyl)phthalate	2.40	0.20	3.0	"	3.00		80.0	70-130			J
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.36*			*"*	*5.00*		*107*	*70-130*			
Surrogate: Perylene-d12	*4.65*			*"*	*5.00*		*93.0*	*70-130*			
Surrogate: Triphenyl phosphate	*5.36*			*"*	*5.00*		*107*	*70-130*			
LCS Dup (AB40727-BSD1)					Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	2.40	0.080	0.10	ug/l	3.00		80.0	70-130	11.9	20	
Di(2-ethylhexyl)adipate	2.70	0.40	5.0	"	3.00		90.0	70-130	8.09	20	J
Di(2-ethylhexyl)phthalate	2.57	0.20	3.0	"	3.00		85.7	70-130	6.84	20	J
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.39*			*"*	*5.00*		*108*	*70-130*			
Surrogate: Perylene-d12	*4.84*			*"*	*5.00*		*96.8*	*70-130*			
Surrogate: Triphenyl phosphate	*5.47*			*"*	*5.00*		*109*	*70-130*			
Matrix Spike (AB40727-MS1)		**Source: 14A1714-01**			Prepared: 02/08/14 Analyzed: 02/13/14						
Benzo (a) pyrene	2.79	0.080	0.10	ug/l	3.00	ND	93.0	70-130			
Di(2-ethylhexyl)adipate	3.11	0.40	5.0	"	3.00	ND	104	70-130			J
Di(2-ethylhexyl)phthalate	2.79	0.20	3.0	"	3.00	ND	93.0	70-130			J
Surrogate: 1,3-Dimethyl-2-nitrobenzene	*5.27*			*"*	*5.00*		*105*	*70-130*			
Surrogate: Perylene-d12	*5.52*			*"*	*5.00*		*110*	*70-130*			

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Todd Groundwater	Project Manager:	Dr. Bill Motzer	
Alameda CA, 94501	Project:	Groundwater Reuse Project	Reported:
2490 Mariner Square Loop, Suite 215	Project Number:	60408	02/18/14 14:08

Semivolatile Organic Compounds by EPA Method 525.2 - Quality Control

Alpha Analytical Laboratories, Inc.

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AB40727 - EPA 525.2											
Matrix Spike (AB40727-MS1)		**Source: 14A1714-01**			Prepared: 02/08/14 Analyzed: 02/13/14						
Surrogate: Triphenyl phosphate	*5.65*			*ug/l*	*5.00*		*113*	*70-130*			

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Todd Groundwater Alameda CA, 94501 2490 Mariner Square Loop, Suite 215	Project Manager: Project: Project Number:	Dr. Bill Motzer Groundwater Reuse Project 60408	Reported: 02/18/14 14:08

Notes and Definitions

J	Detected but below the Reporting Limit; therefore, result is an estimated concentration, detected but not quantified (DNQ).
QM-01	The spike recovery for this QC sample is outside of established control limits possibly due to a sample matrix interference.
QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QM-4X	The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.
R-01	The Reporting Limit for this analyte has been raised to account for matrix interference.
S-GC	Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogates.
U	Analyte included in analysis, but not detected at or above MDL.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

McCampbell Analytical, Inc.

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Analytical Report

WorkOrder: 1402036

Report Created for: Alpha Analytical Laboratories
208 Mason Street
Ukiah, CA 95482

Project Contact: David S. Pingatore
Project P.O.:
Project Name: #14B0093

Project Received: 02/04/2014

Analytical Report reviewed & approved for release on 02/10/2014 by:

Question about your data?

Click here to email McCampbell

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

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NELAP: 12283CA ♦ ELAP: 1644 ♦ ISO/IEC: 17025:2005 ♦ WSDE: C972-11 ♦ ADEC: UST-098 ♦ UCMR3

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Glossary of Terms & Qualifier Definitions

Client: Alpha Analytical Laboratories
Project: #14B0093
WorkOrder: 1402036

Glossary Abbreviation	Description
95% Interval	95% Confident Interval
DF	Dilution Factor
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not detected at or above the indicated MDL or RL
NR	Matrix interferences, or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix; or sample diluted due to high matrix or analyte content.
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
TEQ	Toxicity Equivalence

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Analytical Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	1402036
Project:	#14B0093	**Extraction Method**	E218.6
Date Received:	2/4/14 9:23	**Analytical Method:**	E218.6
Date Prepared:	2/4/14	**Unit:**	µg/L

Hexachrome by IC

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
City of Seaside #4	**1402036-001A**	**Water**	**02/03/2014 15:00**	**IC2**	**86689**

Analytes	Result	RL	DF	Date Analyzed
Hexachrome	**3.4**	0.050	1	02/04/2014 15:01

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Quality Control Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	1402036
Date Prepared:	2/4/14	**BatchID:**	86689
Date Analyzed:	2/4/14	**Extraction Method**	E218.6
Instrument:	IC2	**Analytical Method:**	E218.6
Matrix:	Water	**Unit:**	µg/L
Project:	#14B0093	**Sample ID:**	MB/LCS-86689 1402035-001AMS/MSD

QC Summary Report for E218.6

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Hexachrome	ND	24.04	0.050	25	-	96.2	90-110

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Hexachrome	23.52	24.27	25	ND	94.1	97.1	90-110	3.14	10

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1402036 **ClientCode: ALPU**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
David S. Pingatore
Alpha Analytical Laboratories
208 Mason Street
Ukiah, CA 95482
(707) 468-0401 FAX: (707) 468-5267

Email: sspeaks@alpha-labs.com;david@alpha-lab
cc:
PO:
ProjectNo: #14B0093

Bill to:
Accounts Payable
Alpha Analytical Laboratories
208 Mason Street
Ukiah, CA 95482

Requested TAT: 5 days

Date Received: 02/04/2014
Date Printed: 02/04/2014

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
1402036-001	City of Seaside #4	Water	2/3/2014 15:00	☐	A											

Test Legend:

1	218_6_DW	2		3		4		5	
6		7		8		9		10	
11		12							

Prepared by: Maria Venegas

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

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WORK ORDER SUMMARY

Client Name: ALPHA ANALYTICAL LABORATORIES
QC Level: LEVEL 2
Work Order: 1402036
Project: #14B0093
Client Contact: David S. Pingatore
Date Received: 2/4/2014
Comments:
Contact's Email: sspeaks@alpha-labs.com;david@alpha-labs.com

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Number of Containers	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1402036-001A	City of Seaside #4	Water	E218.6 (Hexachrome)	1	250mL HDPE w/ (NH4)2SO4	☐	2/3/2014 15:00	5 days	None	☐	

*** NOTE: STLC and TCLP extractions require 48 hrs to complete; therefore, all TATs begin after the extraction is completed (i.e., 24hr TAT yields results in 72 hrs from sample submission).**

Bottle Legend:

250mL HDPE w/ (NH4)2SO4 = 250mL HDPE Bottle w/ Ammonium Sulfate

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

1402036

14B0093

SENDING LABORATORY:	**RECEIVING LABORATORY:**
Alpha Analytical Laboratories, Inc.	McCampbell Analytical
208 Mason St.	1534 Willowpass Rd.
Ukiah, CA 95482	Pittsburg, CA 94565
Phone: (707)468-0401	Phone :(925) 252-9262
Fax: (707)468-5267	Fax: (925) 252-9269
Project Manager: David S. Pingatore	**Terms: Net 30**

Analysis	Due	Expires	Comments
14B0093-01 City Of Seaside #4 [Water] Sampled 02/03/14 15:00 Pacific			
Cr6 218.6 DW	02/18/14 12:00	02/08/14 15:00	
Containers Supplied:			
250ml Poly - (NH4)2SO4 (A			

☐ *Report to State*

System Name: NO **Employed by:**

User ID: **Sampler:**

System Number:

1.3

CONDITION APPROPRIATE

HEADSPACE ABSENT CONTAINERS

DECHLORINATED IN LAB PRESERVED IN LAB

PRESERVATION	VOAS	O&G	METALS	OTHER

Released By	Date	Received By	Date
[signature]	02/04/14	[signature]	2/4/14 0916

Page 1 of 1

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Sample Receipt Checklist

Client Name: **Alpha Analytical Laboratories**

Date and Time Received: **2/4/2014 9:23:23 AM**

Project Name: **#14B0093**

LogIn Reviewed by: Maria Venegas

WorkOrder N°: **1402036** Matrix: Water

Carrier: Client Drop-In

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐
Chain of custody signed when relinquished and received?	Yes ☑	No ☐
Chain of custody agrees with sample labels?	Yes ☑	No ☐
Sample IDs noted by Client on COC?	Yes ☑	No ☐
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐
Sampler's name noted on COC?	Yes ☐	No ☑

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp: 1.3°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	NA ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☑	No ☐	

(Ice Type: BLUE ICE)

** NOTE: If the "No" box is checked, see comments below.*

Comments:

ASBESTOS TEM LABORATORIES, INC.

EPA 600/4-83 Drinking Water
Transmission Electron Microscopy
Analytical Report

Laboratory Job # 1288-00573

630 Bancroft Way
Berkeley, CA 94710
(510) 704-8930
FAX (510) 704-8429

ASBESTOS TEM LABORATORIES, INC

Certified by
CA DPH ELAP
Lab No. 1866

Feb/13/2014

David S. Pingatore
Alpha Analytical Laboratories, Inc.
208 Mason Street
Ukiah, CA 95482

RE: LABORATORY JOB # 1288-00573
Transmission electron microscopy analytical results for 1 water sample(s).
Job Site: City of Seaside # 4
Job No.: 14B0093

Enclosed please find results for the TEM analysis of one or more water samples. The analytical procedures were performed according to EPA Method 100.2 for the analysis of asbestos in drinking water.

Prior to analysis, samples are checked for damage, disruption of any chain-of-custody seals, and completeness of accompanying paperwork. If no problems are found, samples are then logged-in, each given a unique laboratory number, and a hard copy containing all pertinent information is generated. This, and all other relevant paper work are kept with each sample throughout the analytical procedures to assure proper analysis.

Preparation of water samples is performed within a HEPA filtered, Class 100 air, laminar flow clean bench environment. Prior to filtration, water sample containers are ultrasonicated, and the exterior surfaces cleaned. An aliquot of water is drawn from the sample container and drawn through a special filtration apparatus and collected onto a mixed cellulose ester (MCE) or polycarbonate (PC) filter. The filters are removed from the apparatus and dried. A portion of each sample filter is sectioned, placed onto a glass microscope slide, and carbon coated. The filters are further sectioned and placed carbon side up onto 200-mesh copper TEM sample grids in a solvent bath until all filter material is dissolved. The TEM grids are removed and placed into labeled grid storage boxes.

TEM analysis is performed on a Philips EM-300 or CM-12 transmission electron microscope operating at 80 or 100 kV. Initially, the grid is scanned at low and medium magnification to insure proper sample loading, and coherence of the carbon support film. Then TEM grid openings are analyzed at a magnification of 10,000X. All fibers >10 um in length and exhibiting an aspect ratio >3:1 are analyzed. Scanning continues until either 100 asbestiform fibers >10um in length are counted, or an analytical sensitivity of 0.2 million fibers per liter (MFL) is achieved. Analyzed fibers are subjected to detailed morphological and selected area diffraction (SAED) analysis. Fibers indicated as asbestos, or potentially asbestos, are further analyzed by energy dispersive X-ray (EDX) analysis as needed. The number of asbestos fibers detected, and other analytical parameters, are then used to calculate the concentration of asbestos in MFL. The results are entered into a standard report format and reviewed by the analyst and the laboratory manager before release to the client.

Sincerely Yours,

Laboratory Manager
ASBESTOS TEM LABORATORIES, INC.

--- These results relate only to the samples tested and must not be reproduced, except in full, with the approval of the laboratory. This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government. ---

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TRANSMISSION ELECTRON MICROSCOPY ANALYTICAL REPORT

Contact:	David S. Pingatore		
Address:	Alpha Analytical Laboratories, Inc. 208 Mason Street Ukiah, CA 95482	Report No.:	323883
		Date:	Feb-13-14
		Total Samples Analyzed:	1
Job Site / No.	City of Seaside # 4 14B0093	Sample Collector:	

CLIENT SAMPLE #	**14B0093-01**	**SAMPLE LOCATION/DESCRIPTION**	
Laboratory Sample #	1288-00573-001		

WATER SAMPLE DATA

Date/Time Collected	Feb-03-14 / 3:00 pm	Volume Submitted (ml)	1000
Date/Time Lab Received	Feb-04-14 / 4:48 pm	Volume Filtered (ml)	15
Date/Time Filtered	Feb-04-14 / 5:20 pm	Filter & Pore Size	MCE 0.22
Date/Time Analyzed	Feb-13-14 / 8:15 am	UV/Ozone Treated:	NO

IDENTIFIED STRUCTURES (>10um)			
ASBESTOS		OTHER	
CHRYS	AMPH	AMBIG	NON-ASB
NSD	NSD	NSD	NSD

CALCULATED ASBESTOS STRUCTURE CONCENTRATION (>10um)		
CHRYS	AMPH	TOTAL
< 0.1 MFL	< 0.1 MFL	< 0.1 MFL

COMMENTS

No asbestos detected

Filter Loading: LIGHT

SAED Photo ID Nos.

TEM / ANALYTICAL PARAMETERS

Grid Openings Scanned at 10,000X	8	Analytical Sensitivity	0.1 MFL
Grid Opening Area (mm2)	0.0094	95% UCL	0.33 MFL
Scan Area (mm2)	0.0752	95% LCL	0 MFL

WATER SAMPLE LAB BLANK RESULTS

Lab ID#	Blank 9478	Analytical Sensitivity	0.01 MFL
Grid Openings Scanned at 10,000X	8	Asbestos Structure Concentration	<0.01 MFL
Volume Filtered (ml)	300		

NOTATION KEY

Chrys. - Chrysotile Asbestos
Amph. - Amphibole Asbestos
NSD - No Structures Detected
1 mm = 1 millimeter

1 um = 1 micron = 0.001 mm
MFL = Millions of Fibers per Liter
UCL = Upper Confidence Level
LCL = Lower Confidence Level

ANALYST SIGNATURE

Stephanie Dunn
LAB QC REVIEWER SIGNATURE

ASBESTOS TEM LABORATORIES, INC.
www.asbestostemlabs.com
630 BANCROFT WAY, BERKELEY, CA 94710 (510) 704-8930
With Offices in Reno, NV (775) 359-3377

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

14B0093 323883

SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: David S. Pingatore

RECEIVING LABORATORY:

Asbestos TEM Laboratories, Inc.
630 Bancroft Way
Berkeley, CA 94710
Phone :(510) 704-8930
Fax: (510) 704-8429
Terms: Net 30

Analysis	Due	Expires	Comments
14B0093-01 City Of Seaside #4 [Water] Sampled 02/03/14 15:00 Pacific			
Asbestos-DW SUB	02/18/14 12:00	02/05/14 15:00	
Containers Supplied:			
1L Amber- Unpres. (Y)	1L Amber- Unpres. (Z)		

☐ *Report to State*

System Name: _____ **Employed by:** _____

User ID: _____ **Sampler:** _____

System Number: _____

+QC

Released By	Date	Received By	Date
[signature]	2-4-14	PTEM/RY	02-04-14 P04:48 IN
Released By	Date	Received By	Date

ALS Environmental
ALS Group USA, Corp.
1317 South 13th Avenue
Kelso, WA 98626
T: +1 360 577 7222
F: +1 360 636 1068
www.alsglobal.com

February 21, 2014 Analytical Report for Service Request No: K1401158

David Pingatore
Alpha Analytical Laboratories, Inc.
6398 Dougherty Road, Suite 35
Dublin, CA 94568

RE: 14B0093

Dear David:

Enclosed are the results of the sample submitted to our laboratory on February 05, 2014. For your reference, these analyses have been assigned our service request number K1401158.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3293. You may also contact me via Email at Shar.Samy@alsglobal.com.

Respectfully submitted,

ALS Group USA Corp. dba ALS Environmental

Shar Samy, Ph.D.
Project Manager

SS/mj

RIGHT SOLUTIONS | RIGHT PARTNER

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2286
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L12-28
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Georgia DNR	http://www.gaepd.org/Documents/techguide_pcb.html#cel	881
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
Indiana DOH	http://www.in.gov/isdh/24859.htm	C-WA-01
ISO 17025	http://www.pjlabs.com/	L12-27
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	3016
Maine DHS	Not available	WA0035
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-368
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA35
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA200001
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	4704427-08-TX
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C1203
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.caslab.com or at the accreditation bodies web site

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

ALS ENVIRONMENTAL

Client:	Alpha Analytical Laboratories, Inc.	**Service Request No.:**	K1401158
Project:	14B0093	**Date Received:**	02/05/14
Sample Matrix:	Water		

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Matrix/Duplicate Matrix Spike (MS/DMS), and Laboratory Control Sample (LCS).

Sample Receipt

One water sample was received for analysis at ALS Environmental on 02/05/14. The sample was received in good condition and consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4ºC upon receipt at the laboratory.

Explosives by EPA Method 8330

Sample Notes and Discussion:
Insufficient sample volume was received to perform a Matrix Spike/Matrix Spike Duplicate (MS/MSD). A Laboratory Control Sample/Duplicate Laboratory Control Sample (LCS/DLCS) was analyzed and reported in lieu of the MS/MSD.

No other anomalies associated with the analysis of this sample were observed.

Approved by_____

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

14B0093

K1401158

SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: David S. Pingatore

RECEIVING LABORATORY:

ALS Environmental - Kelso
1317 S. 13th Ave
Kelso, WA 98626
Phone :(360) 577-7222
Fax: -
Terms: Net 30

Analysis	Due	Expires	Comments
14B0093-01 City Of Seaside #4 [Water] Sampled 02/03/14 15:00 Pacific			
8330B Explosives Water	02/18/14 12:00	02/10/14 15:00	
Containers Supplied:			
1L Amber- Unpres. (AD) 1L Amber- Unpres. (AE)			

☐ *Report to State*

System Name: _____ **Employed by:** _____

User ID: _____ **Sampler:** _____

System Number: _____

+QC

Released By	Date	Received By	Date
[signature]	2-4-14	[signature]	2/5/14 1020
Released By	Date	Received By	Date

ALS

PC Shan

Cooler Receipt and Preservation Form

Client / Project: Alpha Service Request K14 01158

Received: 2/5/14 Opened: 2/5/14 By: [illegible] Unloaded: 2/5/14 By: [illegible]

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? _____

   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID → NA	Tracking Number NA	Filed
-0.9	-0.6	—	—	-0.1	308		1Z894250 01489473 8	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

Page ____ *of* ____

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Alpha Analytical Laboratories, Inc. (Uki	**Service Request:**	K1401158
Project:	14B0093	**Date Collected:**	02/03/2014
Sample Matrix:	Water	**Date Received:**	02/05/2014

Nitroaromatics and Nitramines (Explosives)

Sample Name:	14B0093-01 City of Seaside #4	**Units:**	ug/L
Lab Code:	K1401158-001	**Basis:**	NA
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	8330B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
HMX	ND	U	0.099	0.010	1	02/06/14	02/08/14	KWG1400979	
RDX	ND	U	0.099	0.017	1	02/06/14	02/08/14	KWG1400979	
1,3,5-Trinitrobenzene	ND	U	0.20	0.050	1	02/06/14	02/08/14	KWG1400979	
1,3-Dinitrobenzene	ND	U	0.099	0.0085	1	02/06/14	02/08/14	KWG1400979	
3,5-Dinitroaniline	ND	U	0.099	0.013	1	02/06/14	02/08/14	KWG1400979	
TETRYL	ND	U	0.10	0.042	1	02/06/14	02/08/14	KWG1400979	
Nitrobenzene	ND	U	0.099	0.013	1	02/06/14	02/08/14	KWG1400979	
4-Amino-2,6-dinitrotoluene	ND	U	0.099	0.016	1	02/06/14	02/08/14	KWG1400979	
2-Amino-4,6-dinitrotoluene	ND	U	0.099	0.0089	1	02/06/14	02/08/14	KWG1400979	
2,4,6-Trinitrotoluene	ND	U	0.099	0.026	1	02/06/14	02/08/14	KWG1400979	
2,6-Dinitrotoluene	ND	U	0.20	0.054	1	02/06/14	02/08/14	KWG1400979	
2,4-Dinitrotoluene	ND	U	0.099	0.0091	1	02/06/14	02/08/14	KWG1400979	
2-Nitrotoluene	ND	U	0.10	0.032	1	02/06/14	02/08/14	KWG1400979	
4-Nitrotoluene	ND	U	0.099	0.019	1	02/06/14	02/08/14	KWG1400979	
3-Nitrotoluene	ND	U	0.099	0.0064	1	02/06/14	02/08/14	KWG1400979	
Nitroglycerin	ND	U	0.99	0.39	1	02/06/14	02/08/14	KWG1400979	
Pentaerythritol Tetranitrate	ND	U	0.50	0.18	1	02/06/14	02/08/14	KWG1400979	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1-Chloro-3-nitrobenzene	90	23-98	02/08/14	Acceptable

Comments:

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Alpha Analytical Laboratories, Inc. (Uki	**Service Request:**	K1401158
Project:	14B0093	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Nitroaromatics and Nitramines (Explosives)

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG1400979-3	**Basis:**	NA
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	8330B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
HMX	ND	U	0.098	0.010	1	02/06/14	02/07/14	KWG1400979	
RDX	ND	U	0.098	0.017	1	02/06/14	02/07/14	KWG1400979	
1,3,5-Trinitrobenzene	ND	U	0.20	0.050	1	02/06/14	02/07/14	KWG1400979	
1,3-Dinitrobenzene	ND	U	0.098	0.0085	1	02/06/14	02/07/14	KWG1400979	
3,5-Dinitroaniline	ND	U	0.098	0.013	1	02/06/14	02/07/14	KWG1400979	
TETRYL	ND	U	0.10	0.042	1	02/06/14	02/07/14	KWG1400979	
Nitrobenzene	ND	U	0.098	0.013	1	02/06/14	02/07/14	KWG1400979	
4-Amino-2,6-dinitrotoluene	ND	U	0.098	0.016	1	02/06/14	02/07/14	KWG1400979	
2-Amino-4,6-dinitrotoluene	ND	U	0.098	0.0089	1	02/06/14	02/07/14	KWG1400979	
2,4,6-Trinitrotoluene	ND	U	0.098	0.026	1	02/06/14	02/07/14	KWG1400979	
2,6-Dinitrotoluene	**0.068**	JN	0.20	0.054	1	02/06/14	02/07/14	KWG1400979	
2,4-Dinitrotoluene	ND	U	0.098	0.0091	1	02/06/14	02/07/14	KWG1400979	
2-Nitrotoluene	ND	U	0.10	0.032	1	02/06/14	02/07/14	KWG1400979	
4-Nitrotoluene	ND	U	0.098	0.019	1	02/06/14	02/07/14	KWG1400979	
3-Nitrotoluene	ND	U	0.098	0.0064	1	02/06/14	02/07/14	KWG1400979	
Nitroglycerin	ND	U	0.98	0.39	1	02/06/14	02/07/14	KWG1400979	
Pentaerythritol Tetranitrate	ND	U	0.49	0.18	1	02/06/14	02/07/14	KWG1400979	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1-Chloro-3-nitrobenzene	75	23-98	02/07/14	Acceptable

Comments:

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: Alpha Analytical Laboratories, Inc. (Uki
Service Request: K1401158
Project: 14B0093
Sample Matrix: Water

Surrogate Recovery Summary
Nitroaromatics and Nitramines (Explosives)

Extraction Method: METHOD
Units: Percent
Analysis Method: 8330B
Level: Low

Sample Name	Lab Code	Sur1
14B0093-01 City of Seaside #4	K1401158-001	90
Method Blank	KWG1400979-3	75
Duplicate Lab Control Sample	KWG1400979-1	82
Lab Control Sample	KWG1400979-2	91

Surrogate Recovery Control Limits (%)

Sur1 = 1-Chloro-3-nitrobenzene 23-98

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	Alpha Analytical Laboratories, Inc. (Uki	**Service Request:**	K1401158
Project:	14B0093	**Date Extracted:**	02/06/2014
Sample Matrix:	Water	**Date Analyzed:**	02/07/2014

Lab Control Spike/Duplicate Lab Control Spike Summary
Nitroaromatics and Nitramines (Explosives)

Extraction Method:	METHOD	**Units:**	ug/L
Analysis Method:	8330B	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG1400979

	Lab Control Sample KWG1400979-2 Lab Control Spike			Duplicate Lab Control Sample KWG1400979-1 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
HMX	7.75	8.00	97	7.46	8.00	93	11-147	4	30
RDX	7.53	8.00	94	7.26	8.00	91	10-142	4	30
1,3,5-Trinitrobenzene	7.54	8.00	94	7.01	8.00	88	16-137	7	30
1,3-Dinitrobenzene	7.51	8.00	94	7.03	8.00	88	26-125	7	30
3,5-Dinitroaniline	7.48	8.00	93	7.09	8.00	89	30-133	5	30
TETRYL	7.71	8.00	96	7.26	8.00	91	29-123	6	30
Nitrobenzene	7.43	8.00	93	6.93	8.00	87	10-116	7	30
4-Amino-2,6-dinitrotoluene	7.57	8.00	95	7.11	8.00	89	55-117	6	30
2-Amino-4,6-dinitrotoluene	7.47	8.00	93	7.00	8.00	88	54-116	6	30
2,4,6-Trinitrotoluene	7.53	8.00	94	6.93	8.00	87	47-118	8	30
2,6-Dinitrotoluene	7.57	8.00	95	6.95	8.00	87	40-108	9	30
2,4-Dinitrotoluene	7.46	8.00	93	6.83	8.00	85	50-111	9	30
2-Nitrotoluene	7.18	8.00	90	6.55	8.00	82	12-110	9	30
4-Nitrotoluene	7.21	8.00	90	6.58	8.00	82	16-113	9	30
3-Nitrotoluene	7.51	8.00	94	6.83	8.00	85	13-109	10	30
Nitroglycerin	7.71	8.00	96	7.43	8.00	93	15-136	4	30
Pentaerythritol Tetranitrate	7.81	8.00	98	7.35	8.00	92	66-103	6	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ASBESTOS TEM LABORATORIES, INC.

EPA 600/4-83 Drinking Water
Transmission Electron Microscopy
Analytical Report

Laboratory Job # 1288-00573

630 Bancroft Way
Berkeley, CA 94710
(510) 704-8930
FAX (510) 704-8429

ASBESTOS TEM LABORATORIES, INC

Certified by
CA DPH ELAP
Lab No. 1866

Feb/13/2014

David S. Pingatore
Alpha Analytical Laboratories, Inc.
208 Mason Street
Ukiah, CA 95482

RE: LABORATORY JOB # 1288-00573
Transmission electron microscopy analytical results for 1 water sample(s).
Job Site: City of Seaside # 4
Job No.: 14B0093

Enclosed please find results for the TEM analysis of one or more water samples. The analytical procedures were performed according to EPA Method 100.2 for the analysis of asbestos in drinking water.

Prior to analysis, samples are checked for damage, disruption of any chain-of-custody seals, and completeness of accompanying paperwork. If no problems are found, samples are then logged-in, each given a unique laboratory number, and a hard copy containing all pertinent information is generated. This, and all other relevant paper work are kept with each sample throughout the analytical procedures to assure proper analysis.

Preparation of water samples is performed within a HEPA filtered, Class 100 air, laminar flow clean bench environment. Prior to filtration, water sample containers are ultrasonicated, and the exterior surfaces cleaned. An aliquot of water is drawn from the sample container and drawn through a special filtration apparatus and collected onto a mixed cellulose ester (MCE) or polycarbonate (PC) filter. The filters are removed from the apparatus and dried. A portion of each sample filter is sectioned, placed onto a glass microscope slide, and carbon coated. The filters are further sectioned and placed carbon side up onto 200-mesh copper TEM sample grids in a solvent bath until all filter material is dissolved. The TEM grids are removed and placed into labeled grid storage boxes.

TEM analysis is performed on a Philips EM-300 or CM-12 transmission electron microscope operating at 80 or 100 kV. Initially, the grid is scanned at low and medium magnification to insure proper sample loading, and coherence of the carbon support film. Then TEM grid openings are analyzed at a magnification of 10,000X. All fibers >10 um in length and exhibiting an aspect ratio >3:1 are analyzed. Scanning continues until either 100 asbestiform fibers >10um in length are counted, or an analytical sensitivity of 0.2 million fibers per liter (MFL) is achieved. Analyzed fibers are subjected to detailed morphological and selected area diffraction (SAED) analysis. Fibers indicated as asbestos, or potentially asbestos, are further analyzed by energy dispersive X-ray (EDX) analysis as needed. The number of asbestos fibers detected, and other analytical parameters, are then used to calculate the concentration of asbestos in MFL. The results are entered into a standard report format and reviewed by the analyst and the laboratory manager before release to the client.

Sincerely Yours,

Laboratory Manager
ASBESTOS TEM LABORATORIES, INC.

--- These results relate only to the samples tested and must not be reproduced, except in full, with the approval of the laboratory. This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government. ---

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TRANSMISSION ELECTRON MICROSCOPY ANALYTICAL REPORT

Contact:	David S. Pingatore		
Address:	Alpha Analytical Laboratories, Inc. 208 Mason Street Ukiah, CA 95482	Report No.:	**323883**
		Date:	Feb-13-14
		Total Samples Analyzed:	1
Job Site / No.	City of Seaside # 4 14B0093	Sample Collector:	

CLIENT SAMPLE # **14B0093-01**

Laboratory Sample # 1288-00573-001

SAMPLE LOCATION/DESCRIPTION

WATER SAMPLE DATA

Date/Time Collected	Feb-03-14 / 3:00 pm	Volume Submitted (ml)	1000
Date/Time Lab Received	Feb-04-14 / 4:48 pm	Volume Filtered (ml)	15
Date/Time Filtered	Feb-04-14 / 5:20 pm	Filter & Pore Size	MCE 0.22
Date/Time Analyzed	Feb-13-14 / 8:15 am	UV/Ozone Treated:	NO

IDENTIFIED STRUCTURES (>10um)			
ASBESTOS		OTHER	
CHRYS	AMPH	AMBIG	NON-ASB
NSD	NSD	NSD	NSD

CALCULATED ASBESTOS STRUCTURE CONCENTRATION (>10um)		
CHRYS	AMPH	TOTAL
< 0.1 MFL	< 0.1 MFL	< 0.1 MFL

COMMENTS

No asbestos detected

Filter Loading: LIGHT

SAED Photo ID Nos.

TEM / ANALYTICAL PARAMETERS

Grid Openings Scanned at 10,000X	8	Analytical Sensitivity	0.1 MFL
Grid Opening Area (mm2)	0.0094	95% UCL	0.33 MFL
Scan Area (mm2)	0.0752	95% LCL	0 MFL

WATER SAMPLE LAB BLANK RESULTS

Lab ID#	Blank 9478	Analytical Sensitivity	0.01 MFL
Grid Openings Scanned at 10,000X	8	Asbestos Structure Concentration	<0.01 MFL
Volume Filtered (ml)	300		

NOTATION KEY

Chrys. - Chrysotile Asbestos
Amph. - Amphibole Asbestos
NSD - No Structures Detected
1 mm = 1 millimeter

1 um = 1 micron = 0.001 mm
MFL = Millions of Fibers per Liter
UCL = Upper Confidence Level
LCL = Lower Confidence Level

ANALYST SIGNATURE

Stephanie Dunn

LAB QC REVIEWER SIGNATURE

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Analytical Laboratory Service - Since 1964

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Report Date: 02/24/14 10:55
Received Date: 02/05/14 08:30
Turnaround Time: Normal

Project: 14B0093

Phones: (925) 872-9637
Fax: (707) 468-5267

P.O. #:

Attn: David S. Pingatore

Client: Alpha Analytical Laboratories - Ukiah
208 Mason St
Ukiah, CA 95482

Dear David S. Pingatore :

Enclosed are the results of analyses for samples received 2/5/2014 with the Chain of Custody document. The samples were received in good condition, at 1.7 °C and on ice. All analysis met the method criteria except as noted below or in the report with data qualifiers.

Lab Sample ID: 4B05036-01 **Sample ID: 14B0093-01 City of Seaside #4** **Matrix:** Water
Sampled by: Client **Sampled: 02/03/14 15:00**

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
N-Nitrosodiethylamine	ND		2.0	ng/l	1	EPA 1625M	2/10/14	2/11/14 23:25	W4B0362	
N-Nitrosodimethylamine	ND		2.0	ng/l	1	EPA 1625M	2/10/14	2/11/14 23:25	W4B0362	
N-Nitrosodi-n-butylamine	ND		2.0	ng/l	1	EPA 1625M	2/10/14	2/11/14 23:25	W4B0362	
N-Nitrosodi-n-propylamine	ND		2.0	ng/l	1	EPA 1625M	2/10/14	2/11/14 23:25	W4B0362	
N-Nitrosomethylethylamine	ND		2.0	ng/l	1	EPA 1625M	2/10/14	2/11/14 23:25	W4B0362	
N-Nitrosomorpholine	ND		2.0	ng/l	1	EPA 1625M	2/10/14	2/11/14 23:25	W4B0362	
N-Nitrosopiperidine	ND		2.0	ng/l	1	EPA 1625M	2/10/14	2/11/14 23:25	W4B0362	
N-Nitrosopyrrolidine	ND		2.0	ng/l	1	EPA 1625M	2/10/14	2/11/14 23:25	W4B0362	
17-a-Ethynylestradiol	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 20:36	W4B0281	
17-b-Estradiol	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 20:36	W4B0281	
Estrone	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 20:36	W4B0281	
Progesterone	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 20:36	W4B0281	
Testosterone	ND		1.0	ng/l	1	EPA 1694M-APCI	2/7/14	2/19/14 20:36	W4B0281	
Bisphenol A	**9.0**		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 1:02	W4B0283	
Gemfibrozil	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 1:02	W4B0283	
Ibuprofen	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 1:02	W4B0283	
Iopromide	ND		5.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 1:02	W4B0283	
Naproxen	ND		1.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 1:02	W4B0283	
Salicylic Acid	**52**		50	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 1:02	W4B0283	
Triclosan	ND		2.0	ng/l	1	EPA 1694M-ESI-	2/7/14	2/15/14 1:02	W4B0283	

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Lab Sample ID: 4B05036-01 **Sample ID: 14B0093-01 City of Seaside #4** **Matrix:** Water
Sampled by: Client **Sampled: 02/03/14 15:00**

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
Acetaminophen	ND		20	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
Amoxicillin	ND		10	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
Atenolol	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
Atorvastatin	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
Azithromycin	ND		10	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
Caffeine	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
Carbamazepine	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
Ciprofloxacin	ND		5.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
Cotinine	ND		2.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
DEET	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
Diazepam	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
Fluoxetine	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
Meprobamate	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
Methadone	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
Oxybenzone	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
Phenytoin	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
Primidone	ND		10	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	R-01
Sucralose	ND		5.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
Sulfamethoxazole	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
TCEP	**6.7**		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
TCPP	**5.2**		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	B
TDCPP	**1.1**		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	
Trimethoprim	ND		1.0	ng/l	1	EPA 1694M-ESI+	2/7/14	2/19/14 1:27	W4B0282	

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Quality Control Section

Nitrosamines by isotopic dilution GC/MS CI Mode - Quality Control

Batch W4B0362 - EPA 1625M

Blank (W4B0362-BLK1) — **Prepared: 02/10/14 Analyzed: 02/11/14 19:08**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine		4.01	B-06	ng/l					
N-Nitrosomethylethylamine		ND		ng/l					
N-Nitrosodiethylamine		ND		ng/l					
N-Nitrosodi-n-propylamine		ND		ng/l					
N-Nitrosomorpholine		ND		ng/l					
N-Nitrosopyrrolidine		ND		ng/l					
N-Nitrosopiperidine		ND		ng/l					
N-Nitrosodi-n-butylamine		ND		ng/l					

LCS (W4B0362-BS1) — **Prepared: 02/10/14 Analyzed: 02/11/14 19:37**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine		2.87		ng/l	3.00	96	50-150		
N-Nitrosomethylethylamine		2.86		ng/l	3.00	95	50-150		
N-Nitrosodiethylamine		2.97		ng/l	3.00	99	50-150		
N-Nitrosodi-n-propylamine		3.77		ng/l	3.00	126	50-150		
N-Nitrosomorpholine		2.95		ng/l	3.00	98	50-150		
N-Nitrosopyrrolidine		3.15		ng/l	3.00	105	50-150		
N-Nitrosopiperidine		3.42		ng/l	3.00	114	50-150		
N-Nitrosodi-n-butylamine		5.24	Q-08	ng/l	3.00	175	50-150		

LCS Dup (W4B0362-BSD1) — **Prepared: 02/10/14 Analyzed: 02/11/14 20:05**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
N-Nitrosodimethylamine		2.81		ng/l	3.00	94	50-150	2	30
N-Nitrosomethylethylamine		3.25		ng/l	3.00	108	50-150	13	30
N-Nitrosodiethylamine		4.22	Q-12	ng/l	3.00	141	50-150	35	30
N-Nitrosodi-n-propylamine		3.89		ng/l	3.00	130	50-150	3	30
N-Nitrosomorpholine		3.41		ng/l	3.00	114	50-150	15	30
N-Nitrosopyrrolidine		4.24		ng/l	3.00	141	50-150	29	30
N-Nitrosopiperidine		3.84		ng/l	3.00	128	50-150	12	30
N-Nitrosodi-n-butylamine		6.63	Q-08	ng/l	3.00	221	50-150	23	30

PPCPs - Pharmaceuticals by LC/MSMS-ESI+ - Quality Control

Batch W4B0282 - EPA 1694M-ESI+

Blank (W4B0282-BLK1) — **Prepared: 02/07/14 Analyzed: 02/18/14 22:39**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Acetaminophen		ND		ng/l					
Caffeine		ND		ng/l					
Sulfamethoxazole		ND		ng/l					
Trimethoprim		ND		ng/l					
Azithromycin		ND		ng/l					
Cotinine		ND		ng/l					

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PPCPs - Pharmaceuticals by LC/MSMS-ESI+ - Quality Control

Batch W4B0282 - EPA 1694M-ESI+

Blank (W4B0282-BLK1) — **Prepared: 02/07/14 Analyzed: 02/18/14 22:39**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Atenolol		ND		ng/l					
Ciprofloxacin		ND		ng/l					
Carbamazepine		ND		ng/l					
DEET		ND		ng/l					
Fluoxetine		ND		ng/l					
Atorvastatin		ND		ng/l					
Methadone		ND		ng/l					
Primidone		ND		ng/l					
Diazepam		ND		ng/l					
TCPP		2.23	B	ng/l					
TCEP		ND		ng/l					
TDCPP		ND		ng/l					
Phenytoin		ND		ng/l					
Amoxicillin		ND		ng/l					
Meprobamate		ND		ng/l					
Sucralose		ND		ng/l					
Oxybenzone		ND		ng/l					

LCS (W4B0282-BS1) — **Prepared: 02/07/14 Analyzed: 02/18/14 22:53**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Acetaminophen		435		ng/l	400	109	66-156		
Caffeine		17.4		ng/l	20.0	87	55-152		
Sulfamethoxazole		17.6		ng/l	20.0	88	60-133		
Trimethoprim		18.6		ng/l	20.0	93	67-139		
Azithromycin		199		ng/l	200	100	52-166		
Cotinine		22.6		ng/l	20.0	113	68-155		
Atenolol		21.0		ng/l	20.0	105	56-164		
Ciprofloxacin		83.8		ng/l	100	84	51-168		
Carbamazepine		19.3		ng/l	20.0	96	60-135		
DEET		15.5		ng/l	20.0	78	45-135		
Fluoxetine		23.8		ng/l	20.0	119	55-150		
Atorvastatin		16.3		ng/l	20.0	82	0.1-173		
Methadone		19.0		ng/l	20.0	95	62-137		
Primidone		17.1		ng/l	20.0	86	54-147		
Diazepam		18.3		ng/l	20.0	92	58-127		
TCPP		18.1		ng/l	20.0	90	24-149		
TCEP		17.5		ng/l	20.0	88	25-149		
TDCPP		17.7		ng/l	20.0	88	20-158		
Phenytoin		18.2		ng/l	20.0	91	69-138		
Amoxicillin		164		ng/l	200	82	14-167		
Meprobamate		20.5		ng/l	20.0	102	11-166		
Sucralose		95.7		ng/l	100	96	50-150		
Oxybenzone		15.4		ng/l	20.0	77	50-150		

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PPCPs - Pharmaceuticals by LC/MSMS-ESI+ - Quality Control

Batch W4B0282 - EPA 1694M-ESI+

LCS Dup (W4B0282-BSD1) — **Prepared: 02/07/14 Analyzed: 02/18/14 23:07**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Acetaminophen		499		ng/l	400	125	66-156	14	30
Caffeine		18.2		ng/l	20.0	91	55-152	4	30
Sulfamethoxazole		19.4		ng/l	20.0	97	60-133	10	30
Trimethoprim		18.4		ng/l	20.0	92	67-139	1	30
Azithromycin		206		ng/l	200	103	52-166	3	30
Cotinine		26.7		ng/l	20.0	134	68-155	17	30
Atenolol		23.0		ng/l	20.0	115	56-164	9	30
Ciprofloxacin		83.4		ng/l	100	83	51-168	0.5	30
Carbamazepine		19.7		ng/l	20.0	98	60-135	2	30
DEET		16.4		ng/l	20.0	82	45-135	6	30
Fluoxetine		22.8		ng/l	20.0	114	55-150	4	30
Atorvastatin		15.1		ng/l	20.0	76	0.1-173	8	30
Methadone		19.1		ng/l	20.0	96	62-137	0.5	30
Primidone		16.2		ng/l	20.0	81	54-147	5	30
Diazepam		18.9		ng/l	20.0	94	58-127	3	30
TCPP		21.0		ng/l	20.0	105	24-149	15	30
TCEP		20.6		ng/l	20.0	103	25-149	16	30
TDCPP		18.9		ng/l	20.0	94	20-158	7	30
Phenytoin		18.4		ng/l	20.0	92	69-138	1	30
Amoxicillin		164		ng/l	200	82	14-167	0	30
Meprobamate		20.6		ng/l	20.0	103	11-166	0.5	30
Sucralose		93.0		ng/l	100	93	50-150	3	30
Oxybenzone		18.3		ng/l	20.0	92	50-150	17	30

PPCPs - Pharmaceuticals by LC/MSMS-ESI- - Quality Control

Batch W4B0283 - EPA 1694M-ESI-

Blank (W4B0283-BLK1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:08**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Bisphenol A		1.99	B	ng/l					
Gemfibrozil		ND		ng/l					
Ibuprofen		ND		ng/l					
Naproxen		ND		ng/l					
Salicylic Acid		ND		ng/l					
Triclosan		ND		ng/l					
Iopromide		ND		ng/l					

LCS (W4B0283-BS1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:22**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Bisphenol A		19.5		ng/l	20.0	98	53-168		
Gemfibrozil		18.0		ng/l	20.0	90	76-122		
Ibuprofen		17.7		ng/l	20.0	88	67-139		
Naproxen		17.3		ng/l	20.0	86	64-138		
Salicylic Acid		171		ng/l	200	86	56-229		

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PPCPs - Pharmaceuticals by LC/MSMS-ESI- - Quality Control

Batch W4B0283 - EPA 1694M-ESI-

LCS (W4B0283-BS1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:22**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Triclosan		38.9		ng/l	40.0	97	76-139		
Iopromide		114		ng/l	100	114	0.1-163		

LCS Dup (W4B0283-BSD1) — **Prepared: 02/07/14 Analyzed: 02/14/14 22:37**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Bisphenol A		18.4		ng/l	20.0	92	53-168	6	30
Gemfibrozil		18.3		ng/l	20.0	92	76-122	2	30
Ibuprofen		19.8		ng/l	20.0	99	67-139	11	30
Naproxen		19.1		ng/l	20.0	96	64-138	10	30
Salicylic Acid		183		ng/l	200	92	56-229	7	30
Triclosan		40.5		ng/l	40.0	101	76-139	4	30
Iopromide		104		ng/l	100	104	0.1-163	9	30

PPCPs - Hormones by LC/MSMS-APCI - Quality Control

Batch W4B0281 - EPA 1694M-APCI

Blank (W4B0281-BLK1) — **Prepared: 02/07/14 Analyzed: 02/19/14 16:58**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
17-a-Ethynylestradiol		ND		ng/l					
17-b-Estradiol		ND		ng/l					
Estrone		ND		ng/l					
Progesterone		ND		ng/l					
Testosterone		ND		ng/l					

LCS (W4B0281-BS1) — **Prepared: 02/07/14 Analyzed: 02/19/14 17:15**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
17-a-Ethynylestradiol		19.1		ng/l	20.0	96	68-159		
17-b-Estradiol		18.0		ng/l	20.0	90	65-146		
Estrone		17.6		ng/l	20.0	88	59-141		
Progesterone		17.8		ng/l	20.0	89	58-154		
Testosterone		24.8		ng/l	20.0	124	60-172		

LCS Dup (W4B0281-BSD1) — **Prepared: 02/07/14 Analyzed: 02/19/14 17:31**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
17-a-Ethynylestradiol		18.9		ng/l	20.0	94	68-159	1	30
17-b-Estradiol		18.4		ng/l	20.0	92	65-146	2	30
Estrone		18.3		ng/l	20.0	92	59-141	4	30
Progesterone		18.1		ng/l	20.0	90	58-154	2	30
Testosterone		26.0		ng/l	20.0	130	60-172	5	30

Weck Laboratories, Inc 14859 East Clark Avenue, City of Industry, California 91745-1396 (626) 336-2139 FAX (626) 336-2634
www.wecklabs.com

Certificate of Analysis

Notes:
The Chain of Custody document is part of the analytical report.
Any remaining sample(s) for testing will be disposed of one month from the final report date unless other arrangements are made in advance.
All results are expressed on wet weight basis unless otherwise specified.

An Absence of Total Coliform meets the drinking water standards as established by the State of California Department of Health Services.
The Reporting Limit (RL) is referenced as laboratory's Practical Quantitation Limit (PQL).
For Potable water analysis, the Reporting Limit (RL) is referenced as Detection Limit for reporting purposes (DLRs) defined by EPA.

If sample collected by Weck Laboratories, sampled in accordance to lab SOP MIS002

Authorized Signature
Contact: Kim G Tu
(Project Manager)

ELAP # 1132
LACSD # 10143
NELAC # 04229CA

The results in this report apply to the samples analyzed in accordance with the chain of custody document. Weck Laboratories certifies that the test results meet all requirements of NELAC unless noted in the Case Narrative. This analytical report must be reproduced in its entirety.

Flags for Data Qualifiers:

B	Blank contamination. The analyte was found in the associated blank as well as in the sample.
B-06	This analyte was found in the method blank, which was possibly contaminated during sample preparation. The batch was accepted since this analyte was either not detected or more than 10 times of the blank value for all the samples in the batch.
Q-08	High bias in the QC sample does not affect sample result since analyte was not detected or below the reporting limit.
Q-12	The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on the percent recoveries and/or other acceptable QC data.
R-01	The Reporting Limit for this analyte has been raised to account for matrix interference.
ND	NOT DETECTED at or above the Reporting Limit. If J-value reported, then NOT DETECTED at or above the Method Detection Limit (MDL).
Sub	Subcontracted analysis, original report enclosed.
DL	Method Detection Limit
RL	Method Reporting Limit
MDA	Minimum Detectable Activity
NR	Not Reportable

Weck Laboratories, Inc 14859 East Clark Avenue, City of Industry, California 91745-1396 (626) 336-2139 FAX (626) 336-2634
www.wecklabs.com

ISOTECH
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Water Analysis

Lab Number: 410669 Job Number: 24232 IS-69368

Sample Name: CITY OF SEASIDE #4

Company Lab #:

Company Job #:

Company: Alpha Analytical, Inc.

API/Well:

Field or Site: WO 14B0093

Location:

Depth/Formation:

Container Type: 1 Liter Plastic Bottle

Date Sampled: 2/03/2014 Date Received 2/05/2014 Date Reported: 2/26/2014

δD of water	----------	na
$\delta^{18}O$ of water	----------	na
Tritium content of water	----------	0.70 ± 0.15 TU
$\delta^{13}C$ of DIC	----------	na
^{14}C content of DIC	----------	na
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na

Remarks:

LABORATORY REPORT

This report contains ___7___ pages.
(including the cover page)

If you have any questions concerning this report, please do not hesitate to call us at (800) 332-4345 or (574) 233-4777.

This report may not be reproduced, except in full, without written approval from UL.

UL LLC
110 S. Hill St., South Bend, IN 46617-2702 USA
T: 800.332.4345 / F: 574.233.8207 / W: UL.com

NELAC NARRATIVE PAGE

Client: Alpha Analytical Report #: 311111NP

Underwriters Laboratories is a NELAP accredited laboratory. All reported results meet the requirements of the NELAC standards, unless otherwise noted.

UL contact person: James Van Fleit

NELAP requires complete reporting of deviations from method requirements, regardless of the suspected impact on the data. Quality control failures not reported within the report summary are noted here.

There were no quality control failures.

Note: This report may not be reproduced, except in full, without written approval from UL. UL is accredited by the National Environmental Laboratory Accreditation Program (NELAP).

Authorized Signature Title Date

UL LLC
110 S. Hill St., South Bend, IN 46617-2702 USA
T: 800.332.4345 / F: 574.233.8207 / W: UL.com

Laboratory Report

Client:	Alpha Analytical	Report:	311111
Attn:	David Pingatore 6398 Dougherty Road, Suite 35 Dublin, CA 94568	Priority:	Standard Written
		Status:	Final
		PWS ID:	Not Supplied

Copies to: None

Sample Information

UL ID #	Client ID	Method	Collected Date / Time	Collected By:	Received Date / Time
2968100	14B0093-01	905.0	02/03/14 15:00	Client	02/06/14 09:45
2968101	14B0093-01	7500-Ra B	02/03/14 15:00	Client	02/06/14 09:45
2968101	14B0093-01	7500-Ra D	02/03/14 15:00	Client	02/06/14 09:45
2968102	14B0093-01	7110 B	02/03/14 15:00	Client	02/06/14 09:45
2968103	14B0093-01	1613	02/03/14 15:00	Client	02/06/14 09:45
2968104	14B0093-01	300.0	02/03/14 15:00	Client	02/06/14 09:45
2968105	14B0093-01	300.1	02/03/14 15:00	Client	02/06/14 09:45

Report Summary

Note: See attached page for additional comments.

Note: Sample containers were provided by the client except for Methods 300.0 and 300.1.

Note: Strontium-90 analysis was performed by General Engineering Laboratories, Charleston, SC.

Detailed quantitative results are presented on the following pages. The results presented relate only to the samples provided for analysis.

We appreciate the opportunity to provide you with this analysis. If you have any questions concerning this report, please do not hesitate to call James Van Fleit at (574) 233-4777.

Note: This report may not be reproduced, except in full, without written approval from UL. UL is accredited by the National Environmental Laboratory Accreditation Program (NELAP).

Authorized Signature | Title | Date

Client Name: Alpha Analytical
Report #: 311111

UL LLC
110 S. Hill St., South Bend, IN 46617-2702 USA
T: 800.332.4345 / F: 574.233.8207 / W: UL.com

Client Name: Alpha Analytical

Report #: 311111

Sampling Point: 14B0093-01

PWS ID: Not Supplied

General Chemistry

Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	UL ID #
14998-27-7	Chlorite	300.0	1000 *	20	< 20	ug/L	---	02/07/14 03:49	2968104
15541-45-4	Bromate	300.1	10 *	5.0	< 5.0	ug/L	---	02/07/14 17:44	2968105

Radionuclides

Analyte ID #	Analyte	Method	Reg Limit	DL**	Result	Units	Preparation Date	Analyzed	UL ID #
---	Gross Alpha	7110 B	15 *	3.00	0.29 ± 0.39	pCi/L	02/24/14 09:07	02/27/14 13:25	2968102
---	Gross Beta	7110 B	50 *	4.0	1.4 ± 0.5	pCi/L	02/24/14 09:07	02/27/14 13:25	2968102
13982-63-3	Radium-226	7500-Ra B	3 *	1.00	0.48 ± 0.46	pCi/L	02/21/14 09:22	02/27/14 15:45	2968101
15262-20-1	Radium-228	7500-Ra D	2 *	1.00	0.11 ± 0.38	pCi/L	02/21/14 09:22	03/03/14 14:08	2968101
---	Combined Radium	calc.	5 *	1.00	0.59 ± 0.60	pCi/L	02/21/14 09:22	03/03/14 14:08	2968101

** Detection Limit (DL) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Semi-volatile Organic Chemicals

Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	UL ID #
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-Dioxin	1613	30 *	5.0	< 5.0	pg/L	02/12/14 07:40	02/13/14 20:38	2968103

Reference Lab Tests

Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	UL ID #
---	Strontium-90	905.0	8 *	2.00	**0.339 ± 0.692**	pCi/L	---	02/21/14 14:23	2968100

† UL has demonstrated it can achieve these report limits in reagent water, but can not document them in all sample matrices.

Reg Limit Type:	MCL	SMCL	AL
Symbol:	*	^	!

Lab Definitions

Continuing Calibration Check Standard (CCC) / Continuing Calibration Verification (CCV) / Initial Calibration Verification Standard (ICV) / Initial Performance Check (IPC) - is a standard containing one or more of the target analytes that is prepared from the same standards used to calibrate the instrument. This standard is used to verify the calibration curve at the beginning of each analytical sequence, and may also be analyzed throughout and at the end of the sequence. The concentration of continuing standards may be varied, when prescribed by the reference method, so that the range of the calibration curve is verified on a regular basis.

Internal Standards (IS) - are pure compounds with properties similar to the analytes of interest, which are added to field samples or extracts, calibration standards, and quality control standards at a known concentration. They are used to measure the relative responses of the analytes of interest and surrogates in the sample, calibration standard or quality control standard.

Laboratory Duplicate (LD) - is a field sample aliquot taken from the same sample container in the laboratory and analyzed separately using identical procedures. Analysis of laboratory duplicates provides a measure of the precision of the laboratory procedures.

Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS) - is an aliquot of reagent water to which known concentrations of the analytes of interest are added. The LFB is analyzed exactly the same as the field samples. LFBs are used to determine whether the method is in control.

Laboratory Method Blank (LMB) / Laboratory Reagent Blank (LRB) - is a sample of reagent water included in the sample batch analyzed in the same way as the associated field samples. The LMB is used to determine if method analytes or other background contamination have been introduced during the preparation or analytical procedure. The LMB is analyzed exactly the same as the field samples.

Laboratory Trip Blank (LTB) / Field Reagent Blank (FRB) - is a sample of laboratory reagent water placed in a sample container in the laboratory and treated as a field sample, including storage, preservation, and all analytical procedures. The FRB/LTB container follows the collection bottles to and from the collection site, but the FRB/LTB is not opened at any time during the trip. The FRB/LTB is primarily a travel blank used to verify that the samples were not contaminated during shipment.

Matrix Spike Duplicate Sample (MSD) / Laboratory Fortified Sample Matrix Duplicate (LFSMD) - is a sample aliquot taken from the same field sample source as the Matrix Spike Sample to which known quantities of the analytes of interest are added in the laboratory. The MSD is analyzed exactly the same as the field samples. Analysis of the MSD provides a measure of the precision of the laboratory procedures in a specific matrix.

Matrix Spike Sample (MS) / Laboratory Fortified Sample Matrix (LFSM) - is a sample aliquot taken from field sample source to which known quantities of the analytes of interest are added in the laboratory. The MS is analyzed exactly the same as the field samples. The purpose is to demonstrate recovery of the analytes from a sample matrix to determine if the specific matrix contributes bias to the analytical results.

Quality Control Standard (QCS) / Second Source Calibration Verification (SSCV) - is a solution containing known concentrations of the analytes of interest prepared from a source different from the source of the calibration standards. The solution is obtained from a second manufacturer or lot if the lot can be demonstrated by the manufacturer as prepared independently from other lots. The QCS sample is analyzed using the same procedures as field samples. The QCS is used as a check on the calibration standards used in the method on a routine basis.

Reporting Limit Check (RLC) / Initial Calibration Check Standard (ICCS) - is a procedural standard that is analyzed each day to evaluate instrument performance at or below the minimum reporting limit (MRL).

Surrogate Standard (SS) / Surrogate Analyte (SUR) - is a pure compound with properties similar to the analytes of interest, which is highly unlikely to be found in any field sample, that is added to the field samples, calibration standards, blanks and quality control standards before sample preparation. The SS is used to evaluate the efficiency of the sample preparation process.

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

14B0093

250324

311111

SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: David S. Pingatore

RECEIVING LABORATORY:

UL Drinking Water Laboratory
110 South Hill Street
South Bend, IN 46617
Phone :(574) 472-5535
Fax: (574) 233-8207
Terms: Net 30

Analysis	Due	Expires	Comments
14B0093-01 City Of Seaside #4 [Water] Sampled 02/03/14 15:00 Pacific			
Strontium 90	02/18/14 12:00	08/02/14 15:00 (4)	pH<2 2968100
Radium 226 & 228	02/18/14 12:00	08/02/14 15:00	101
Gross Alpha & Beta	02/18/14 12:00	08/02/14 15:00	102
Dioxin 2378 TCDD Aq 1613	02/18/14 12:00	02/03/15 15:00 (2)	103
Chlorite 300.0	02/18/14 12:00	02/17/14 15:00 (1)	104
Bromate 300.1	02/18/14 12:00	03/03/14 15:00 (1)	105

Containers Supplied:

1L Amber- Unpres. (AB) 1L Amber- Unpres. (AC) 1L Poly - HNO3 (AJ) 1L Poly - HNO3 (AK) 1L Poly - HNO3 (AL)
500 mL Poly HNO3 (AM) 250 mL Poly EDA (AN) 250 mL Poly EDA (AO)

☐ *Report to State*

System Name: _____ Employed by: _____

User ID: _____ Sampler: _____

System Number: _____

+2C

Client Provided Sample Container Radn + Dioxin only

Wd in 0.2 ft

Released By	Date	Received By	Date
[signature]	2-4-14	Kellen Dupont	2.6.2014 0945
Released By	Date	Received By	Date

Underwriters Laboratories
110 South Hill Street
South Bend, IN 46617
800-332-4345
574-233-8207 fax

REC - Subcontractor Laboratory Request Form

Reference Lab Name: GEL Laboratories
Address: 2040 Savage Rd
City, State, Zip: Charleston, SC 29407
Telephone Number: 843-556-8171

Total Sent: 1
Shipping Method: SAVER
UL Contact Name: VANFleit

Reference Lab: This form must be returned by fax to 574-233-8207 (Attn: OTD Coordinator) upon receipt of samples. Note any discrepencies in the number of samples received, analyses requested, sample condition upon receipt, ID discrepencies, or price in the Reference Lab Notes section at the bottom of this form.

Result sheets must be faxed to 574-233-8207 (Attn: OTD Coordinator) upon completion of analysis. All sample charges may be billed to the VISA card on file.

UL Order #	UL Batch #	UL Sample ID#	Matrix	Collection Date	Collection Time	State of Origin	QC Criteria (circle one)	Analysis Requested	Price	UL-PM
250324	311111	2968100	DW	2-3-2014	1500	CA	NELAC / State compliance / non-compliance	STRONTium 90		
							NELAC / State compliance / non-compliance			
							NELAC / State compliance / non-compliance			
							NELAC / State compliance / non-compliance			
							NELAC / State compliance / non-compliance			
							NELAC / State compliance / non-compliance			
							NELAC / State compliance / non-compliance			
							NELAC / State compliance / non-compliance			
							NELAC / State compliance / non-compliance			
							NELAC / State compliance / non-compliance			
							NELAC / State compliance / non-compliance			
							NELAC / State compliance / non-compliance			

Reference Lab Notes:

Relinquished from UL By: _____ Date/Time: _____

Matrix: DW, RW, GW, SW, BW, EW, PW, WW

Received by Reference Lab By: _____ Date/Time: _____

David S. Pingatore
Project Manager
Alpha Analytical Laboratories, Inc.
208 Mason Street
Ukiah, CA 95482
Tel: 707.468.0401
Fax: 707.468.5267
Project: 14B0093
Email: david @ alpha.com

Dr. Yi Wang
Director of ZymaX Forensics Isotope
Senior Environmental Geochemist, PACE
600 S. Andreasen Dr., Suite B
Escondido, CA 92029
Tel: 760.781.3338 ext 202
Fax: 760.781.3339
Cell: 609.721.2843
Email: yi.wang@zymaxusa.com

REPORT OF ENVIRONMENTAL FORENSICS ISOTOPE ANALYSES

Date Received: February 5th, 2014
Date Reported: March 20th, 2014

Sample from Alpha Analytical Labs for $\delta^{15}N$ (‰ Air), $\delta^{18}O$ and δD (‰ VSMOW) stable isotope analysis

ZymaX ID	Client ID/Sample Description	$\delta^{18}O_{H2O}$	δD_{H2O}	$\delta^{15}N_{NO3}$	$\delta^{18}O_{NO3}$
43454-1	14B0093-01 City of Seaside #4	-6.62	-44.27	1.4	0.7
	Analytical precision (1σ)	0.06	0.32	0.2	0.4

ZymaX ID	$\delta^{18}O_{H2O}$	δD_{H2O}	$\delta^{15}N_{NO3}$	$\delta^{18}O_{NO3}$
QC-01	-5.89	-41.12	4.5	25.3
QC-02	-5.98	-41.57	4.8	25.9
Mean	-5.94	-41.35	4.7	25.6
Analytical Precision (1σ)	0.06	0.32	0.2	0.4

ZymaX Forensics Isotope Services

Product or Dissolved Organics: Chlorinated Solvents, Oil, Extract, Fraction and Kerogen
3D-CSIA of ^{13}C, ^{37}Cl, and ^{2}H for PCE, TCE, DCE, MTBE, BTEX, PAHs, Pesticides, Alkanes, Gasoline and Oil; Bulk ^{13}C, ^{2}H, ^{18}O, ^{34}S, and ^{15}N
Gas Sample
Gas Composition and 2D-CSIA of ^{13}C and ^{2}H of C1 to C5; ^{13}C of CO_2; ^{14}C of C1 and CO_2; ^{34}S of H_2S; ^{15}N and ^{18}O of N_2O gas
Water and Dissolved Inorganics
^{2}H, ^{3}H and ^{18}O; ^{34}S and ^{18}O of dissolved sulfate; ^{34}S of dissolved H_2S
^{15}N and ^{18}O of dissolved Nitrate; ^{15}N of Ammonia; ^{13}C of dissolved CO_2 and Carbonate/Bicarbonate
Soil and Minerals
^{13}C, ^{18}O, ^{15}N, ^{34}S, D/H; ^{14}C of carbonate or organics
Post-Analysis Forensic Isotope Data Interpretation

Laboratory Order - Summary

analytical chemistry for a better environment

Report To:	David S. Pingatore Alpha Analytical Laboratories, Inc. 208 Mason St. Ukiah, CA. 95482	Date Received: Date Due: Project:	02/05/2014 04/28/2014 14B0093	9:05AM 12:00AM
Phone: Fax:	(707) 468-0401 (707) 468-5267	Project Number:		

Lab Number	Description	Analysis	Dept
43454-1	14B0093-01 City of Seaside #4	d15N and d18O of NO3	M6
		d18O+dD of H2O	M6

Notes/Special Instructions	SC Login/Computer Login CY/CY	DPRA PM: YW

ZymaX FORENSICS

Condition Upon Reciept

Lab Number: 43454 Client: AAL

Sample Temprature (should be 2-6 degrees C): 1.9°C

Do the sample descriptions on the containers match the discriptions on the COC? ☒ Yes ☐ No

Do the sample dates on the containers match the sample dates on the COC? ☒ Yes ☐ No

Are the samples within holding time for each analysis at time of reciept? ☒ Yes ☐ No ☐ N/A

Do the number of containers received match the number listed on the COC, and are all of the necessary containers for the required analysis available? ☒ Yes ☐ No ☐ N/A

Does the preservation of the samples match the notation on the COC, and is the preservation correct for requested analysis? ☐ Yes ☐ No ☐ N/A ☒ Zymax

Are all of the samples intact with no headspace, if required for analysis? ☒ Yes ☐ No

Did samples arrive with custody seal intact? ☒ Yes ☐ No ☐ N/A

Sample Control Signature: [signature] Date: 2/5/14 Time: 9:05

Client Discrepancies

Contacted: _____ Date: _____ Sample Control Initials: _____

Discrepancy: _____

Solution: _____

Contacted: _____ Date: _____ Sample Control Initials: _____

Discrepancy: _____

Solution: _____

Contacted: _____ Date: _____ Sample Control Initials: _____

Discrepancy: _____

Solution: _____

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com

Laboratory & Corporate: 208 Mason Street, Ukiah, CA 95482
707-468-0401 Fax: 707-468-5267

Service Center & Micro Lab: 6398 Dougherty Rd, Ste 35, Dublin, CA 94568
925-828-6226 Fax: 925-828-6309

Chain of Custody Record

Reports and Invoices will be delivered by email in .pdf format.

Lab No. 14B0093

Report to:	Invoice to (if different):	Project Info for Report:
Company: Todd Engineers	Company:	Project ID: Groundwater Reuse Project
Attn: Dr. Bill Motzer	Attn:	
Address: 2490 Mariner Square Loop, Suite 215 Alameda, CA 94501	Address:	Project No: Project # 60408
Phone/Fax: 510.747.6920 / 510.747.6921	Phone/Fax:	PO/Reference :
Email Address: bmotzer@toddengineers.com	Email Address:	

Samplers Signature: [signature]
Print: Jon Cutiz

Signature below authorizes work under terms stated on reverse side.

TAT: 10 days ● RUSH: 5 days ○ 48 hours ○ Other: ___days ○

Lab Approval Required For Rush TATs

Sample Notes (lab use only): Temperature: 4.2 1.9 deg. C; Shipment Method:; Custody Seals: Y / N

Sample Identification	Sampled: Date	Sampled: Time	Container: 40ml VOA	Poly	Amber glass	Soil jar		Preservative: NaOH	HNO3	H2SO4	Other	None	Matrix: Water	Soil		Total Number of Containers	Analyses Requested: Inorganics Scan, DU-General Physical Scan	200.7 - Ca, K, Mg, Na	200.8 - Ag, B, Cu, Fe, Mn, U, V, Zn	Bicarbonate, Chloride, Conductivity	MBAS, Perchlorate, TDS, Sulfate	HAA5, TOC	507, 508, 515, 525 DHS, 531, 547, 548, 549	504.1, 524.2 Sample Traps scan	Asbestos DW (sub TEM Lab)	Cr6 218.6 DW (sub MAI) - DU Refer	Dioxin 2,3,7,8 TCDD DW (sub UL)	Sample Notes or CDPH Source Numbers:
City of Seaside #4	2-3-14	1500		x	x			x	x			x	x			4	x	x	x	x	x							
			x		x						x		x			3						x						
				x	x						x	x	x			10							x					(507/508/515.1 = one 1L BRA ea)
			x								x		x			7								x				
					x							x	x			2									x			
				x							x		x			1										x		
					x							x	x			2											x	
Trip blank ($0.00 analysis)	2-3-14		x								x	x	x			2								x				

Relinquished by:	Received by:	Date:	Time:
[signature]	[signature]	2-3-14	15:10
[signature]	[signature]	2-3-14	1700
[signature]	[signature]	2-3-14	1850
[signature]	LAB [signature]	2-3-14	2130

CDPH Write On EDT Transmission? ○ Yes ○ No

State System Number:

If "Y" please enter the Source Number(s) in the column above

CA Geotracker EDF Report? ○ Yes ○ No

Global ID: Sampling Company Log Code:

EDF to (Email Address):

Travel and Site Time: Mileage: Misc. Supplies:

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com

Laboratory & Corporate: 208 Mason Street, Ukiah, CA 95482
707-468-0401 Fax: 707-468-5267

Service Center & Micro Lab: 6398 Dougherty Rd, Ste 35, Dublin, CA 94568
925-828-6226 Fax: 925-828-6309

Chain of Custody Record

Reports and Invoices will be delivered by email in .pdf format.

Lab No. 14B0093

Report to:
Company: Todd Engineers
Attn: Dr. Bill Motzer
Address: 2490 Mariner Square Loop, Suite 215, Alameda, CA 94501
Phone/Fax: 510.747.6920 / 510.747.6921
Email Address: bmotzer@toddengineers.com

Invoice to (if different):
Company:
Attn:
Address:
Phone/Fax:
Email Address:

Project Info for Report:
Project ID: Groundwater Reuse Project
Project No: Project # 60408
PO/Reference :

Samplers Signature:
Print: Jose Ortiz

Signature below authorizes work under terms stated on reverse side.

TAT: 10 days ● / RUSH: 5 days ○ / 48 hours ○ / Other: ___days ○

Lab Approval Required For Rush TATs

Sample Notes (lab use only): Temperature: 4 deg. C; Shipment Method:; Custody Seals: Y / N

Sample Identification	Sampled: Date	Sampled: Time	Container: 40ml VOA	Poly	Amber glass	Soil jar	Preservative: HCL	HNO3	H2SO4	Other	None	Matrix: Water	Soil	Total Number of Containers	8330B Explosives (sub ALS)	PPCP Hormones 1694M (sub Weck)	PPCP Negative Pharmas 1694M (sub Weck)	PPCP Positive Pharmas 1694M (sub Weck)	Nitrosamines LL 1625M (sub Weck)	Gross A & B, R226 &R228, Sr 90 (sub UL)	Bromate 300.1, Chlorite 300.0 (sub UL)	Tritium, Enriched (sub Isotech)	Oxygen 18 Isotope (sub Zymax)	N and O Isotopes of NO3 (sub Zymax)	j-flag MDL reporting + Standard excel EDD	Sample Notes or CDPH Source Numbers:
City of Seaside #4	2-3-14	1506			x						x	x		2	x											
					x					x		x		2		x	x	x							x	
					x						x	x		2					x							
				x				x				x		4						x						
				x						x		x		2							x					
				x							x	x		1								x				
				x							x	x		1									x			
				x							x	x		1										x		

Relinquished by:	Received by:	Date:	Time:
[signature]	[signature]	2-3-14	15:10
[signature]	[signature]	2-3-14	1850
[signature]	[signature]	2-3-14	5130

CDPH Write On EDT Transmission? ○ Yes ○ No
State System Number:
If "Y" please enter the Source Number(s) in the column above

CA Geotracker EDF Report? ○ Yes ○ No
Global ID: Sampling Company Log Code:
EDF to (Email Address):

Travel and Site Time: Mileage: Misc. Supplies:

APPENDIX G

Geochemical Model Simulation Results

Technical Memorandum: Geochemical Evaluation of Injection of Water into the Aromas Formation

Mahoney Geochemical Consulting
July 31, 2014

Technical Memorandum

TO: Edwin Lin, Gus Yates, William Motzer, Ph.D. - Todd Groundwater

FROM: John Mahoney, Ph.D.

DATE: July 31st, 2014

SUBJECT: Geochemical Evaluation of Injection of Water into the Aromas Formation

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INTRODUCTION

A series of PHREEQC (Parkhurst and Appelo, 2013) geochemical models and PHAST for Windows (p4w) reactive transport models (Parkhurst et al. 2010) were constructed to better understand the potential impacts of aquifer storage in the Aromas Formation and subsequent infiltration into the Paso Robles Formation. Both programs were developed by the US Geological Survey and are in the public domain. Particular attention was focused on arsenic [assumed to be an arsenate form - As(5)] and hexavalent chromium [Cr(IV)]. The models primarily examined the interaction between the proposed injectate composition and the Aromas Sands. Examples of the general model setups are included at the end of this memo.

The composition of the pilot water (proposed injection solution) is listed below, this compositions was derived from the composition listed in Table 14 of the Todd Groundwater main report, prepared by Todd Groundwater, Inc. The parameters used to represent the modeled composition are listed in Table 1 of this technical memorandum. These modeled compositions were mainly major ions and trace metals that had values above the reporting limit.

Concentrations in the proposed pilot water for arsenic and lead were less than the reporting limit, so they were not included in the modeled composition. Ammonia, although reported, was not included in the model calculations either. In reaction models with excess oxygen, PHREEQC tends to completely oxidize ammonia to nitric acid, this changes the pH to unrealistically low values. Normally, nitrification occurs in steps and nitrogen gas is produced in the first step rather than nitrate. In most models the alternative approach is to remove the ammonia and nitrate reaction in the database, and this approach was used in these models. Ammonia is a reducing agent so its presence would have favored the production of Cr(III) rather than Cr(VI). So with respect to public health risk, the model is conservative.

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These models do not evaluate the oxidation of Cr(III) to hexavalent chromium. In most cases involving groundwater, oxidation is believed to be a slower process than the release of surface complexed As and Cr. Those rate limited models enter the realm of chemical kinetics and although PHREEQC can prepare such models they usually require a more detailed characterization including a series of concentration measurements reported as a function of time. Please see the work of Gonzales et al. (2005) for a discussion of oxidation of chromium to chromate in the Aromas Formation.

Table 1. Summary of Concentrations used in the Geochemical Models, units in mg/L.

Parameter	Pilot Water	FO-7 Shallow Paso Robles	Paso Robles Low As Pb
pH	7.7	8.11	8.11
pe	10.7	10.5	10.5
Bicarbonate	43	68	68
Ammonia (not included in model)	1.3	--	--
Arsenic as As(5)	--	0.2	0.01
Barium	0.14	--	--
Calcium	11	29	29
Chloride	2	44	44
Chromium as Cr(6)	0.00021	0.0017	0.0017
Lead	--	0.042	0.0042
Magnesium	--	3.8	3.8
Nitrate as N	0.64	0.266	0.266
Potassium	0.05	3.1	3.1
Sodium	19	38	38
Sulfate as S(6)	0.11	24	24
Iron as Fe(2)		80 Not used too high for this water turbidity issues	

The redox condition, listed as the pe in the input file, was defined by ORP measurements reported in volts, corrected for the reference electrode potential which converts the value from an $E_{measured}$ value to a true E_h value, where the subscript h refers to the standard hydrogen electrode (SHE) reference state. Tables in the primary Todd report use the alternative term Normal Hydrogen Electrode (NHE), this is equivalent to the SHE reference. The value is then converted to pe using the following equation:

$$pe = [F]\, E_h / 2.303RT$$

Where F is the Faraday constant (23.061 Kcal/V g eq, or 9.648×10^4 Coulombs/mole),
E_h is in volts,
R is the gas constant, and
T is the temperature in K.

The measured Eh and pH for the pilot water, the leach tests and the receiving water in the Paso Robles Formation are shown on Figures 1 and 2. The two diagrams demonstrate that the dominant (stable form) of chromium is hexavalent chromium (CrO_4^{-2}) and arsenate (as $HAsO_4^{-2}$) strictly speaking biarsenate.

Figure 1. Eh-pH diagram for the system Cr, O, H, at 25°C prepared using HYDRA/MEDUSA (Puigdomenech, 2009). The blue triangle represents the pilot water. The six green diamonds represent measurement taken from the Core Leachate Sample analyses as listed in Table 15 of the Todd Groundwater main report. The purple square represents the composition of the Paso Robles F0-7 shallow sample.

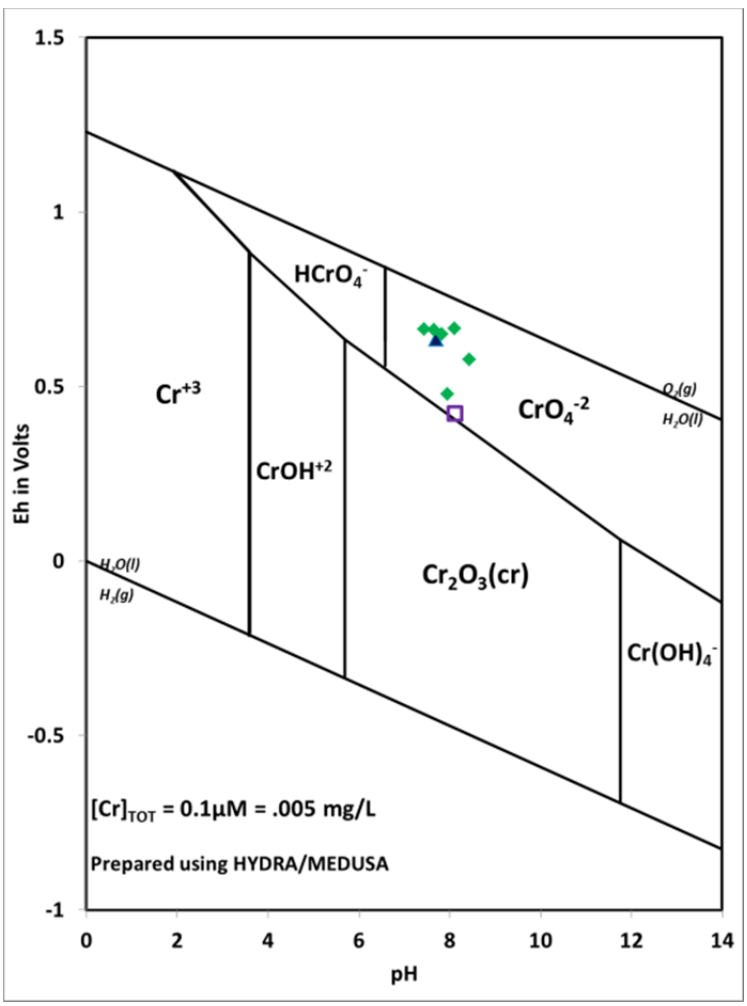
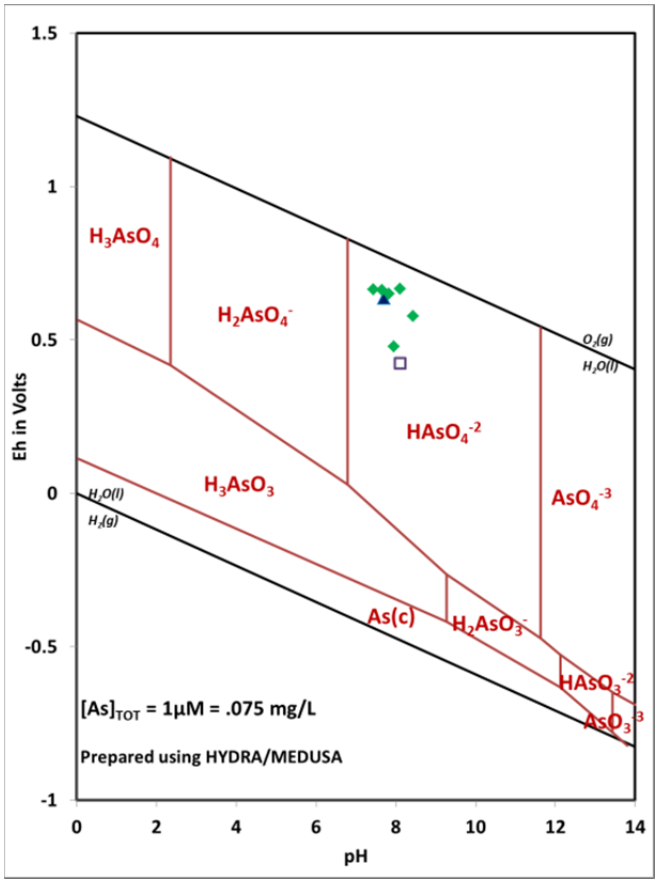


Figure 2. Eh-pH diagram for the system As, O, H, at 25°C. The blue triangle represents the pilot water (injection solution). The six green diamonds represent measurement taken from the Core Leachate Sample analyses as listed in Table 15 of the Todd Groundwater main report. The purple square represents the composition of the Paso Robles F0-7 shallow sample.



SURFACE COMPLEXATION MODELS

In selecting the geochemical modeling approach the chemical characteristics of arsenic and chromium were considered in light of the geochemical conditions related to the proposed (pilot water) injection solution, the nature of the unsaturated Aromas Formation and the composition of the ambient groundwater in the Paso Robles Formation. The low concentration of these components and oxidizing conditions preclude the formation of solid precipitates. Consequently, a sorption based model is believed to be the primary process to control these elements. The model relies primarily upon surface complexation reactions as defined by Dzombak and Morel, (1990). Model assumptions were confirmed and constrained by the laboratory results. Surface complexation parameters were updated for arsenic as arsenate, and the reactions of Gustafsson and Bhattacharya (2007) were used instead of those reported by Dzombak and Morel (1990). Surface complexation constants for hexavalent complexation onto HFO as reported by Dzombak

and Morel were reviewed and considered to be acceptable. Additional details about surface complexation models can be found in Langmuir (1997).

Surface ionization and complexation models allow for the calculation of adsorption reactions onto mineral surfaces. In these models the primary mineral is usually ferrihdyrite [$Fe(OH)_3$] and it is commonly called hydrous ferric oxide (HFO). The atoms that make up the surface form complexes with components in solution. The basic premise of all the models is that certain mineral surfaces can form complexes with dissolved species and these complexes lower the concentration of dissolved components in solution. There are various surface ionization and complexation models that mainly differ in how the surface charge and surface potential are estimated.

The particular version used in these models was based upon work presented in Dzombak and Morel (1990). For the HFO surface the dominant complexes are defined as the weak surface site, identified as Hfo_wOH.

Hfo_wOH = Hfo_wOH
log_k 0.0

The above reaction represents the formation or presence in the model of an uncharged surface species. The log K value of zero equals 1 and the above equation represents an identity. This is the surface component upon which all other weak surface complexes are based.

The surface sites can react with protons and under low pH conditions the surface will become positively charged.

Hfo_wOH + H^+ = Hfo_wOH_2^+
log_k 7.29 # = pKa1,int

The surface can also release protons in response to high pH conditions.

Hfo_wOH = Hfo_wO^- + H^+
log_k -8.93 # = -pKa2,int

In the diffuse layer model, all the surface charge related reactions occur in the same surface plane. For arsenate adsorption these additional reactions include:

Hfo_wOH + AsO_4^{-3} + $3H^+$ = Hfo_wH2AsO_4 + H_2O
log_k 30.98 # From Gustaffson D&M 29.31

Hfo_wOH + AsO_4^{-3} + $2H^+$ = Hfo_w$HAsO_4^-$ + H_2O
log_k 25.84 # From Gustaffson D&M 23.51

Hfo_wOH + AsO_4^{-3} + H^+ = Hfo_wAsO_4^{-2} + H_2O
log_k 19.5 # Added From Gustaffson D&M did not include

$Hfo\_wOH + AsO_4^{-3} = Hfo\_wOHAsO_4^{-3}$
log_k 11.92 # From Gustaffson D&M 10.58

There is only one reaction for surface complexation with hexavalent chromium:

$Hfo\_wOH + CrO_4^{-2} + H^+ = Hfo\_wCrO_4^- + H_2O$
log_k 10.85

For similar activities and pH values chromium forms fewer surface complexes, one may also say that the complexes with chromate are less strongly bound to the surface than are the arsenic surface complexes. Comparing the following equation $Hfo\_wOH + AsO_4^{-3} + H^+ = Hfo\_wAsO_4^{-2} + H_2O$ with a log k value of 19.5 to the single chromium reaction indicates that the difference is nearly nine orders of magnitude greater for the arsenate surface complex

Cations can also form surface complexes with the HFO weak sites, as well as a cation specific site called a strong site (Hfo_sOH). Using lead as an example we have:

Hfo_sOH + Pb+2 = Hfo_sOPb+ + H+
log_k 4.65

Hfo_wOH + Pb+2 = Hfo_wOPb+ + H+
log_k 0.3

Strong sites (HFo_sOH) were added by Dzombak and Morel to better fit cation surface complexation particularly under low pH conditions. Dzombak and Morel (1990) set the weak site density based upon 0.2 moles of sites per mole of HFO precipitated. The strong site density was much lower and was based upon a value of 0.005 moles of strong sites per mole of HFO precipitated. Because of the small amount of strong sites it is difficult to identify their role in simple potentiometric titrations. Consequently, the strong sites have the same amphoteric properties as the weak sites with the same log K values.

Hfo_sOH = Hfo_sOH
log_k 0.0

$Hfo\_sOH + H^+ = Hfo\_sOH_2^+$
log_k 7.29 # = pKa1,int

$Hfo\_sOH = Hfo\_sO^- + H^+$
log_k -8.93 # = -pKa2,int

The strong site complexation reactions form stronger complexes with the cations. In some cases strong site metal complexes can nearly equal the weak site concentrations for that metal.

There is another factor that influences the amount of surface complexation and that is the surface charge represented by sigma (σ) and resulting surface potential (ψ). In a surface complexation model calculation, PHREEQC sums up the net surface charge on the surface in terms of equivalents. Using the surface area in contact with the solution, the program then converts sigma values to units of Coulombs/m^2. For example, fresh laboratory produced HFO is assumed to have a surface area of 600m^2/gram. So a model that had 10 grams of fresh HFO would have a surface area of 6000m^2. A potential (ψ) in volts is then calculated and this is converted to a term represented by $\exp(-F\psi/RT)$. This term is used to calculate the thermodynamic "work" required to bring charged ions through the diffuse layer charge on the surface. If the surface is negatively charged, then positive ions (cations) will more readily form surface complexes. If anions are involved then there is a force working against their complex formation and less of the anions will be sorbed onto the surface. This helps explain the pH dependence of surface complexation and provides a starting place for the fact that anions, such as arsenate and chromate form more surface complexes at low pH, where the surface is typically positively charged. Those anions will desorb with increasing pH. Cations show the opposite pattern of increased surface complex formation with increasing pH.

DESCRIPTION OF SITE SPECIFIC MODEL

In most cases predictive geochemical models are not unique. There are numerous adjustable parameters that can influence the model setup and the final conclusion. Consequently, several different models were initially developed and parameters such as total arsenic, hexavalent chromium and the amount of sorbent surface (and the corresponding surface site concentration values) were adjusted primarily by a simple trial and error method. However, the selected values were generally constrained by appropriate laboratory results. Two models are described below and they demonstrate the range in the selection of the primary parameters. Ultimately the selected model was based upon an arsenic concentration consistent with measured values from the HA-HCl extraction test, a lower surface site concentration, than the initial model as well as approximate agreement with the leach test results.

All models assumed 30% porosity in the Aromas formation and that the main mineral in the formation was quartz with an iron oxide coating. Samples of the Aromas were analyzed using hydroxylamine hydrochloride (HA-HCl) to extract the readily reduced amorphous iron and selected trace metals in the sample. It should be noted that Gonzalez et al. (2005) also included a slightly different HA-HCl extraction in their extraction sequence, and for the most part their extractions produced comparable results. Figure 3 summarizes the calculations needed to estimate surface site concentrations for the model. Trace metal concentrations for arsenic, lead and Cr(VI) from the extraction were converted to concentrations based upon the amount of rock in contact with 1 liter of solution. To avoid confusion this memo will refer to the HA-HCl procedure as an extraction, and the column leach tests that used the proposed pilot water as the leachate will be described as the leach test. The two procedures are distinctly different.

PHREEQC is a solution centric model, and all of the reactions are based upon a specific amount of water. That amount is usually, but not always, 1.0 kilogram of water, which is usually equivalent to 1.0 liter of solution. For 30 percent porosity that means 2.33 liters of rock are in contact with one liter of water. If the rock is mainly quartz with a specific gravity of 2.65 then that liter of water is in contact with 6.18 kilograms of rock. The results of these extractions are listed in Table 15 of the Todd Groundwater main report. A spreadsheet was prepared to calculate site concentrations based upon the HA-HCl extraction results. The Aromas 200 to 202.5 foot sample was selected for the model because it has a significantly higher proportion of arsenic relative to the total amount of extractable iron.

Model one assumed that all of the extractable iron is in the form of HFO, 100% of which is exposed to the pore solution. It was decided to model the arsenic and chromium concentrations from the leach test results described on Table 15 of the Todd Groundwater main report. The leach test used 200 grams of solids and 1 liter of pilot water. This is a very high water to rock ratio, and the "porosity" in these leach test was effectively 1300 percent, [(1000 ml of solution)/(~75 ml of Aromas solids)]. Subsequent models used in the transport and PHAST models were based upon 30% porosity. In order to preserve the surface characteristics for subsequent applications the model of the leach test was scaled to represent 6.18 kilograms of solid and 30.9 liters of water. In this model arsenic and chromium reaction amounts were then adjusted to reach the average leachate concentrations. The leach test had a large amount of dilution, and the model must consider the dilution process and the surface complexation reactions simultaneously.

The target concentrations represent the model calculated concentration in the model step that simulates the leach tests. A value of 1.3 µg/L was selected for hexavalent chromium, which is the average from the six leach tests run on the Aromas. For arsenic, the target concentration was around 4-5 µg/L. However, only two of the six leach tests reported values greater than the detection limit of 5µg/L (5.5 and 7.6 µg/L). Accordingly, some latitude was allowed for the average arsenic concentration.

Figure 3. Calculation summary used to estimate surface site concentrations for the surface complexation model.

AROMAS 200 - 202.5						
SOLUTION CENTRIC SITE CONCENTRATION CALCULATION FOR HYDROXYLAMINE HCl EXTRACTABLE IRON						
Hydroxyl Amine HCl extractable iron =		3300	as mg Fe/ Kg (Rock)			
			0.059	moles HFO / Kg (Rock) using =value/ (55.847*1000)		
Specific Gravity of Minerals in Rock =		2.65	Calculation assumes iron with formula weight of 55.847 gm/ mole			
Porosity %	Liters Rock in Contact with 1.0 L	Kilograms Rock in Contact with 1.0 L	Moles Ferrihydrite (HFO)	Hfo_wOH @ 0.2/mol HFO	Hfo_sOH @ 0.005/mol HFO	89 Mass of HFO default 89 g/mole
30	2.33	6.18	0.368	0.0735	0.001839	32.7292
CALCULATED VALUE						
			1%	0.00074	0.000018	0.3273
				For shallow sample 3300 mg/L Fe		
				As	Pb	Cr
			CONCENTRATION mg/kg	1.8	1.1	0.4
			Proportion rock mass/Liter at 30 % porosity	6.18	6.18	6.18
			Formula weights (mg/mole)	74922	207000	52000
			Concentrations to add moles	1.48E-04	3.28E-05	4.754E-05
			for As2O5	7.42E-05		

For an open system [CO2(g)] loaded surface, the model consisted of the first six steps.

1. Define the pilot water composition. This is defined as SOLUTION 1.

2. Use SOLUTION 1 and add K_2CrO_4 at a concentration of 1.0e-6 moles. This value was determined by trial and error. Maintain pH at 7.7. SAVE this as SOLUTION 2.

3. Use SOLUTION 2 and Add As_2O_5 at a concentration of 8.0-3 moles. Maintain pH at 7.7. SAVE this as SOLUTION 3.

4. Use SOLUTION 3, load SURFACE 1 with the arsenic and chromium. Maintain pH at 7.7. SAVE SURFACE as SURFACE 3. The SURFACE 1 starting parameters for 100% HFO are:

```
SURFACE
Hfo_wOH  0.0735  600.0  32.73
Hfo_sOH 0.00184
```

For 1% the values are:

```
SURFACE  1
Hfo_wOH  0.000735  6.0  .3273
Hfo_sOH 0.0000184

SAVE SURFACE 3
EQUILIBRIUM_PHASES 102
Fix_H+  -7.7 NaOH
CO2(g)  -3.4  10
END
```

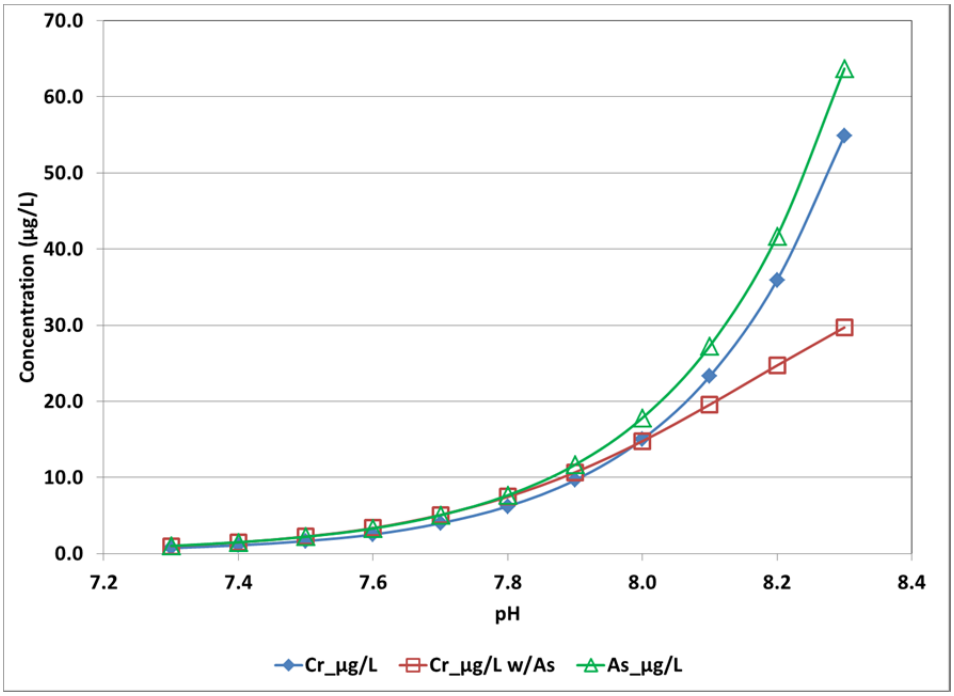
5. To compare to the leach test, prepare 30.9 liters of leaching SOLUTION 1. Do this by mixing SOLUTION 1 at 30.9. SAVE this as SOLUTION 31.

6. USE SOLUTION 31, USE SURFACE 3, and maintain pH at 7.7. This step represents the leach test and uses 6.18 kg of solid, and 30.9 liters of solution 1. Compare these concentrations to the target leachate parameters. Adjust concentrations in steps two and three to match target leachate average values.

Steps 7 to 17 used SOLUTION 1 and SURFACE 3 to sweep a range of pH's from 7.3 to 8.3.

After several iterations, the first model provided a good match to the leachate test results, with arsenic at 4.2 µg/L and chromium at 1.3µg/L. Figure 4 shows the results of the pH sweep calculations. Chromium was estimated to be at approximately 10 µg/L or less at pH values of 7.9 or less. The maximum concentration of hexavalent chromium was less than 30 µg/L at a pH of 8.3. Another simulation was also prepared that effectively removed arsenic from the surface. The figure shows that simulation as the blue line with the diamonds. For that model the chromium concentration was increased from the selected 1.0e-6 moles to 1.3e-5 moles. The increased load of Cr(VI) causes a steep increase in chromium above a pH of about 8.0.

Figure 4. Result of pH sweep simulations assuming 100 percent HA-HCl extractable iron available as HFO sorbent, initial models.



The arsenic concentration used to prepare the model shown in Figure 4 used a value of 8.e-3 moles of As_2O_5. This value is about 100 times greater than the concentration of arsenic measured in the HA-HCl extraction at 7.42e-5 moles of As_2O_5. These high concentrations of arsenic also decrease the surface charge and produce a negative surface even at a pH of 7.3. For the chromium only model the surface developed a negative charge at a pH between 8.1 and 8.2. An alternative model was prepared that was more consistent with the measurements from the HA-HCl extraction. This model constrained the total arsenic concentration to 7.42e-5 moles of As_2O_5. To achieve this, the percent of HFO exposed to pore water was decreased, eventually to 1.0 percent of HA-HCl extractable iron. This assumption is probably more reasonable as over time the effectiveness of HFO as a sorbent decreases as it increases in crystallinity, which decreases the exposed surface area.

The initial models were prepared under closed system conditions. That means that the solutions do not equilibrate with the atmospheric gases carbon dioxide [CO_2(g)] and oxygen [O_2(g)]. The models define oxidized species for arsenic and chromium so exchange with oxygen is not required. The open system model added a source of carbon dioxide and there are two additional surface complexation reactions that are included in the calculations. These reactions are taken from Appelo et al. (2002).

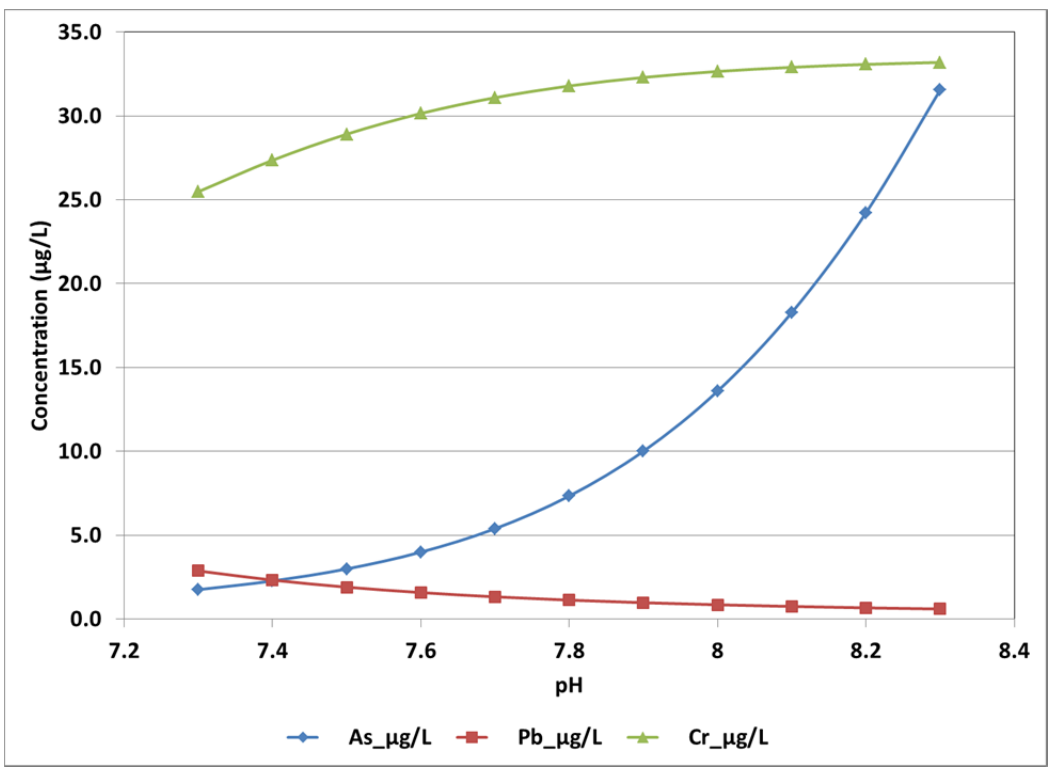
$$Hfo\_wOH + CO_3^{-2} + H+ = Hfo\_wOCO_2^{-} + H_2O$$
log_K 12.78

$Hfo\_wOH + CO_3^{-2} + 2H+ = Hfo\_wOCO_2H + H_2O$
log_K 20.37

Differences are slight between open and closed system models but it was decided to select an open system model (at least for the surface definition steps included loading of As, Cr, and Pb because the leach tests are probably closer to an open system than a closed system. The initial open system models increased the arsenic concentration in the leachate to about 3.5 µg/L and decreased chromium (VI) to 1.1 µg/L so some additional Cr(VI) was added in the reaction step.

Lead was reported in the HA-HCl leachate samples and so it was added to the HFO surface for the final model. As a cation it is strongly adsorbed under these relatively high pH conditions. It also increases the positive surface charge slightly, which helps retain chromate on the HFO surface. The two surface complexation reactions for lead described above were used. Lead was only reported in one of the core leachate samples, and so it was not used to calibrate the surface. Rather it acts more as a site occupying species and it has some influence on the surface charge. The low pH of the HA-HCl extraction may also dissolve other forms of lead in the samples, so it is not as certain that lead is dominantly surface complexed. Figure 5 shows the modeled pilot water concentration for the selected surface conditions as a function of pH.

Figure 5. Concentrations of arsenic, chromate and lead for the open system model for the arsenic constrained model, 1%HFO.



These calculations define a surface that can be used in subsequent models such as the transport models described below. The final surface assumes that only one percent of the HA-HCl extractable iron provides surface sites. The composition of the surface is consistent with the results for the HA-HCl extraction for arsenic. For chromium, the concentration in the extracted water was less than the (relatively high) detection limit of 0.4 mg/L, so a precise concentration could not be selected based upon those tests. However, the core leachate tests did detect chromate and the model is consistent with those results.

SUMMARY OF SURFACE MODEL SELECTION PROCEDURE

The final surface and the surfaces used as the basis for the one-dimensional transport models and the PHAST reactive transport models are summarized in Table 2. These concentrations when equilibrated with the pilot water produced concentrations of arsenic and hexavalent chromium consistent with the leach tests. The loaded surface was estimated at a fixed pH of 7.7 the pH of the pilot water.

Table 2 lists distribution coefficients (Kd) in two ways. The first way is the nondimensional Kd. In PHREEQC this type of Kd is readily calculated and it merely represents the proportion of surface complexed chromium in moles/kgw (kilograms of water) divided by the concentration of chromium in solution (moles/kgw). These are concentrations used in PHREEQC as part of its mass balance constraints. For chromium, the table also includes the more familiar representation reported in units of L/kg. The distribution coefficient is calculated according to:

$$K_d = \frac{\left(Conc_{init} - Conc_{final}\right)}{Conc_{final}} \times \frac{Volume}{Mass}$$

Where:

$Conc_{init}$ is the initial concentration of Cr(VI),
$Conc_{final}$ is the final concentration of Cr(VI),
Volume is volume of solution 1 Liter, and
Mass is mass of solid 6.18 kgs.

Table 2. Summary of HFO surface concentrations.

pH	Fixed 7.7
TOTAL Hfo_wOH moles/L	7.35E-04
TOTAL Hfo_sOH moles/L	1.84E-05
Cr Surface complexed moles/L	6.39E-07
Cr Surface complexed as µg/L	33
Kd Cr dimensionless	0.091
Kd Cr L/kg	0.015
As Surface complexed moles/L	0.00015
As Surface complexed as µg/L	11054
Kd As dimensionless	2677
Pb surface complexed moles/L	3.28E-05
Pb surface complexed as µg/L	6789
Kd Pb dimensionless	9897

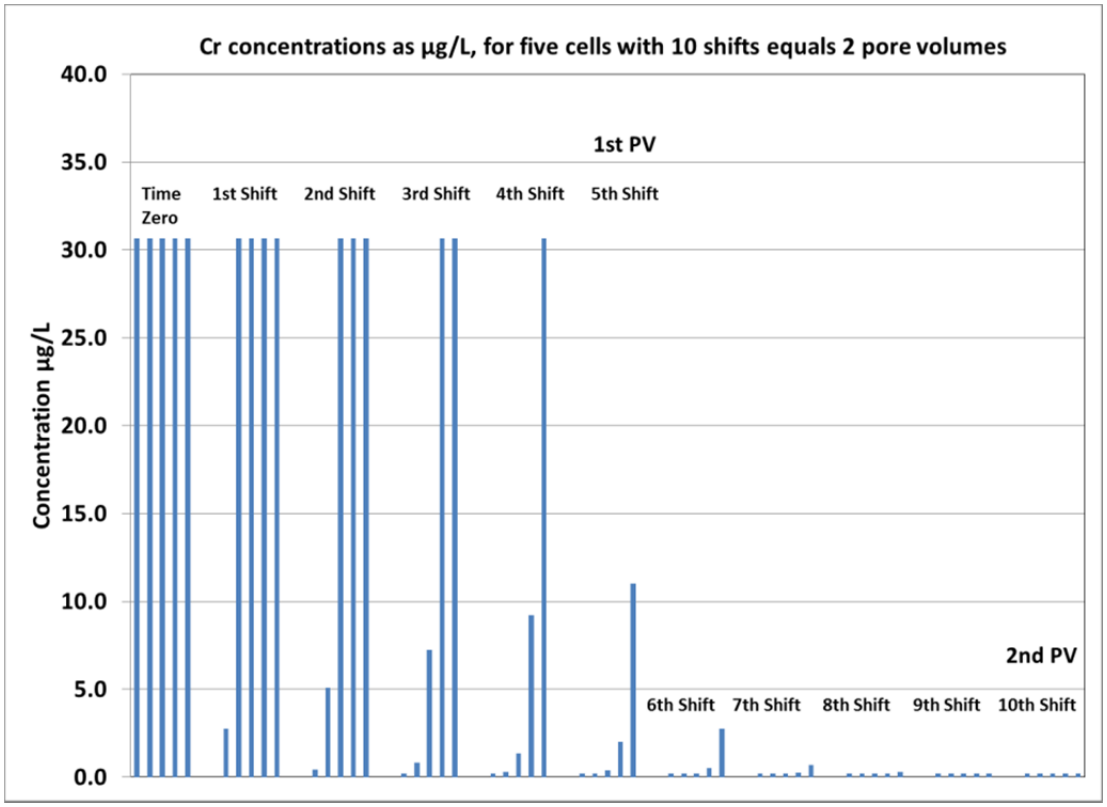
ONE-DIMENSIONAL TRANSPORT MODELS

To further understanding of the release of chromate from the HFO surface a series of transport models were prepared using PHREEQC. The purpose of the transport models was to work around a limitation of the leach test, in which the mineral surface equilibrated with five times more water than would be contained in the pores for that amount of aquifer solids. The concentration of the leachate is the average concentration for five pore volumes of desorption. If the same amount of metal desorbs with each new pore volume, the result is the same as if the

pore volumes had flowed through the rock sequentially, which is what would happen when injected water flows into the aquifer. If desorption decreases substantially with each new pore volume, a very different picture emerges. The transport models investigate this issue by simulating the five pore volumes in sequence rather than simultaneously.

The transport models assumed a simple five cell system and used the same surface as described above. Each of the five cells contained the equivalent of 6.18 kgs of Aromas material as the Loaded HFO surface and the volume of water in each cell was 1 liter. PHREEQC transport models are basically a set of beakers (the cells) and each shift adds new water to the first beaker and transports the water in each cell down to the next cell. For five cells it would take five shifts to replace a pore volume for the five cell system. Figure 6 shows the results of the transport model.

Figure 6. Results of PHREEQC transport model showing the concentrations of Cr(VI) along a five cell "flowpath". Ten shifts are equivalent to two pore volumes.



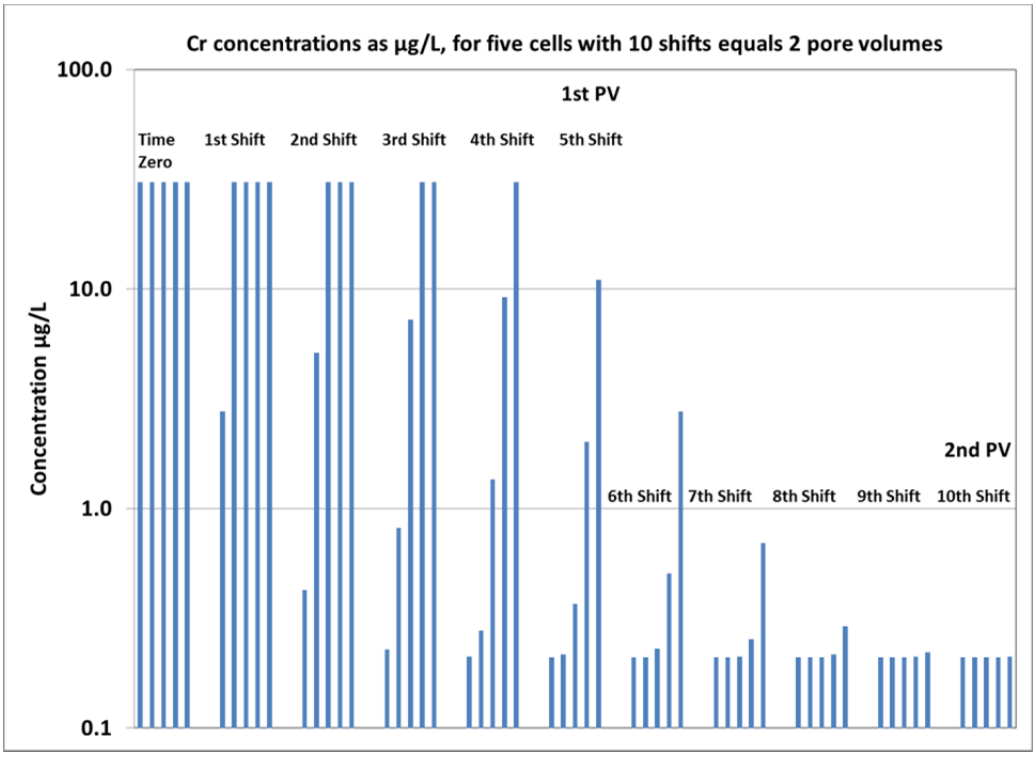
Because the Aromas is unsaturated the initial water in the cells (at Time Zero) is the same pilot water that was used in the previous models. The previously loaded surface equilibrates with the initial water and produced a chromium concentration of 30.65 µg/L. As a first approximation this can be considered to be 0.21 µg/L Cr(VI) from the pilot water and 30.45 µg/L from the surface. This amount is about 93 percent of the chromium on the surface at the start of the simulation. In the first shift, fresh pilot water displaces the waters in the cells and those waters

migrate into their next respective cell. The fresh pilot water introduced into cell 1 creates a new equilibrium, the resultant chromium concentration in cell 1 is now 2.76 µg/L, this removes another 7 to 8 percent of the originally surface complexed Cr(VI). The increase in chromium is a result of the desorption of the surface complexed chromium that remained. The non-dimensional distribution coefficient for Cr(VI) under these conditions is typically around 0.1 or less. Basically with such low Kd's each shift into cell 1 removes approximately 90% of the surface complexed chromium and places it into solution.

In the second shift, solutions are again moved into the next cell. The water previously in cell 1 now moves into cell 2 and a new equilibrium is established. The chromium concentration is now 5.10 µg/L, remember this solution when it was in cell 1 had 2.76 µg/L previously. The new composition in cell 1 is now 0.42 µg/L. The pilot water has a chromium (VI) concentration of 0.21µg/L. so the amount of chromium released in the second shift in cell 1 is only 0.21 µg/L.

In the third shift, cell 3 has a cumulative concentration of 7.25 µg/L. In cell 1, more pilot water is introduced, but the amount of surface complexed chromium is so small that the equilibrated concentration is now 0.228µg/L, nearly the same as the pilot water. The process continues with the next seven shifts. By the eighth shift concentrations in cells 1, 2 and 3 are 0.21 µg/L, and in cell 5 the concentration is 0.290 µg/L. After ten shifts the concentration in cell five is 0.212 ug/L. Figure 7 shows the concentration based upon a log concentration scale.

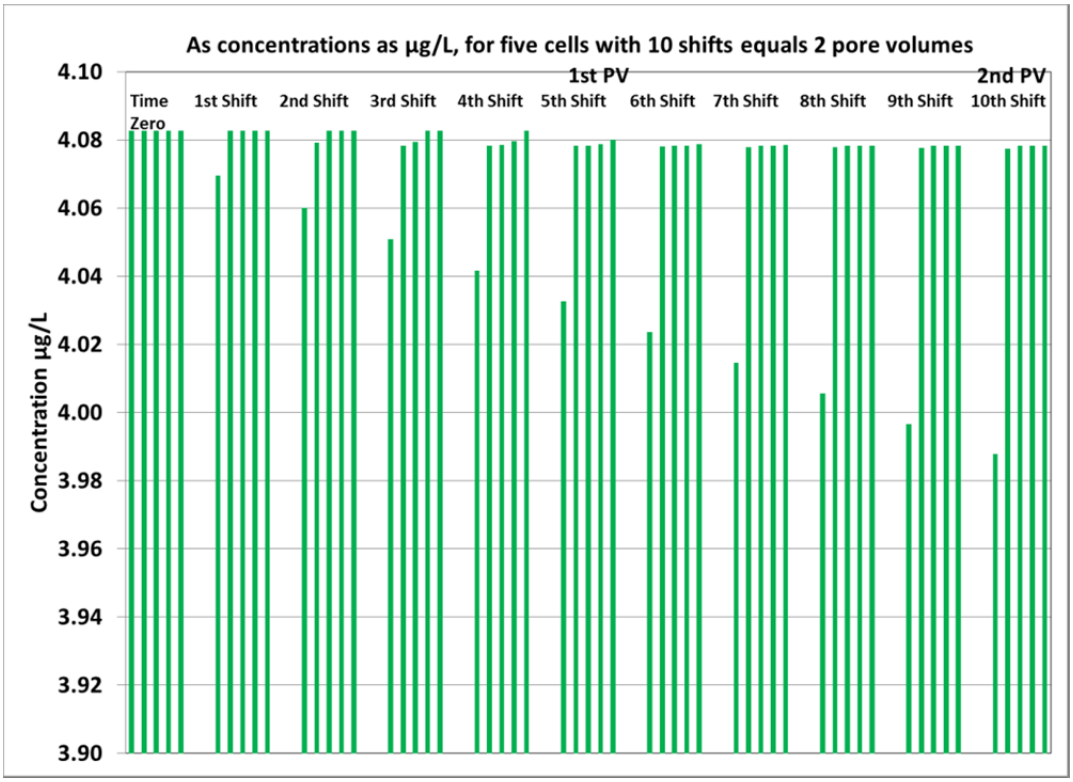
Figure 7. Results of PHREEQC transport model showing the concentrations of Cr(VI) along a five cell "flowpath". Concentrations are shown on a log base 10 scale.



Two pore volumes have essentially removed all of the chromate from this surface. The model that generated the results shown above was actually run out for 20 shifts or four pore volumes. But the result for the third and fourth PV's only showed near pilot concentration and so to simplify the figures and improve readability only the first ten shifts are shown.

The distribution coefficient for arsenic is much larger (Figure 8), so arsenic will be retained on the surface and it will be much harder to remove. In this case, the surface complexation reactions tend to retain the arsenic and release much less of it into the solution during each shift. After ten pore volumes, the concentration in the first cell is still half of its initial concentration, and the remaining four cells are still at or near the initial concentration.

Figure 8. Results of PHREEQC transport model showing the concentrations of arsenic along a five cell "flowpath". Ten shifts, equivalent to two pore volumes, are shown.



The pH sweep and one-dimensional transport models are consistent in their conclusions. The surface will react with the pilot water and release chromate and arsenate. Chromate concentrations 31 µg/L, but this only represents the first pore volume. The small value for the distribution coefficient for chromate means that based upon the core leachate samples there is little chromium "in reserve" on the surface. It is rapidly leached away and effectively diluted. Arsenic on the other hand is strongly retained so it maintains a concentration of around 4 µg/L for some time.

PHAST MODELS

The program PHAST (PHreeqc And Solute Transport) for Windows (version 1.0.8.8538) by Parkhurst et al. (2010) prepares three dimensional reactive solute transport models using PHREEQC to perform all the chemical related calculations. This is a finite difference model that permits scaling to real word dimensions and time frames and provides further insights into the water injection process. This is a preliminary model that is not perfect in its implementation of all proposed features of the project. It is designed to show the nature and extent of the expected geochemical processes at scales (volumes, fluxes and time frames) that approximate the scale of the expected project.

Figure 9 shows the basic features of the model. The model dimensions are 5000 feet by 5000 feet and 300 feet deep. Hydrologic parameters throughout the model are listed in Table 3. The unsaturated Aromas Formation is above the larger Paso Robles formation. Two wells are also included in the image. Later models included an area to allow zone flow estimates from the recharge zone to the Paso Robles.

Figure 9. Basic features of the PHAST model. The Z scale has been increased by a factor of 10. The two wells are represented by the yellow cylinders, the Aromas Formation is the upper purple box, with the spheres to show its dimensions. The area used for the zone flow measurements is the flat magenta square. It is centered in the model in the X and Y dimensions and it is 2500 feet by 2500 feet. Its Z range is 251 to 251.1 feet.

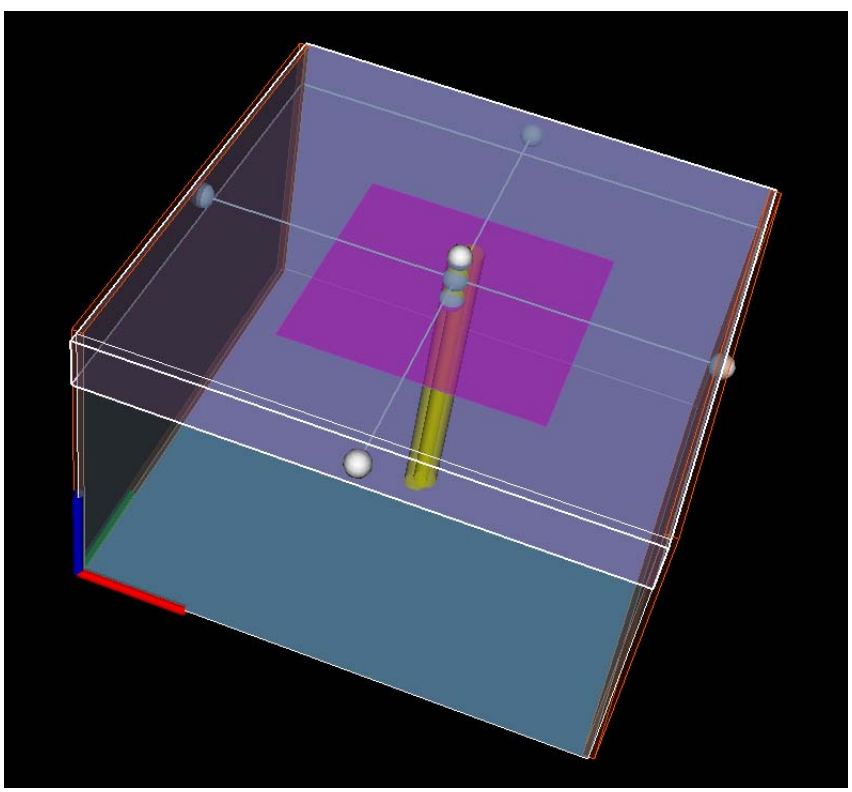


Table 3. Summary of hydrologic conditions for PHAST Model.

Parameter	Value	Units
Hydraulic Conductivity Kx	5	ft/day
Hydraulic Conductivity Ky	5	ft/day
Hydraulic Conductivity Kz	0.5	ft/day
Porosity	0.3	fraction
Specific Storage	0.0001	1/foot
Longitudinal Dispersivity	50	ft
Horizontal Dispersivity	50	ft
Vertical Dispersivity	5	ft

The finite element grid for the X and Y directions is shown on Figure 10. The vertical grid spacing is shown on Figure 11.

Figure 10. X and Y axes grid spacings for PHAST models.

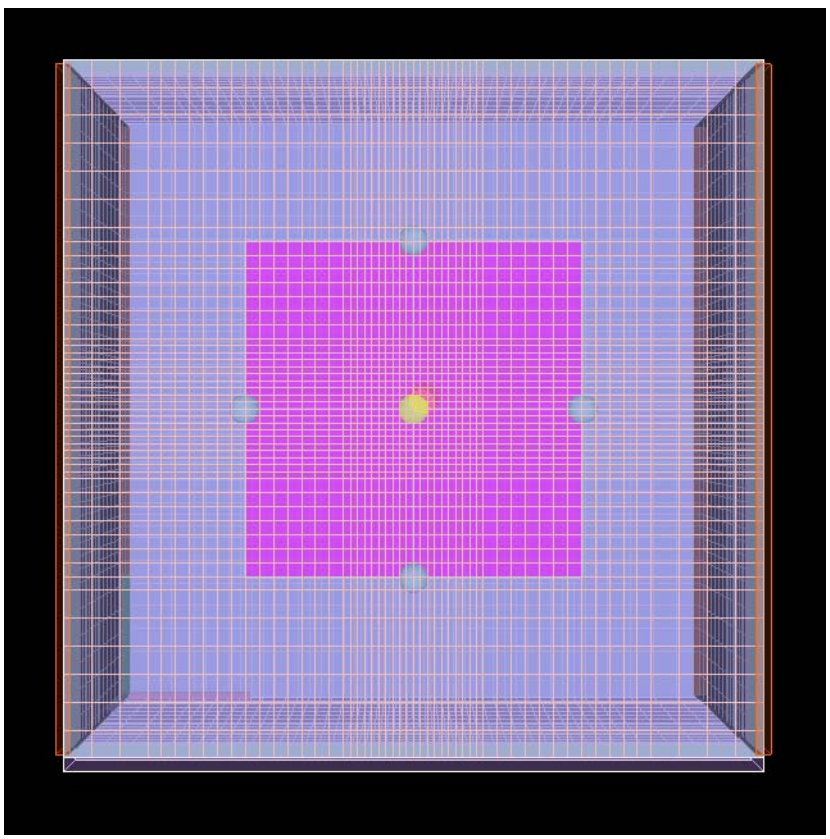
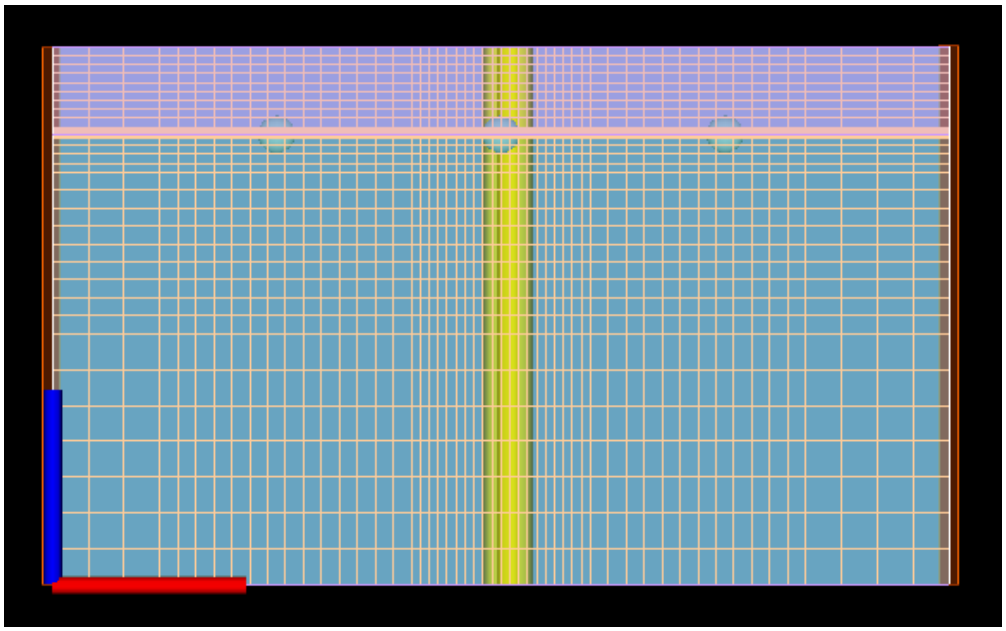


Figure 11. Z axis grid spacings for PHAST models.



The upper 50 feet represent the Aromas formation (purple box). The Aromas is unsaturated so there is no corresponding solution. However, it does have the same surface containing chromate and arsenate used in the previous models. The lower 250 feet represent the Paso Robles formation. It is saturated, and the composition of this solution is the FO-7 shallow water sample shown in Table 1. The PHAST model used the major ion concentrations, plus nitrate, and for trace metals it included, Cr(VI), As, and Pb. Arsenic concentrations at 200 µg/L are uncertain because of the high turbidity in the sample. The value was retained, however, because this is primarily a model to examine impact from injection of a low TDS solution. An alternative model with low lead and arsenic was developed for the PHAST simulations.

The groundwater level for the Paso Robles formation water was set at 252.5 feet on the left hand side and 248.5 feet on the right hand side. This is a gradient of 0.001. Constant head boundary conditions at these values were also defined on the left and right sides of the model at these elevations.

Two wells were also included in the model. The first well was the injection well. It is located in the center of the model at 2500 X and 2500 Y. It is screened in the Aromas (within the unsaturated zone) from 250 to 290 feet. It is 6 inches in diameter and injects pilot water at 110 gallons per minute. The model simulation generally ran for 6 years although some simulations were run out to 12 years. The second well was located at 2575 by 2575. It is slightly small at 5 inch diameter and pumps at 25 gpm and the screen interval is 100 to 120 feet. This well was originally included to provide additional water composition data. However, the review of the initial figures prepared by PHAST indicated that even close to the injection point acceptable

water quality was present and so additional review of simulated concentrations was not required for this review.

The initial models were set up so that there are no reactive phases (EQUILIBRIUM_PHASES) or surfaces (SURFACE) in the Paso Robles formation. In this respect the Paso Robles can be considered inert and only mixing/dilution reactions can take place in this formation. An HFO surface was not included as it was possible that the surface would remove target elements from the inflowing pilot water. This setup provides the most direct answer related to concentrations and their impact from the injected water. The injected water loads are essentially conserved in the Paso Robles Formation. As discussed below, the Paso Robles Formation appears to be at saturation with respect to calcite, but including this phase would increase the pH and so it was decide to not add it to the model.

An alternative low flow model was also prepared. That model injected water at 10 gpm and the pumping well was set at 2 gpm. The lower flow rates showed little difference to the higher flow rate model and so the results are not discussed further in this report.

Initial models run with a time step of 0.25 years per step provided an indication that a lot of the geochemistry was occurring near the injection well and in a very short period of time. This is consistent with the transport model results. Consequently, the model was modified to start with very small time steps (0.001 years per step). However, at a flow rate of 110 gpm even this short a time step (less than nine hours) was too big to identify the processes around the injection point so the low flow model was developed. But the grid spacing was too big to readily see the effects related to the low flow model under a short time frame. Final models used a 0.05 year time step to 0.25 years and then 0.25 years to 12 years. Near steady-state conditions were present by six years.

REVIEW OF PHAST FOR WINDOWS RESULTS

Model results are viewed using Model Viewer (Hsieh and Winston, 2002).

A “tracer” was also added to the injected solution. The tracer is called “Mx”, and it was added at a concentration of 1 mg/L. It represents a conservative neutral-charged non-reactive species. It is included as an additional component to the model thermodynamic data base and there is only one solution species - Mx. The tracer shows the extent of migration and mixing of the injected the pilot water. Figure 12a shows the distribution of the Mx tracer after one year of injection as a percentage of the total tracer. The figure has been cropped along the Y axis (50 % removed) to show the interior distribution. The injection well is represented by the small vertical magenta blocks. An alternative view is shown in Figure 12b, where the Mx plume has been cropped at 1 percent.

Figure 12a. Results of PHAST Calculations for the Mx (mixing) component after one year. Scale (color bar) shows percentage of Mx component.

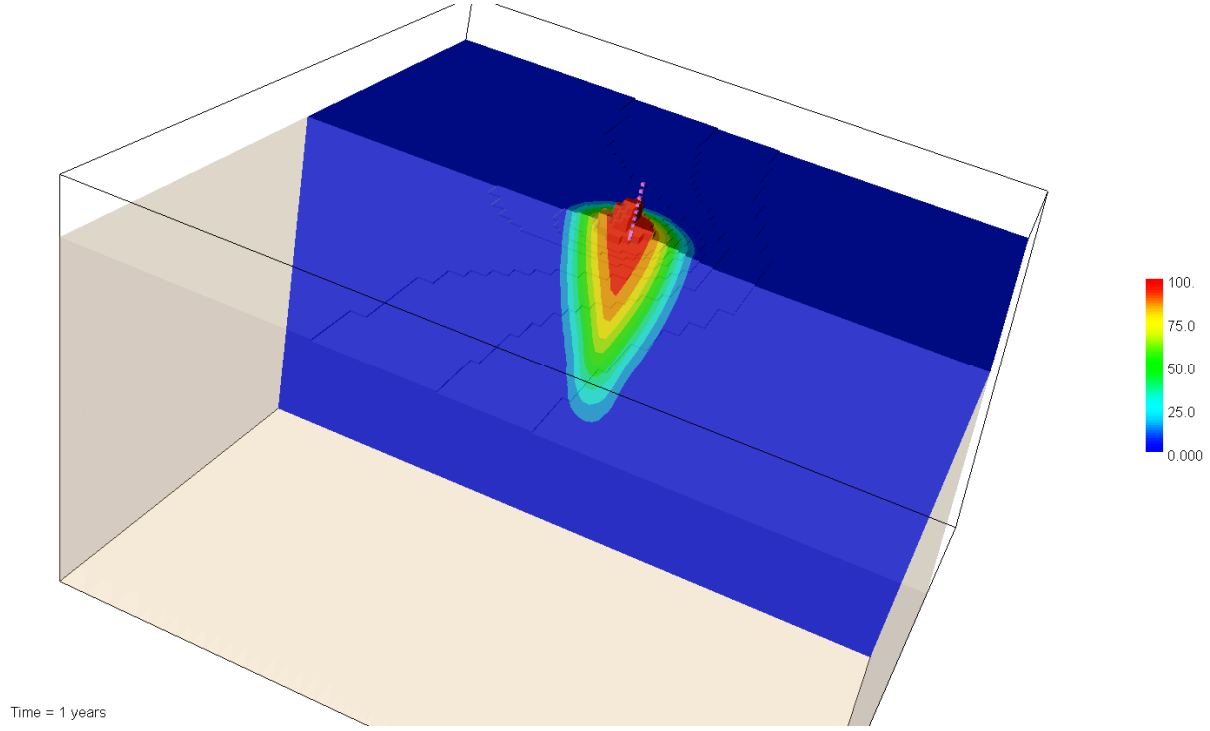


Figure 12b. Results of PHAST Calculations for the Mx (mixing) component after one year. The figure shows the threshold set at 1 percent Mx.

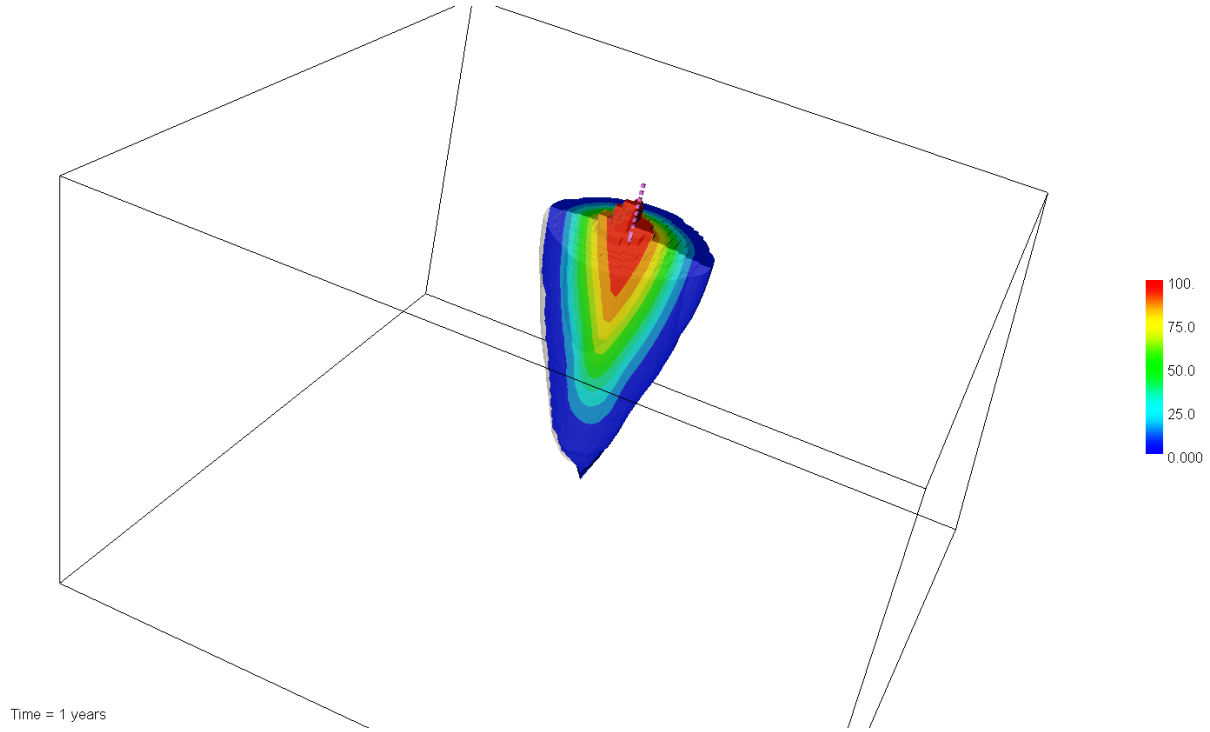
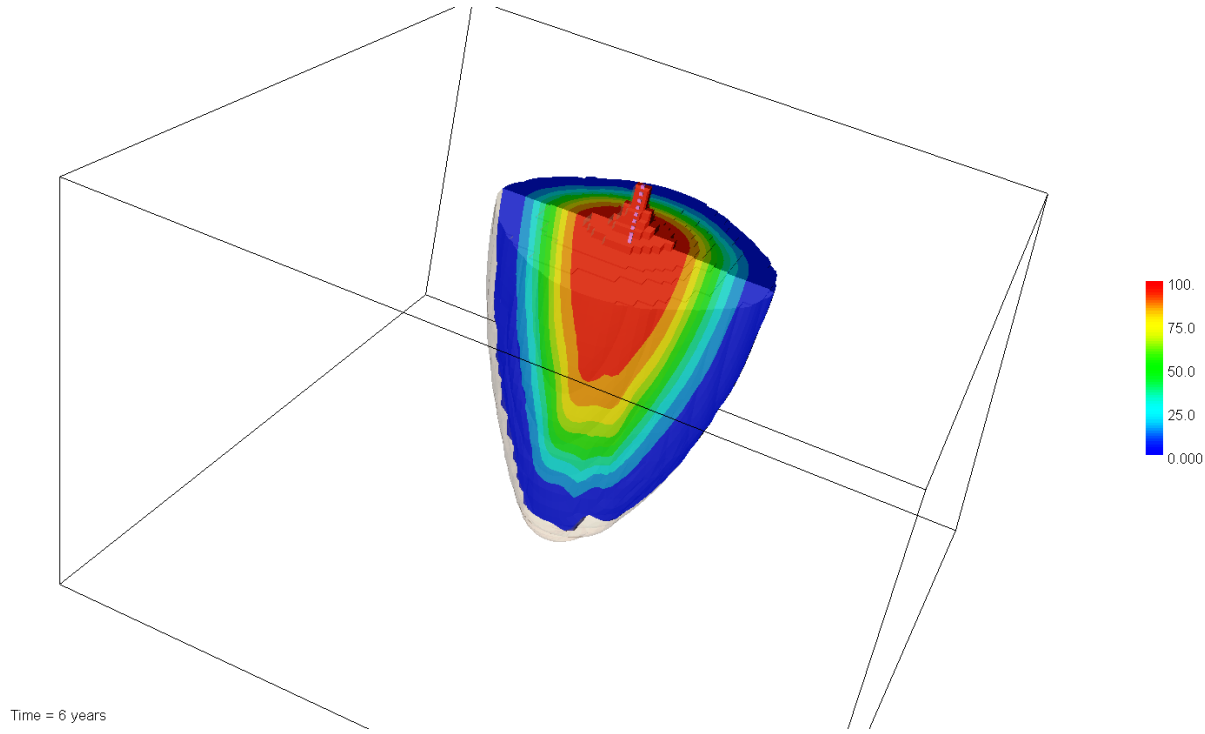


Figure 13 shows the distribution of the Mx tracer at six years. Note the mounding of water around the injection well. This is the volume of water that is wetted in the Aromas Formation, even after six years the volume is a small percentage of the entire injectate "plume". The simple tracer results show an important point in the overall process, namely that the volume of originally unsaturated Aromas Formation that has "leached" is small, and that resulting number of pore volumes is large.

Figure 13. Results of PHAST Calculations for the Mx (mixing) component after six years. The figure shows the threshold set at 1 percent Mx.



Figures 14 and 15 show the water table surface (fluid head) in meters. These are default figures prepared by PHAST and apparently the figures cannot be converted to elevation in units of feet. The chief features of these figures are the gradient across the model domain, and the mounding associated with the injection well. The area of low head shown in the central portion of the figures (at depth) is caused by the pumping well.

Figure 14. Water table surface (Fluid Head) in meters after one year. Color bar scaled to show overall regional gradient. The small green area in the middle of the figure is caused by the pumping well located at 100 to 120 feet elevation.

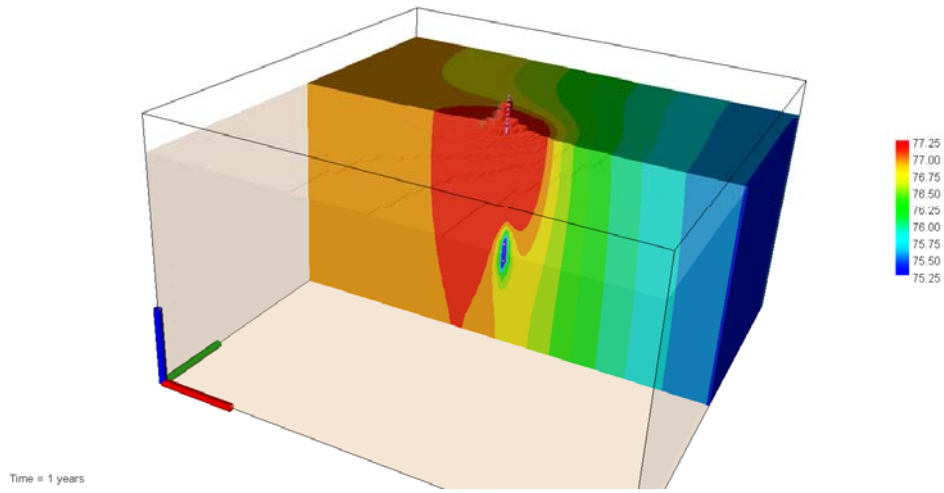


Figure 15. Water table surface (Fluid Head) in meters after six years. Color bar scaled to show overall regional gradient. The small green area in the middle of the figure is caused by the pumping well.

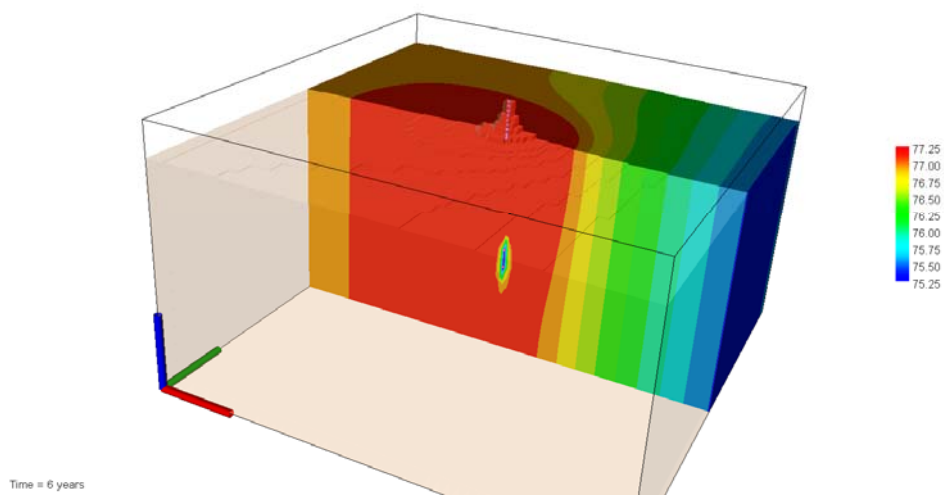


Figure 16 shows the distribution of pH after six years of injection. The slight initial decrease in pH for the pilot water is believed to be related to release of some of the protons from the HFO surface.

The pilot water had bicarbonate concentration of 43 mg/L as HCO3 and so there is some potential pH buffering. The pH drop is slight, only 0.05 units. Within the Paso Robles Formation mixing/dilution is the main process responsible for the decreases in concentrations. As mentioned above, the Paso Robles is probably at saturation with respect to calcite, but calcite was not included as an equilibrium phase in these initial PHAST models.

Figure 16. Distribution of pH at six years.

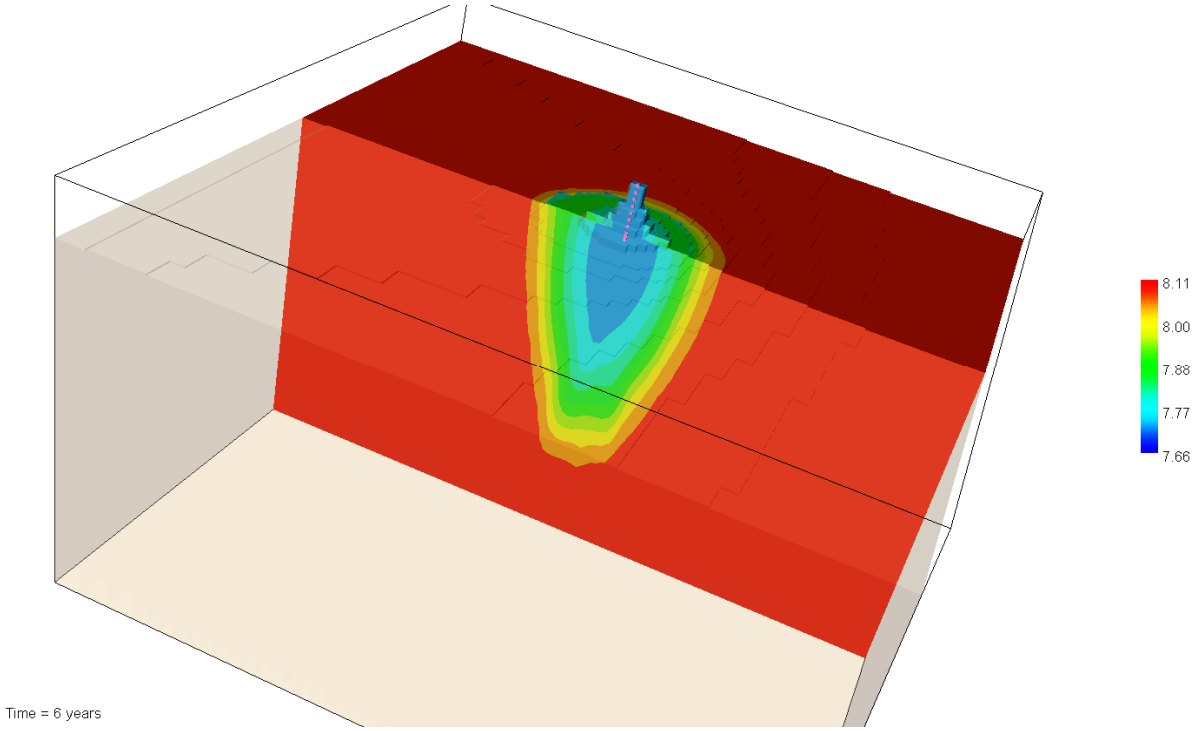


Figure 17 shows the distribution of hexavalent chromium [Cr(VI)] at 0.1 years, concentrations are all less than 1.7 µg/L. The ambient water in the Paso Robles formation was set at 1.7 µg/L, and most of the injected water has a lower chromium concentration at this time. Continued injection shows an expansion of the infiltration zone and some mounding of the injected solution (Figures 18, 19 and 20). At time 0.25 years, the maximum concentration is less than 4.1 µg/L. The maximum modeled concentration then decreases to around 4.00 µ/L with a slow decrease over time. After 6 years the maximum concentration is 3.75 µg/L, but the volume is small for this concentration.

Figure 17. Chromate concentrations after 0.1 years of injection, the greatest concentration was reported to be 1.7 µg/L.

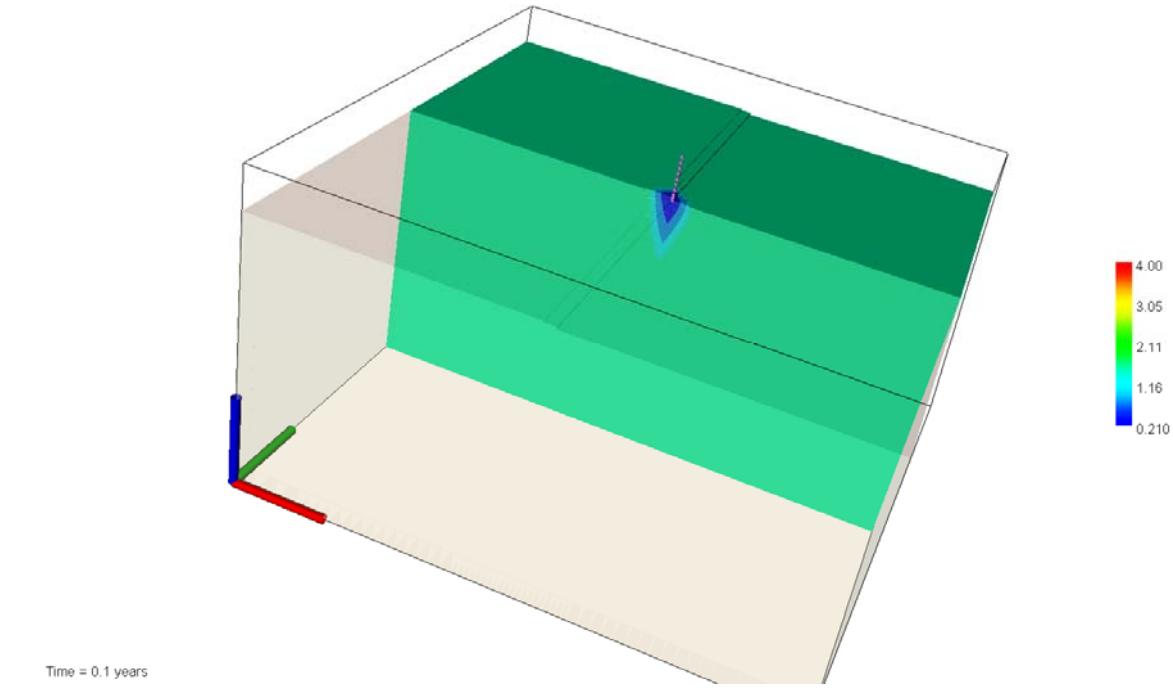


Figure 18. Chromate concentrations after 0.25 years of injection, the largest concentration was reported to be 4.1 µg/L.

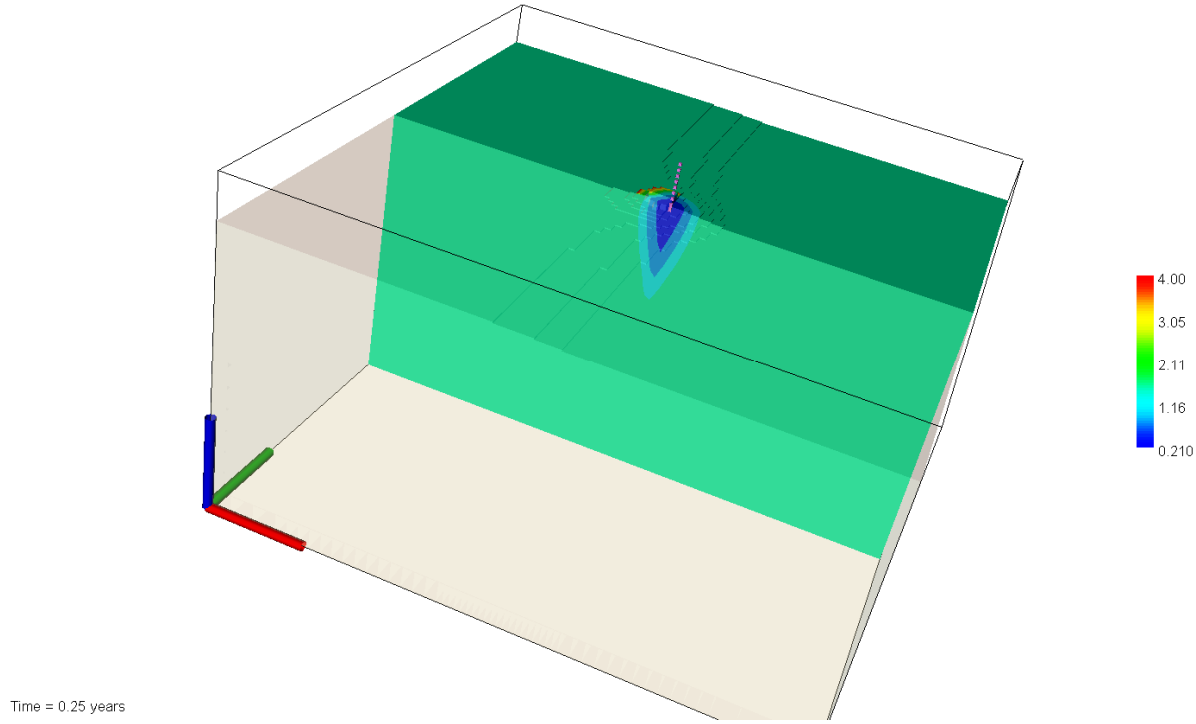


Figure 19. Chromate concentrations at 1 year of injection. The largest concentration was reported to be 3.99 µg/L.

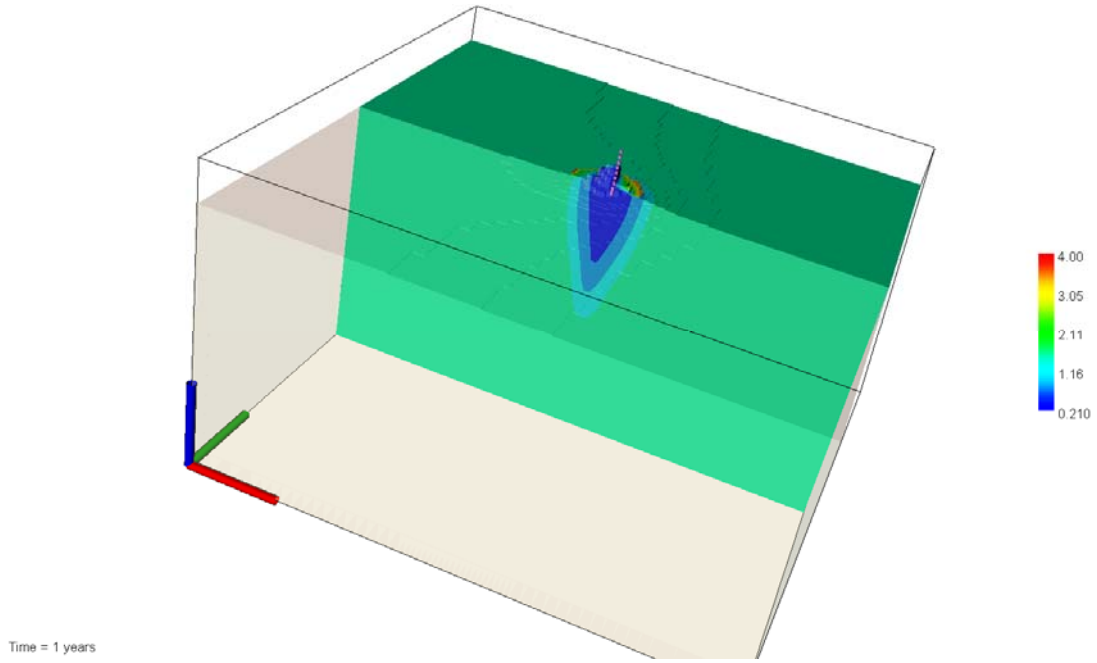


Figure 20. Chromate concentrations at 1 year of injection - threshold view. The largest concentration was reported to be 4.0 µg/L. Lower threshold value set at 1.75 µg/L. The greatest concentrations are noted at the outer perimeter of the mounded water.

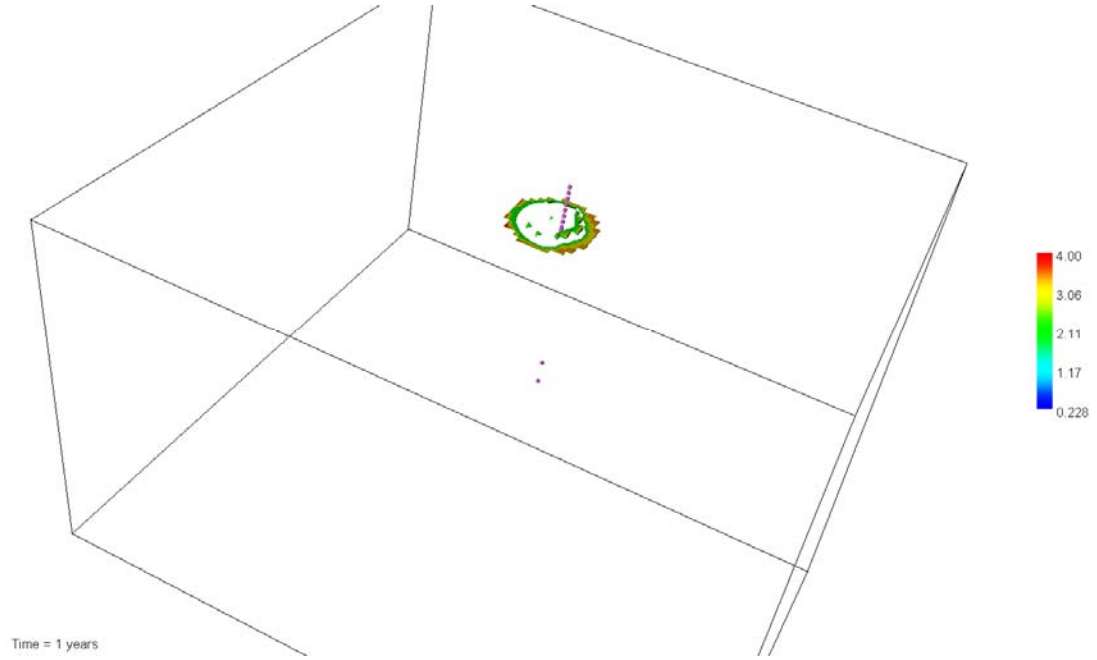


Figure 21 is an expanded view of the area around the injection well shown on Figure 22 and the figure demonstrates several processes related to chromium. First the volume closest to the injection well is characterized by low concentrations (less than the threshold of 1.75 µg/L). This volume has been essentially leached of the surface complexed hexavalent chromium. The greatest concentrations are in the areas that have just been wetted by the injection solution. In modeling unsaturated transport PHAST for Windows does not calculate reactions at the dry nodes. Only when water has contacted the appropriate node are the surface complexation reactions considered. This is reasonable when considering reactive solute transport near the water table. So these new points [HFO sites loaded with Cr(VI), As, and Pb] release some of the sorbed metals into solution. As this is the first contact, the initial concentrations will be high. However, it should be noted that this is a thin layer (about 1 foot in the model) and the underlying layers show even lower concentrations. The same type of effect is seen at higher elevations along the injection well. As the ground water mound builds upward and outward the same type of process is observed. The three images that make up Figure 22 show the distribution coefficient for Cr(VI) at this time. The greatest values are on the leading edges where chromate is actively being leached upon initial contact with solution. In those fresh (previously uncontacted) regions the distribution coefficients are comparable to the values noted in the initial PHREEQC modeling and in the transport modeling. The distribution of Kd values are consistent with the modeled concentrations.

Figure 21. Expanded image of chromate concentrations at 1 year of injection. The largest concentration was reported to be 5.83 µg/L. Lower threshold value set at 1.75 µg/L, just above the concentration of Cr(VI) in the Paso Robles. The image shows an expanded view of the recharge area. Vertical exaggeration set to 10. Note mounding around injection well and that the greatest concentrations are only present in one layer.

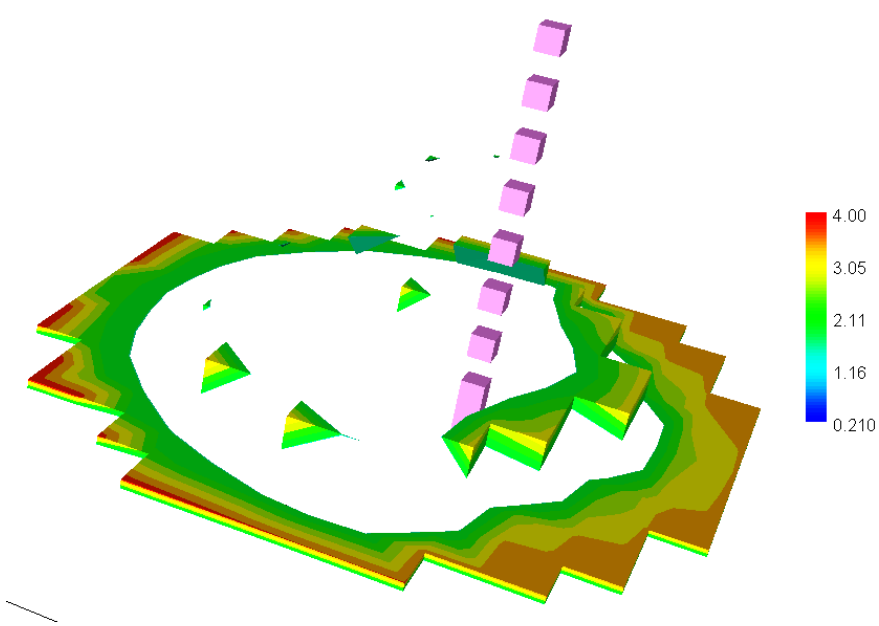


Figure 22 a, b, c. Distribution coefficients (non-dimensional) for chromate after one year of pilot water injection. The b-image has a threshold of 0.001, the c-image has been expanded and the vertical exaggeration is 10.

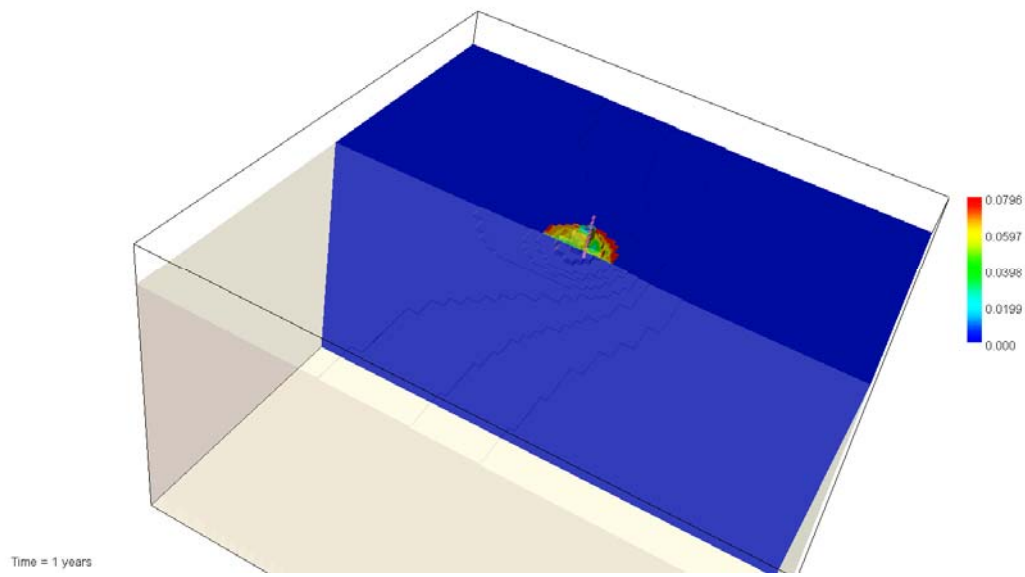


Figure 22 b.

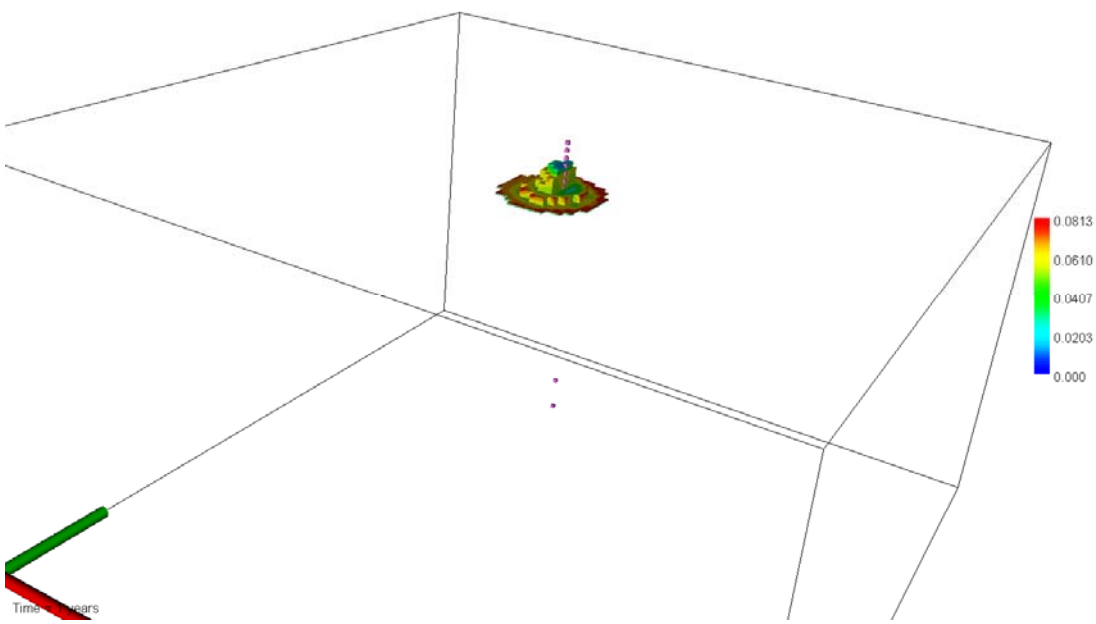
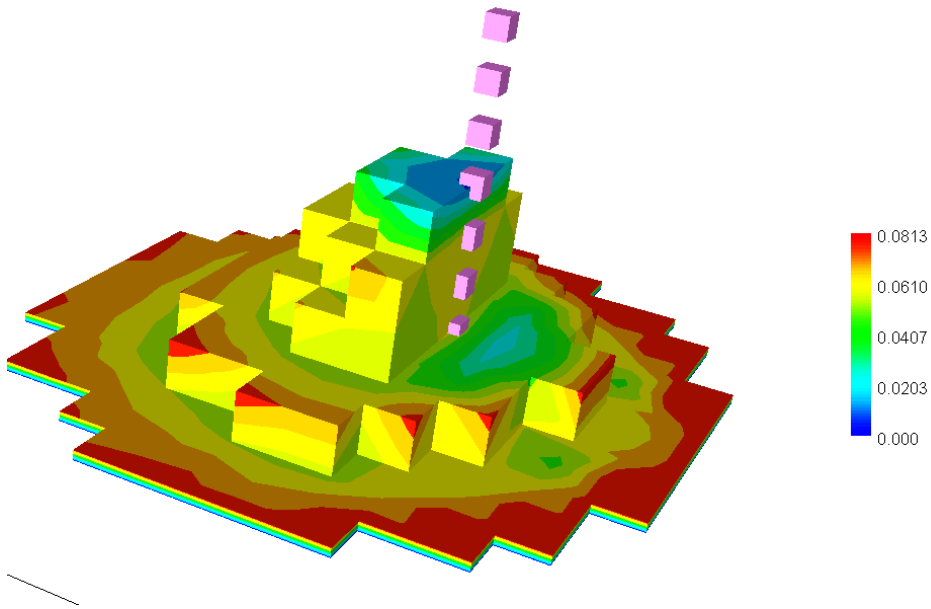


Figure 22 c.



With continued injection, a steady state condition is reached by about six years. Figure 23 shows the chromate distribution at six years. Figure 24 shows the distribution coefficients at six years the infiltration foot print has essentially stabilized and the values are lowered at the base of the Aromas formation. Higher Kd values are noted at higher elevations probably due to increases in water levels that are contacting cells that were previously dry.

Figure 23. Chromate concentrations at 6 year of injection. The largest concentration was reported to be 3.75 µg/L.

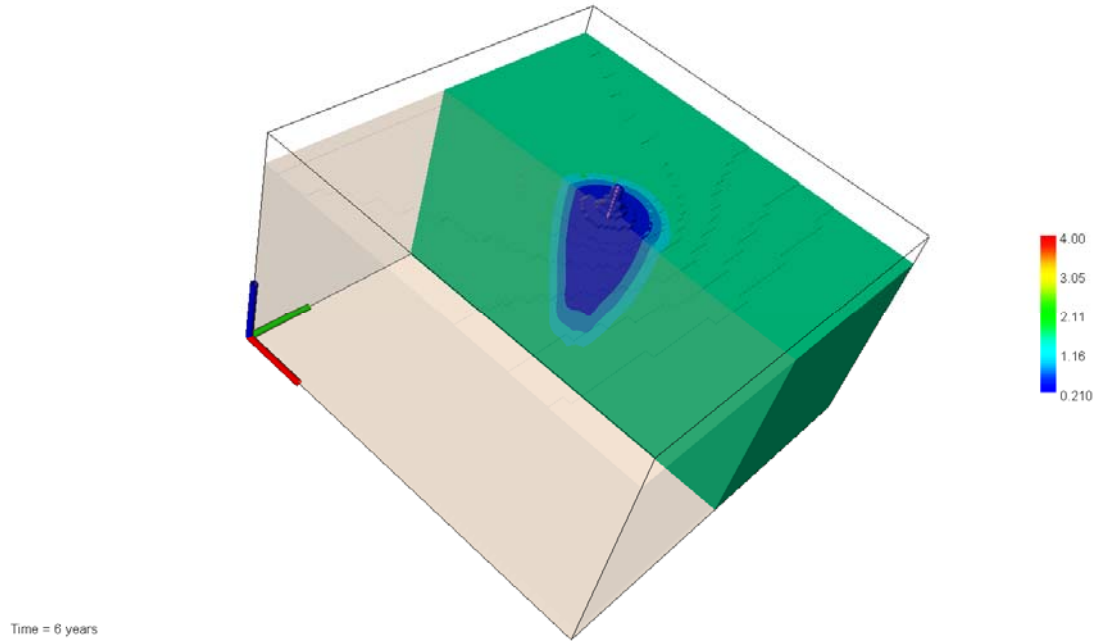


Figure 24 a,b. Chromate distribution coefficients (non-dimensional) after six years of pilot water injections.

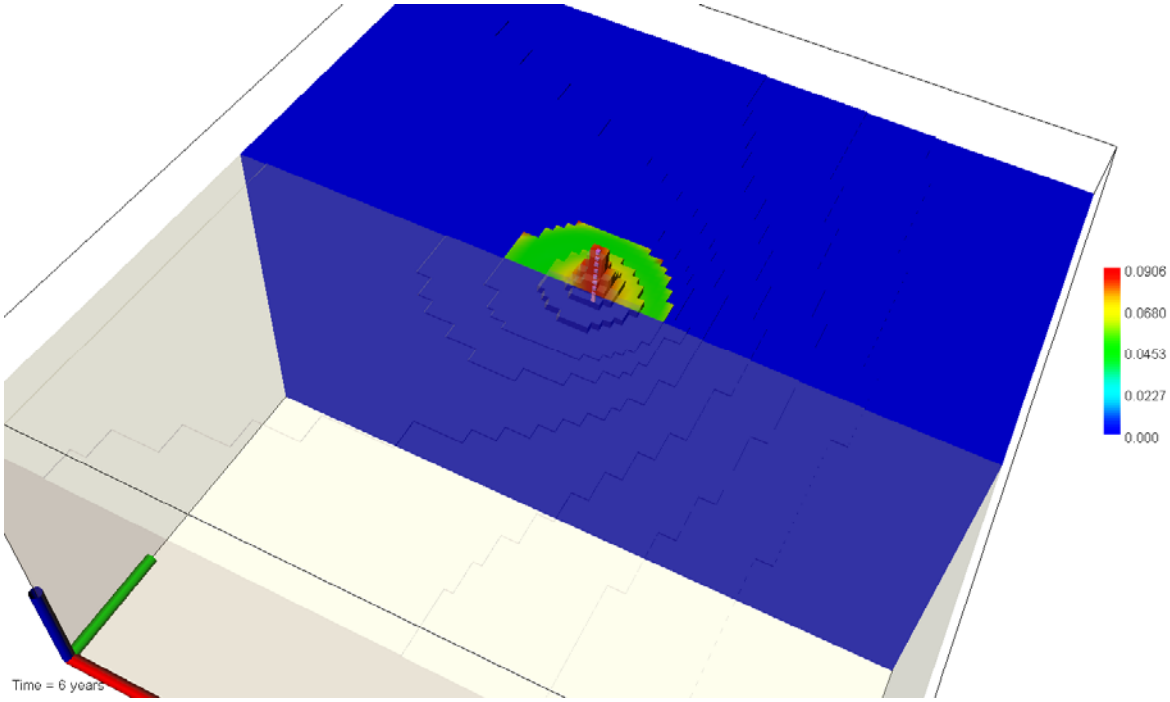
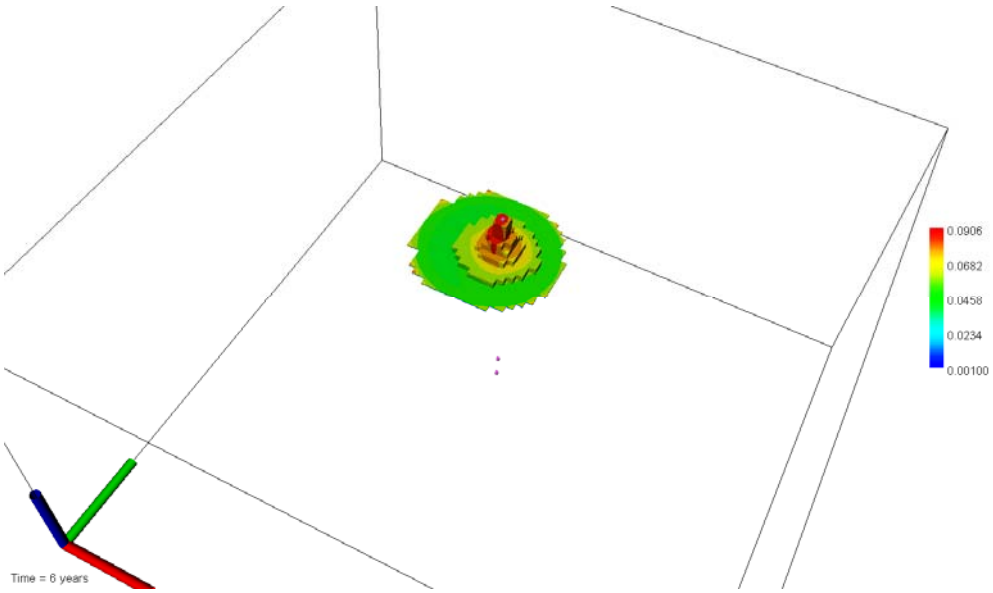


Figure 24 b.



Arsenic concentrations appear to be lower than the ambient concentration reported in the sample from the Paso Robles (Figure 25). Concentrations are consistent with the approximately 4 mg/L noted in the transport models. Lead concentrations from the inject water are also low as values of 0.5 to 0.6 µg/L are present after six years near the injection well (Figure 26). Because of the way Model Viewer sets its ranges for the color bar both figures show similar patterns.

Figure 25. Distribution of arsenic after six years of injection for the initial high arsenic/lead model.

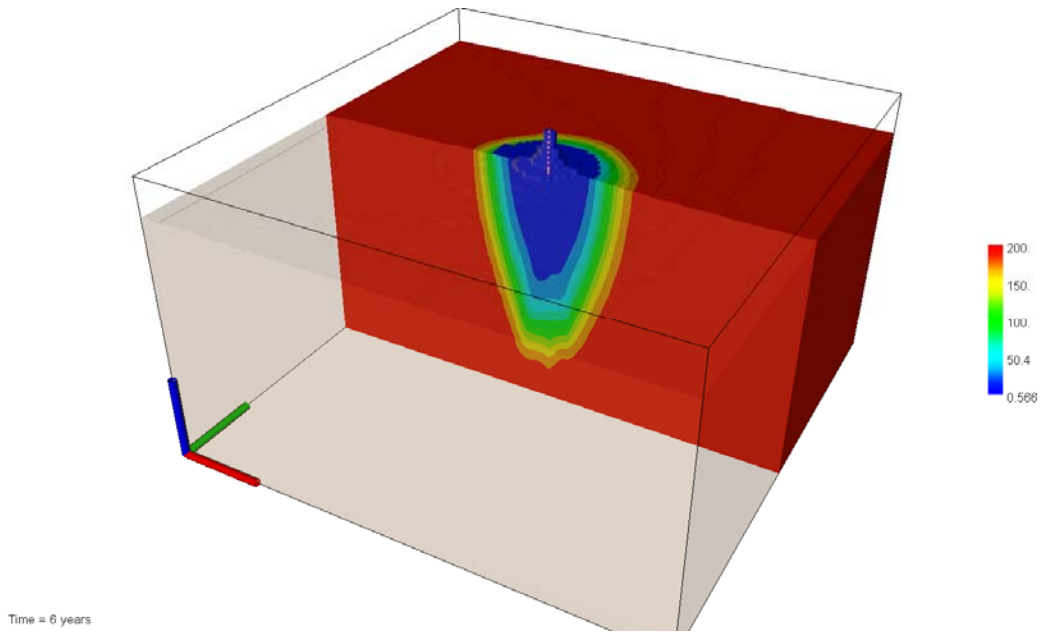
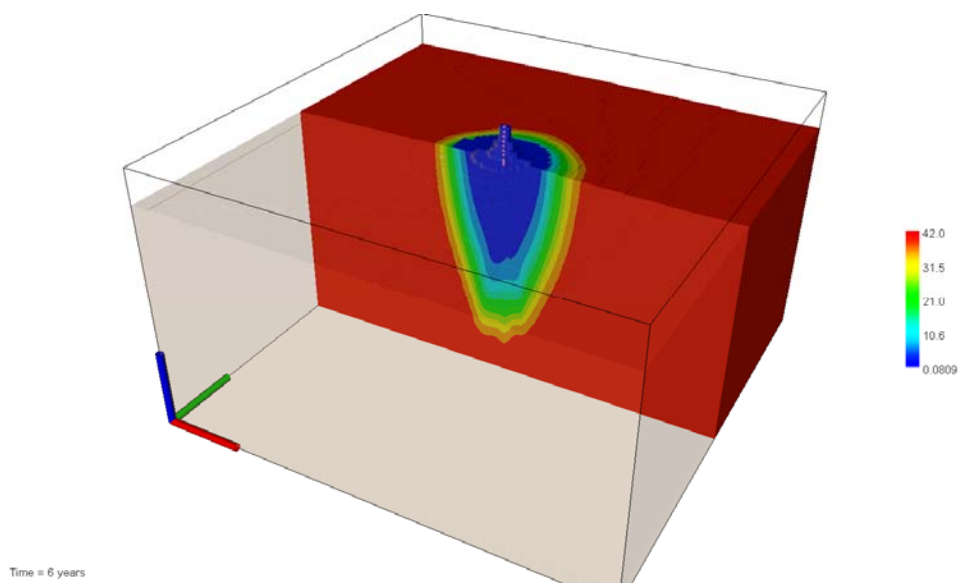


Figure 26. Distribution of lead after six years of injection for the initial high arsenic/lead model.



As mentioned previously the arsenic and lead concentrations in the Paso Robles Formation ground water sample appear to have been impacted by excess turbidity. Such a result is also consistent with the high iron noted in the sample and the high distribution coefficients for these two components. To show a more realistic set of model results, an additional PHAST model was prepared that used lower As and Pb concentrations (Table 1) (Figures 27 and 28). For lead the lower initial estimated concentration at six years is 0.06µg/L rather than 0.571 (Figure 28). This is about a ten-fold decrease. A tenfold decrease was also used to change the lead concentration from 42 to 4.2 µg/L in the Paso Robles Formation, suggesting that mixing of the injected solution with the Paso Robles was responsible for these concentrations. During early time steps (0.1 years) the minimum lead concentration was 0.4 µg/L, this minimum value decreased with time.

In the case of arsenic, a twenty fold dilution was used that lowered the arsenic from 200 µg/L to 10 µg/L. The revised low As/Pb model also shows a decrease in the lowest concentrations within the injection plume. The new value is 0.398 µg/L, at six years rather than the 2.88 reported in the original model.

The concentrations estimated for the low concentration model are probably more realistic than the models that used the measured concentrations.

Figure 27. Results of arsenic distribution from the low arsenic/lead model at six years.

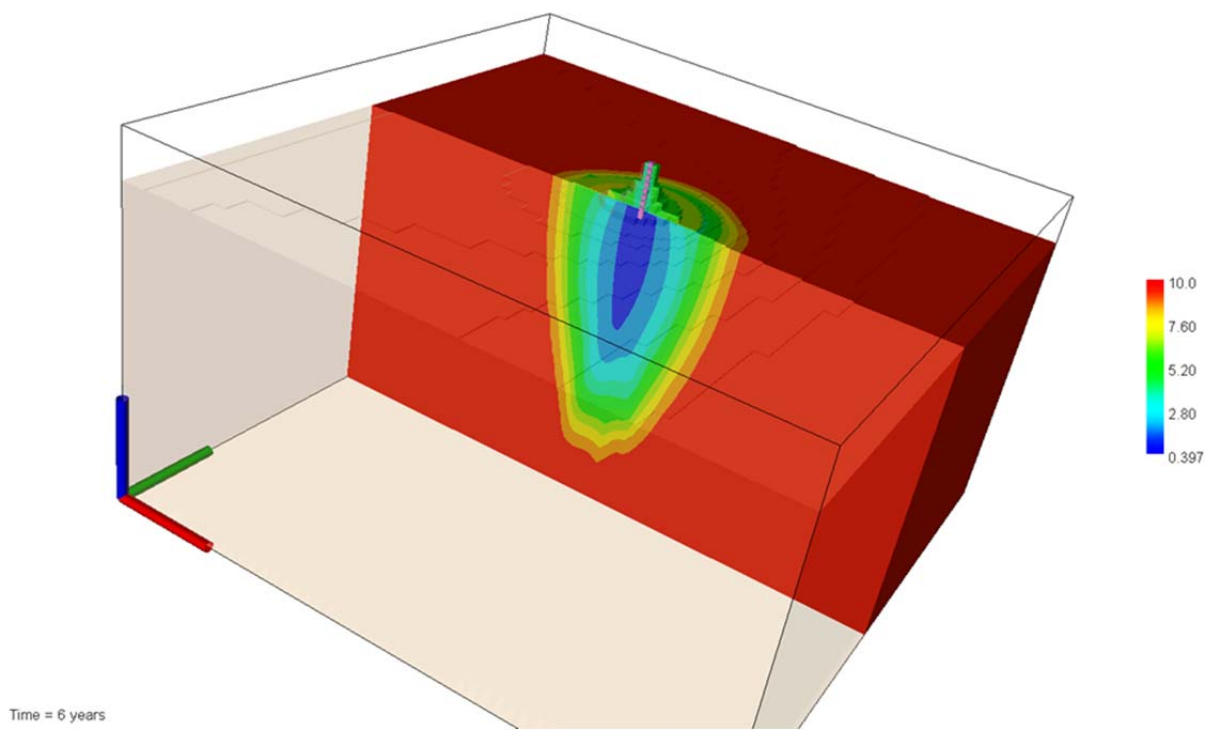
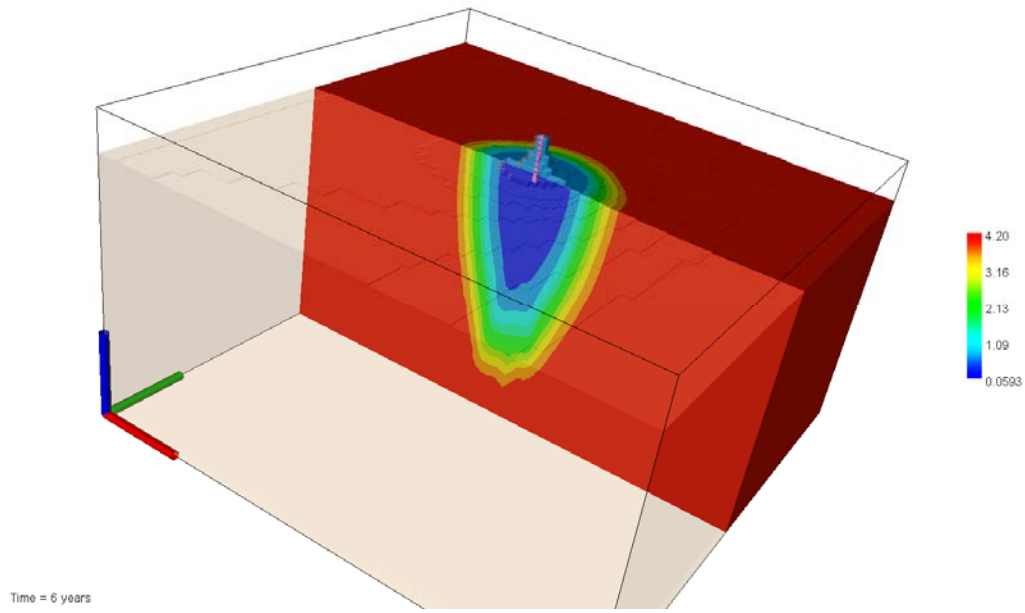


Figure 28. Results of lead distribution from the low arsenic/lead model at six years.



DISCUSSION

The volume of Aromas Formation that actually contacts the pilot water appears to be small and so it will rapidly release chromate in that volume of rock. Arsenic will be released slowly over time but even those concentrations will decrease over time. Figure 29 is the zone flow (flux rates) for Cr(VI) that migrates down from the Aromas recharge area to the Paso Robles Formation. These amounts represent masses that pass through the zone centered around the injection well. In the case of Cr(VI) the steady state flux of about 0.5 kilograms per 0.25 years is close to a concentration of 0.21 µg/L, the starting concentration for Cr(VI) in the pilot water.

Because Cr(VI) has such a low Kd, a set of simple calculations will put this in perspective. The zone flow values indicate that for the first 0.25 years 0.0975 kilograms of chromium passed through the zone boundary Figure 3X). Assuming a concentration of 7.5µg Cr(VI)/kilogram of rock indicates that the chromium came from the complete leaching of 1.3e7 kilograms of rock. At specific gravity of 2.65 for the quartz grains this corresponds to a volume of 4.9e6 liters of rock converting that to 30 porosity we estimate a pore space of 1.41e7 liters. An injection rate of 110 gpm corresponds to 416.39 liters per minute. In 0.25 years (assumed to be 90 days, to match the calculation) the volume of injected water would be 5.46e7 liters, which is 36.7 pore volumes. This number of pore volumes is consistent with the transport calculations and the results based upon the PHAST modeling. This effect increases with increased injection. Fluxes for 0.5 to 2.25 years range from 0.158 kg to 0.11 kilograms/year for chromium. After 2.25 years fluxes decrease to less than 0.1 kilogram per year or a concentration of about 0.4 µg/L. After about six years fluxes become nearly steady at 0.055 kilograms and slowly decrease to 0.05 kilograms per 0.25 years. These correspond to concentration of approximately 0.25 µg/L.

Similar patterns for fluxes are seen for arsenic and lead (Figure 31), where initial concentrations rapidly drop. However, the arsenic fluxes are greater and maintain higher fluxes during steady state. Furthermore, the higher Kd values preclude the application of the simple calculations shown above.

Figure 29. Zone flow calculations showing Cr(VI) flux in kilograms per 0.25 year moving from the Aromas recharge zone to the Paso Robles Formation, calculated using PHAST for Windows.

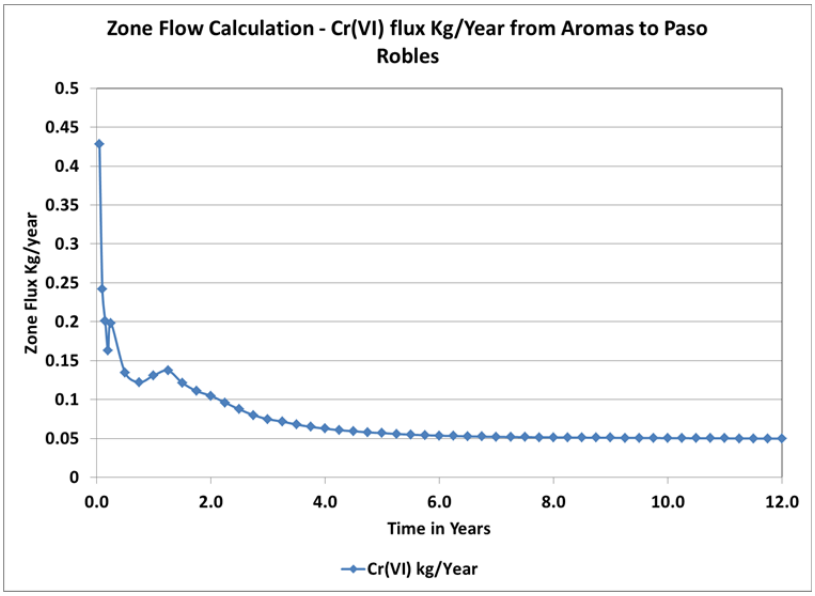


Figure 30. Zone flow calculations showing arsenic and lead for the low As/Pb model. Flux in in kilograms per 0.25 year moving from the Aromas recharge zone to the Paso Robles Formation, calculated using PHAST for Windows.

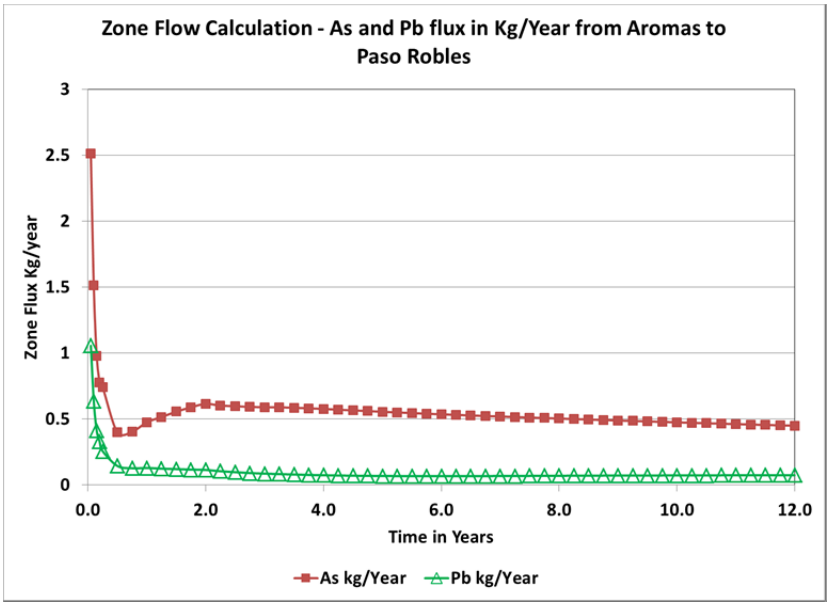
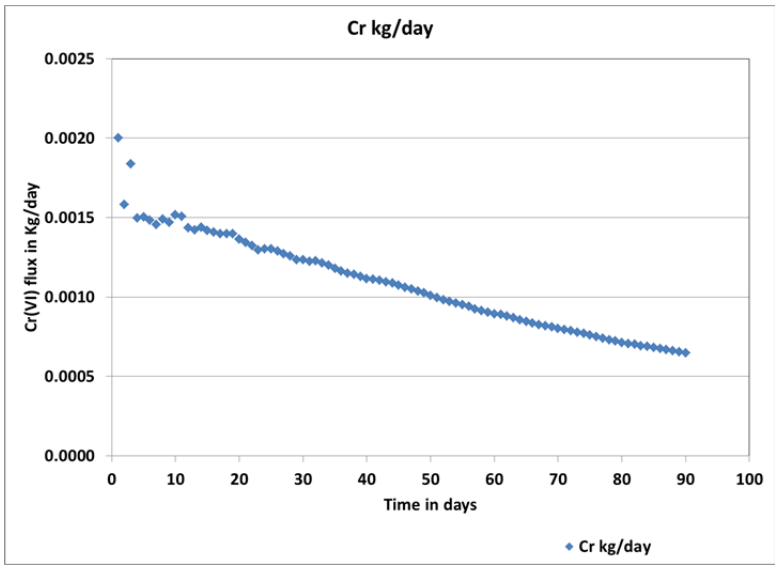


Figure 31. Cr(VI) daily flux rates from Aromas to Paso Robles Formation.



SATURATION INDEX CALCULATIONS

Another potential issue is associated with the potential for well plugging. One of the most likely precipitates is calcite ($CaCO_3$). In some cases gypsum ($CaSO_4 \cdot 2H_2O$) may form but this normally occurs with industrial wastes with much higher calcium and sulfate concentrations. These waters are far too dilute to cause gypsum precipitation. Silica was not reported for these samples so silica phases cannot be evaluated at this time.

Figure 29 shows the spatial distribution of saturation indices for calcite. Saturation indices provide a means to determine whether a solution is in equilibrium with a particular mineral phase. The Saturation Index (SI) is defined as:

$$SI = \log \frac{(IAP)}{K_{sp}}$$

Where:

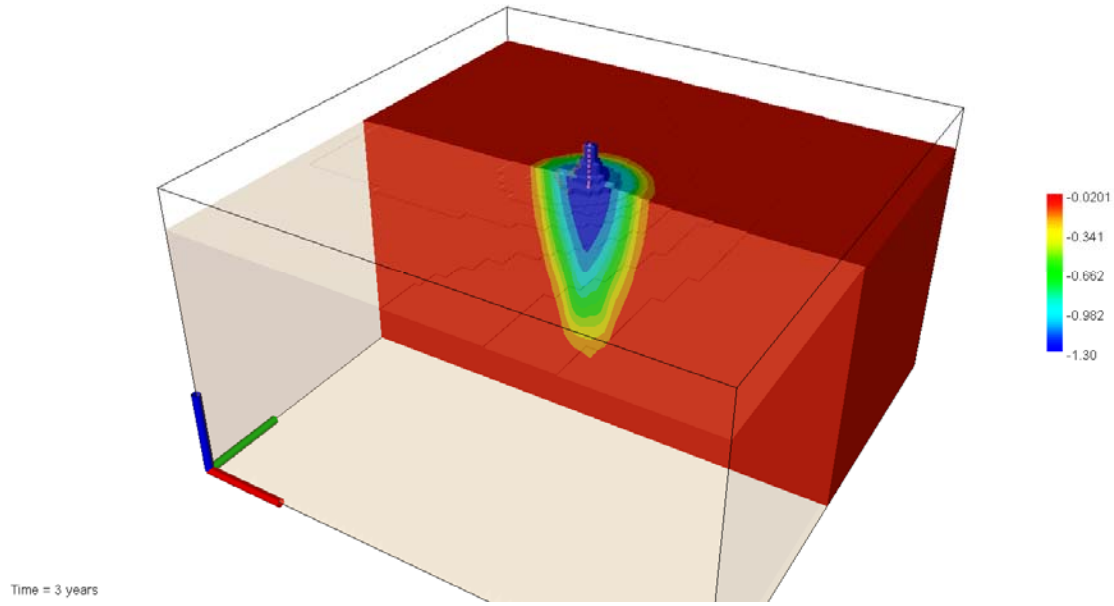
IAP represents the ion activity product, and

K_{sp} is the solubility product constant for the specific mineral.

Positive SI values mean that the solution is oversaturated with respect to that phase (mineral) and it should form. Negative values mean the solution is undersaturated and the mineral if present will dissolve to attain equilibrium. Zero values mean that equilibrium is present. The -0.02 value present throughout the Paso Robles Formation (Figure 32) is close enough to zero to indicate that the solution is in equilibrium with calcite; in this water if the pH was reported to be at 8.13 rather than 8.11, the SI would be 0.001. The pilot water has a lower pH at 7.7 and the calcite saturation

index is estimated to be -0.98, so it is strongly undersaturated. Calcite will dissolve to achieve equilibrium and the pH will increase from its initial value in the mid 7's. It is unlikely that the pH will increase beyond the 8.13 value estimated for equilibrium with calcite in the Paso Robles formation.

Figure 32. Saturation indices for calcite at 3 years.



CALCITE EQUILIBRIUM AND METAL MOBILITY

Several additional simulations were run to evaluate the role of calcite in the mobility of Cr(VI) As, and Pb. One model included calcite in both the Aromas and in the Paso Robles, the partial pressure for CO_2(g) was fixed at -3.3 log atmospheres, which is the model calculated partial pressure for the F0-7 shallow water sample. The pH values in the Paso Robles increased to 8.13 from 8.11 and the pH plume from the Aromas infiltration zone essentially vanished as the pH in nearly all of the model domain went to 8.13 also. Slight but insignificant changes were noted for Cr(VI). Basically the Kd at 7.7 is so low, and the total amount of Cr(VI) is similarly low that any further increase in the source terms is slight.

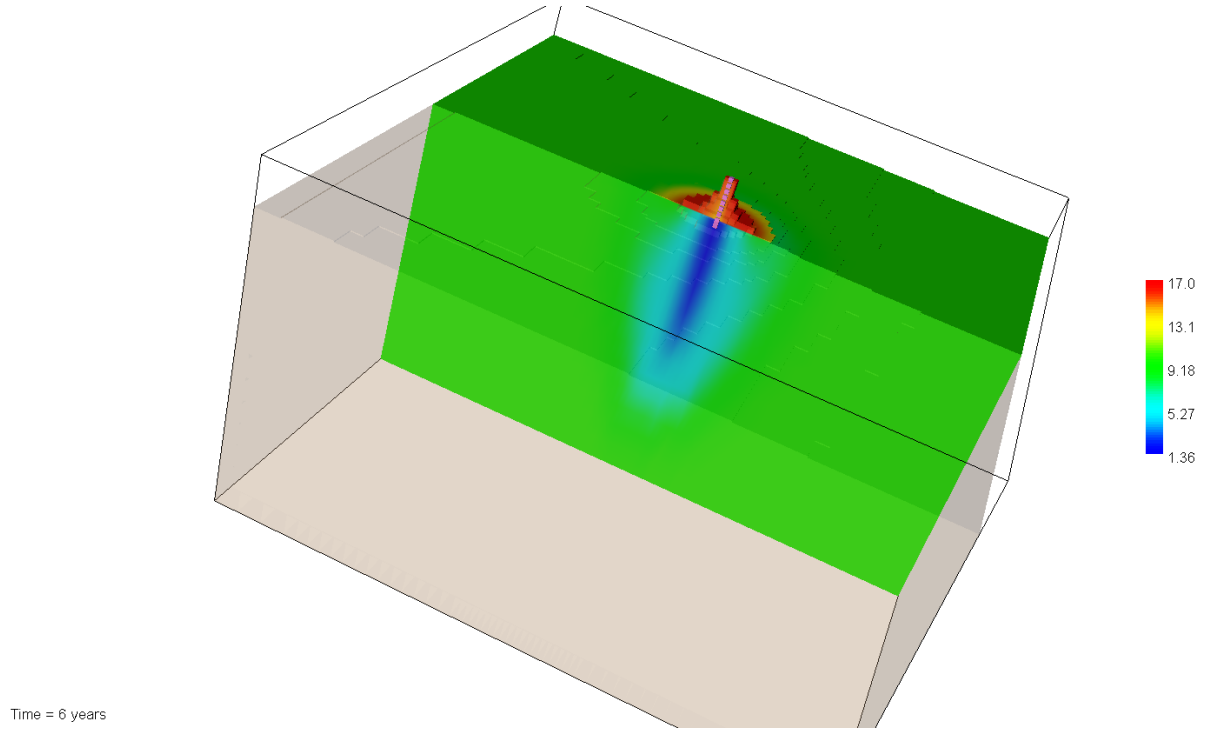
With the increased pH lead concentrations decreased slightly. This is consistent with the assumption of the surface complexation model.

Arsenic concentrations around the well increased by about a factor of 3, and this is reflected in the minimum concentrations noted at year 6 Figure 33. In the model without calcite the minimum As concentration was 0.355 µg/L with the maximum essentially at the formation

defined concentration of 10 µg/L. For the model that included calcite in the Aromas and Paso Robles the increased pH caused more As release and the maximum concentration was about 16.9 µg/L. But this area is limited to the saturated zone in the Aromas. A transport model was also run to confirm these observations. Because the model did not include initial mixing with the Paso Robles the pH increased to 8.23. Chromium concentrations increased to about 33 µg/L, for the initial cell values. But that means that the chromium can leach out even faster. Arsenic concentrations increased to about 23.8 µg/L. As the pH is slightly greater than estimated in the PHAST model the estimated maximum concentration of 16.9 µg/L from the PHAST model is consistent with the transport concentrations.

It should also be understood that the model did not include any type of sorbent (HFO) surface in the Paso Robles, and it is likely that all of these metals could be attenuated by additional surface complexation. So the model is very conservative in that respect. Some decreases in pH may help slow arsenic release and depending upon the extent of the pH reduction it could reduce hexavalent chromium mobility but as noted above lead would become more mobile. But the simplest control method is probably through pH adjustments.

Figure 33. Distribution of arsenic for model with calcite in the Aromas and Paso Robles, at six years.



CONCLUSIONS

All of the model results, whether from the pH sweeps, the transport models or the reactive transport PHAST simulations support the premise that any hexavalent chromium in the Aromas Formation is at average concentration around 7 to 8 mg/kg of rock or that about 45 µg per liter of chromate is in contact with water for every 6.18 kg of Aromas material (at 30% porosity). These estimated concentrations are derived from the average leach concentrations. Chromate is readily released upon addition of solution with a pH of the proposed pilot water. Contact with lower pH solutions would reduce the concentrations of chromate released to solution. This would lower the concentrations and increase the amount of time required to leach the chromium from the HFO surface.

Arsenic is present at a greater concentration in the Aromas Formation, but it is more strongly adsorbed onto the HFO surface. So it will continue to provide a small contribution of arsenic over the long term.

The model does not include any adsorption capacity in the Paso Robles. It is reasonable to expect that the relatively small loads of metals and metalloids (arsenic) from the Aromas would be "picked up" by the Aromas with a probably an unnoticeable change in the dissolved metal concentrations in the formation waters.

Lead concentrations and fluxes appear to be similarly slight.

The proposed injection solution is dilute and the pH is low enough that it will not cause mineral precipitation reactions that could plug well screens either in the Aromas or in the Paso Robles.

REFERENCES

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SAVED SURFACE FOR pH SWEEPS, TRANSPORT AND PHAST OPEN SYSTEM

```
SELECTED_OUTPUT 1
    -file                 BICARB Cr 7.7e-6 run Fix As first 1 percent HFO 6SA then
chrom.xls
    -reset                false
    -simulation           true
    -state                true
    -solution             true
    -distance             true
    -step                 true
    -pH                   true
    -water                true
USER_PUNCH
-headings pH Moles_As_Surface Kd_As LOG_Kd_As As_µg/L  MOLES_PB_SURFACE KD_Pb
LOG_KD_Pb Pb_µg/L Moles_Cr_Surface Kd_Cr LOG_Kd_Cr Cr_µg/L
-start
5  PUNCH -LA("H+")
10 TOTAsSURF = MOL("Hfo_wAsO4-2") + MOL("Hfo_wH2AsO4")  + MOL("Hfo_wHAsO4-") +
MOL("Hfo_wOHAsO4-3")
12 PUNCH  TOTAsSURF
20 PUNCH  TOTAsSURF/TOT("As")
21 PUNCH LOG10(TOTAsSURF/TOT("As"))
22 PUNCH TOT("As")*74922*1000
30 TOTPbSURF = MOL("Hfo_wOPb+") + MOL("Hfo_sOPb+")
32 PUNCH  TOTPbSURF
36 PUNCH TOTPbSURF/TOT("Pb")
37 PUNCH LOG10(TOTPbSURF/TOT("Pb"))
39 PUNCH TOT("Pb")*207*1000*1000
40 TOTCrSURF = MOL("Hfo_wCrO4-")
42 PUNCH TOTCrSURF
46 PUNCH TOTCrSURF/TOT("Cr")
48 PUNCH LOG10(TOTCrSURF/TOT("Cr"))
50 PUNCH TOT("Cr")*51.99*1000*1000
-end
USER_PRINT
-start
1 PRINT "Chromium(VI)  ug/L        :", TOT("Cr(6)")*51.996*1000*1000
3 PRINT "pH                        :", -LA("H+")
40 TOTCrSURF = MOL("Hfo_wCrO4-")
42 PRINT "MOLES Cr Surface complexed    :", TOTCrSURF
45 PRINT "MOLES Cr ",  TOT("Cr") "in Soln    :", TOT("Cr") *51990 " as mg/L  Cr  :"
46 PRINT "Kd Cr dimensionless      :", TOTCrSURF/TOT("Cr")
52 PRINT "     "

128 PRINT "Lead      ug/L        :", TOT("Pb")*207*1000*1000
130 TOTPbSURF = MOL("Hfo_wOPb+") + MOL("Hfo_sOPb+")
132 PRINT "MOLES Pb surface complexed    :", TOTPbSURF
135 PRINT "MOLES Pb  in Soln :", TOT("Pb") "Pb mg/L  :", TOT("Pb") *20700
136 PRINT "Kd Pb dimensionless      :", TOTPbSURF/TOT("Pb")
138 PRINT "     "
160 PRINT "Arsenic µg/L           :", TOT("As")*74922*1000
161 PRINT "pH                        :", -LA("H+")
162 TOTAsSURF = MOL("Hfo_wAsO4-2") + MOL("Hfo_wH2AsO4")  + MOL("Hfo_wHAsO4-") +
MOL("Hfo_wOHAsO4-3")
163 PRINT "MOLES As Surface complexed    :", TOTAsSURF
165 PRINT "MOLES As   in Soln :", TOT("As") "As mg/L  :", TOT("As")*74922
170 PRINT "Kd As dimensionless      :", TOTAsSURF/TOT("As")
-end
SOLUTION 200 Pilot water
```

```
    temp      25
    pH        7.70
    pe    10.7
    units     mg/l
    density   1
    S(6)      0.11
    N(5)      0.64
   # N(-3)     1.3
    Ca        11
    Ba    0.140
    Cr(6) 0.00021
    K         0.050
    Na        19
    Cl        2 charge
C(4)   43 as HCO3
    -water    1 # kg
PHASES
Fix_H+
H+ = H+
logk 0.0
END
USE SOLUTION 200
REACTION  100
K2CrO4  1
7.7e-6    #
EQUILIBRIUM_PHASES 100
Fix_H+  -7.7  NaOH
SAVE SOLUTION 202
END
USE SOLUTION 202
REACTION  200
PbCl 1
3.28e-5
SAVE SOLUTION 202
END
USE SOLUTION 202
REACTION  300
As2O5  1
0.74e-4
EQUILIBRIUM_PHASES  101
Fix_H+  -7.7  NaOH
SAVE SOLUTION 300
END
USE SOLUTION 300 #back to 1.0% HFO
SURFACE  1
Hfo_wOH  0.000735  6.0  .3273   #30.9 actual factor
Hfo_sOH 0.0000184
SAVE SURFACE 1
EQUILIBRIUM_PHASES 102
Fix_H+  -7.7 NaOH
CO2(g)  -3.4  10
END
MIX
200 30.9
SAVE SOLUTION 31
END
USE SOLUTION 31
USE SURFACE 1
EQUILIBRIUM_PHASES
Fix_H+  -7.7 NaOH
CO2(g)  -3.4  10
END
```

PHREEQC INPUT FILE

(Transport version)

```
#OPEN WITH TRANSPORT Pb 1%

PRINT

    -alkalinity            false
    -echo_input            true
    -eh                    false
    -equilibrium_phases    false
    -exchange              false
    -gas_phase             false
    -headings              true
    -inverse               false
    -kinetics              false
    -other                 true
    -saturation_indices    false
    -solid_solutions       false
    -species               false
    -surface               true
    -totals                true
    -user_print            true
    -selected_output       true
    -status                true
    -warnings              0

SELECTED_OUTPUT 1
    -file           FINAL SURFACE BICARB TRANSPORT Cr 7.7e-6 run Fix As first 1
percent HFO 6SA then chrom.xls
    -reset                false
    -simulation           true
    -state                true
    -solution             true
    -distance             true
    -step                 true
    -pH                   true
    -water                true
USER_PUNCH
-headings pH Moles_As_Surface Kd_As LOG_Kd_As As_µg/L  MOLES_PB_SURFACE KD_Pb
LOG_KD_Pb Pb_µg/L Moles_Cr_Surface Kd_Cr LOG_Kd_Cr Cr_µg/L
-start
5  PUNCH -LA("H+")
10 TOTAsSURF = MOL("Hfo_wAsO4-2") + MOL("Hfo_wH2AsO4")  + MOL("Hfo_wHAsO4-") +
MOL("Hfo_wOHAsO4-3")
12 PUNCH  TOTAsSURF
20 PUNCH  TOTAsSURF/TOT("As")
21 PUNCH LOG10(TOTAsSURF/TOT("As"))
22 PUNCH TOT("As")*74922*1000

30 TOTPbSURF = MOL("Hfo_wOPb+") + MOL("Hfo_sOPb+")
32 PUNCH  TOTPbSURF
36 PUNCH TOTPbSURF/TOT("Pb")
37 PUNCH LOG10(TOTPbSURF/TOT("Pb"))
39 PUNCH TOT("Pb")*207*1000*1000
40 TOTCrSURF = MOL("Hfo_wCrO4-")
42 PUNCH TOTCrSURF
46 PUNCH TOTCrSURF/TOT("Cr")
48 PUNCH LOG10(TOTCrSURF/TOT("Cr"))
```

```
50 PUNCH TOT("Cr")*51.99*1000*1000
-end

USER_PRINT
-start
1 PRINT "Chromium(VI)  ug/L        :", TOT("Cr(6)")*51.996*1000*1000
3 PRINT "pH                        :", -LA("H+")
40 TOTCrSURF = MOL("Hfo_wCrO4-")
42 PRINT "MOLES Cr Surface complexed    :", TOTCrSURF
45 PRINT "MOLES Cr ",  TOT("Cr") "in Soln    :", TOT("Cr") *51990 " as mg/L  Cr  :"
46 PRINT "Kd Cr dimensionless      :", TOTCrSURF/TOT("Cr")
52 PRINT "     "

128 PRINT "Lead      ug/L        :", TOT("Pb")*207*1000*1000
130 TOTPbSURF = MOL("Hfo_wOPb+") + MOL("Hfo_sOPb+")
132 PRINT "MOLES Pb surface complexed    :", TOTPbSURF
135 PRINT "MOLES Pb  in Soln :", TOT("Pb") "Pb mg/L  :", TOT("Pb") *20700
136 PRINT "Kd Pb dimensionless      :", TOTPbSURF/TOT("Pb")
138 PRINT "     "

160 PRINT "Arsenic µg/L           :", TOT("As")*74922*1000
161 PRINT "pH                        :", -LA("H+")
162 TOTAsSURF = MOL("Hfo_wAsO4-2") + MOL("Hfo_wH2AsO4")  + MOL("Hfo_wHAsO4-") +
MOL("Hfo_wOHAsO4-3")
163 PRINT "MOLES As Surface complexed    :", TOTAsSURF
165 PRINT "MOLES As   in Soln :", TOT("As") "As mg/L  :", TOT("As")*74922
170 PRINT "Kd As dimensionless      :", TOTAsSURF/TOT("As")
-end

SOLUTION 200 Pilot water
    temp      25
    pH        7.70
    pe    10.7
    units     mg/l
    density   1
    S(6)      0.11
    N(5)      0.64
   # N(-3)     1.3
    Ca        11
    Ba    0.140
    Cr(6) 0.00021
    K         0.050
    Na        19
    Cl        2 charge
C(4)   43 as HCO3
    -water    1 # kg

PHASES
Fix_H+
H+ = H+
logk 0.0
END
USE SOLUTION 200
REACTION  100
K2CrO4  1
7.7e-6    #
EQUILIBRIUM_PHASES 100
Fix_H+  -7.7  NaOH
SAVE SOLUTION 202

END
USE SOLUTION 202
REACTION  200
```

```
PbCl 1
3.28e-5
SAVE SOLUTION 202
END
USE SOLUTION 202
REACTION  300
As2O5  1
0.74e-4
EQUILIBRIUM_PHASES  101
Fix_H+  -7.7  NaOH
SAVE SOLUTION 300
END
USE SOLUTION 300 #back to 1.0% HFO
SURFACE  1
Hfo_wOH  0.000735  6.0  .3273   #30.9 actual factor
Hfo_sOH 0.0000184
SAVE SURFACE 1-5
EQUILIBRIUM_PHASES 102
Fix_H+  -7.7 NaOH
CO2(g)  -3.4  10
END
#MIX
#200 30.9
#SAVE SOLUTION 31
END
#USE SOLUTION 31
#USE SURFACE 101
#EQUILIBRIUM_PHASES
#Fix_H+  -7.7 NaOH
#CO2(g)  -3.4  10
END
SOLUTION 1-5 Pilot water
    temp      25
    pH        7.70
    pe    10.7
    units     mg/l
    density   1
    S(6)      0.11
    N(5)      0.64
   # N(-3)     1.3
    Ca        11
    Ba    0.140
    Cr(6) 0.00021
    K         0.050
    Na        19
    C(4)   43 as HCO3
    Cl        2 charge
    -water    1 # kg

EQUILIBRIUM_PHASES 1-5
CO2(g) -3.4  10
Fix_H+  -7.7 NaOH

SAVE SOLUTION 0

END
TRANSPORT
-cells 5
-shifts 20
END
```

PHAST INPUT FILES

*.trans.dat

```
# <?xml version="1.0" encoding="UTF-8" standalone="no" ?>
# <WPhast>
#   <!--Exported from C:\data\Projects\TODD engineers\Final
Models\PHAST\pasorobles4_0_7_midtimes_noFe_12_LowZonebicarb77.p4w-->
#   <!--Exported to   C:\Users\John J.
Mahoney\Desktop\pasorobles4_0_7_midtimes_noFe_12_LowZonebicarb77.trans.dat-->
# </WPhast>
#
SOLUTE_TRANSPORT true
      -diffusivity  1e-009
STEADY_FLOW false
FREE_SURFACE_BC true
SOLUTION_METHOD
      -iterative_solver   true
      -tolerance          1e-010
      -save_directions    20
      -maximum_iterations 500
      -space_differencing 0
      -time_differencing  1
      -cross_dispersion   false
      -rebalance_fraction 0.5
      -rebalance_by_cell  false
UNITS
      -time                              years
      -horizontal_grid                   ft
      -vertical_grid                     ft
      -map_horizontal                    ft
      -map_vertical                      ft
      -head                              ft
      -hydraulic_conductivity            ft/day
      -specific_storage                  1/foot
      -dispersivity                      ft
      -flux                              ft/second
      -leaky_hydraulic_conductivity      ft/day
      -leaky_thickness                   ft
      -well_diameter                     inches
      -well_flow_rate                    gallon/minute
      -well_depth                        ft
      -river_bed_hydraulic_conductivity m/s
      -river_bed_thickness               m
      -river_width                       m
      -river_depth                       m
      -drain_hydraulic_conductivity      m/s
      -drain_thickness                   m
      -drain_width                       m
      -equilibrium_phases                WATER
      -exchange                          WATER
      -surface                           WATER
      -solid_solutions                   WATER
      -kinetics                          WATER
      -gas_phase                         WATER
```

```
GRID
      -nonuniform X
            0    200    400    600    700
            800    900    1000    1100    1200
            1300    1400    1500    1600    1700
            1800    1900    2000    2050    2100
            2150    2200    2250    2300    2350
            2400    2450    2500    2550    2600
            2650    2700    2750    2800    2850
            2900    2950    3000    3100    3200
            3300    3400    3500    3600    3700
            3800    3900    4000    4100    4200
            4400    4600    4800    5000
      -nonuniform Y
            0    200    400    600    800
            1000    1200    1300    1400    1500
            1600    1700    1800    1900    2000
            2050    2100    2150    2200    2250
            2300    2350    2400    2450    2500
            2550    2600    2650    2700    2750
            2800    2850    2900    2950    3000
            3100    3200    3300    3400    3500
            3600    3700    3800    4000    4200
            4400    4600    4800    5000
      -nonuniform Z
            0    20    40    60    80
            100    120    140    150    160
            170    180    190    200    210
            220    230    235    240    245
            249    250    251    252    253
            254    255    260    265    270
            275    280    285    290    295
            300
      -snap X 0.001
      -snap Y 0.001
      -snap Z 0.001
      -chemistry_dimensions XYZ
      -print_orientation XY
      -grid_origin   0  0  0
      -grid_angle    0
MEDIA
      -domain
            -active                    1
            -Kx                        5
            -Ky                        5
            -Kz                        0.5
            -porosity                  0.3
            -specific_storage          0.0001
            -long_dispersivity         50
            -horizontal_dispersivity   50
            -vertical_dispersivity     5
            -tortuosity                1
SPECIFIED_HEAD_BC
      -box -56.38811531968 26.7758550919261 0 44.8549795025603
4965.99252455504 300.000008009863 GRID
            -head
                  0 years     252.5
```

```
            -associated_solution
                  0 years     7
SPECIFIED_HEAD_BC
      -box 4942.52900037648 26.7758550919261 0 5053.9301633344
4965.99252455504 300.611610625052 GRID
            -head
                  0 years     247.5
            -associated_solution
                  0 years     7
HEAD_IC
      -domain
            -head                     POINTS GRID
                        0 0 252.5    252.5
                        0 5000 252.5    252.5
                        5000 0 247.5    247.5
                        5000 5000 247.5    247.5
                        end_points
CHEMISTRY_IC
      -domain
            -solution            7
CHEMISTRY_IC
      -box 0 -98.0693175104449 251.100006103516 5000 5000 300.161987304688
GRID
            -surface             POINTS GRID
                        0 0 250    0
                        0 0 254    0
                        0 0 255    1
                        0 0 260    1
                        0 0 300    1
                        5000 0 250    0
                        5000 0 254    0
                        5000 0 255    1
                        5000 0 260    1
                        5000 0 300    1
                        0 5000 250    0
                        0 5000 254    0
                        0 5000 255    1
                        0 5000 260    1
                        0 5000 300    1
                        5000 5000 250    0
                        5000 5000 254    0
                        5000 5000 255    1
                        5000 5000 260    1
                        5000 5000 300    1
                        end_points
WELL 1
      -xy_coordinate_system GRID
      -z_coordinate_system GRID
      -location 2500 2500
      -diameter 6
      -elevation 250 290
      -allocate_by_head_and_mobility False
      -injection_rate
            0 years     110
      -solution
            0 years     0
WELL 2
```

```
      -xy_coordinate_system GRID
      -z_coordinate_system GRID
      -location 2575 2575
      -diameter 5
      -elevation 100 120
      -allocate_by_head_and_mobility False
      -pumping_rate
            0 years     25
ZONE_FLOW 1
      -write_xyzt    zoneFLow boundary
      -box 1250.4599609375 1250 251 3750.47998046875 3750 251.100006103516
GRID
PRINT_INITIAL
      -boundary_conditions        false
      -components                 false
      -conductances               false
      -echo_input                 true
      -fluid_properties           true
      -force_chemistry_print      false
      -HDF_chemistry              true
      -HDF_heads                  true
      -HDF_media                  true
      -HDF_steady_flow_velocities true
      -heads                      true
      -media_properties           false
      -solution_method            true
      -steady_flow_velocities     false
      -wells                      true
      -xyz_chemistry              false
      -xyz_components             false
      -xyz_heads                  false
      -xyz_steady_flow_velocities false
      -xyz_wells                  false
PRINT_FREQUENCY
      -save_final_heads false
      0
            -bc_flow_rates          0
            -boundary_conditions    false
            -components             0
            -conductances           0
            -end_of_period_default  true
            -flow_balance           end
            -force_chemistry_print  0
            -HDF_chemistry          0.05    years
            -HDF_heads              0.05    years
            -HDF_velocities         end
            -heads                  0.05    years
            -progress_statistics    end
            -restart_file           0
            -velocities             0
            -wells                  1    years
            -xyz_chemistry          0
            -xyz_components         0
            -xyz_heads              0
            -xyz_velocities         0
            -xyz_wells              1    years
            -zone_flow              0.05    years
```

```
            -zone_flow_xyzt         0.05    years
            -zone_flow_tsv          0.05    years
            -hdf_intermediate       0.05    years
      0.25 years
            -bc_flow_rates          0
            -boundary_conditions    false
            -components             0
            -conductances           0
            -end_of_period_default  true
            -flow_balance           end
            -force_chemistry_print  0
            -HDF_chemistry          0.25    years
            -HDF_heads              0.25    years
            -HDF_velocities         end
            -heads                  0.25    years
            -progress_statistics    end
            -restart_file           0
            -velocities             0
            -wells                  1    years
            -xyz_chemistry          0
            -xyz_components         0
            -xyz_heads              0
            -xyz_velocities         0
            -xyz_wells              1    years
            -zone_flow              0.25    years
            -zone_flow_xyzt         0.25    years
            -zone_flow_tsv          0.25    years
            -hdf_intermediate       0.25    years
TIME_CONTROL
      -time_step
            0 0.05 years
            0.25 years 0.25 years
      -time_change
            0.25 years
            12 years
      -start_time 0 years
```

Corresponding *.chem.dat file

```
#OPEN WITH TRANSPORT Pb 1% HFO

SOLUTION_MASTER_SPECIES
Mx   Mx   0.0  100 100

SOLUTION_SPECIES
#Mx
Mx = Mx
log_k 0.0

SELECTED_OUTPUT 1
    -file                PR1.xls
    -reset               false
    -simulation          true
    -state               true
    -solution            true
    -distance            true
    -step                true
    -pH                  true
```

```
    -water                true
    -totals As Cr Cr(6) Pb
    -molalities Hfo_wCrO4- Hfo_wAsO4-2  Hfo_wH2AsO4  Hfo_wHAsO4- Hfo_wOHAsO4-3
Hfo_sOPb+
-eq Calcite  CO2(g)
-si Cerrusite Hydrocerrusite

USER_PUNCH
-headings mix_% pH Moles_As_Surface As_µg/L  MOLES_PB_SURFACE  Pb_µg/L
Moles_Cr_Surface Kd_Cr Cr_µg/L  Cl_mg/L  SI_Calcite
-start
1 Punch TOT("Mx")*100*1000
5  PUNCH -LA("H+")
10 TOTAsSURF = MOL("Hfo_wAsO4-2") + MOL("Hfo_wH2AsO4")  + MOL("Hfo_wHAsO4-") +
MOL("Hfo_wOHAsO4-3")
12 PUNCH  TOTAsSURF
22 PUNCH TOT("As")*74922*1000
30 TOTPbSURF = MOL("Hfo_wOPb+") + MOL("Hfo_sOPb+")
32 PUNCH  TOTPbSURF
39 PUNCH TOT("Pb")*207*1000*1000
40 TOTCrSURF = MOL("Hfo_wCrO4-")
42 PUNCH TOTCrSURF
46 PUNCH TOTCrSURF/TOT("Cr")
50 PUNCH TOT("Cr")*51.99*1000*1000
66 PUNCH TOT("Cl")*35.5*1000
69 PUNCH SI("Calcite")
-end

SOLUTION 7 FO-7 Shallow Paso Robles
pe 7.16
pH 8.11
units mg/L
C(4) 68 as HCO3
Cl 44 charge
S(6)  24
N(5)  .266
 As  0.01
Cr(6)  0.0017
Ca 29
Mg  3.8
Pb  0.0042
Na  38
K 3.1
#Fe(2)  80
END

SOLUTION 1 Paso Robles water PRTIW MIssion Memorial
pe 7
pH 6.39
units mg/L
C(4) 130 as HCO3
Cl 86 charge
S(6)  89
N(5)  2.5
Al 0.0043
As 0.0016
Cr(6)  0.0016
Ca 37
Mg  10
Pb  0.0006
Na  64
K 3.1
Fe(2)  0.067
```

```
Ba 0.059

SOLUTION 200 Pilot water Ambient water also
    temp      25
    pH        7.10
    pe    10.7
    units     mg/l
    density   1
    S(6)      0.11
    N(5)      0.64
   # N(-3)     1.3
    Ca        11
    Ba    0.140
    Cr(6) 0.00021
    K         0.050
    Na        19
    Cl        2 charge
C(4)  43  as HCO3
    -water    1 # kg

PHASES
Fix_H+
H+ = H+
logk 0.0
END

USE SOLUTION 200
REACTION  100
K2CrO4  1
7.7e-6    #
EQUILIBRIUM_PHASES 100
Fix_H+  -7.7  NaOH

SAVE SOLUTION 202

END
USE SOLUTION 202
REACTION  200
PbCl 1
3.28e-5
SAVE SOLUTION 202

END

USE SOLUTION 202
REACTION  300
As2O5  1
0.74e-4

EQUILIBRIUM_PHASES  101
Fix_H+  -7.7  NaOH

SAVE SOLUTION 300

END

USE SOLUTION 300
SURFACE  1
Hfo_wOH  0.000735  6.0  .3273   # 1% HFO at 6.18 kg rock
Hfo_sOH 0.0000184

EQUILIBRIUM_PHASES 102
 Fix_H+  -7.7 NaOH
```

```
 CO2(g)  -3.4  10
 O2(g) -0.7 10

SAVE SURFACE 1
END

SURFACE  2  #clean
Hfo_wOH  0.000735  6.0  .3273   # 1% HFO at 6.18 kg rock
Hfo_sOH 0.0000184
END

SOLUTION 200 Pilot water injection version
    temp      25
    pH        7.70
    pe    10.7
    units     mg/l
    density   1
    Mx      100
    S(6)      0.11
    N(5)      0.64
   # N(-3)     1.3
    Ca        11
    Ba    0.140
    Cr(6) 0.00021
    K         0.050
    Na        19
C(4)  43  as HCO3
    Cl        2 charge
    -water    1 # kg

EQUILIBRIUM_PHASES 1
CO2(g) -3.4  10
Fix_H+  -7.7 NaOH

SAVE SOLUTION 0  # Pilot water injection

SURFACE  0
Hfo_wOH  0.00000000001  6  0.00000001
END

EQUILIBRIUM_PHASES 111
Calcite 0  0.1
CO2(g)  -3.3 0.1
END
```

APPENDIX H

Photographs

Appendix H. List of Photographs

Figure Number	Description
MEC Training, Site Control, Rig Setup	
H-1	Munitions and Explosives of Concern (MEC) Training on Dec. 16, 2013
H-1	Munitions and Explosives of Concern (MEC) Training on Jan. 27, 2014
H-2	Public Notice of Monitoring Well Installation
H-2	Traffic Control Measures
H-3	Sonice drilling rig and support vehicle setup
H-3	Field personnel work area
Well Drilling, Construction, Demobilization, and Sampling	
H-4	Core sample layout area
H-4	Nighttime operations
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H-5	Well casing stabilizer
H-5	Well following tremie of cement seal
H-5	12-inch diameter well box
H-6	36-inch diameter circular asphalt cutter
H-6	Bolted well box with lamp black-tinted concrete
H-6	Core boxes/plastic removed and cores spread evenly across soil layout area
H-7	Sonic sediment core bag (Aromas Sand from 27.5 to 30.0 feet-bgs)
H-7	3-inch brass tube sediment samples for laboratory hydraulic analysis
Well Development, Geophysical Logging, and Groundwater Quality Sampling	
H-8	Well development - Smeal rig
H-8	Downhole geophysical logging
H-8	Low-flow water quality sampling setup at MRWPCA MW-1 (similar setup at FO-07)
H-9	Water quality sampling at ASR MW-1
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H-11	174.5 - 177.0 feet-bgs: AROMAS SAND (SP-SM)
H-12	274.5 - 277.0 feet-bgs: AROMAS SAND (SP)
H-12	296.0 - 298.5 feet-bgs: AROMAS SAND (ML)
H-13	317.0 - 319.5 feet-bgs: AROMAS SAND (ML)
H-13	337.0 - 339.5 feet-bgs: AROMAS SAND (SP)
H-14	364.5 - 367.0 feet-bgs: AROMAS SAND (SP)
H-14	389.5 - 392.0 feet-bgs: AROMAS SAND (SM)
H-15	392.5 - 393.5 feet-bgs: PASO ROBLES FORMATION (ML)
H-15	396.0 - 398.5 feet-bgs: PASO ROBLES FORMATION (CL)
H-16	412.5 - 415.0 feet-bgs: PASO ROBLES FORMATION (ML)
H-16	430.5 - 433.0 feet-bgs: PASO ROBLES FORMATION (SP)
H-17	447.5 - 450.0 feet-bgs: PASO ROBLES FORMATION (ML)
H-17	469.5 - 472.0 feet-bgs: PASO ROBLES FORMATION (SM)
H-18	487.0 - 489.5 feet-bgs: PASO ROBLES FORMATION (SM-SP)
H-18	496.0 - 498.5 feet-bgs: PASO ROBLES FORMATION (ML)
H-19	514.5 - 517.0 feet-bgs: PASO ROBLES FORMATION (SP)
H-19	527.5 - 530.0 feet-bgs: PASO ROBLES FORMATION (ML)

Path: T:\Projects\MRWPCA GWRII MW 60408\GIS\MAPS\Appendix H Photos\Figure H-1.mxd

Munitions and Explosives of Concern (MEC) Training on December 16, 2013

Munitions and Explosives of Concern (MEC) Training on January 27, 2014

TODD GROUNDWATER

Figure H-1

Path: T:\Projects\MRWPCA\GW\III.MW.60408\GIS\MAPS\Appendix H Photos\Figure H-2.mxd

RESOURCE MANAGEMENT SERVICES | PLANNING DIVISION

440 Harcourt Avenue Phone (831) 899-6737 Seaside, CA 93955 Fax (831) 899-6211
http://www.ci.seaside.ca.us/

NOTICE OF MONITORING WELL INSTALLATION

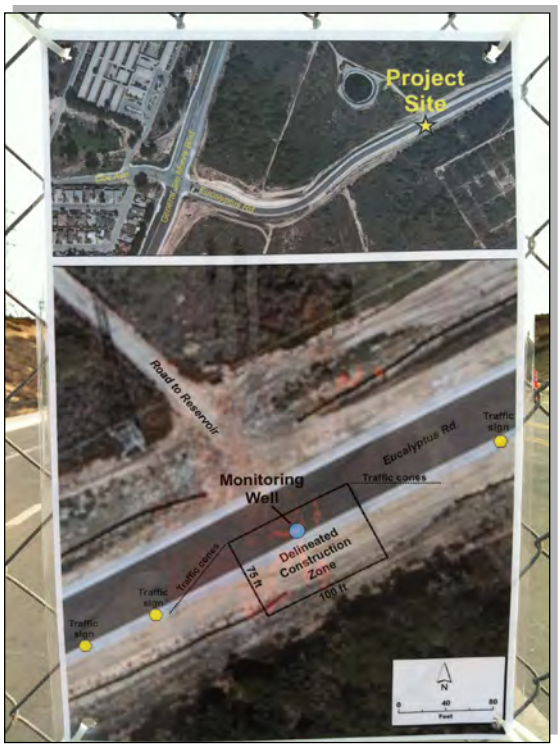
December 16, 2013

NOTICE IS HEREBY GIVEN that the City of Seaside, State of California, has issued an encroachment permit to the Monterey Regional Water Pollution Control Agency (MRWPCA) for the construction of the following application:

1. **Use Permit Application No UP-12-07**: The City of Seaside has approved Use Permit Application No. UP-12-07 allowing MRWPCA, Applicant, and Fort Ord Reuse Authority (FORA), Property Owner, to proceed with the installation and use of a monitoring well to collect site-specific hydrogeologic data for a potential future Monterey Peninsula Groundwater Replenishment project. The Monterey Peninsula Groundwater Replenishment project will be addressed in the future under a separate project-level environmental review process. In general, the proposed field program for the monitoring well includes the drilling of an approximate 550foot deep boring using the sonic drilling method, coring of the subsurface sediments, sampling and testing of core samples for hydraulic properties and leaching potential, and the installation and sampling of a monitoring well to obtain water levels and groundwater quality data. The monitoring well is proposed to be located within the southern bike lane of Eucalyptus Road, approximately 1,800 feet east of General Jim Moore Boulevard within the RS-8 (Single Family Residential) Zoning District. In accordance with the California Environmental Quality (CEQA) Guidelines, a Negative Declaration has been completed for the proposed project.

See accompanying map showing subject property.

NOTICE IS FURTHER GIVEN that the public may contact Scott Ottmar, Junior Engineer, at (831) 899-6886 (sottmar@ci.seaside.ca.us) for additional information concerning the proposed monitoring well and encroachment permit or to report any noise related / construction impacts resulting from the drilling process or any issues related to the placement of traffic signs and/or cones advising the public of the project construction area. The construction period for the monitoring well is from Monday, December 16, 2013 to Saturday, December 21, 2013.



Public Notice of Monitoring Well Installation (Eucalyptus Rd. and General Jim Moore Blvd.)

Traffic Control Measures

TODD GROUNDWATER

Figure H-2

Path: T:\Projects\MRWPCA GWRII MW 60408\GIS\MAPS\Appendix H Photos\Figure H-3.mxd

Sonic drilling rig and support vehicle setup

Field personnel work area

TODD GROUNDWATER

Figure H-3

Path: T:\Projects\MRWPCA GWRII MW 60408\GIS\MAPS\Appendix H Photos\Figure H-4.mxd

Core sample layout area

Nighttime operations

TODD GROUNDWATER

Figure H-4

Path: T:\Projects\MRWPCA GWRII MW 60408\GIS\MAPS\Appendix H Photos\Figure H-5.mxd

3-inch PVC well screen/casing installation

Well casing centralizer

Well following tremie of cement seal

12-inch diameter well box

TODD GROUNDWATER

Figure H-5

Path: T:\Projects\MRWPCA GWRII MW 60408\GIS\MAPS\Appendix H Photos\Figure H-6.mxd

36-inch diameter circular asphalt cutter

Bolted well box with lamp black-tinted concrete

Core boxes/plastic removed and cores spread evenly across soil layout area

TODD GROUNDWATER

Figure H-6

Path: T:\Projects\MRWPCA GWRII MW 60408\GIS\MAPS\Appendix H Photos\Figure H-7.mxd

Sonic sediment core bag (Aromas Sand from 27.5 to 30.0 feet-bgs)

3-inch brass tube sediment samples for laboratory hydraulic analysis

TODD GROUNDWATER

Figure H-7

Path: T:\Projects\MRWPCA GWRII MW 60408\GIS\MAPS\Appendix H Photos\Figure H-8.mxd

Well development - Smeal rig

Downhole geophysical logging

Low-flow water quality sampling setup at MRWPCA MW-1 (similar setup at FO-07)

TODD GROUNDWATER

Figure H-8

Path: T:\Projects\MRWPCA GW\EIR\MW 60408\GIS\MAPS\Appendix H Photos\Figure H-9.mxd

Water quality sampling at ASR MW-1

Water quality sampling at City of Seaside Well 4

TODD GROUNDWATER

Figure H-9

Path: T:\Projects\MRWPCA GWRII MW 60408\GIS\MAPS\Appendix H Photos\Figure H-10.mxd

Water quality sampling at PRTIW Well at Mission Memorial Cemetery

TODD GROUNDWATER

Figure H-10

Path: N:\Projects\MRWPCA GWR\LMW 6049\GIS\MAPS\Appendix H Photos\Figure H-11.mxd

75.0 - 77.5 feet-bgs: AROMAS SAND (SP-SM) Dark yellowish brown fine sand with large silt nodules, dry

174.5 - 177.0 feet-bgs: AROMAS SAND (SP-SM) Yellowish brown silty fine sand, dry

TODD GROUNDWATER

Figure H-11

Path: T:\Projects\MR\WPCA GWRII MW 60408\GIS\MAPS\Appendix H Photos\Figure H-12.mxd

274.5 - 277.0 feet-bgs: AROMAS SAND (SP) Dark yellowish brown fine sand, dry

296.0 - 298.5 feet-bgs: AROMAS SAND (ML) Light yellowish brown dense clayey silt with fine sand, moist

TODD GROUNDWATER

Figure H-12

Path: T:\Projects\MRWPCA GWRII MW 60408\GIS\MAPS\Appendix H Photos\Figure H-13.mxd

317.0 - 319.5 feet-bgs: AROMAS SAND (ML) Yellowish brown fine sandy silt (40% sand / 60% silt), dry

337.0 - 339.5 feet-bgs: AROMAS SAND (SP) Yellowish brown fine sandy, clayey, silt (40% sand / 10% clay / 50% silt), dry

TODD GROUNDWATER

Figure H-13

Path: T:\Projects\MRWPCA GWRII MW 60408\GIS\MAPS\Appendix H Photos\Figure H-14.mxd

364.5 - 367.0 feet-bgs: AROMAS SAND (SP) Yellowish brown very fine sand, dry

389.5 - 392.0 feet-bgs: AROMAS SAND (SM) Yellowish brown very fine silty sand (30% silt /70% sand), dry

TODD GROUNDWATER

Figure H-14

Path: T:\Projects\MRWPCA GWRII MW 60408\GIS\MAPS\Appendix H Photos\Figure H-15.mxd

392.5 - 393.5 feet-bgs: PASO ROBLES FORMATION (ML) Very dark gray clayey silt, very dense, dry

396.0 - 398.5 feet-bgs: PASO ROBLES FORMATION (CL) Very dark gray silty clay (50% silt / 50% clay), very dense, dry

TODD GROUNDWATER

Figure H-15

Path: T:\Projects\MRWPCA GWRII MW 60408\GIS\MAPS\Appendix H Photos\Figure H-16.mxd

412.5 - 415.0 feet-bgs: PASO ROBLES FORMATION (ML) Brown fine to medium coarse sandy silt (30% sand / 70% silt), dry

430.5 - 433.0 feet-bgs: PASO ROBLES FORMATION (SP) Dark yellowish brown silty fine sand, moist

TODD GROUNDWATER

Figure H-16

Path: T:\Projects\MRWPCA GWRI\LMW 60408\GIS\MAPS\Appendix H Photos\Figure H-17.mxd

447.5 - 450.0 feet-bgs: PASO ROBLES FORMATION (ML) Olive gray clayey silt, wet

469.5 - 472.0 feet-bgs: PASO ROBLES FORMATION (SM) Olive silty fine sand (40% silt / 60% sand), wet

TODD GROUNDWATER

Figure H-17

Path: T:\Projects\MRWPCA GWRII MW 60408\GIS\MAPS\Appendix H Photos\Figure H-18.mxd

487.0 - 489.5 feet-bgs: PASO ROBLES FORMATION (SM-SP) Yellowish brown silty fine to medium coarse sand (20% silt / 80% sand) with well-rounded chert cobbles up to 2", wet

496.0 - 498.5 feet-bgs: PASO ROBLES FORMATION (ML) Yellowish brown fine sandy, clayey silt (30% sand / 20% clay / 50% silt), dense

TODD GROUNDWATER

Figure H-18

Path: T:\Projects\MRWPCA GWRII MW 60408\GIS\MAPS\Appendix H Photos\Figure H-19.mxd

514.5 - 517.0 feet-bgs: PASO ROBLES FORMATION (SP) Yellowish brown fine to medium coarse sand (30/10/60), wet

527.5 - 530.0 feet-bgs: PASO ROBLES FORMATION (ML) Olive gray sandy, silty clay (30/30/40) with grayish white deposits of volcanic ash (reactive to acid, indicating calcium carbonate); lithology similar from 522 - 535 feet-bgs with fragments up to 6" diameter

TODD GROUNDWATER

Figure H-19

APPENDIX J

White Paper: Potable Reuse Operator Training and Certification Framework

A WHITE PAPER

Potable Reuse Operator Training and Certification Framework

January 2016

table of contents //

1 Executive Summary
2 Introduction
3 Operator Certification Survey
4 Current Operator Certification Practices
5 Existing Operator Training Opportunities
6 Advanced Water Treatment Processes Used in Potable Reuse
7 Gaps in AWT System Operator Skill Needs
8 Exploring Possible Paths Forward
9 CUWA Potable Reuse Operator Certification Workshop Outcomes
10 Conclusions & Recommendations
11 References
12 Acronyms

CALIFORNIA URBAN WATER AGENCIES

SECTION 1

Executive Summary

A regulatory framework for potable reuse is key to increasing statewide reuse and meeting the State Water Resources Control Board's (SWRCB's) goal of 1.5 million acre-feet/year (AFY) of recycled water by 2020 and at least 2.5 million AFY by 2030. Successful training and certification of potable reuse operators is a critical element of a comprehensive program to maintain high-quality reuse supplies that are protective of public health.

This paper summarizes existing standard practices for certification and training of operators at water, wastewater, and potable reuse facilities, explores additional skills and experience needed for operating potable reuse advanced treatment plants, outlines remaining challenges to implementation, and recommends a standardized potable reuse certification framework to the DDW.[1] This white paper can serve as a foundation for further development of actual training and certification requirements by DDW, along with pending DDW regulations for permitting and operation of reuse facilities, Individual agencies may also augment with additional, site-specific requirements as needed to protect public health and the environment.

Background

In California, indirect potable reuse (IPR) projects involve either the application of unrestricted non-potable recycled water through surface spreading, or the application of full advanced treated purified water for groundwater recharge or for surface water augmentation upstream of a water treatment plant. IPR uses the aquifer or reservoir as an environmental buffer to provide added treatment and response time. In the future, direct potable reuse would further expand potable reuse (PR) to include systems where the purified water is added directly upstream or downstream of a water treatment plant (WTP)—where there is no environmental buffer. The challenge for state regulators and municipalities implementing PR is to determine the best way to verify that operators assigned to operate a PR plant have an adequate level of experience and training to operate these complex and critically important systems.[2]

This white paper is a collaborative effort with CUWA and its partners:

- WateReuse California (WRCA)
- California-Nevada Section of the American Water Works Association (CA-NV Section AWWA)
- California Water Environment Association (CWEA)
- California Association of Sanitation Agencies (CASA)
- State Water Resources Control Board, Division of Drinking Water (DDW)

[1] A graphic illustrating the certification program development process is included in Attachment 1.

[2] This white paper is concerned with application of PR with the exception of groundwater recharge relying on percolation from spreading basins, which does not require AWT as defined in the Groundwater Recharge Regulations.

Current California Operator Certification Programs

"Certification" is a formal process to identify and acknowledge individuals who have met an established standard of competency for a defined job. Attachment 1 provides an illustration of a certification program development process.

Wastewater and drinking water operators are certified by the State Water Resources Control Board Office of Operator Certification (OOC). The wastewater and water operator programs were developed separately and are operated separately through the Wastewater Operator Certification Program (WW-OCP) and the Drinking Water Operator Certification Program (DW-OCP), respectively.

There are five grades for both wastewater and drinking water treatment certification. To receive a certificate, a candidate must:

1. Meet minimum experience and education requirements.
2. Pass a written test.
3. Apply for certification.

The grade level required for the chief plant operator and designated operator-in-charge depends upon the "grade" level of the wastewater treatment plant (WWTP) or WTP, which is a function of both its capacity and its complexity.

The specific educational and experience requirements for wastewater operator and for water treatment operator certifications vary. Additionally, a person certified by the DDW as a WTP operator may also operate a water recycling treatment plant[3] at a grade level appropriate for the class of WWTP being operated.

Gaps in Advanced Water Treatment (AWT) Operator Skill Needs from Conventional WTP and WWTP Operations

Except some applications where percolation basins are used for groundwater recharge, California potable reuse systems that supplement drinking water sources are expected to be advanced water purification facilities (AWPFs). Such systems use complex treatment trains centered on reverse osmosis (RO) and advanced oxidation processes (AOPs) not present in conventional WWTPs and WTPs. The reason for this sophisticated, multi-barrier AWT train is the need to achieve both a high level of log removal of pathogens and to remove organic and inorganic microcontaminants. The difficulty with applying only the existing California wastewater or drinking water treatment operator certification requirements to operators of PR plants is that the existing exams do not cover advanced water treatment or potable reuse-specific regulations and concerns (e.g., operation and monitoring of advanced technologies).

Water Boards

State Water Resources Control Board

EXAMINATION APPLICATION
FOR WASTEWATER TREATMENT PLANT OPERATOR

USE THIS FORM ONLY FOR EXAMINATION APPLICATIONS

FOR EXAMINATION ONLY

Existing exams do not cover advanced water treatment or potable reuse regulations and concerns.

[3] "Water recycling treatment plant" means a treatment plant that receives and further treats secondary and/or tertiary effluent from a wastewater treatment plant. –CCR Title 23, Division 3, Chapter 26, Article 1§ 3671.

Potable reuse system operation for groundwater recharge and surface water augmentation is different from conventional wastewater and water treatment operations in a number of important ways:

1. Potable reuse requires multiple barriers using a variety of technologies and a more complex treatment train than conventional water and wastewater treatment processes.
2. Given that source water is treated secondary or tertiary wastewater effluent, it is critical that all components are operated and maintained as intended.
3. Feedwater quality (both raw wastewater into the WWTP and secondary or tertiary effluent feedwater to the AWT process) can vary significantly, which can impact the daily operation of the advanced treatment plant and potentially the purified water quality.
4. Potable reuse is not regulated under any one existing Federal program.

Existing Operator Training Opportunities

Many training opportunities are available for existing wastewater and water treatment operator certification exams through community colleges, universities, and professional association-based organizations, but not for AWT. If a WTP or WWTP wants to train operators on AWT(s), it must be conducted largely in-house. Existing AWPFs have developed internal programs site-by-site that combine hands-on training under supervision with some combination of in-house training manuals and exams, standard operational plans, and consultant- and/or treatment process vendor-supplied supplemental instruction. Similar efforts have also been made by WTP and WWTPs with AWT systems. In order to create a substantial pool of potential AWPF operators, training available for PR would need to be expanded beyond the existing opportunities.

Exploring Possible Paths Forward

Operators that currently run AWT processes for potable water reclamation must be either water treatment- or wastewater-certified. Training program content and tests have historically been site-specific and developed in-house.

Potable Reuse Operator Certification Survey: Utility Preferences

As one of the collaborative partners on this joint certification effort, WateReuse California distributed a survey to their membership, including a wide range of California municipal water and wastewater agencies. It was used to identify gaps in the existing DW-OCP and WW-OCP with respect to AWT practices for potable reuse facilities. Sixty-four agencies answered the survey.

70%

of survey respondents agree that one certification process for all potable reuse water system types should be developed.

California representatives of the water and wastewater sector responding to our survey prefer new certification options to fill the “holes” in existing programs and allow water treatment and wastewater operators to obtain advanced treatment certification for potable reuse. A minority of survey respondents preferred one type of existing operator certification program, typically based on the method used within their facilities—i.e., water purveyors were more likely to state that potable reuse systems should be operated by water treatment operators, and wastewater agencies were more likely to state that potable reuse systems should be operated by wastewater operators. However, over 70% of respondents agreed that one certification process for all potable reuse water system types (both indirect and direct) should be developed. Workshop participants

were largely in agreement that it is important to draw on the knowledge and experience of both water and wastewater operators to operate reuse facilities successfully.

Potential approaches to developing an advanced potable reuse treatment certification program

A number of different paths could be taken to develop a potable reuse operator certification program. It could be developed as an independent, stand-alone program (option 1 below), or incorporated under an existing certification program or programs (i.e., under wastewater *or* water, or as a supplement to both)—such as options 2-4 below. The ideas presented here reflect thinking and discussion from different individuals and groups looking at the potable reuse operator certification question, particularly the CA-NV Section AWWA's Advanced Water Treatment Certification Workgroup, which is comprised of utility members (including some CUWA member agencies), California and federal regulators, and consultant potable water experts. This list is not intended to be a reflection of the ideas of any one group or person, but rather is an effort to capture and reflect some of the current avenues of thought and discussion on the topic.

While the growth of AWPFs may be the most pressing factor driving the need for AWT certification, there is also a desire for operator training and certification in other AWT facilities. For this reason, both a general AWT program and a PR-specific program are being considered.

Four potential potable reuse operator certification program options include:

1

SEPARATE POTABLE REUSE OPERATOR CERTIFICATION PROGRAM

Exclusively for potable reuse system operators, certifying that an individual has a defined level of potable reuse system-specific knowledge, skill, and experience.

2

PR or AWT OPERATOR CERTIFICATION PROGRAM SUPPLEMENT TO EXISTING DW CERTIFICATION

Verifies that a certified WTP operator has a defined level of specific knowledge, skill, and experience in AWT and related drinking water, wastewater and potable reuse rules and practices.

3

PR OR AWT OPERATOR CERTIFICATION PROGRAM SUPPLEMENT TO EXISTING WW CERTIFICATION

Verifies that a certified wastewater operator has a defined level of specific knowledge, skill, and experience in AWT and related drinking water, wastewater, and potable reuse rules and practices.

4

PR OR AWT SUPPLEMENT TO EITHER LICENSE

Certifies that a certified water treatment or wastewater operator has a defined level of specific knowledge, skill and experience in AWT and related drinking water, wastewater, and potable reuse rules and practices.

Selecting the program location and focus of a new stand-alone or supplemental certification program must balance two key necessities: covering knowledge elements necessary for operating indirect

and direct potable reuse systems, which by their nature straddle the wastewater and drinking water fields, while also developing a program that will be economically viable and draw a large enough pool of certified operators to meet utility hiring needs.

Recommendations and Conclusions

New training and certification programs are needed to provide AWT and potable reuse skill-specific operator endorsements. In a workshop facilitated by CUWA, a wide range of utility and State regulatory agency representatives came together and achieved consensus on the basic structure of the future certification program and a strategy for moving it forward. The CUWA workshop participants and the survey respondents both agreed that a special AWT or PR module to enhance existing certification (Option 4 on the previous page) is the best choice. The workshop participants developed a number of strategic recommendations:

1 The certification program should be centered on AWT technologies used in purification of wastewater effluent for potable reuse with a clear focus on protection of public health and should include risk management concepts.

2 It should be a certification "add on" available to both wastewater and water treatment operators with an acceptable level of training and experience.

3 One test for each level of certification should be given regardless of the qualifying background of the candidate. Training must be developed to address any gaps in background knowledge or experience associated with advanced treatment or potable reuse concepts for either water or wastewater candidates.

4 The program should provide an adequate population of certified operators from which utilities can hire new PR treatment plant operators and be broad enough to draw a large enough testing population to be financially viable.

Creating a certification program that is open to both water and wastewater operators offers the benefit of combining critical background knowledge from existing certification programs while enabling a broader pool of candidate operators for this additional training and certification. With increasing levels of certification, candidates must demonstrate their competence in increasingly complex potable reuse concepts beginning with an understanding of AWT basics and progressing into more critical aspects of potable reuse such as advanced monitoring, emergency response, and regulatory concepts.

The water/wastewater community has yet to reach consensus on one primary point: whether the ultimate target audience for the certification program should be centered on potable reuse with AWT specifically, or serve as a more general AWT program with water and wastewater elements. This decision is dependent upon: 1) what State regulators need to feel comfortable with the certification program, and 2) how broad the program needs to be to serve water sector needs and be economically viable for the certifying agency or agencies.

Regardless of the selected strategy, legislation and/or an update to the operator certification regulations will likely be needed to address the proposed new certification requirements. Additional work will also be needed to determine the details on the range of knowledge and criteria for qualifications.

This framework establishes a foundation for further development of a potable reuse training and certification program. A critical question to be resolved is what organization or organizations will create and maintain the program. At the workshop, there was general recognition that both water and wastewater perspectives are needed to develop the proper training and certification program to prepare and verify a minimum skillset for AWT/potable reuse operators. An effort is underway through the CA-NV Section AWWA AWT Operator Certification Committee to explore the possibility of developing an AWT- or PR-focused certification program. At the CUWA Workshop, representatives from CA-NV Section AWWA and CWEA agreed that collaboration would make good sense. It was also recognized that each organization would need to further explore with their leadership how such a partnership could work. As of publication, conversations between these groups are on-going, but no formal agreements have been made. An entity or entities will need to step forward and commit to developing training and certification programs for an AWT or PR supplement to create such a program.

It is important to note that while potable reuse training and certification is critically important, it is just one part of a comprehensive program required to ensure the protection of public health and safety amidst more widespread adoption of potable reuse. To have the greatest benefit, potable reuse operator training and certification must be accompanied by a regulatory framework as well as customized, agency-specific training and Operations, Monitoring, and Maintenance Plans (OMMPs).

SECTION 2

Introduction

California utilities are working hard to maximize beneficial use of all available water sources to enhance the resilience and reliability of their water supply portfolios. As noted in CUWA's Water Supply Reliability Report, demand management and water supply diversification are critical elements of establishing resilience to meet future challenges and uncertainties. Water reuse is a critical element of California's water supply portfolio, and the drought has elevated awareness of potable reuse as a locally controlled, drought resistant, high-quality drinking water supply source. Increased interest in and accelerated development of water purification projects for potable reuse is tempered by the commitment to proceed deliberately to ensure that potable reuse is fully protective of public health and the environment.

A regulatory framework for potable reuse is key to increasing statewide reuse and meeting the State Water Resources Control Board's (SWRCB) goal of 1.5 million acre-ft/year (AFY) of recycled water production by 2020 and at least 2.5 million AFY by 2030. Successful training and certification of potable reuse operators is a critical element of a comprehensive program to maintain high-quality reuse supplies that are protective of public health; it will also be an important piece of successful large-scale implementation of direct potable reuse (DPR).

Operator certification has been identified as a major issue for consideration by the Expert Panel providing recommendations to the SWRCB on surface water augmentation regulations and the feasibility of establishing DPR criteria. It has been similarly cited by the Advisory Group to the Expert Panel on DPR issues and by the DDW. Good operator training and certification programs will be an intrinsic element of successful widespread implementation of AWT-based PR in California—this white paper is concerned with application of PR with the exception of groundwater recharge that relies on percolation from spreading basins, which does not require AWT as defined in the Groundwater Recharge Regulations.

This white paper is a collaborative effort with CUWA and its partners:

- WateReuse California (WRCA)
- California-Nevada Section of the American Water Works Association (CA-NV Section AWWA)
- California Water Environment Association (CWEA)
- California Association of Sanitation Agencies (CASA)
- State Water Resources Control Board Division of Drinking Water (DDW)

Background

Potable reuse is inclusive of indirect potable reuse and direct potable reuse. In California, IPR projects involve either: 1) the application of unrestricted non-potable recycled water through surface spreading, or 2) the application of full advanced-treated purified water for groundwater recharge or surface water augmentation upstream of a water treatment plant (WTP), using these environmental buffers as treatment and for response and retention time.

DPR is defined as "[introduction of] purified water[4]... directly into a potable water supply distribution system or into the raw water supply immediately upstream of a WTP" (Tchobanoglous et al., 2011). The water purification process involves the use of an advanced water treatment (AWT) train consisting of a series of advanced treatment processes designed to collectively provide a robust, multi-barrier purification approach for the protection of public health. As a result, advanced water purification facilities (AWPF) use additional treatment processes than those used in conventional wastewater treatment plants (WWTPs) and WTPs (Figure 2-1).

As with any treatment train, good operator knowledge and skill is critical to the proper control of an AWT process. Because potable reuse is not widely practiced, existing operator certification programs are based on conventional WWTP and WTP operations. Potable reuse requires knowledge of advanced treatment technologies, additional regulatory requirements, AWT train water quality monitoring, and additional drinking water distribution requirements. An understanding of both wastewater and water operations is valuable. However, operating a PR plant generally carries a greater level of risk and complexity associated with its proper operation than most WWTPs and WTPs.

The challenge for state regulators and municipalities implementing potable reuse is to determine the best way to verify that the operators assigned to operate an AWPF have an adequate level of experience and training to operate these complex and critically important systems to consistently produce a high-quality drinking water supply protective of public health.

Purpose

The intent of this white paper is to summarize current water and wastewater operator certification programs, describe existing standard practices for required certification and training of operators at potable reuse facilities, explore additional skills and training opportunities needed for operating potable reuse advanced treatment plants, review potential strategies for creating such a program, and make a recommendation to DDW on a standardized potable reuse certification approach. This was accomplished through a two-phased process:

- **Phase 1,** performed in collaboration with WateReuse CA, consisted of a literature review and utility survey that set the foundation for a preliminary white paper. The initial draft was used as the basis of discussion for a facilitated workshop in Phase 2.
- **Phase 2** involved a 2-day facilitated workshop attended by our collaborative partners (WateReuse CA, CA-NV Section AWWA, CWEA, and CASA), and several key stakeholders including DDW and agencies currently involved in or planning for potable reuse. Workshop participants collaborated to prioritize previously reviewed certification strategies and gain agreement on which approach to recommend to DDW. Participants also identified implementation issues that will need to be addressed moving forward.

[4] Where "purified water" refers to highly treated reclaimed wastewater.

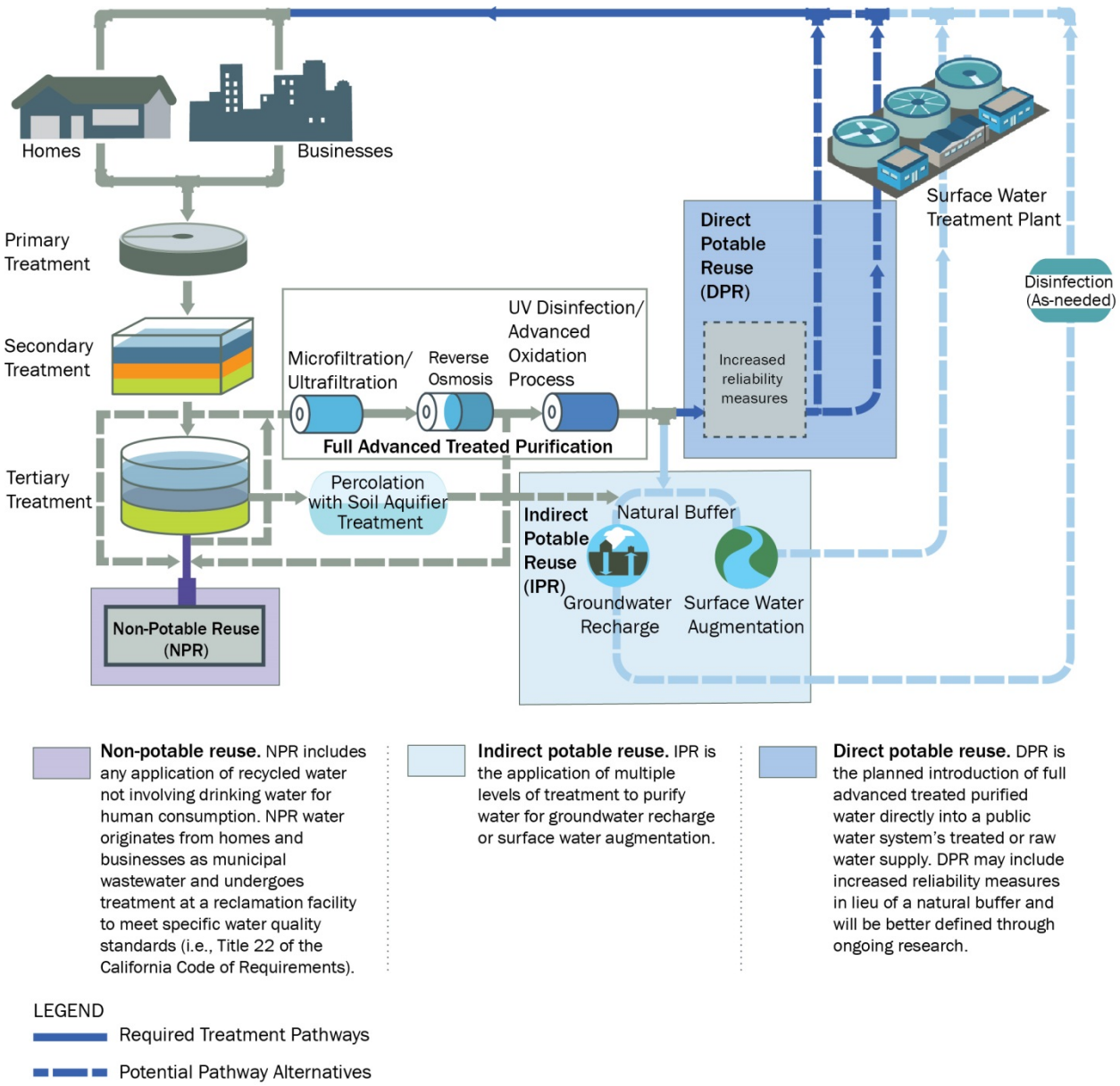


Figure 2-1. The water treatment process alternatives typical of non-potable and indirect potable reuse systems, and the basis for future direct potable reuse systems

While AWPF staffing needs may be the most pressing AWT certification need at this time, there is also a need for operator training and certification in other AWT facilities. For this reason, both a more general AWT program and potable reuse (PR)-specific program are being considered. This white paper includes discussion of both general AWT training and certification needs and PR-specific training and certification needs as there is a great deal of overlap and it is unclear which path (AWT-based or PR-based) future operator training and certification programming will take.

SECTION 3

Operator Certification Survey

As one of the collaborative partners on this joint certification effort, WateReuse California distributed a survey to their members, which includes a wide range of California municipal water and wastewater agencies. The survey aimed to identify gaps in the existing water and wastewater operator certification programs compared to the needs at an AWT facility for potable reuse water.

CUWA staff collaborated with the WRCA to develop a nineteen-question survey on potable reuse practices and preferences. Ninety-one respondents from 64 agencies answered the survey, covering a range of perspectives, as shown in Figures 3-1, 3-2, and 3-3. The respondents included water, wastewater, and combined utilities and represented diverse roles within their agency (i.e., upper management, operations, and others), providing a statewide snapshot of current utility thinking on reuse. Representatives from outside water/wastewater agencies also participated (i.e., a contract operator, wholesalers and groundwater management agencies, and a regulator). This white paper highlights survey results that capture key water and wastewater sector preferences on this topic.

These questions offered the option to select from a list of responses or manually enter an alternate descriptor. Some responses have been described within each figure. Other results from the survey are discussed later in this document.

The full survey instrument is provided in Attachment 2. The full suite of survey responses can be requested from WRCA.

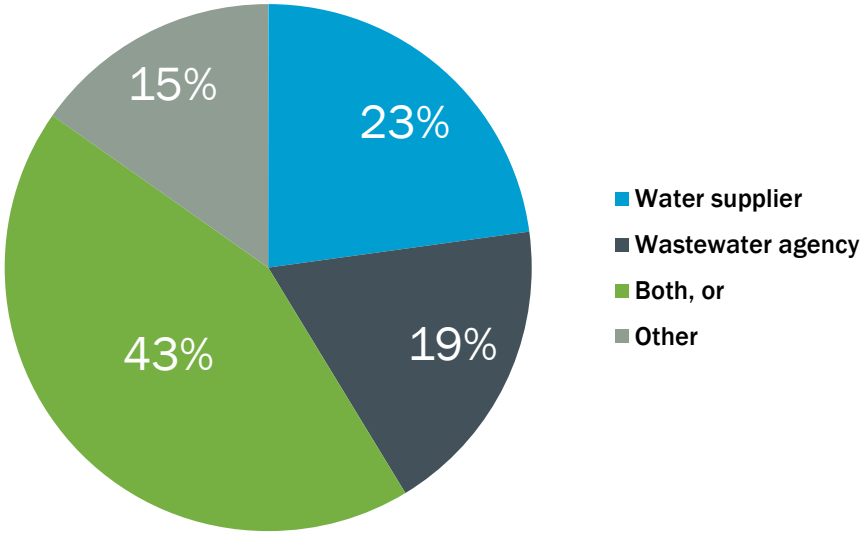


Figure 3-1. Type of agency providing survey responses ("Other" includes write-in respondents from similar groups such as plant supervisors, operations and maintenance supervisors, plant technicians).

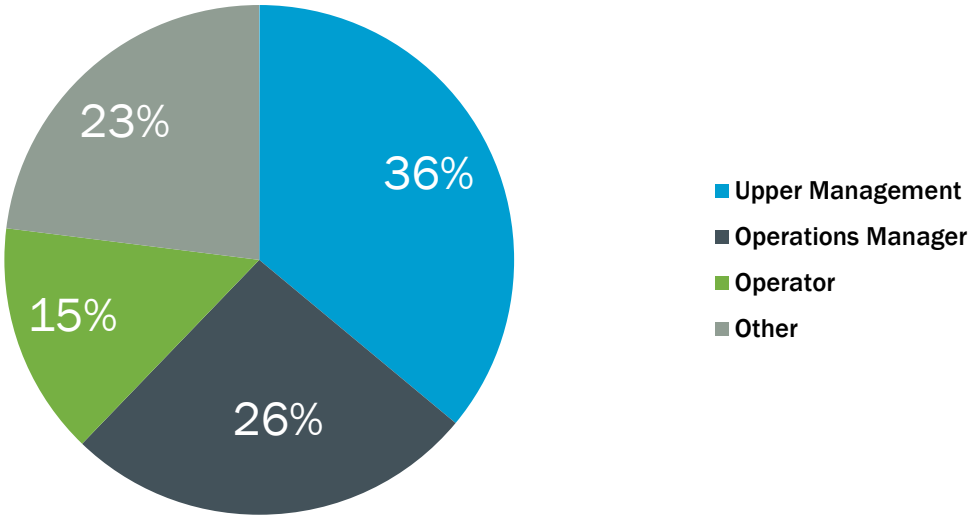


Figure 3-2. Survey respondents' roles at their respective agencies ("Other" includes write-in respondents from similar groups such as plant supervisors, operations and maintenance supervisors, and plant technicians).

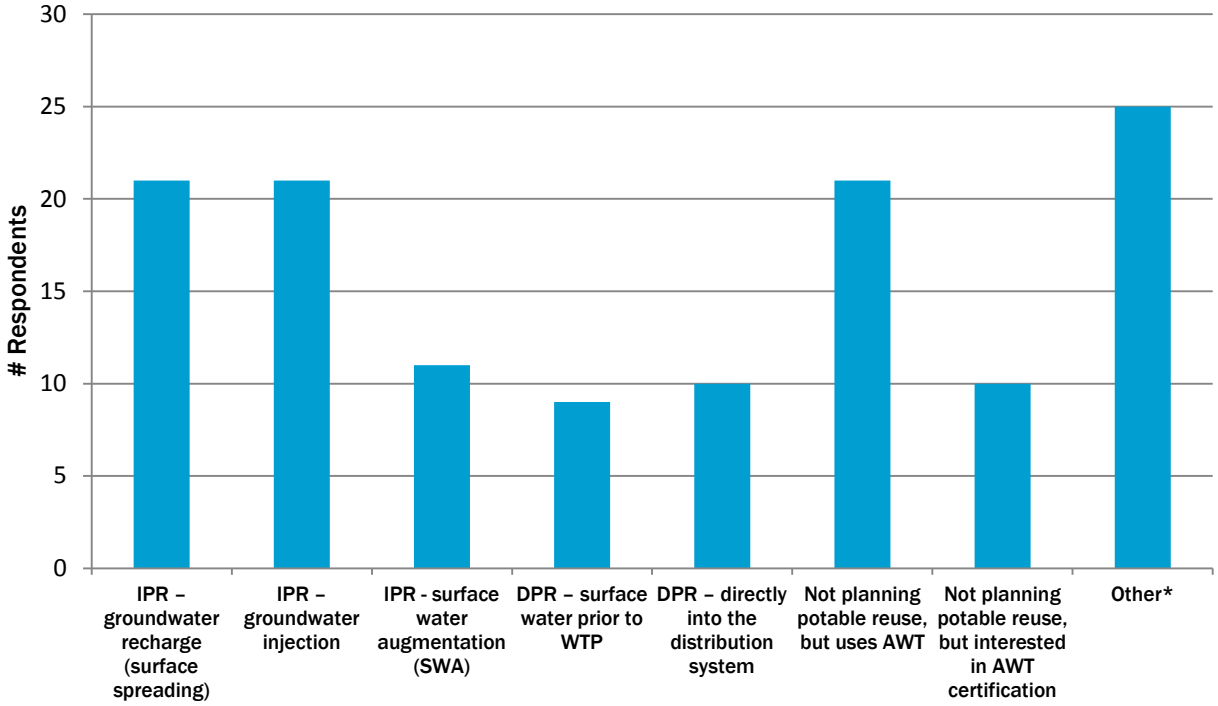


Figure 3-3. Types of potable reuse being performed or planned for by responding agencies

"Other" includes agencies looking at all types of potable reuse, those that have only unrestricted non-potable reuse water, and wholesalers.

SECTION 4

Current Operator Certification Practices

"Certification" is a formal process to identify and acknowledge individuals who have met an established standard of competency for a defined job using a psychometrically valid test. This process typically involves obtaining education and on-the-job experience, and passing an exam that measures job-critical knowledge and skills. When the individual has met these requirements, the certifying body "certifies" that the individual has the required level of skill and ability for the defined job. More information on the certification process is provided in Attachment 1.

Current California Operator Certification Programs

Wastewater and drinking water certification programs were developed separately and are operated through the Wastewater Operator Certification Program (WW-OCP) and the Drinking Water Operator Certification Program (DW-OCP), respectively. With the merger of the Drinking Water Program into the State Water Resources Control Board, both water and wastewater operator certification programs now operate under the State Board's Office of Operator Certification (OOC). The current management structure can help facilitate any solutions involving both programs.

Wastewater Operator Certification Program

The requirements for wastewater operator certification in California are contained in Title 23, Division 3, Chapter 26 of the California Code of Regulations (CCR, 2015b). These regulations were adopted pursuant to the California Water Code Section 13625 et seq. (included in Appendix A) and apply to wastewater treatment facilities used in the treatment or reclamation of sewage or industrial wastes. The Federal Water Pollution Control Act (i.e., the Clean Water Act) also includes provisions for support of operator training programs. There are five grades of operator certification (Grades I – V). To receive a certificate, a candidate must:

1. Meet minimum experience and education requirements,
2. Pass a written test, and
3. Apply for certification.

Certificate application must be within two years following an examination for Grade I and within four years following an examination for Grades II, III. IV, and V. WWTP classifications and operator requirements for each classification are summarized in Figure 4-1 and Table 4-1, respectively. It is illegal to operate a public or private WWTP regulated by the Public Utilities Commission without a valid certificate. The Grade level required for the chief plant operator and designated operator-in-charge depends upon the “Grade” level of the WWTP, which is a function of both its capacity and complexity.

	Examination + Education Requirements	Certification Qualifying Experience Requirements
GRADE I		
Path 1	High school diploma or equivalent and 6 educational points	1 year of full-time qualifying experience
GRADE II		
Path 1	High school diploma or equivalent and 9 educational points	18 months of full-time qualifying experience as a Grade I operator
or		
Path 2	High school diploma or equivalent and 12 educational points	2 years of full-time qualifying experience
or		
Path 3	Associate's degree, a higher degree, or a minimum of 60 college semester units, including a minimum of 15 semester units of science courses	1 year of full-time qualifying experience
GRADE III		
Path 1	High school diploma or equivalent and 12 educational points	3 years of full-time qualifying experience as a Grade II operator
or		
Path 2	High school diploma or equivalent and 18 educational points	4 years of full-time qualifying experience
or		
Path 3	Associate's degree or a minimum of 60 college semester units, including a minimum of 15 semester units of science courses	2 years of full-time qualifying experience
or		
Path 4	Bachelor's degree or a higher degree, including a minimum of 30 semester units of science courses	1 year of full-time qualifying experience

	Examination + Education Requirements	Certification Qualifying Experience Requirements
GRADE IV		
Path 1	High school diploma or equivalent and 32 educational points	6 years of full-time qualifying experience as a Grade II operator
or		
Path 2	Associate's degree or a minimum of 60 college semester units, including a minimum of 15 semester units of science courses	4 years of full-time qualifying experience
or		
Path 3	Bachelor's degree or a higher degree, including a minimum of 30 semester units of science courses	3 years of full-time qualifying experience
or		
Path 4	Valid registration as a chemical, civil, or mechanical engineer issued by the California Board for Professional Engineers and Land Surveyors or by another state, territory, or Indian tribe	2 year of full-time qualifying experience
GRADE V		
Path 1	High school diploma or equivalent and 48 educational points	10 years of full-time qualifying experience as a Grade II operator
or		
Path 2	Associate's degree or a minimum of 60 college semester units, including a minimum of 15 semester units of science courses	6 years of full-time qualifying experience
or		
Path 3	Bachelor's degree or a higher degree, including a minimum of 30 semester units of science courses	5 years of full-time qualifying experience
or		
Path 4	Valid registration as a chemical, civil, or mechanical engineer issued by the California Board for Professional Engineers and Land Surveyors or by another state, territory, or Indian tribe	4 year of full-time qualifying experience

Figure 4-1. California Wastewater Operator Certification Requirements (*Source*: *§3687(c)*)

Qualifying experience may be acquired in two ways:

1. Individuals may work part- or full-time performing operator duties while holding an Operator-in Training[5] certificate or a wastewater certificate at a lower grade level. Part-time experience is prorated, e.g., two years of half-time work equals one year of qualifying experience.
2. Individuals may use wastewater experience gained outside California, provided they are a certified wastewater operator and performing duties requiring certification in California.

The general topics covered by the wastewater certification exams include:

1. Source waters (domestic and industrial),
2. Wastewater treatment processes:
   a. Racks, screens, and grit removal, sedimentation and flotation, trickling filters, rotating biological contactors, activated sludge, oxidation ditches, ponds, sludge digestion, solids handling, and disinfection
3. WWTP operation and maintenance,
4. Collection system operation and maintenance,
5. Laboratory procedures, and
6. Wastewater regulatory requirements and administrative duties.

Table 4-1. WWTP Classification Table

Source: §3675(a)

WWTP Classification	Wastewater Treatment Process	Design Flow (mgd)
I	Primary	≤1.0
	Conventional Treatment Pond	All
II	Primary	>1.0 – 5.0
	Biofiltration	≤1.0
	Modified Treatment Pond	All
III	Primary	>5.0 – 20.0
	Biofiltration	>1.0 – 10.0
	Activated Sludge	≤5.0
	Sequencing Batch Reactor	≤1.0
	Tertiary	≤1.0
IV	Primary	>20.0
	Biofiltration	>10.0 – 30.0
	Activated Sludge	>5.0 – 20.0
	Sequencing Batch Reactor	>1.0 – 10.0
	Tertiary	>1.0 – 10.0
V	Primary	>30.0
	Activated Sludge	>20.0
	Sequencing Batch Reactor	>10.0
	Tertiary	>10.0

[5] The Operator-in-Training (OIT) certificate is a valid temporary certificate allowing someone to obtain experience as an operator. The regulations define an OIT as "any person who operates a WWTP under the direct supervision of a certified operator while gaining experience to qualify for an operator certificate." An owner may employ or train an OIT at any grade level, provided the OIT is under the direct supervision of an operator at the same or a higher grade level as the OIT and performing the duties at the grade level for which the certificate was issued. An OIT may not supervise operators or other OITs. An OIT may not be a chief plant operator, designated operator-in-charge, or lone operator.

Drinking Water Operator Certification Program

In 1999, the Environmental Protections Agency (EPA) published guidance, as required by the Safe Drinking Water Act Amendments of 1996, establishing minimum requirements for state operator certification programs (EPA, 1999). Also in 1999, the California State legislature amended the Health and Safety Code to conform to the federal statute and guidelines (Chapter 755, 1999 statutes). These regulations have been adopted pursuant to that statute (Health & Safety Code §106875 et. seq.; included in Appendix B) in the CCR Title 22, Division 4, Chapter 13 (CCR, 2015a).

Unlike the wastewater certification process, the Drinking Water Operator Certification Program (DW-OCP) has two certification tracks: one for work "inside the fence" and one for work "outside the fence." It offers five levels of *water treatment plant* operator certification ("T" grades) for plant operators and five levels of *distribution system* operator certification ("D" grades) for those who work outside the plant in the transmission system. Treatment operator certification and distribution operator certification programs are independent of one another. Drinking water treatment certification requirements are described in this section.

Drinking Water Treatment Operator Certification

To receive a certificate as a Drinking Water Treatment Plant Operator, as with WWTP operator certification, a candidate must meet the minimum experience and education requirements and pass a written test (within the last three years for each level). A summary of the experience and education necessary for each treatment plant operator grade is presented in Figure 4-2.

For the most part, all public water systems with water treatment facilities require certified WTP operators. The only exception is water systems using disinfection facilities for groundwater where no *Giardia* or virus reduction is required. These systems can meet the operator certification requirements with a certified distribution operator. All community and non-transient, non-community public water systems with or without water treatment facilities must have certified distribution operators.

The Grade level required for the chief plant operator and designated operator-in-charge depends upon the classification level of the WTP, which is a function of both its capacity and its complexity. WTPs are classified using a points system based on source water type, influent microbial water quality and turbidity, influence water contaminants with primary maximum contaminant limits, and treatment and disinfection types (CCR §64412.1 and §64413.1). Operator requirements for each classification are summarized in Table 4-2.

Similar to WWTP operators, qualifying experience may be acquired in two ways:

1. Individuals may work either part-time or full-time performing operator duties; part-time experience is prorated, e.g., two years of half-time work equals one year of qualifying experience.
2. The Board can grant certification through reciprocity to operators holding a valid water treatment or distribution certificate issued by another state. Reciprocity is offered for Grades 1–3 for both water treatment and distribution.

"Operator experience" means the daily performance of control or oversight activities of any process or operation at a water treatment facility or in a distribution system that may affect water quality or quantity. Many operators perform both water treatment and water distribution duties, and the operator must provide the State with a letter from their immediate supervisor or chief operator to determine how much time he or she spends performing each function.

	Examination Education Requirements +	Additional Certification Qualifying Experience Requirements
T1	High school diploma or equivalent. **or** Successful completion of the "Basic Small Water System Operations" course provided by the SWRCB **or** One year as an operator of a facility that required an understanding of chemical feeds, hydraulic systems, and pumps.	None
T2	High school diploma or equivalent. **or** Successful completion of the "Basic Small Water System Operations" course provided by the SWRCB **or** One year as an operator of a facility that required an understanding of chemical feeds, hydraulic systems, and pumps. **+** Successfully completed at least one course of specialized training covering the fundamentals of drinking water treatment	None
T3	High school diploma or equivalent. **+** Successfully completed a total of at least two courses of specialized training that includes at least one course covering the fundamentals of drinking water treatment.	At least one year of operator experience working as a certified **T2** operator for a **T2** facility or higher. **+** At least one additional year of operator experience working as a certified treatment operator.
T4	A valid Grade **T3** operator certificate. **+** Successfully completed at least three courses of specialized training that includes at least two courses in drinking water treatment.	At least one year of operator experience working as a shift or chief operator, while holding a valid **T3** operator certificate, at a **T3** facility or higher. **+** At least three additional years of operator experience working as a certified treatment operator.
T5	A valid Grade **T4** operator certificate. **+** Successfully completed at least four courses of specialized training that includes at least two courses in drinking water treatment.	At least two years of operator experience working as a shift or chief operator, while holding a valid **T4** operator certificate, at a **T4** facility or higher. **+** At least three additional years of operator experience working as a certified treatment operator.

Notes:

1. An Associate degree or certificate in water or wastewater technology that includes at least 15 units of physical, chemical, or biological science may be used to fulfill 1 year of operator experience.
2. .A Bachelor's degree in engineering or in physical, chemical, or biological sciences may be used to fulfill 1.5 years of operator experience.
3. A Master's degree in engineering or in physical, chemical, or biological sciences may be used to fulfill 2 years of operator experience.

Figure 4-2. California WTP Operator Certification Requirements
(Sources: §63775 and §63800)

General topics covered by the water treatment certification exams include:

1. Source waters (surface and groundwaters),
2. Water treatment processes:
    a. Coagulation/flocculation/ sedimentation, filtration, disinfection, demineralization, corrosion control, iron and manganese removal, fluoridation, water softening, solids handling, and Best Available Technologies (BATs)
3. WTP operation and maintenance,
4. Laboratory procedures, and
5. Drinking water regulatory requirements and administrative duties.

Both certified WTP and distribution system operators must receive ongoing training to ensure that their knowledge of treatment, operations, and public health issues remains current. Water treatment and distribution certificates must be renewed every three years. Continuing education units (CEUs) are required for renewal. The number of hours needed depends on the level of certification. These contact hours must be obtained between the certificate's renewal dates.

Table 4-2. Certificate Requirements for Water Treatment Plants

Source: §63765(a) Table 63765-A

WTP Classification	Minimum Chief Operator Certification	Minimum Shift Operator Certification
T1	T1	T1
T2	T2	T1
T3	T3	T2
T4	T4	T3
T5	T5	T3

Table 4-3. Certificate Requirements for Water Recycling Treatment Plants

Source: §3670.1.(b)(1)

WWTP Classification	WTP Operator Certificate	WWTP Operator Certificate
I	T1	Grade I
II	T2	Grade II
III	T3	Grade III
IV	T4	Grade IV
V	T5	Grade V

Water Distribution Operator Certification

All community and non-transient, non-community public water systems are required to have certified distribution system operators. Like WWTP and WTP operators, to receive a distribution operator certificate a candidate must meet minimum experience and education requirements, pass a written test, and apply for certification. Also like wastewater operators, the grade level required for the chief distribution system operator and designated distribution system operator-in-charge depends upon the classification level of the distribution system.

The general topics covered by the water treatment certification exams include:

1. Disinfection,
2. Distribution system design and hydraulics,
3. Equipment operation/maintenance/inspections,
4. Water regulations, management and safety,
5. Water mains and piping, and
6. Water quality/water source.

Water Recycling Plant Operation

Water recycling treatment plants are defined as WWTPs "that receive and further treat secondary and/or tertiary effluent from another [WWTP] for the purpose of meeting [recycled water regulations] for the use of recycled water." An individual certified by the SWRCB as a Water Treatment operator may also operate a water recycling treatment plant at a Grade level appropriate for the class of WWTP as set forth in CCR sections §3680 and §3680.1. A WTP operator certificate is equivalent to a WWTP operator certificate as outlined in Table 4-3.

Differences in Water and Wastewater Operator Certification

Historically, water operator certification and wastewater operator certification programs were managed by separate agencies. Water operator certification (for treatment and distribution) was under the California Department of Public Health (CDPH) until CDPH was merged into the State Water Resources Control Board as the Division of Drinking Water in 2014. At that time, drinking water operator certification was moved under the OOC. The following explains some of the important differences between the two programs:

1. While both water treatment and wastewater licenses require a combination of written testing and experience for each level of certification, and both have five levels of certification, they are not identical from level-to-level in terms of requirements. For example, Grade I wastewater certification requires a year of experience, whereas level 1 and level 2 in water treatment (T1 and T2 licenses) do not. The wastewater program has an OIT certificate serving a function similar to a T1 or T2 license in the water program.
2. A wastewater license allows you to operate WWTPs and water recycling plants. There is no certification requirement for collection system operation, although it is included in the exam. On the water side, two separate licenses are needed to operate the WTP (a "T" license) and distribution system (a "D" license), although many operators have both.
3. Water treatment and water distribution licenses require CEUs be earned annually. Wastewater licenses do not.
4. Bases for WWTP and WTP classifications (that determine required certification levels) are different. Wastewater classification is based on system size and what treatment processes are used. Water plant classification is based on influent water quality characteristics, treatment processes, and system size.

SECTION 5

Existing Operator Training Opportunities

For a certification program to be successful, adequate training programs must be in place to provide potential applicants with reasonable opportunities to acquire required knowledge. Extensive training programs are available for wastewater and water treatment operator certification through community colleges, universities, and water/wastewater association-based organizations (e.g., CWEA and CA-NV Section AWWA). Training available for an AWT or PR program could be an expansion of existing training opportunities.

The basic purpose of training is to give individuals a knowledge base in the fundamental concepts associated with tasks for a defined job. They can then use this knowledge on the job as they gain experience. The level of knowledge (i.e., number of credit hours) is defined by the certification agency (see Figure 4-1 and Figure 4-2 for California wastewater operator and water treatment operator requirements, respectively).

Programs providing CEUs are intended to serve as a supplement to basic training programs to enhance operator knowledge on a particular topic and keep individuals up-to-date on advances in technology, regulations, and operational practices. This type of training is less intensive than training courses for preparing for certification tests; such education is typically gained through attendance at workshops and conferences hosted by CA-NV Section AWWA, CWEA, WRCA, and similar organizations.

Existing Sources of Training

Many training opportunities are available for existing wastewater and water treatment operator certification exams through community colleges, universities, and association-based organizations (e.g., CWEA and CA-NV Section AWWA). Some of the more well-known organizations offering courses and/or full training programs are listed in Table 5-1.

Table 5-1. Existing Wastewater and Water Treatment Operator Certification Programs		
Training Entity	Offers Water Courses	Offers Wastewater Courses
Community and Junior Colleges, For-Profit Colleges		
American Water College	X	
Antelope Valley College	X	
Bakersfield College	X	X
Citrus College	X	
College of the Canyons	X	X
College of the Redwoods	X	
College of the Sequoias	X	X
Columbia College	X	
Cuesta College	X	
Cuayamaca	X	
Folsom Lake College	X	X
Fresno City College	X	
Gavilan College	X	
Glendale Community College	X	
Hartnell College	X	X
Imperial Valley College	X	X
Los Angeles Trade Technical College	X	X
Mendocino College	X	
Merced College	X	X
Mesa College	X	
Mt. San Antonio College	X	
Mt. San Jacinto College	X	
Ohlone College	X	
Palomar College	X	X
Sacramento City College	X	X
San Bernardino College	X	X
San Jose/Evergreen Community College	X	
Santa Barbara City College	X	X
Santa Rosa Junior College	X	X
Santiago Canyon College	X	
Shasta College	X	X
Solano Community College	X	X
Ventura College	X	X
Yuba College	X	
4-Year Colleges and Universities		
California State University, Sacramento	X	X
San Jose State University	X	
UC Davis	X	
Water/Wastewater Associations		
CA-NV Section AWWA Water College	X	
CWEA	X	X
Water Environment Federation		X
Water Operator Association	X	
California Rural Water Association Academy of Water Education	X	X

Table 5-1. Existing Wastewater and Water Treatment Operator Certification Programs		
Training Entity	Offers Water Courses	Offers Wastewater Courses
Others		
OCT Water Quality Academy	X	
Golden State Water Company	X	
Note: The programs cited above are included in the master list from the OOC. It is likely not all inclusive.		

As discussed in Section 8, the current approach to AWT operator training is defined on a site-by-site basis. It combines hands-on training under supervision with some combination of in-house training manuals and exams, standard operational plans, and consultant- and/or treatment process vendor-supplied supplemental instruction. Some formalized training opportunities also exist on membrane processes from various water sector organizations and individuals, including the American Membrane Technology Association (AMTA), Southwest Membrane Operator Association (SMOA), and Southeast Desalting Association (SEDA).

SECTION 6

Advanced Water Treatment Processes Used in Potable Reuse

As illustrated in Figure 2-1, when permitted in California, except for some cases when spreading basins are used (where AWT is optional), potable reuse systems supplementing drinking water sources are expected to use complex treatment trains centered on reverse osmosis and advanced oxidation processes. These AWT processes are also used in some WTPs with challenging raw water qualities, and to a lesser extent in WWTP applications where meeting effluent discharge goals can be difficult without advanced treatment.

Water Quality Goals

In developing the regulations for Groundwater Replenishment Using Recycled Water (CDPH [now DDW], 2014), the State adopted a pathogenic microorganism control based on a goal of achieving a pathogen de minimus risk of annual infection ($<10^{-4}$ assuming a sewage influent of 10^5/L – i.e., a waterborne disease outbreak) via multibarrier treatment. This is expected to extend to Reservoir Augmentation IPR and eventually to DPR. This rule states:

> "A project sponsor shall design and operate a GRRP [Groundwater Replenishment Reuse Project] such that the recycled municipal wastewater used as recharge water for a GRRP receives treatment that achieves at least 12-log enteric virus reduction, 10-log *Giardia* cyst reduction, and 10-log *Cryptosporidium* oocyst reduction. The treatment train shall consist of at least three separate treatment processes. For each pathogen (i.e., virus, *Giardia* cyst, or *Cryptosporidium* oocyst), a separate treatment process may be credited with no more than 6-log reduction, with at least three processes each being credited with no less than 1.0-log reduction." - §60320.208, Pathogenic Microorganism Control.

A secondary goal is removal of microcontaminants that could pose a chronic health risk and degrade the environment. Treatment credits are awarded in the WWTP and recycled water purification process. If injected into the ground (and very likely if added to a reservoir or other drinking water

source), the water must also receive "full advanced treatment" (or an alternative equally protective of public health), defined as three-part (or more) multibarrier treatment[6] including reverse osmosis (RO) and advanced oxidation (AOP). AWT systems for indirect potable reuse are typically designed and operated to provide disinfection and microcontaminant removal in excess of the baseline statutory requirements.

The DDW is expected to propose Draft Surface Water Augmentation (IPR) rules in 2016. A report from the National Water Research Institute (NWRI)-sponsored expert panel on the feasibility of developing uniform criteria for DPR in California is also anticipated in late 2016.

Characteristics of Advanced Unit Processes

Advanced technologies currently being used in direct injection potable reuse projects are briefly summarized in Table 6-1, with key operating parameters highlighted. Other processes, like chemical pretreatment, post-treatment water conditioning, and brine minimization may also be used, but are not AWT processes and not included here. Most treatment processes listed are also used in other water treatment facilities. The treatment selected depends on source water quality and requirements to meet drinking water standards. Current water treatment certification testing requirements do not incorporate many of these treatment processes and are focused on chlorination, conventional surface water treatment trains (coagulation–sedimentation–filtration–disinfection), and other common treatment processes.

In DPR, it is critical that processes used begin with a wastewater treatment facility followed by advanced treatment processes. Furthermore, good performance of each subsequent process is dependent upon receiving acceptable water quality from the previous process. For example, wastewater effluent quality must be consistent to ensure proper performance of the downstream microfiltration (MF) system. Good performance of the MF system is essential to avoiding quick fouling of the downstream RO membranes.

Table 6-1. Advanced Water Treatment Processes Commonly Used in Potable Reuse

Process Description
Soil Aquifer Treatment (SAT)
SAT is a passive process where water is introduced into the groundwater through soil percolation under controlled conditions. Water is introduced into a permeable pond where it percolates through the infiltration zone and the vadose zone on its way to aquifer storage. Natural treatment and attenuation occurs as it moves through the soil. In California, the water is later withdrawn after it has traveled through the aquifer for at least two months.
Ozone/Biologically Active Carbon (BAC)
Ozonation: Ozone is added to the water to oxidize contaminants present in the water, particularly organic compounds and microorganisms. Ozone is the strongest oxidant of the common disinfecting agents.
Biologically Active Carbon: BAC uses a stationary bed (typically granular activated carbon) on which biofilms of indigenous bacteria are allowed to develop. Biological filters remove contaminants by three main mechanisms: biodegradation, micropollutant adsorption, and suspended solids filtration. The microbial growth attached to the filter media (biofilm) consumes organic matter.
Membrane Filtration
Low-pressure membrane systems use semi-permeable membranes to separate out suspended solids, turbidity and microbiological organisms from the feed water. Low-pressure membranes (microfiltration and ultrafiltration) do not remove appreciable amounts of dissolved organic materials, total dissolved solids (TDS), or viruses.

[6] A requirement included in the GRRP regulations for IPR groundwater injection projects.

Table 6-1. Advanced Water Treatment Processes Commonly Used in Potable Reuse
Process Description
Reverse Osmosis
RO systems use semi-permeable membranes to separate out contaminants from the feed water. The applied pressure must be in excess of the osmotic pressure of the dissolved constituents to allow flow through the membrane. It differs from low-pressure membranes in that: 1) it removes appreciable amounts of dissolved organic materials and TDS, 2) it is a physical-chemical removal process, as opposed to a size exclusion process. Rejected salts are concentrated into a small percentage of the flow (15 – 20% of the feed volume) and exit the system as a concentrated waste stream.
UV/AOP
Ultraviolet (UV) light can be used as an advanced oxidation process with the addition of hydrogen peroxide or chlorine. In these applications, a high dose of UV light (on the order of 400 – 1,000 millijoules per square centimeter, mJ/cm^2) is applied to catalyze the formation of hydroxyl radicals from the peroxide. These free radicals subsequently oxidize the microorganisms and organic contaminants present, including both synthetic and naturally-occurring organic chemicals of concern.

SECTION 7

Gaps in AWT System Operator Skill Needs

Applying only existing California wastewater or drinking water treatment operator certification requirements to AWT and PR plant operators does not address all current skill assessment needs, as existing exams do not cover advanced water treatment or potable reuse regulations and concerns.

Certification exams are regularly updated based on reassessments of what a "water/wastewater treatment plant operator" job requires at different grade levels. Periodically, surveys are sent to operators across the state to query them on aspects of their jobs. If a specific job task is not identified by at least 60% of the survey respondents, it is not added to the job description. Given that AWT processes are relatively rare, even in surface water treatment plants (WTPs), questions on advanced water treatment (AWT) processes have not yet been added to the test.

Potable reuse system operation is different from conventional wastewater and water treatment operations in a number of important ways:

1. The need to treat water from wastewater quality to drinking water quality requires multiple barriers using a variety of technologies and a more complex treatment train than conventional water and wastewater treatment processes.
2. Given that the feed water to the wastewater treatment plant (WWTP) is wastewater containing high levels of pathogens and trace levels of various chemical contaminants that will be treated to drinking water standards through the AWT treatment train, it is critical that all components are operated and maintained as intended.
3. Feedwater quality (both raw wastewater into the WWTP and secondary or tertiary effluent feedwater to the AWT process) can vary. This can impact daily operation of the advanced treatment plant as well as the purified water quality.
4. Regulations exist in California for IPR through groundwater recharge applications and the State is actively working toward similar regulations for surface water augmentation and DPR. However, potable reuse (PR) water is not clearly regulated under any one existing Federal program. In the course of making recycled water for potable use, it could be interpreted to be regulated under the California Water Code (Porter-Cologne) jurisdiction (to produce an acceptable effluent) and under the State and Federal Safe Drinking Water Act jurisdiction to produce an acceptable drinking water source and provide treatment to potable water standards. Neither operator certification program covers both wastewater and drinking water regulations.

There is an additional problem with the application of the Water Treatment (T-license) experience credit under the existing Operator Certification structure. Because the recycled water certification program was initially developed under the umbrella of the wastewater certification program to produce water almost exclusively for non-potable applications (typically relying on tertiary treatment only), there are problematic rules for Water Treatment operators to earn equal experience credit working at advanced treatment facilities producing water for non-potable applications using advanced treatment like membrane and oxidation systems similar to potable applications. Water Treatment Operators working at an AWT facility can only accrue Water Treatment Operator-qualified experience at half time because the plant is not technically a potable water treatment facility (i.e., for every year a Water Treatment Operator works at an advanced recycled water facility, he/she only accrues six months of experience credit for their Water Treatment Operator's certificate.) This reduced credit for experience does a disservice to the operators, who run these sophisticated and complex advanced treatment systems.

The lower experience credit allowance for Water Treatment operators working at AWT facilities for recycled potable-quality water (as opposed to AWT facilities for drinking water) has become an issue at the Santa Clara Valley Water District's (SCVWD's) Silicon Valley Advanced Water Purification Center (SVAWPC), which processes tertiary effluent from a nearby water reclamation plant. At the SVAWPC, operators are Water Treatment-certified at Grade T3 or higher, when hired at the journey level. Although all job openings are available to both Water Treatment and Wastewater operators, at this time all staff are T-operators. Because of the way current operator certification regulations are written, staff receive only six months credit for operating the AWT facility each year, whereas the same type of job would earn 12 months of credit if the plant's water source was characterized as a potable water source. This issue must be considered in the development of a new potable reuse operator certification strategy.

Table 7-1. Aspects of current operator training or certification program(s) considered essential for potable reuse operations by respondents

Answer Choice	Percent Respondents
Wastewater treatment processes	77%
Drinking water regulatory requirements	72%
Wastewater treatment plant operation/maintenance	67%
Wastewater regulatory requirements	66%
Water treatment processes	63%
Laboratory procedures	57%
Water treatment plant operation/maintenance	52%
Distribution system operation/maintenance	52%
Source water	43%
Administrative duties	30%
Collection system operation/maintenance	28%
Other (list)	11%

Many survey respondents reported that knowledge of both water treatment and wastewater treatment processes was important (Table 7-1). Advanced processes were the most common certification deficiencies identified by those who had potable reuse facilities, although other related topics, like emergency response and monitoring, were also commonly cited (Table 7-2).

Table 7-2. Gaps in existing certification programs needed for potable reuse facility operation identified by respondents	
Answer Choices	Percent Respondents
UV-advanced oxidation	44%
Microfiltration	39%
Reverse osmosis	39%
Ozone	36%
Unified approach to failure analysis, prediction, and avoidance	36%
Automation and process control	30%
Other (list)	30%
Monitoring (e.g., contaminant and TOC detection) protocol	25%
UV disinfection	23%
Biologically active filters	18%
Emergency response	18%
Drinking water regulatory requirements	18%
Multiple discharge requirements	18%
Control of discharges to sewer system	18%
Monitoring of wastewater quality	7%

SECTION 8

Exploring Possible Paths Forward

To date, managers of advanced water treatment (AWT) and potable reuse (PR) plants have had to develop their own internal training programs. A formal AWT/PR certification program defining and verifying skill and knowledge needs for PR system operators could follow a number of different paths. The ideas presented here reflect thinking and discussion from different water sector individuals and groups considering the PR operator certification question. They were captured prior to the CUWA Operator Certification Workshop discussed in Section 9 and represent the range of possibilities explored by workshop participants.

Existing Potable Reuse Operator Training Practices

Given that PR and AWT plants do not have a formal certification process to verify that operators have a minimum skill and knowledge level of AWT, utilities have had to develop their own internal programs[7]. As with advanced processes for standard drinking water or wastewater treatment, operators that currently run AWT processes for potable water reclamation can be water- or wastewater-certified. Training program content and tests have historically been site-specific and developed in-house.

For example, at the **Orange County Water District (OCWD) Groundwater Replenishment System (GWRS)**, the AWT system, employing MF, RO, and UV-AOP, is operated mostly by wastewater operators. Due to its size (100 MGD), the GWRS must have 50% or more of its operators certified at least a Grade 2 or higher. These plants do not fall neatly into the categories referenced in Table 4-1, but are closest to Grade V tertiary facilities.

[7] It is expected that all PR facilities will retain some internal, on-the-job training specific to each facility's process train and operational plan. In this section, "training" refers to uniform, basic instruction regarding how AWT processes work and what related training (e.g., regulations, monitoring) is included in the formal PR/AWT job description similar to that already in place for conventional drinking water and wastewater treatment certification programs.

OCWD's job descriptions have the following requirements:

- Shift supervisors are required to have Grade IV or V certification.
- Leads and operators at a Plant Operator III level are required to have minimum Grade III certification.
- Operators at a Plant Operator II level are required to have minimum Grade II certification.
- Operators at a Plant Operator I level are required to have minimum Grade I certification.

OCWD has also created an internal training and testing program. This program involves a combination of internal trainers and external experts engaged periodically to provide additional theoretical and hands-on training. Operators are encouraged to also obtain their water treatment operator's license, but it is not required.

City of Los Angeles Sanitation (LASAN) has an AWT train at their Terminal Island facility including MF and RO plus lime stabilization. Product water has been sent to a seawater intrusion barrier for the past eight years. They are currently in the process of expanding the facility to include UV AOP. Their permit calls for wastewater operators. Similar to OCWD, LASAN has instituted its own formal internal training program above and beyond state requirements. LASAN has developed a detailed operators training manual covering all aspects of the advanced treatment system, from the MF feedwater wet well to the outfall dechlorination system. Both process-specific operations and safety training is included.

Other facilities have less formalized training programs, but in essence do the same type of training on an individual-by-individual basis. **Santa Clara Valley Water District** holds extensive internal hands-on training for the personnel working at their Silicon Valley Advanced Water Purification Center (SVAWPC), where they operate an AWT process with MF, RO, and UV disinfection (with addition of UV-AOP planned). At SVAWPC, operators can be either water treatment- or wastewater-certified and must be Grade III wastewater or Grade T3 or higher. At this time, all SVAWPF staff are water treatment operators.

The approaches in use to train and verify competence of operators at advanced recycled water treatment facilities such as those cited above are in line with approaches reported by survey respondents for developing advanced treatment expertise. As would be expected given the lack of formal training and certification requirements, the primary means of gaining potable reuse advanced treatment system experience is on-the-job (Figure 8-1).

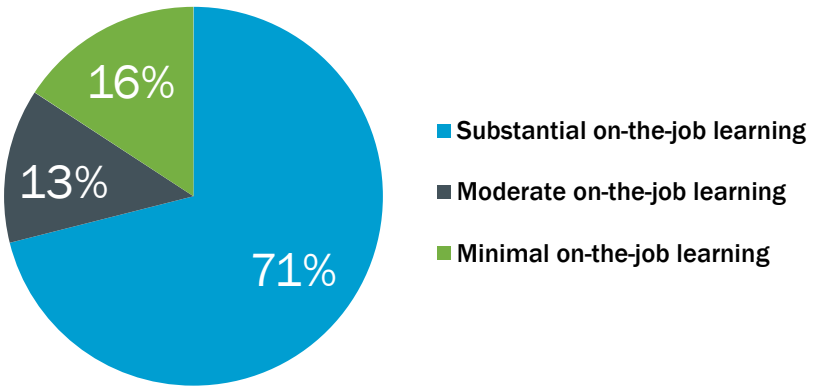


Figure 8-1. Contribution of on-the-job experience to potable reuse facility operators' knowledge of AWT

As potable reuse becomes more prevalent, the need for a potable reuse operator certification program grows to ensure continued delivery of high-quality reuse water from a wide range of agencies. This white paper provides a framework for development of a certification program to facilitate an appropriate alignment between the risk/criticality of the application and the knowledge/experience of the operators. In initial discussions, some individuals suggested that, given AWPFs are often co-located with a WWTP and the flexibility to operate both would be beneficial to some municipal agencies, PR facilities could be certified as wastewater systems with wastewater operators. PR operators and managers also highlighted the importance of good (educated) communication with WWTP operators to manage the source water quality and maintain AWT system performance.

However, DPR produces potable water supply with limited to no environmental buffer, so it needs to be held to the standards and regulations that apply to potable water and a drinking water treatment operator's skills and knowledge will be needed. Current operator certification programs do not adequately verify the level of skill and knowledge operators need to successfully run these systems and therefore pose a potential obstacle to implementation of potable reuse programs more widely. Individual utilities must develop their own training and education programs. This collaborative effort, led by CUWA, is intended to reach agreement on operator certification that will instill public confidence that operators meet a basic standard of expertise by providing a concrete demonstration of operator proficiency. It will also help overcome the current challenge that municipal agencies face in recruiting and training future operators.

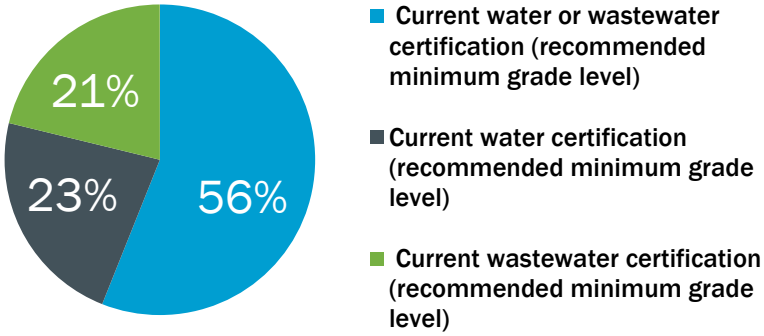
Utility Needs and Preferences

Representatives of the water and wastewater sector responding to our survey in California prefer new certification options to fill the "holes" in the existing programs and allow both water treatment and wastewater operators to obtain advanced treatment certification for potable reuse (Figure 8-2). A minority preferred one type of existing operator certification over another, depending on the operator type used within their facilities—i.e., water purveyors were more likely to state that potable reuse systems should be operated by water treatment operators and wastewater agencies were more likely to state that potable reuse systems should be operated by wastewater operators. This indicates an area of some disagreement that might need to be addressed in the certification program development process. However, over 70% of respondents agreed that whatever certification process is developed, it should be one approach for all potable reuse water system types (both indirect and direct).

70%

of survey respondents agree that one certification process for all potable reuse water system types should be developed.

Figure 8-2. Stated preferences for operator certification type for enhancement with advanced treatment certification for potable reuse



Potential Approaches to Developing an AWT or PR Certification Program

A certification program that helps define and verify skill and knowledge needs for potable reuse system operators could be developed as an independent, stand-alone program, or incorporated under an existing certification program. A number of different paths could be taken to develop an advanced water treatment/potable reuse (AWT/PR) operator certification program. The ideas presented here reflect thinking and discussion from different water sector individuals and groups looking at the potable reuse operator certification question, particularly the CA-NV Section AWWA's Advanced Water Treatment Certification Workgroup, comprised of utility members (including some CUWA member agencies), California and federal regulators, and consultant potable water experts. This list is not intended to reflect the ideas of any one group or person, but rather capture and reflect some of the avenues of thought and discussion on the topic considered prior to the October 2015 CUWA Operator Certification Workshop. The options presented below represent the range of possibilities explored by workshop participants.

1 Separate Potable Reuse Operator Certification Program

With this approach, a separate certification program would be developed exclusively for PR system operators to validate an individual has a defined level of PR system-specific knowledge, skill, and experience. This would incorporate advanced treatment material along with water and wastewater topics critical to the operation of an AWPF. This concept is illustrated in Figure 8-3.

DW-OCP		PR-OCP	WW-OCP
• T1	• D1	• PR1	• Grade I
• T2	• D2	• PR2	• Grade II
• T3	• D3	• PR3	• Grade III
• T4	• D4	• …	• Grade IV
• T5	• D5		• Grade V

Figure 8-3. Illustration of potential PR certification program Option 1, a stand-alone program; where DW-OCP = Water Treatment Operator Certification Program, PR-OCP = PR Operator Certification Program, and WW-OCP = Wastewater Operator Certification Program; PR*i* = PR Operator Certification Level *i*.

2 & 3 DPR or AWT Operator Certification Program Supplement

With this approach, a PR or more general AWT[8] certification program would verify that an individual has a defined level of advanced treatment-specific knowledge, skill, and experience. It might also include water or wastewater topics critical to the operation of an AWPF and missing from the operator's standard certification exams.

As a WW-OCP Supplement

If a supplemental certification program was developed under the WW-OCP, its content would enhance the existing wastewater certification requirements. In this scenario, it is assumed that DPR plant operators would need WW-OCP + PR or AWT supplement certification. This concept is illustrated in Figure 8-4.

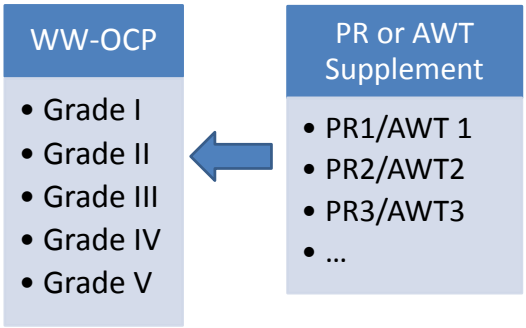


Figure 8-4. Illustration of potential PR or AWT certification program Option 2, as a supplement to wastewater certification; where WW-OCP = Wastewater Operator Certification Program; PR*i*/AWT*i* = PR or AWT certification level *i*.

As a DW-OCP Supplement

If a supplemental certification program was developed under the DW-OCP, its content would enhance existing water treatment certification requirements. In this scenario, it is assumed that DPR plant operators would need DW-OCP + PR or AWT supplement certification. This concept is illustrated in Figure 8-5.

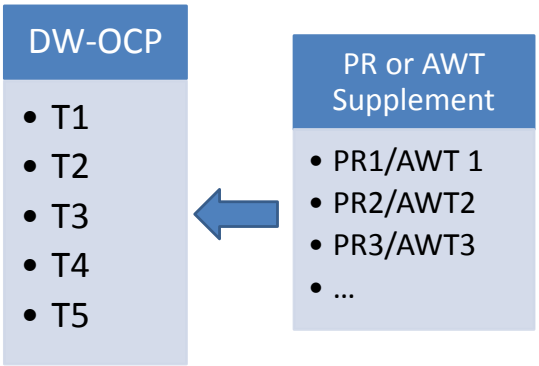


Figure 8-5. Illustration of potential PR or AWT certification program Option 3, as a supplement to drinking water treatment certification; where DW-OCP = Drinking Water Treatment Operator Certification Program; PR*i*/AWT*i* = PR or AWT certification level *i*.

[3] A more general AWT program would include all standard PR technologies (e.g., MF/UF, RO, UV-AOP) plus other advanced technologies like ion exchange. A general AWT certification could be used to certify operators running advanced systems in conventional drinking water plants, as well as in PR facilities. This would both expand opportunities for recruiting high enough numbers of participants to support a certification program through CA-NV Section AWWA, or similar organization and provide utilities with the opportunity to raise their formal standards for AWT operators.

4 DPR or AWT Hybrid Added on to Either License

With this approach, either a separate PR or more general AWT[4] supplemental certification program would be developed under the Operator Certification Program to certify that a WWTP or WTP operator has a defined level of advanced treatment-specific knowledge, skill, and experience. This approach might have different components for water treatment-certified and wastewater-certified operators to fill in their different knowledge gaps.[9] This concept is illustrated in Figure 8-6.

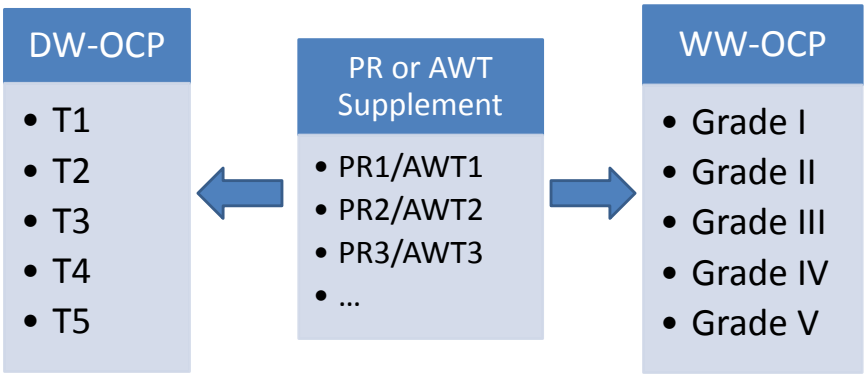


Figure 8-6. Illustration of potential PR or AWT certification program Option 4, as a hybrid supplement that can be used with either water treatment certification or wastewater certification; where DW-OCP = Water Treatment Operator Certification Program, and WW-OCP = Wastewater Operator Certification Program; PR*i* = PR Operator Certification Level *i*.

When queried as to which approaches would be preferred, a large majority of survey respondents ranked a special potable reuse or AWT module to enhance existing certifications highest among the options. However, respondents were again split on which program should offer the module (water treatment, wastewater, or both, as shown in Figure 8-7). Definitions for what would comprise the certification module were not provided with the survey.

[9] This would be the case if it was determined that direct PR operators should have knowledge of both water and wastewater topics.

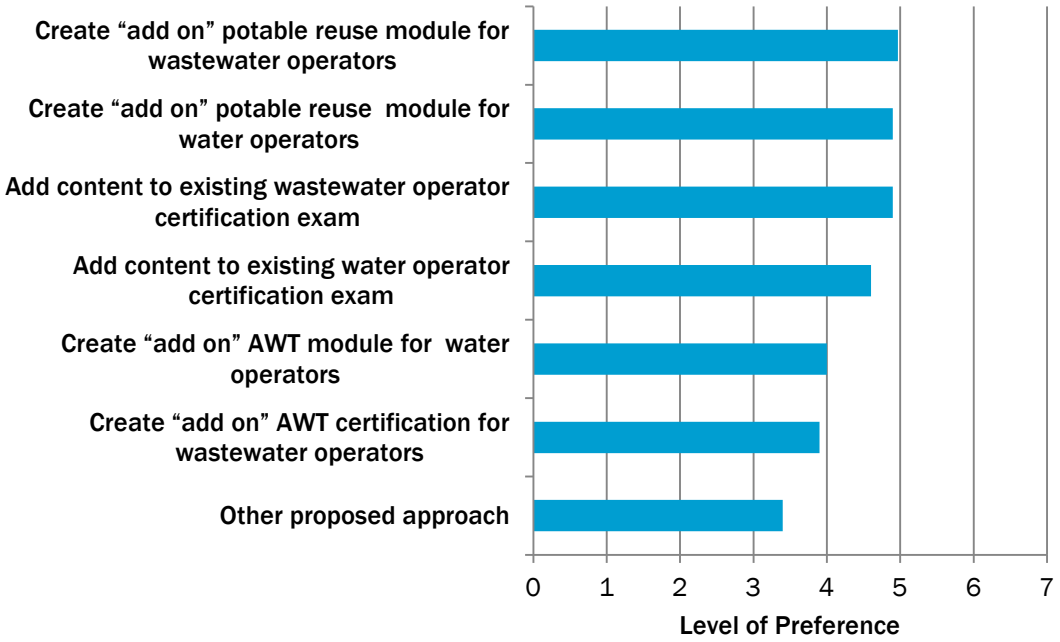


Figure 8-7. Preferences for modifying water and wastewater certification programs to advance PR, ranked in order of preference, where 7 is most preferred and 1 is least preferred.

Benefits and limitations of these approaches are presented in Table 8-1. Whichever certification path is selected, there will be a number of questions and issues to consider and settle. The most critical questions identified prior to the workshop included:

- What key elements must be covered in the job description for this test?
- How will training to prepare candidates be handled? Who might be able to offer the needed training?
- Is there a large enough market for the AWT/PR certification program to support its development (expense question)?
- Could the selected approach limit the available pool of existing PR operators (availability of workers question)?
- What type of experience would be acceptable to operate a potable reuse facility and sit for the proposed certification exam (WTP operation, WWTP operation, or either/both)?
- Would this approach result in unacceptable knowledge and/or experience gaps to some parties?
- How would the State/plant managers address knowledge and/or experience gaps?
- If the program developed is not explicitly for PR, would this negatively impact public perception regarding the safety of potable reuse to supplement drinking water?
- If both drinking water treatment and wastewater operators are used, would senior supervisors be experienced enough to effectively manage a diversity of staff backgrounds?

Selecting the location and focus of a new add-on certification program will need to balance two primary needs: covering knowledge elements necessary for operating potable reuse systems—which by their nature straddle the wastewater and drinking water fields—and developing a program that will draw a high enough number of participants that it is economically viable to maintain and creates a large enough pool of certified operators to meet utility hiring needs.

Table 8-1. Summary of Potential Potable Reuse/AWT Operator Certification Approaches

Certification Approach	Description	Benefits	Limitations
Separate DPR Operator Certification Program	A separate certification program developed solely for potable reuse system operators. A wastewater or water treatment operator with some pre-specified Grade level (perhaps Grade-II or T3) would start a new program and get everything he/she needs to operate an advanced potable reuse plant.	– Would be specifically tailored to the needs of the job of operating a potable reuse plant.	– Would likely result in a very small pool of qualified operators. – Would not cover other water/wastewater systems with advanced technologies.
Add-on to WWTP Certification	A supplemental certificate for existing wastewater operator certification that verifies a defined skill level in potable reuse/AWT.	– Would allow wastewater agencies to use internal staff in new potable reuse projects.	– Might not require knowledge of drinking water-specific treatment, rules and protocols. – Would preclude WTP operators from operating potable reuse systems.
Add-on to WTP Certification	A supplemental certificate for existing water treatment operator certification that verifies a defined skill level in potable reuse/AWT.	– Would staff potable reuse plants with individuals that are well-versed in potable water requirements and protocols.	– Might not require knowledge of wastewater-specific treatment, rules and protocols. – Would preclude WWTP operators from operating potable reuse systems.
Hybrid that can be added on to either license	A supplemental certification program that supplements both WW-OCP and the W-OCP that verifies a defined skill level in PR/AWT. A wastewater or water treatment operator with some pre-specified Grade level (perhaps Grade-II or T3) would acquire this certification as a supplement or rider to their existing license.	– Would allow potable reuse plants to hire a diverse staff.	– If focused solely on advanced treatment, WTP operators would potentially miss exposure to wastewater topics and vice versa. There might be inevitable knowledge gaps for all operators (wastewater- or water-related). – If focused solely on potable reuse, it might not draw enough potential applicants

Potential Future Sources of Training

In order to create a substantial pool of potential AWPF operators, training available for an AWT or PR program would need to be expanded beyond existing opportunities. This could include new training programs developed under the same sorts of entities as have developed conventional DW and WW operator training courses. Historically, initial (and for some topics relatively exclusive) sources of training for many operator certification topics has come from CA-NV Section AWWA and CWEA for water and wastewater training, respectively.

Some similar effort may be needed for AWT training. The WateReuse Research Foundation is preparing to issue RFP 15-05, *Developing Curriculum and Content for Operator Training* to help address this shortfall. This WateReuse project will develop recommendations on what content is needed to train operators in AWT processes and to impart critical knowledge about the operations and management of a potable reuse system.This effort could serve as the foundation for the development of new curricula in AWT and potable reuse.

SECTION 9

CUWA Potable Reuse Operator Certification Workshop Outcomes

CUWA facilitated a workshop on October 19 and 20, 2015 at the Orange County Water District to provide an opportunity for collaborative partners and stakeholders to reach agreement on a framework for advanced water treatment (AWT) and potable reuse (PR) operator training and certification for recommendation to DDW. The results of this workshop are summarized below.

There is much ongoing work related to the development of PR operator training and certification in California by a few motivated entities. CUWA hosted a workshop to bring many of these stakeholders together, including collaborative partners WRCA, CA-NV Section AWWA, CWEA, and CASA, representatives of several water and wastewater agencies from across the state engaged in or planning to implement PR, and representatives from the SWRCB, DDW and OOC. The intent was to provide a forum to advance the AWT or PR certification dialog and set the stage for further collaboration. In this two-day workshop, CUWA Executive Director Cindy Paulson facilitated a series of presentations, group discussions, and break-out sessions designed to reach agreement on a proposed strategy for PR operator training and certification. Topics included current practices and certification rules and requirements, training and certification gaps as they relate to PR and AWT, options for implementing a new certification program, and implementation needs, challenges, and alternatives.

By coming together face-to-face, the group was able to make great progress and reach agreement on a number of critical issues and questions. At the conclusion of the workshop, the group had achieved consensus on the basic structure of the future certification program and a strategy to move it forward. The group also identified key foundational needs for the new certification program and explored a wide range of institutional, financial, and technical issues related to implementing an AWT and/or PR operator certification program. The following sections summarize the key findings and remaining challenges that emerged from the workshop.

Strategic Approach for Developing a Certification Program

Key elements of the strategy include the following:

1. The certification program should be a robust training and testing program centered on AWT technologies used in the purification of wastewater effluent for potable reuse and should include risk management concepts (e.g., emergency response and Critical Control Points protocols).
2. It should be a stand-alone certification "add on" or "supplement" to an existing certification available to both wastewater and water treatment operators with an acceptable level of training and experience (e.g., Grade II wastewater operators and T3 water treatment operators[10]).
3. Those with a qualifying background in either wastewater or water treatment should be evaluated on the same competencies and therefore take the same certification test.
4. The program should provide an adequate population of certified operators from which utilities can hire new PR treatment plant operators and be broad enough to draw a large enough testing population to be financially viable.

Foundational Needs for a New AWT/Potable Reuse Certification Program

The essential elements to a new AWT/PR certification program center around three main categories: fielding enough candidates, implementation strategy, and technologies.

Fielding Enough Candidates

In order to be supportable, and to provide utilities with enough qualified job applicants to be able to fill their future AWPF needs, the Certification Program should be founded on the following elements:

1. Provides a clearly outlined path to certification.
2. Is inclusive of water treatment and wastewater operators.
3. Offers career mobility and bridging to and from the AWT/PR track and between Water and Wastewater Operator Certification Programs, as it would be advantageous for recruiting.
4. Grandfathers in existing PR plant operators for a period of time or unless facility treatment or purpose changes is needed.
5. Focuses on the operator role, accountability, and end use rather than get overly focused on technologies, as they can change.
6. Requires a minimum level of water treatment operator and wastewater operator certification. The group did not officially settle on the most appropriate level, but a suggestion of Grade II (wastewater) or T3 (water) was made.

[10] The difference in recommended certification grade level reflects differences in experience requirements between the wastewater certification and water treatment certification programs. While both have five grades of certification, the requirements for each grade are not identical.

Facilitating Program Development

Timely development of training and certification is needed for direct potable reuse (DPR) to move forward. To achieve this goal, the water sector will have to address a number of critical implementation needs.

1. The structure developed must be manageable and enforceable by the State Water Resources Control Board (SWRCB).
2. It must be accepted by regulators, decision makers, operators and the public.
3. There must be a test-able, viable mechanism for training. This will need to be association-led.
    a. The State could allow for certification through CA-NV Section AWWA, CWEA, or a joint CA-NV Section AWWA—CWEA effort in the near term. Draft regulations for potable reuse could maintain flexibility to allow for this approach. There is precedence set for Association-led training and certification evolving to a State-led program on both the water and the wastewater sides.
    b. The CA-NV Section AWWA and the CWEA could collaborate together to facilitate development of this program. It naturally crosses the borders of both wastewater and water treatment knowledge and activities. (However, no formal agreements are currently in development.)

Included Technologies

The exam should be based on the standard elements of an AWT train for potable reuse, including those being considered for DPR and should be practical and responsive to the changing nature of technology.

1. Technologies to be covered in training and certification exams should include at least the following:
    a. MF/UF
    b. RO/NF
    c. Chemical disinfection
    d. Advanced Oxidation
    e. Ozone + BAC
2. Other knowledge that could be included in testing for the first level of certification:
    a. Advanced disinfection, stabilization, advanced separation, brine management
    b. Critical Control Points
    c. Basic instrumentation
    d. Source water
3. The program should evolve in content over time as technology changes.
4. It should effectively address differences between technical knowledge (including continuing education units, or CEUs) and hands-on experience for each existing certification program.

Remaining Challenges to Developing a New AWT/PR Certification Program

The group identified and discussed a number of remaining technical and institutional challenges associated with developing a new program. These centered on implementation, mobility, and career path questions, and program boundaries.

Implementation

1. Sufficient resources will be necessary to run the program. This includes financing the development of training and certification programs *and* financing administration of the certification process within the California State Water Resources Control Board Operator Certification Program.
2. There needs to be sufficient training opportunities for potential candidates to gain the knowledge they need to pass the test.
    a. Design engineers, vendors, and associations are an important part of the alternative competency demonstration process.

Mobility and Career Path

1. Utilities (i.e., potential employers) will have to establish clear treatment tracks, address pay implications, and determine job requirements for different operator types.
2. The minimum entry point for operators and required level of knowledge and water or wastewater experience must be defined. The requirements for transitions between PR1, PR2, PR3,... need to be established. Each level will require knowledge and experience elements including technologies, regulations, and end use. Increasing levels address increasing knowledge and accountability.
3. Advanced grades (e.g., grades T5 and [wastewater] V) should allow an operator to jump above a PR1. However, they would still have to take the required tests.
4. Advanced treatment experience with reuse systems should count toward experience requirements for water treatment and wastewater operator certification.
5. An "in-training" process like the wastewater Operator-in-Training (OIT) program is not desirable.

Program Boundaries

1. As the program will be open to both water treatment and wastewater operators, there is a need to address gaps in "crossover" knowledge (wastewater operators need to understand water treatment and regulations, and water treatment operators must learn similar things about wastewater). Every gap does not necessarily need to be covered as experience and system-specific training will help address remaining gaps.
2. The test focus should change depending upon the certification level. Lower level AWT/PR certifications could focus on technology basics. Upper level AWT/PR certifications could test more advanced monitoring, emergency response, and regulations concepts.
3. The benefits of broadening from a more narrow PR focus to AWT should be considered. For example, it could provide a more robust economic engine to drive the program, making it

more viable. AWWA Cal-NV members have interests in AWT certification that go beyond PR, although that is still a central need. Thus, it could address other concerning source waters such as stormwater and contaminated groundwater.

4. As a compromise, calling it an advanced water purification (AWP) certification program with a focus on potable reuse would speak to the public's interests and provide confidence. One suggestion was that the program could be phased. For example, it could start with source water as wastewater and evolve to other impaired source waters.

It is anticipated that these issues will be resolved as certification program development work moves forward.

Remaining Unresolved Issues Related to Developing a New AWT/Potable Reuse Certification Program

The group was able to achieve consensus on the critical foundational structure of the future certification program. No consensus was reached on the target audience for the certification program. Consensus is needed to complete the initial "job analysis" step, whereby the content of the certification exam topics is identified. What "job(s)" are to be certified (AWT or PR operations) will, in turn, clarify the scope and content of the program.

The other critical question to be resolved is what organization(s) will create and maintain the program. As mentioned previously, there is an effort underway through the CA-NV Section AWWA's AWT Operator Certification Committee to explore the possibility of developing an AWT or PR-focused certification program. At the CUWA Workshop, representatives from CA-NV Section AWWA and CWEA agreed that it might be beneficial to collaborate. It was also recognized that each organization would need to further explore with their leadership how such a partnership could work. As of publication, conversations between these groups are on-going but no formal agreements have been made.

An entity or entities will need to commit to developing training and certification programs for an AWT or PR supplement. This step will allow the OOC to create a program. The institutional complexities and financial contributions needed for program development will take time to resolve. Continuous coordination with the DDW and OOC is necessary.

SECTION 10

Conclusions and Recommendations

Water reuse, including potable reuse (PR), is a critical element of California's water supply portfolio. Yet current operator certification programs do not adequately test the range of skill and knowledge operators need to successfully run these systems and, as a result, pose a potential obstacle to implementation of PR programs. New training and certification programs are needed to provide advanced water treatment (AWT) and PR skill-specific operator endorsements and reassure the public that PR systems are being operated by highly-trained, qualified individuals. In a CUWA-facilitated workshop, a wide range of utility and State regulatory agency representatives came together and achieved consensus on the basic structure of the future certification program and a strategy to move it forward.

A number of different strategies for potable reuse operator certification programs have been described including: 1) a separate PR operator certification program, 2) an AWT or PR supplement to the current water treatment *or* wastewater certification program, 3) an AWT or PR rider or supplement that could be added on to either license. CUWA workshop participants and survey respondents both agreed that a special AWT or PR supplement to enhance water or wastewater operator certification is the best option. Workshop participants developed a number of strategic recommendations:

1 The certification program should be centered on AWT technologies used in the purification of wastewater effluent for potable reuse and should include risk management concepts.

2 It should be a stand-alone certification AWT or PR "add on" available to both wastewater and water treatment operators with an acceptable level of training and experience.[11]

[11] This is Option 4 in Section 8, "DPR or AWT Hybrid that Can Be Added on to Either License."

3 There should be one test for each level of certification.

4 The program should provide an adequate population of certified operators from which utilities can hire new PR treatment plant operators and be broad enough to draw a large enough testing population to be financially viable.

In the workshop, it was agreed that development of this new program would be done in coordination with the existing water and wastewater training and certification programs. The ultimate target audience for the certification program has yet to be defined by the water/wastewater community—whether it should be centered on potable reuse specifically, or a more general AWT program with water and wastewater elements. Considerable time was spent in the workshop on this topic with no final resolution. The need for certified PR operators is the strongest driver for developing a new certification program, but there are other groups both in municipal water treatment and industrial applications that may want to use an AWT training and certification program.

Funding is an equally important topic intrinsic to the discussion. Training and certification programs are expensive to create, and the expense of creating and maintaining a training program and a certification program using water/wastewater organization member dollars must be justified. The funding decision will turn largely on: 1) comforts and endorsement by State regulators, and 2) the broadness of the program needed and sponsoring agency's/agencies' fiscal ability to support the program.

Agreement on the target audience and scope of certification is needed to perform the initial "job analysis" step. This step identifies the content of the certification exam topics. CA-NV Section AWWA is surveying California and Nevada utilities to determine the potential audience for the exam. This data should clarify the scope and content of the program—whether it should be a PR-specific program or a more general AWT program.

The other critical question to be resolved is what organization or organizations will create and maintain the training certification programs[12]. The CA-NV Section AWWA AWT Operator Certification Committee is currently exploring development of an AWT or PR-focused certification program. At the CUWA Workshop, representatives from CA-NV Section AWWA and CWEA agreed that it is beneficial to collaborate. As of publication, however, no formal agreements have been made. Both water and wastewater perspectives are needed to train and certify potable reuse operators.

Many utilities are considering moving forward with PR programs while formal DPR regulatory mechanisms and requirements are in development. Therefore, a program for training and certification needs to be implemented in the near future.

Potable reuse operator certification would establish a minimum standard level of skills and knowledge for operating a PR system and reassure the public that PR is being managed by individuals with the proper background, education, and experience.

[12] It should be noted that training and certification programs are separate efforts and are not necessarily both done by the same organization.

Regardless of the selected strategy, legislation and/or regulations will need to address the proposed new certification requirements. Additional work will also be needed to determine details on the range of knowledge and criteria for qualifications. Any certification program would need to be developed in coordination with the Office of Operator Certification and the DDW. It is anticipated that these issues will be resolved as work moves forward on developing a training and certification program.

SECTION 11

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SECTION 12

Acronyms

AFY	acre-feet/year
AMTA	American Membrane Technology Association
AOP	advanced oxidation processes
AWPF	advanced water purification facilities
AWT	advanced water treatment
BAC	biologically active carbon
BAT	Best Available Technology
CA-NV Section AWWA	California-Nevada Section of the American Water Works Association
CASA	California Association of Sanitation Agencies
CCR	California Code of Regulations
CDPH	California Department of Public Health
CE	continuing education
CEU	Continuing Education Unit
CUWA	California Urban Water Agencies
CWEA	California Water Environment Association
DDW	State Water Resources Control Board, Division of Drinking Water
DPR	direct potable reuse
DW-OCP	Drinking Water Operator Certification Program
EPA	Environmental Protections Agency
Grade I	Level I Wastewater Operator Certification
Grade II	Level II Wastewater Operator Certification
Grade III	Level III Wastewater Operator Certification
Grade VI	Level VI Wastewater Operator Certification
Grade V	Level V Wastewater Operator Certification
GRRP	Groundwater Replenishment Reuse Program
IPR	indirect potable reuse
LASAN	Los Angeles Sanitation
MF	microfiltration
mJ/cm^2	millijoules per square centimeter
NWRI	National Water Research Institute
OIT	Operator-in-Training

OOC	State Water Resources Control Board Office of Operator Certification
PR	potable reuse
PR1	Level 1 Potable Reuse Operator Certification
PR2	Level 2 Potable Reuse Operator Certification
PR3	Level 3 Potable Reuse Operator Certification
PR4	Level 4 Potable Reuse Operator Certification
PR5	Level 5 Potable Reuse Operator Certification
RO	reverse osmosis
SAT	soil aquifer treatment
SEDA	Southeast Desalting Association
SMOA	Southwest Membrane Operator Association
SVAWPC	Silicon Valley Advanced Water Purification Center
SWRCB	State Water Resources Control Board
T1	Level 1 Water Treatment Operator Certification
T2	Level 2 Water Treatment Operator Certification
T3	Level 3 Water Treatment Operator Certification
T4	Level 4 Water Treatment Operator Certification
T5	Level 5 Water Treatment Operator Certification
TDS	total dissolved solids
UV	ultraviolet light
UV-AOP	ultraviolet light advanced oxidation process
WRCA	WateReuse California
WTP	water treatment plant
WW-OCP	Wastewater Operator Certification Program
WWTP	Wastewater treatment plant

Attachment 1 - The Certification Process

"Certification" is a formal process to identify and acknowledge individuals who have met an established standard of competency for a defined job. This process typically involves obtaining education and on-the-job experience, and passing an exam that measures job-critical knowledge and skills. When the individual has met these requirements, the administering agency "certifies" that the individual has the required level of skill and ability for the defined job.

Development of a certification program is complex, time-consuming, and labor-intensive. An example of how a DPR certification program might be developed is presented in Figure 1.1. The process is typically done by a committee of stakeholders and technical experts with the help of certification program consultants. It requires consideration of technical issues related to the certification topic, water sector needs and other economic assessments, a job analysis, eligibility requirements, consultation with regulators to ensure the program is acceptable from the DDW's standpoint, and more. The current certification programs aren't adequate for robust DPR operator certification. There is great value in coming together as an group to determine the best approach for certifying DPR operators so that we can get the cumbersome process of program development underway and create a program that has widespread support and regulator buy-in.

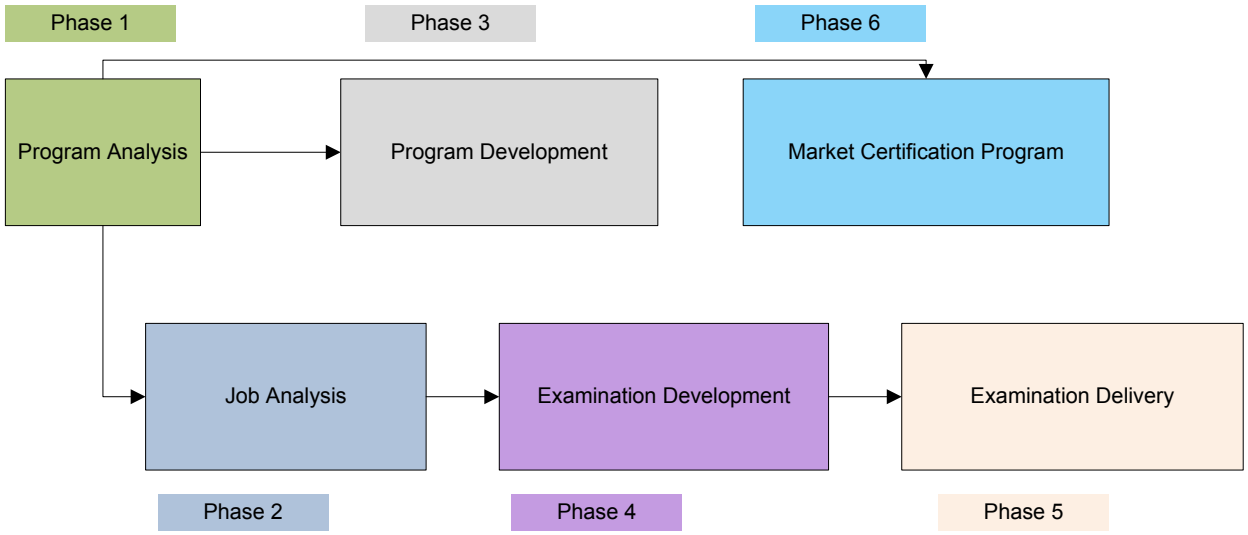


Figure A.1. CA-NV Section AWWA Certification Program Development Process. NOTE: This is representative of the basic process involved in developing a certification program and is not intended to be an exhaustive portrayal.

Attachment 2 - WateReuse California Survey Instrument

Potable Reuse: Operator Certification
Background:

The Expert Panel providing recommendations to the State Board on the Surface Water Augmentation Regulations and the feasibility of direct potable reuse (DPR), the Advisory Group which advises the Expert Panel in DPR issues and the State Water Resources Control Board-Division of Drinking Water (DDW) have identified operator certification as a major issue for consideration in ensuring that potable reuse projects are reliably operated. At this time DDW does not have adequate staffing with which to begin developing a new operator certification program for advanced treatment systems, and there remain some critical outstanding policy issues about the nature of a new or revised certification for potable reuse since this includes advanced technologies and crosses into treatment for both water supply and wastewater.

WateReuse California (WRCA) and the California Urban Water Agencies (CUWA) are developing a white paper that will identify key components for consideration for a revised or new operator certification program for advanced purified recycled water for potable reuse. Collaborative partners such as the American Water Works Association (AWWA) and California Water Environment Association (CWEA) will provide input as they will likely be involved in the implementation of a program as it moves forward. As part of this effort, WRCA is interviewing operators at existing potable reuse facilities to better assess what unique operational issues they face and what range of knowledge is needed for operation of indirect potable reuse (IPR) and DPR facilities.

Currently, operators of agencies producing advanced purified recycled water are mostly certified wastewater treatment operators (Grade V). As the state of California seeks to expand potable reuse for IPR for groundwater, surface water augmentation and eventually DPR, additional certification requirements may be needed to help ensure public safety and public confidence in the process.

Potable Reuse Operational Issues

1. What is the name of the agency you work for? (Note: This is for tracking purposes only; your agency name will not be included in any survey results)
   _____

2. What is the population served by the agency?
   _____

3. Describe your employer:
   ___ Water supplier
   ___ Wastewater agency
   ___ Both, or
   ___ Other (describe)

4. What type of potable reuse does your agency currently employ and/or what type of potable reuse are you planning for?
   ____ IPR – groundwater recharge (surface spreading)
   ____ IPR – groundwater recharge (injection)
   ____ IPR – surface water augmentation

____ DPR – augmenting source water with advanced purified water prior to the Water Treatment Plant (WTP)
____ DPR – introducing advanced purified water directly into the distribution system (after the WTP)
____ Our agency is not planning for potable reuse projects, but does use advanced treatment process in its operations
____ Our agency is not planning for potable reuse projects, but I am interested in being certified in this area
____ Other (describe)

4a. If your agency does/has done groundwater recharge, what type of reclaimed water is/was used?
____ Tertiary filtered and disinfected (i.e., "Title 22 water")
____ Advanced treated (i.e., reverse osmosis with UV advanced oxidation)
____ Other (describe)

5. What is your role in the organization?
____ Upper Management
____ Operations Manager
____ Operator
____ Other (describe)

6. How many years of experience do you have at the facility?
_____

7. What water or wastewater treatment certificates or other licenses do you hold?
____ Water Treatment (Grade: select one 1 2 3 4 5)
____ Grade 1
____ Grade 2
____ Grade 3
____ Grade 4
____ Grade 5
____ Wastewater Treatment (Grade: select one 1 2 3 4 5)
____ Grade 1
____ Grade 2
____ Grade 3
____ Grade 4
____ Grade 5
____ Registered Civil Engineer
____ Registered Chemical Engineer
____ Other technical certifications (list)
____ None

8. What aspects of your current operator training or certification program(s) do you consider essential for potable reuse operations?

____ Source Water

____ *Water* Treatment Processes

____ *Wastewater* Treatment Processes

____ *Water* Treatment Plant Operation/Maintenance

____ *Wastewater* Treatment Plant Operation/Maintenance

____ *Distribution System* Operation/Maintenance

____ *Collection System* Operation/Maintenance

____ Laboratory Procedures

____ *Drinking water* regulatory requirements

____ *Wastewater* regulatory requirements

____ Administrative Duties

____ Other (list)

9. If you are currently operating a potable reuse facility, which of the following unique operational or treatment requirements needed for a potable reuse facility that are not currently addressed by <u>your</u> existing certification program(s)(water or wastewater) Check all that apply:

____ Microfiltration

____ Reverse Osmosis

____ Biologically active filters

____ UV Disinfection

____ UV-Advanced Oxidation

____ Ozone

____ Monitoring (e.g., contaminant and TOC detection) protocol

____ Unified approach to failure analysis, prediction, and avoidance

____ Automation and process control

____ Emergency response

____ Drinking water regulatory requirements

____ Multiple discharge requirements

____ Control of discharges to sewer system

____ Monitoring of wastewater quality

____ Other (list)

10. If you are currently operating a potable reuse facility, is there additional training or information that could help you do your job better? Please describe.

____ College degree (describe)

____ On-site plant operations training

____ Certification courses (describe)

____ Non-certification specialized course(s) (describe)

____ Industry conferences
____ Industry training
____ Pilot plant operations
____ Other (describe)

Comments:

11. If you are currently operating a potable reuse facility, how much has on-the-job experience contributed to your knowledge of operating a potable reuse facility?
____ Substantially
____ Moderately
____ Minimally

Please describe:

12. How many years of experience do you believe is sufficient to operate a potable reuse facility?
_____

13. How can the water and wastewater certification programs be modified to give you more opportunity or flexibility to advance in the area of potable reuse to supplement drinking water supplies? (Rank approach in order of preference)
___ Add content to existing water operator certification exams to address potable reuse
___ Add content to existing wastewater operator certification exams to address potable reuse
___ Create an "add on" certification module for certified *water* operators that addresses potable reuse
___ Create an "add on" certification module for certified *wastewater* operators that addresses potable reuse
___ Create an "add on" certification module for certified *water* operators that addresses advanced treatment processes
___ Create an "add on" certification for certified *wastewater* operators that addresses advanced treatment processes
___ Other proposed approach (describe)

14. What qualifications do you think should be <u>required</u> for an operator of a potable reuse facility (check all that should apply)?
____ Current water certification
____ Current wastewater certification
____ Current water or wastewater certification
____ Advanced treatment certification
____ Potable reuse certification with advanced treatment content
____ Minimum number of years of experience in water or wastewater operations (List minimum number of years)
____ 2-year college degree in water/wastewater
____ 4-year college degree in science or engineering-related field
____ Post-graduate degree in science or engineering-related field

____ Specialized training or certificate (describe)
____ Other (describe)

15. What qualifications should be required to obtain an advanced treatment certification if one is offered?
    a. Operator Certification (pick one)

    ____ Current water certification (recommended minimum grade level)
    ____ Current wastewater certification (recommended minimum grade level)
    ____ Current water or wastewater certification (recommended minimum grade level)

    b. Work Experience (in addition to certification)
    ____ Minimum number of years of experience in water or wastewater operations (List minimum)

16. Should education, training or engineering registration be used as an alternative qualification to current operator certification or work experience?

    ___ Yes

    ___ No

17. If so, which of the following should be allowed?

    ____ 2 year college degree in water/wastewater
    ____ 4 year college degree in science or engineering related field
    ____ Registered civil or chemical engineer
    ____ Specialized training (describe)
    ____ Other (describe)

18. Do you think the operator certification requirements should be the same for projects that do groundwater injection, surface spreading, surface water (reservoir) augmentation, raw water augmentation or direct treated water augmentation?
    ____ Yes
    ____ No

    Comments:

19. Is there anything we missed that you would like to comment on related to this subject?

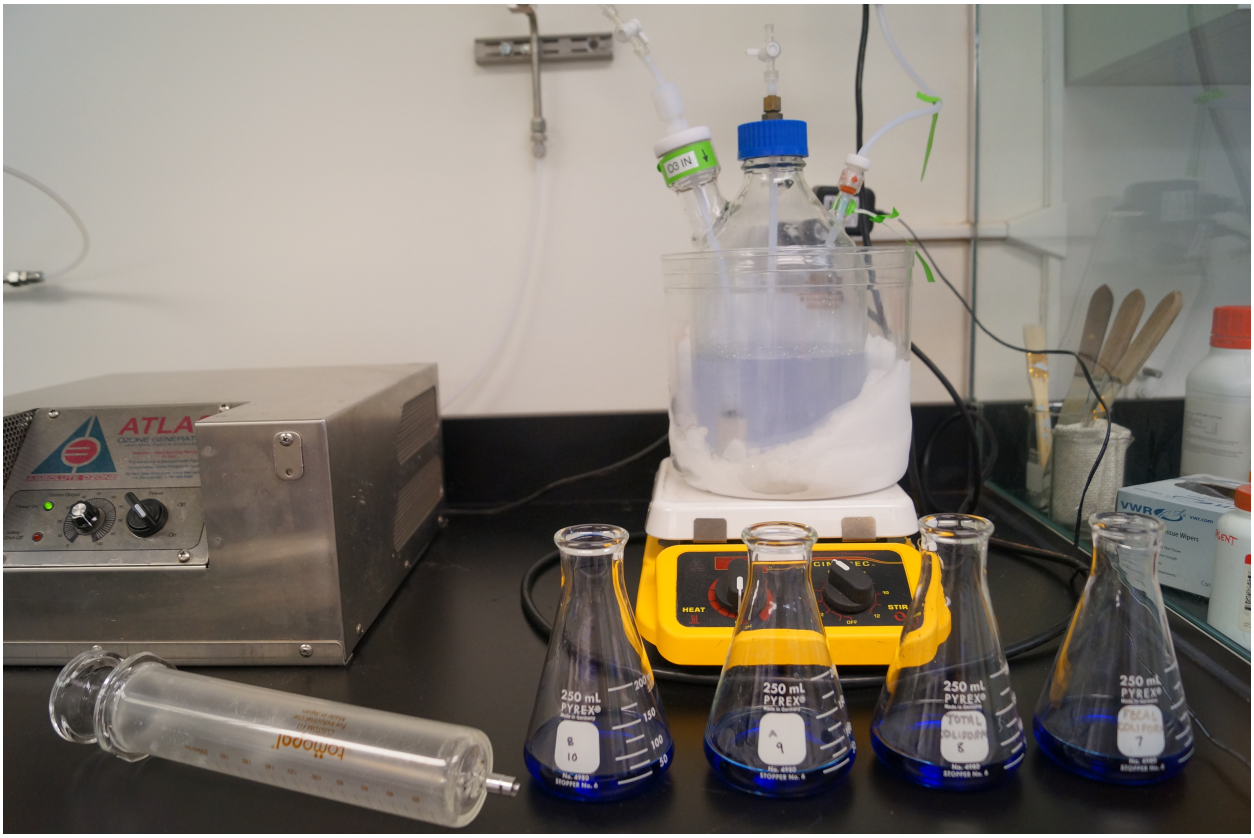
    Comments:

APPENDIX K

Dieldrin and DDx Removal Testing for the Pure Water Monterey Groundwater Replenishment Project Final Report

Dieldrin and DDx Removal Testing for the Pure Water Monterey Groundwater Replenishment Project

FINAL REPORT



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EXECUTIVE SUMMARY

The Monterey Regional Water Pollution Control Agency (MRWPCA) is in the process of developing the Pure Water Monterey (PWM) project to help address potable water needs on the Monterey Peninsula. As part of this project, MRWPCA is designing an Advanced Water Treatment Facility (AWTF), which will include ozonation, membrane filtration (MF), reverse osmosis (RO) and further treatment. The AWTF will receive secondary effluent from the Regional Treatment Plant (RTP), which will receive additional diversions of water sources for the PWM project. One additional water that will be diverted to the RTP is the Blanco Drain, which has elevated levels of dieldrin and DDx.

The California Ocean Plan (COP) has water quality objectives for dieldrin and DDx that are used to develop discharge limits. A by-product of RO treatment is a concentrate stream, which will be discharged through the RTP ocean outfall. The discharge of RO concentrate, along with secondary effluent, has been evaluated for compliance with COP objectives. This assessment concluded that removal of dieldrin and DDx through the RTP, ozone, and MF may be required to meet COP objectives. This report summarizes an effort to evaluate dieldrin and DDx removal through these processes.

Removal of dieldrin and DDx through the RTP, ozone, and MF were evaluated through sampling and bench-scale testing. Samples were collected from the RTP and analyzed with low-detection limit methods to assess removal of ambient dieldrin and DDx through the RTP. Bench-scale testing was conducted on blends of Blanco Drain water and samples from the RTP. Tests included ozonation, membrane filtration, and bench-scale approximations of RTP processes.

Significant dieldrin and DDx removal occurred through the RTP, ozonation, and filtration (see summary of results, with respect to COP compliance of the RTP and the AWTF processes, in Table E-1). Removal through the RTP alone was sufficient to meet COP objectives. Removal through ozonation and MF offer additional layers of redundancy and robustness.

Table E-1: Dieldrin and DDx removals through RTP and AWTF processes

Constituent	Qualifier	Removal (%)			
		RTP	Ozone	MF	Total
Dieldrin	Required for COP	--	--	--	61% - 78%
	Observed or estimated	84%	44% - 63%	1% - 98%	91% - 99.9%
DDx	Required for COP	--	--	--	58% - 71%
	Observed or estimated	93%	36% - 48%	2% - 94%	96% - 99.8%

1 INTRODUCTION

1.1 Background

Pending reductions in Carmel River water diversions are spurring the development of additional potable water supplies on the Monterey peninsula. The Monterey Peninsula Water Management District (MPWMD) and the Monterey Regional Water Pollution Control Agency (MRWPCA) are developing the Pure Water Monterey (PWM) Groundwater Replenishment (GWR) project to help address the water shortage. The project includes diversion of additional waters to the Regional Treatment Plant (RTP), which produces both a secondary treated wastewater and tertiary treated wastewater. A portion of the secondary effluent will be diverted to an Advanced Water Treatment Facility (AWTF), while the remaining secondary effluent will be treated at the Salinas Valley Reclamation Plant (SVRP) for non-potable recycled water or discharged to the Monterey Bay through the ocean outfall. The AWTF will produce high quality recycled water suitable for groundwater replenishment. The main components of the RTP and AWTF treatment train are the following:

- **Regional Treatment Plant (RTP):** screening, primary clarification, optional Chemically Enhanced Primary Treatment (CEPT), non-nitrifying trickling filters, bio-flocculation (solids contact basins), and secondary clarification; and,
- **Advanced Water Treatment Facility (AWTF)**: chloramination, ozonation, membrane filtration (MF), reverse osmosis (RO), advanced oxidation (AOP) with hydrogen peroxide and ultraviolet (UV) light, and product water stabilization.

Additional raw water sources will be diverted to the RTP collection system including agricultural wash water and industrial wastewater from the Salinas Industrial Wastewater Treatment Facility (SIWTF), and agricultural tile drainage and runoff waters from the Blanco Drain, Reclamation Ditch, and stormwater from the City of Salinas. Source water monitoring was conducted from July 2013 to June 2014 to characterize the proposed new source waters for the GWR project (Trussell Technologies, 2014). Two legacy pesticides that have been banned for decades, dieldrin and 4,4'dichlorodiphenyldichloroethylene (4,4'DDE), were detected during the monitoring of the Blanco Drain. The median concentration of dieldrin detected in the Blanco Drain samples was 17 nanograms per liter (ng/L), with a range of less than 10 (below the method detection limit) to 31 ng/L; 4,4'DDE was detected once, at a concentration of 21 ng/L.

DDE is a breakdown degradate of dichlorodiphenyltrichloroethane (DDT), and exists as one of two congeners: 4,4'DDE or 2,4'DDE. Although only one of the congeners was detected in the source water monitoring, all six congeners of DDT (2,4'DDT, 4,4'DDT, 2,4'DDE, 4,4'DDE, 2,4'dichlorodiphenyldichloroethane (DDD), and 4,4'DDD) have been included in this investigation, and will be collectively referred to as DDx. The RTP effluent and the SIWTF were also sampled, in addition to the Blanco Drain, during the source water monitoring. Dieldrin and DDx were not detected in the RTP effluent and the SIWTF (utilizing methods with method reporting limits as low as 10 ng/L).

Both dieldrin and DDx have established water quality objectives in the 2012 California Ocean Plan (COP), as well as the draft 2015 version (State Water Resources Control Board, 2012 and 2015). Ocean discharges in California must meet the water quality objectives described in the

COP. The AWTF will produce an RO concentrate that will be discharged through an ocean outfall, along with varying quantities of secondary treated wastewater. The concentrations of dieldrin and DDx in this RO concentrate are of concern due to the potential to exceed COP water quality objectives.

Modeling of AWTF RO concentrate and secondary effluent discharge suggests that an overall removal of 61% to 78% and 58% to 71% would be required through the RTP and ozone for dieldrin and DDx, respectively, in order for future discharges to comply with the COP objectives. Compliance assessment efforts (Trussell Technologies, 2015b) have estimated concentrations of dieldrin and DDx in the RO concentrate for purpose of evaluating compliance with COP objectives. These efforts assumed that removal through ozone was 90% for dieldrin and 70% for DDx, based on scientific literature (Ormad, 2008). An additional 20% removal of dieldrin and DDx was assumed to occur through the RTP, based on limited sampling that identified the portions of dieldrin in the Blanco Drain that were dissolved or suspended (*i.e.*, filtered or retained on a 0.45-µm glass fiber filter). These assumptions for RTP and ozone removals equate to overall assumed removals of 92% for dieldrin and 76% for DDx.

The objective of this testing was to verify these previously used assumptions for dieldrin and DDx removal prior to RO by measuring dieldrin and DDx removal through the RTP, ozonation, and simulated membrane filtration.

1.2 Test Protocol

Testing was conducted following the bench test plan (attached as Appendix B[1]). Major components of testing were the following:

- RTP sampling,
- RTP bench testing, and
- AWTF bench testing.

Bench testing was conducted on the following three blends of samples from the RTP and the Blanco Drain in order to simulate treatment with this new source water through the RTP:

- Primary influent mixture: primary influent sample and Blanco Drain sample,
- Solids contactor effluent mixture: solids contactor effluent sample and filtered Blanco Drain sample, and
- Secondary effluent or AWTF feed mixture: secondary effluent sample and filtered Blanco Drain sample.

The filtered Blanco Drain sample was produced by filtering the Blanco Drain sample first through the 100-µm filter, then the 45-µm, and lastly the 10-µm filter, to simulate RTP treatment. The mixtures contained 12% Blanco Drain water, which is the maximum contribution projected for the RTP source water blends. The mixtures were subjected to treatment processes that simulate treatment processes in the RTP and the AWTF (treatment processes shown Table 1-1).

[1] Test conditions may have changed from the experimental plan, as warranted during actual testing. Procedures used during testing are described in detail in the main body of this report.

Bench-scale filtration was used to mimic primary, secondary, and membrane filtration treatment. For primary and secondary treatment, a 100-µm hydrophilic nylon net filter ("100-µm filter") was used as a pre-filter, followed by a 45-µm hydrophobic polypropylene filter ("45-µm filter") as another pre-filter, and then by a 10-µm hydrophobic polypropylene filter ("10-µm filter"). To mimic membrane filtration, either a 0.7-µm glass fiber filter ("7-µm filter") or the 10-µm filter was used to pre-filter the samples, followed by a 0.45-µm hydrophilic nitrocellulose membrane ("0.45-µm") as another pre-filter, and then by a 0.1-µm hydrophilic polyethersulfone membrane filter ("0.1-µm filter").

Table 1-1: Bench-scale treatment processes used to simulate full-scale treatment processes

RTP or AWTF treatment process	Bench-scale treatment process
Primary clarification (RTP)	Filtration through 100-, 45- and 10-µm filters
Secondary clarification (RTP)	Filtration through 100-, 45- and 10-µm filters
Ozonation (AWTF)	Solution ozone test (SOT)
Membrane filtration (AWTF)	Filtration through 0.7-µm or 10-, 0.45- and 0.1-µm filter

The solution ozone test (SOT) is a bench-scale ozonation test conducted with a stable stock of ozone solution. Deionized water is ozonated to make a stock of ozone solution that is stable at low temperatures over short time scales. The stock solution concentration is measured using the indigo method[2] and the sample is dosed with the ozone stock solution. Indigo solution was prepared the day of testing and the ultraviolet absorbance (UVA) at 600 nanometers (nm) was checked for quality control (*i.e.*, UVA greater than or equal to 0.2 per centimeter). SOTs were conducted at three ozone-to-total-organic-carbon (O_3:TOC) ratios, after accounting for initial nitrite demand of the sample, where the middle ratio represented the AWTF design O_3:TOC ratio.

RTP sampling was conducted for two purposes: (1) to provide samples for the mixtures that were used in bench testing (blends of RTP samples and Blanco Drain sample), and (2) to measure ambient dieldrin and DDx removal across the RTP. The locations of the RTP sampling and the water qualities simulated during bench-scale testing are shown in Table 1-2.

Table 1-2: RTP and AWTF sample and bench-test water qualities

Facility	**RTP**				**AWTF**		
Sample location	Primary influent	Primary effluent	Solids contact effluent	Secondary clarifier effluent		Ozone effluent	Membrane filtration filtrate
RTP sampling	Sample	--	Sample	Sample		--	--
Bench-scale testing	Blend	Filtered	Blend	Filtered	Blend	SOT	Filtered

[2] Standard Methods 4500-O_3 B Indigo Colorimetric Method

Samples from the Blanco Drain and RTP were collected by Monterey Bay Analytical Services (MBAS) and MRWPCA on February 9, 2016, and shipped to Eurofins Eaton Analytical and Vista Analytical Laboratories for analysis and to the Trussell Technologies Pasadena Laboratory for bench-scale testing. The SOT bench-scale testing was conducted the following day (February 10), and RTP bench-scale testing was completed February 11. Both laboratories received all samples within the method hold time based on the initial sample collection of February 9.

Dieldrin and DDx were analyzed by two laboratories: Vista Analytical Laboratories (VAL) and Eurofins Eaton Analytical (EEA). Low detection limit methods were used at VAL to ensure detection of dieldrin and DDx through treatment; EEA was used for continuity with previous source water sampling for dieldrin. Environmental Protection Agency (EPA) method 1699 was used at VAL, with dieldrin and DDx congener minimum quantification limits (also known as method reporting limits) of 30 picograms per liter (pg/L) when no interferences are present and method detection limits (MDLs) ranging from 1 to 5 pg/L. EPA method 505 was used at EEA with a dieldrin method reporting limit (MRL) of 10,000 pg/L and an MDL of 5,000 pg/L. Unless otherwise specified, sample results are total concentrations of dieldrin and DDx (suspended plus dissolved). VAL filtered one sample through a 0.7-µm filter to measure the fraction retained and filtered; EEA filtered one sample through a 0.45-µm filter to measure the suspended and dissolved fraction.

2 SAMPLING RESULTS

2.1 Comparison to Previous Measurements

Dieldrin and DDx concentrations measured in the Blanco Drain sample and the secondary effluent sample are compared to historical measurements below.

The comparison between the dieldrin and DDx concentrations in the Blanco Drain sample and previous Blanco Drain source water sampling is presented in Table 2-1, which shows that concentrations in the water used for bench testing were similar to previous levels.

Dieldrin concentrations were toward the high end of those observed during previous source water sampling (compared to nine low detection limit samples previously). 2,4-DDE and 2,4-DDD were at higher concentrations than previously observed (compared to one sample for each previously), resulting in a higher DDx concentration in this sample than seen previously. Results from 4,4-DDx and 2,4-DDT were consistent with previous sampling results. The somewhat elevated concentrations of dieldrin and DDx may have been due to rain in the preceding weeks, which may have washed dieldrin- and DDx-bound sediment into the Blanco Drain.

Table 2-1: Blanco drain sample results compared to historical source water sampling

Constituent	2/9/2016 sample (pg/L)[1]	7/14 to 6/15 source water sampling (pg/L)[2]
Dieldrin	28,800 & 27,000	< 10,000 – 31,000
4,4-DDD	5,260	< 10,000
4,4-DDE	1,130	21,000
4,4-DDT	3,320	< 10,000
2,4-DDD	20,900	< 5,000
2,4-DDE	87,600	< 5,000
2,4-DDT	9,700	< 10,000
DDx	127,910	< 61,000

[1] All results from EPA method 1699 except for dieldrin result of 27,000, which was from EPA method 505
[2] Lowest MRL of EPA methods 505, 8081, 608, and 525.2 reported from source water sampling; sampling events were typically twice quarterly for dieldrin and typically quarterly for 4,4-DDx; lowest detection limit methods, including 2,4-DDx, were conducted for one sampling event for DDx

A comparison between the concentration of dieldrin retained on a 0.45-µm glass fiber filter (suspended fraction) and the concentration that passed through the filter (dissolved fraction) in the Blanco Drain sample and an earlier source water sampling event is shown in Table 2-2. Dieldrin is highly hydrophobic; accordingly, it was suspected that a large fraction would be retained with the solids and organics on the filter. The relatively low suspended fraction in the 2014 sample compared with the higher suspended fraction in the 2016 sample suggests that dieldrin may absorb to relatively small organic molecules that pass through 0.45-µm filters with moderately high efficiency. The size of these molecules may vary in the Blanco Drain with time, which may partially explain the difference in split results (*i.e.*, dissolved and suspended fractions) between the two dates. Additionally, the concentration of suspended solids varies in the Blanco Drain, particularly due to rain events, which may affect the split between dissolved and suspended.

Table 2-2: Blanco Drain split sample of dieldrin compared to historical source water sampling

Date	February 9, 2016[1]	July 24, 2014[1]
Dissolved fraction (%)	44%	81%
Suspended fraction (%)	56%	19%

[1] EPA method 505

A comparison between dieldrin and DDx concentrations measured in the secondary effluent sample and historical levels is shown in Table 2-3. The dieldrin and DDx concentrations were within the range of previously observed levels.

Table 2-3: Dieldrin and DDx concentrations in the RTP secondary effluent compared to historical final effluent concentrations

Constituents	2/9/2016 sample[1] (pg/L)	2008 to 2015 CCLEAN[2] (pg/L)
Dieldrin	366	163 - 629
DDD (2,2 & 4,4)	202	109 - 951
DDE (2,2 & 4,4)	802	214 - 343
DDT (2,2 & 4,4)	240	Below detection - 120
DDx	1244	387 - 1362

[1] EPA method 1699
[2] Data collected by the Central Coast Long-Term Environmental Assessment Network (CCLEAN) on the final effluent, which may include hauled brine

Note that the World Health Organization (WHO) drinking water guidance level for DDT is 1,000,000 pg/L, several orders of magnitudes higher than the concentrations observed in the RTP secondary effluent and the Blanco Drain samples.

2.2 Regional Treatment Plant

2.2.1 Removal Through Regional Treatment Plant

Dieldrin and DDx were measured in all samples collected from the RTP, allowing for determination of ambient dieldrin and DDx removal through the RTP (results are shown in Figure 2-1). Removals of 84% and 93% were observed through the RTP for ambient dieldrin and DDx, respectively, which are greater than the required removals for COP compliance. The increase in dieldrin and DDx in the solids contactor effluent is discussed in the next section.

The RTP secondary effluent was filtered by Vista Analytical Laboratories to further investigate the amount of dieldrin and DDx found in the particulate and dissolved phases (0.7-µm filter). Removals of 29% and 80% were observed for dieldrin and DDx, respectively through the filtering process. Removal through the AWTF membrane filter (MF) is expected to be greater than through the 0.7-µm filter, as the design nominal MF pore size is smaller (0.1-µm to 0.01-µm).

The RTP was operating under typical conditions when samples were collected for dieldrin and DDx (see Table A.6-1 in Appendix A for RTP water quality data and operational setpoints from the date water samples were collected).

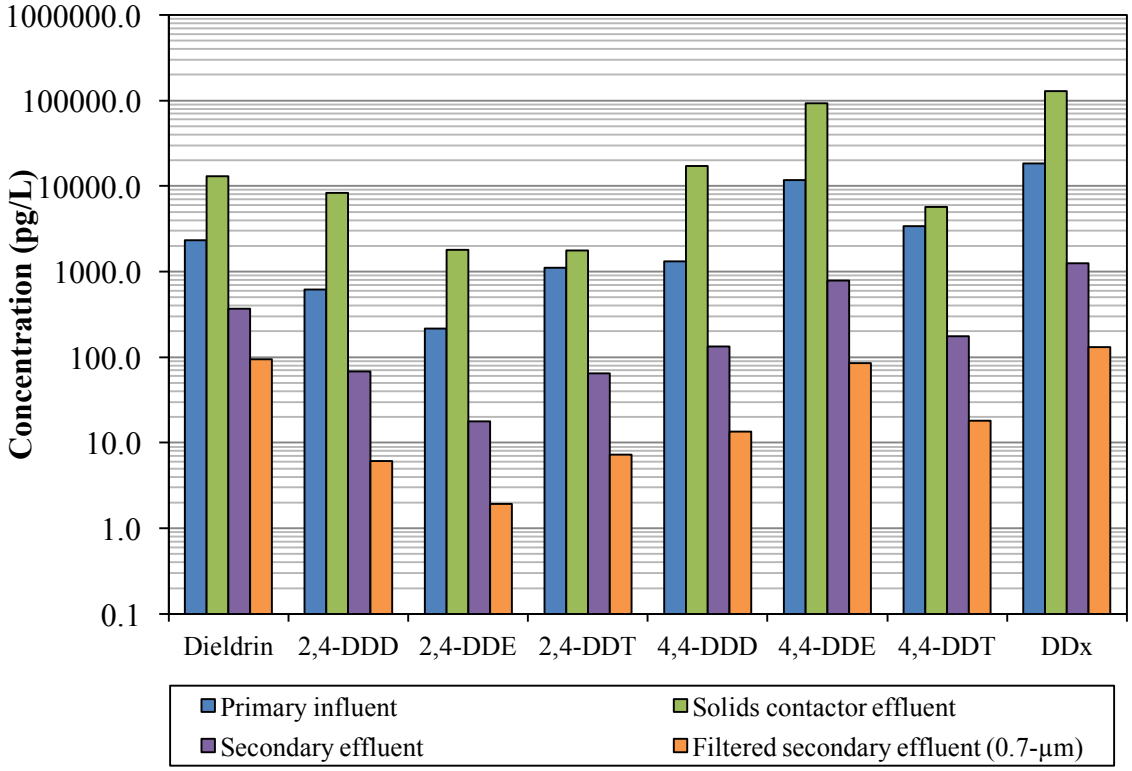

Figure 2-1: RTP dieldrin and DDx congener sampling results

2.2.2 Removal and Volatile Suspended Solids

Dieldrin and DDx concentrations were correlated with volatile suspended solids (VSS) concentration through the RTP (see Figure 2-2; relationship to DDx congeners is shown in Figure A-1 in Appendix A), which suggests that VSS may provide a surrogate for dieldrin and DDx removal through the RTP and operational changes that impact VSS removal may also impact dieldrin and DDx removal.

DDx and dieldrin have a strong affinity to absorb to organics due to their nonpolar structure, minimal hydrogen bonding, and relatively high molecular weight[3]. VSS is comprised of organic matter, such as biological matter in the trickling filter and solids contact process, and the correlation between VSS and dieldrin and DDx appears to be due to the strongly hydrophobic nature of dieldrin and DDx.

[3] Log octanol-water partition coefficients typically measured in the range of 5.9 to 6.9; *i.e.*, the concentration of dieldrin and DDx in an octanol phase of a two phase octanol-water system tends to be 790,000 to 7,900,000 times higher than in the water phase, where octanol is an organic solvent

Dieldrin and DDx concentrations are higher in the solids contact process (Figure 2-1) where a reserve of biological mass is grown and stored to meet carbon removal and solids retention time (SRT) targets. Subsequent clarification and wasting of waste activated sludge (WAS) removes biological mass, including any dieldrin and DDx that may be absorbed to the organic mass. Given this apparent relationship, dieldrin and DDx removal is dependent on secondary clarification removal efficiency.

The primary influent VSS has a similar affinity to dieldrin and DDx as the solids contactor effluent and secondary clarifier effluent VSS. The primary influent contains recycle streams, including the clarified backwash wastewater from SVRP. The solids in the secondary contactor effluent and the secondary clarifier effluent are similar in composition, as both are primarily bacteria from the solids contact and trickling filter processes. The clarified backwash wastewater from SVRP may also be similar in composition, as it contains bacteria removed from the secondary effluent. Presumably, organic runoff with absorbed dieldrin and DDx enter the collection system. These organics may then be oxidized or desorbed by bacteria in the trickling filter-solids contact process or become part of the mixed liquor volatile suspended solids (MLVSS). Influent dieldrin and DDx loading is greater than dieldrin and DDx associated removal through solids wasting (SRT of 33 hours and solid contactor average hydraulic residence time (HRT) of 3.8 hours), which allows for the elevated, equilibrium levels of dieldrin and DDx in the solids contactors.

Although the relationship between dieldrin and DDx may vary with the constitution of organic matter in the RTP influent, trickling filters, and solids contactors, it offers a potential predictive tool as a process surrogate for dieldrin and DDx removal, which suggest that required dieldrin and DDx removals can still be achieved even if VSS concentrations increase with the PWM project. The PWM project is expected to increase the RTP influent flow to a maximum monthly average of 27.8 million gallons per day (MGD). This flowrate is significantly higher than wastewater flows have been in recent years (*e.g.*, the flow as 17.7 MGD on the day of sampling). The increased flowrate may impact the ability of the RTP to remove VSS, dieldrin and DDx, as primary and secondary clarifier loading rates will be increased, among other operational impacts; however, the potential increase in dieldrin and DDx concentrations is expected to be within the range where removal through the RTP, ozone, and MF can maintain compliance with the COP water quality objectives.

The secondary effluent total suspended solids (TSS) concentration was one-third of the National Pollutant Discharge Elimination System (NPDES) permit monthly average limit during sampling (10 milligrams per liter during sampling compared to a limit of 30 milligrams per liter). Assuming a "worst-case" three-fold increase in TSS, and corresponding increase in VSS, dieldrin, and DDx, the observed DDx removal in the RTP would be sufficient to meet COP objectives, and dieldrin COP objectives would be met if ozone and MF achieved a removal of 23%, or greater (bench-scale ozone and MF removals exceeded 23% by approximately a factor of two; see Bench-scale testing results section).

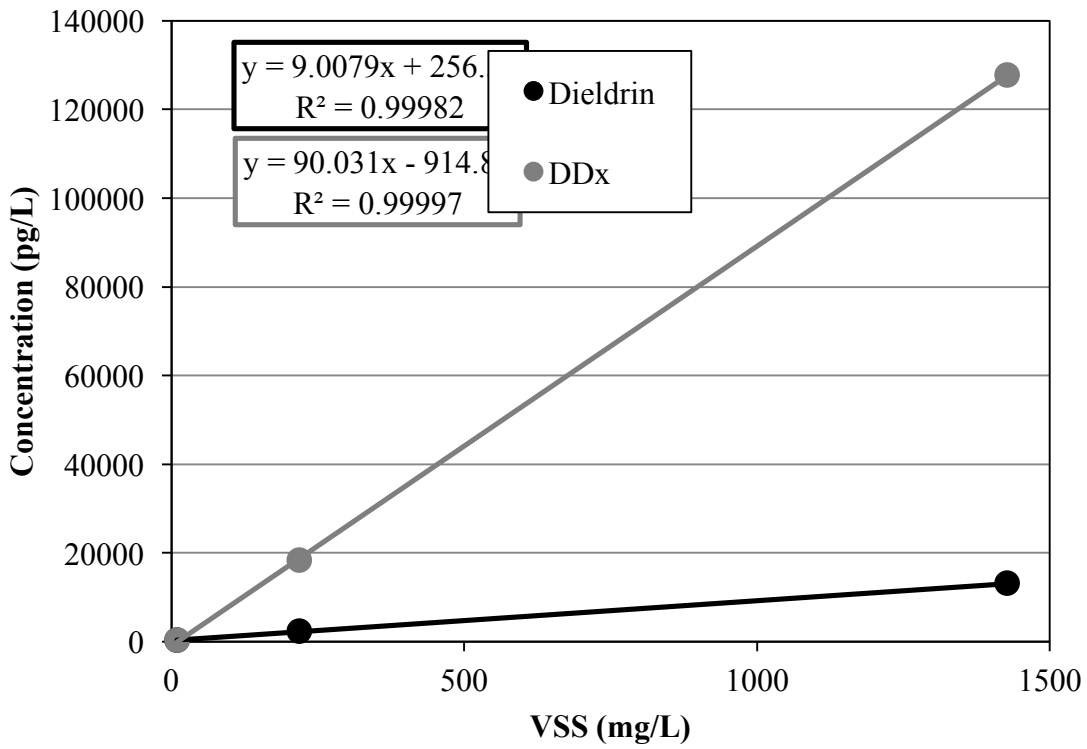

Figure 2-2: Relationship between VSS and total dieldrin and DDx in the RTP (samples points from left to right: secondary effluent, RTP influent, solids contactor effluent)

3 BENCH-SCALE TESTING RESULTS

3.1 Regional Treatment Plant

The removal of dieldrin and DDx through bench-scale testing of RTP processes is shown in Figure 3-1. The bench-scale removals (which included Blanco Drain water) match those observed through the RTP (which did not include Blanco Drain water), suggesting that dieldrin and DDx in the Blanco Drain may be removed similarly to ambient dieldrin and DDx in the RTP influent. The bench-scale removals were 84% and 93% for dieldrin and DDx, respectively, which is greater than the required removals for COP compliance.

The concentrations of the solids contactor effluent mixture Blanco Drain portion were numerically adjusted to account for the dieldrin and DDx accumulation that was observed during RTP sampling. Removals observed through filtration of the solids contactor effluent mixture were applied to the adjusted solids contactor effluent mixture to develop the estimate of the secondary effluent concentrations (unadjusted removals are shown in Appendix A).

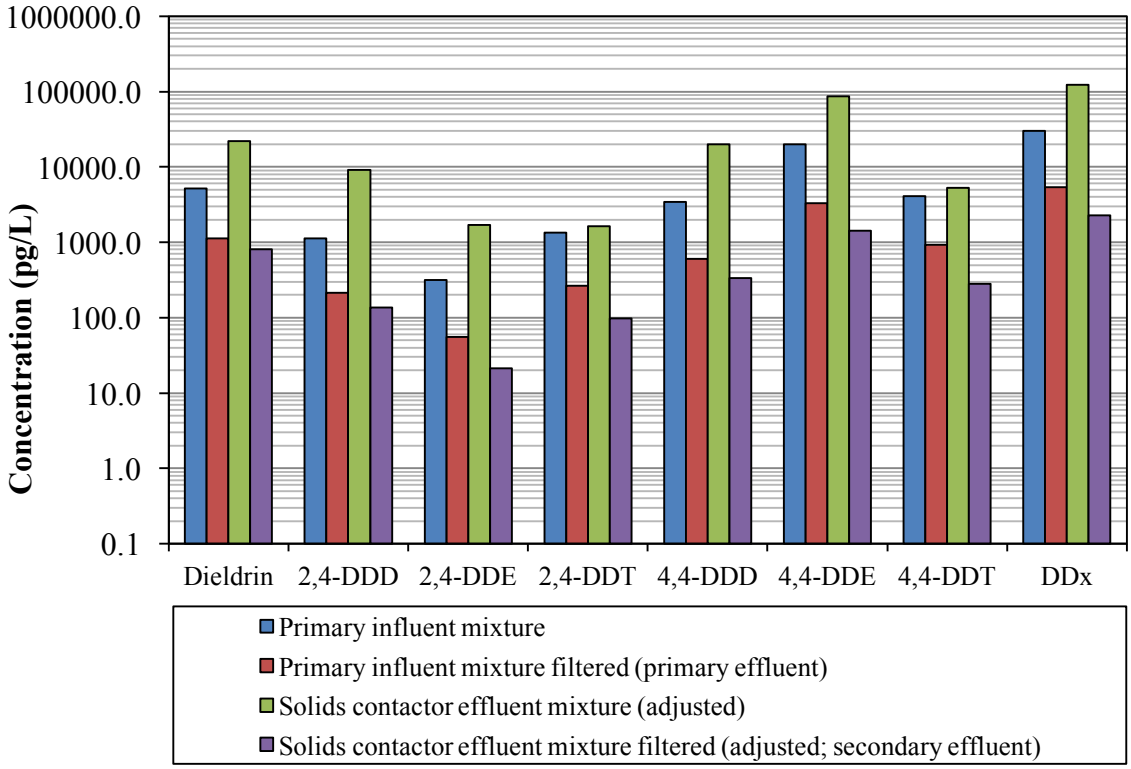

Figure 3-1: Removal of dieldrin and DDx congeners through RTP bench-scale testing (mixtures are blends of RTP and Blanco Drain samples; Blanco Drain contribution adjusted for accumulation of dieldrin and DDx observed at the RTP)

3.2 Solution Ozone Test

Removal of 44% to 63% and 36% to 48% were observed through bench-scale ozonation for dieldrin and DDx, respectively, with higher levels of removal observed with higher ozone doses (see Figure 3-2). While the ozonation removal alone was not sufficient to maintain COP

compliance, it does add an additional layer of redundancy and robustness to dieldrin and DDx removal through the RTP and the AWTF. Removal of dieldrin and DDx through ozonation occurs via a chemical oxidation process, which does not occur in the RTP.

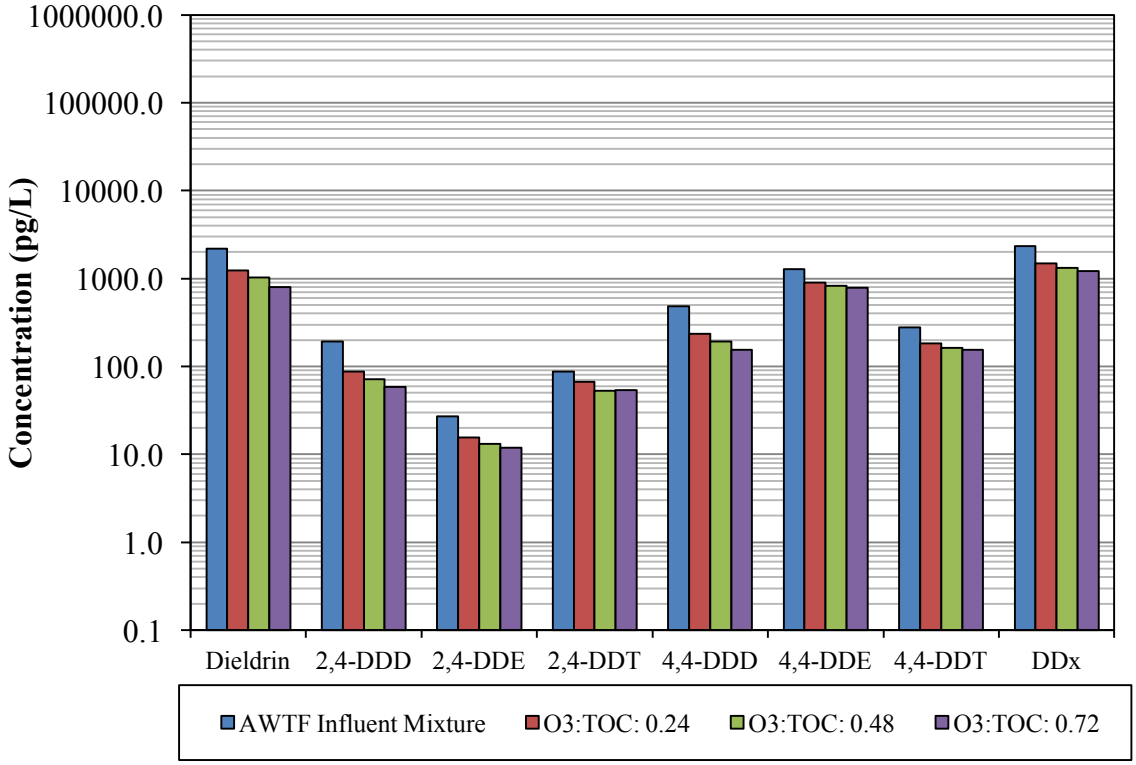

Figure 3-2: Dieldrin and DDx congener removal through ozonation of Blanco Drain-RTP effluent mixture

The water quality of the secondary effluent and Blanco Drain mixture prior to and after bench-scale ozonation are shown in Table 3-1. Three O_3:TOC ratios were tested, where the middle test condition (O_3:TOC wt./wt. ratio of 0.48) represents the AWTF design O_3:TOC ratio. The nitrite concentration was within the range typically observed in the secondary effluent, albeit on the low side. Nitrification may have occurred in the sample bottle prior to measurement (*e.g.*, 1.28 mg/L of DO could have facilitated the conversion of 1.12 mg/L as N of nitrite to nitrate, if the necessary bacterial population were present); however, the method utilized for comparing O_3:TOC ratios accounts for nitrite, likewise accounting for any changes in nitrite concentrations that may have occurred. Turbidity, TOC, and temperature were within typical ranges.

Table 3-1: General water quality of the solution ozone test samples

Parameter	Units	Values		
O_3 dose[1]	mg/L	4.2	7.9	11.6
O_3:TOC ratio[2]	gO_3/gC	0.24	0.48	0.72
Before ozonation				
Nitrite	mg/L as N	0.161		
TOC[4]	mg/L	15.4		
pH	--	8.06	8.06	8.06[2]
Temperature	°C	26.7	26.7	22.7
Turbidity	NTU	3.72		
After ozonation				
TOC[4, 1]	mg/L	14.6	15.2	15.4
pH	--	7.89	7.83	7.96
Temperature	ºC	25.0	25.0	21.4
UVT_{254nm}[1]	%	56%	61%	63%

[1] Accounts for dilution from O_3 stock (results were corrected for dilution to show value without effects of dilution)
[2] Accounts for immediate nitrite demand
[3] At 26.7°C
[4] General Electric (GE) Sievers 5310C

The apparent changes in TOC values due to ozonation are likely due to limited accuracy of the method, as the greatest degree of mineralization, if any, would be expected at the largest ozone dose, which did not exhibit a change in TOC. The decrease in pH is presumably due to both the dilution of the samples with the ozone stock solution and oxidation of organics. The ultraviolet light transmittance (UVT) increased with increasing ozone dose, a phenomenon that was observed at the pilot and elsewhere.

The impact of O_3:TOC ratios on dieldrin and DDx removal is shown in Figure **3-3** (removal for DDx congeners is shown in Figure A-3). The relationship between removal and O_3:TOC ratio was linear under the ranges tested; however, it appears that there may be an initial rapid removal of dieldrin and DDx at lower ozone doses, prior to the linear range, as lines fit to the data do not intersect the origin.

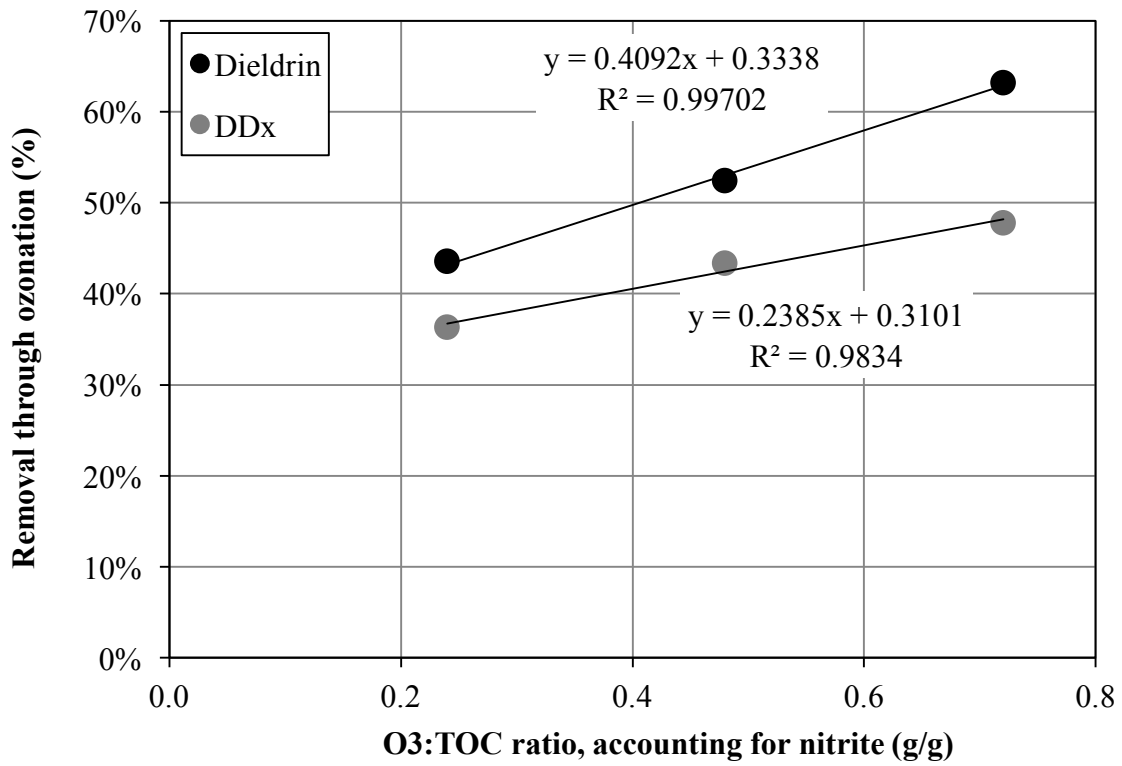

Figure 3-3: Impact of O_3:TOC ratio on dieldrin and DDx removal in Blanco Drain-RTP effluent mixture

3.3 Membrane Filtration

The results from membrane filtration of select ozonated mixtures are shown in Figure 3-4. Removals of 97% to 98% and 92% to 94% were observed for dieldrin and DDx, respectively. These removals may be more representative of full-scale MF removal than the removal observed through the 0.7-µm filter on the non-ozonated secondary effluent described earlier. When no secondary effluent is discharge to the ocean, the MF system, following ozonation, can significantly reduce discharges of dieldrin and DDx to the ocean by removing dieldrin and DDx in the AWTF feed water with high efficiencies.

Dieldrin and DDx adsorbed to organics and particulates that are captured on the MF membrane will be returned to the RTP headworks during regular backwashes and clean-in-places (CIP) events. This recycling of waste backwash water slightly increases the concentrations of dieldrin and DDx in the RTP influent and may marginally increase concentrations in RTP effluent; however, the overall removal of dieldrin and DDx is expected to increase, as recycling increases the amount of dieldrin and DDx removed through the RTP and the ozone system. The increase in dieldrin and DDx concentrations, and the increase in the amount of dieldrin and DDx removed through the RTP and ozone, is a function of flowrates through the RTP and the AWTF and removals through the RTP, ozone and MF. The average increase is expected to be approximately

4% and 2%, or less, for dieldrin and DDx, respectively, based on removals observed during this study and design conditions.[4]

When no secondary effluent is recycled through the SVRP (*i.e.*, when more secondary effluent is being discharged through the ocean outfall), removal through the MF system contributes to a reduction in dieldrin and DDx discharged to the ocean by the increase in dieldrin and DDx removed through the RTP and ozone. Assuming no increase in removal efficiency of the recycled dieldrin and DDx, the decrease in dieldrin and DDx discharged would range from approximately 1% and 2% to 28% and 31% for dieldrin and DDx, respectively, depending on the proportion of secondary effluent and AWTF RO concentrate in the discharge stream to the ocean outfall.[5]

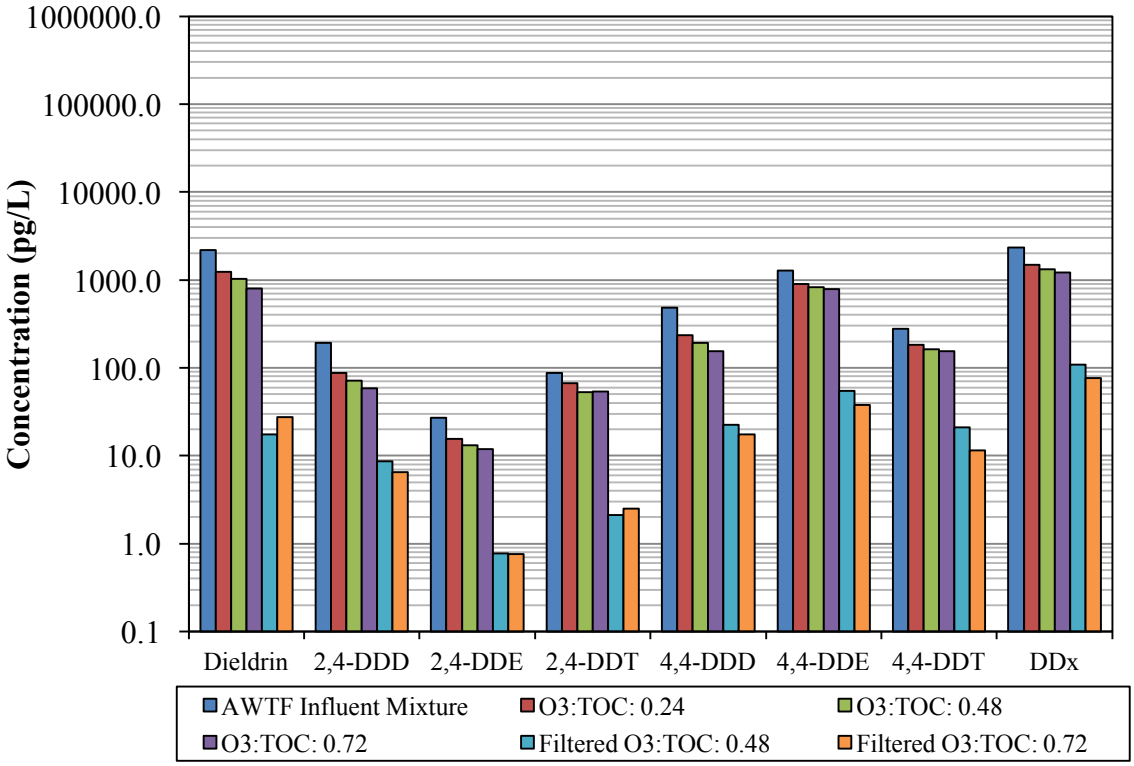

Figure 3-4: Dieldrin and DDx congener removal through membrane filtration of Blanco Drain-RTP effluent mixture

The removal of dieldrin through various size filters for different water qualities is shown in Figure 3-5. From these data, it appears that (1) there may have been negligible interference from dieldrin and DDx adsorption onto the filter material, (2) finer filters result in more dieldrin and DDx removal for low VSS concentrations, and (3) filters removal may be increased if VSS

[4] Low projected average monthly RTP flow of 15 MGD, high AWTF feed flows of 6.85 MGD, high observed removals through 0.1-µm filters, low ozone removal through 0.24 O_3:TOC ratio.

[5] Based on the observed removals through RTP and RTP bench-scale testing, the range of removals observed through bench-scale ozonation and membrane filtration (including through the 0.7-µm filter), and flowrates of 15 to 28 MGD through the RTP and 1.6 to 6.9 MGD through the AWTF.

concentrations were to increase during an upset. The data exhibit a log-linear relationship between filter size and removal for water relatively low in solids and/or for filter sizes of 0.7-µm or less (left size of graph). This relationship appears to be independent of filter material, suggesting negligible adsorption of dieldrin and DDx onto the filters (*i.e.*, that the hydrophobic polypropylene 0.1-µm filters behaved similarly to the hydrophilic glass fiber filters). The AWTF MF membranes will be thermally induced phase separation (TIPS) polyvinylidene fluoride (PVDF), which are moderately hydrophobic. These membranes are expected to behave similarly.

The data in Figure 3-5 also suggest that removal is dependent on another variable besides filter size for samples with relatively high concentrations of solids when filtering through the 10-µm filter (right size of graph). Figure 3-6 shows that better removal was observed for samples with more solids. The increased removal is presumably due to cake filtration, where large material is removed on the filter (e.g., VSS) which in turn can either effectively reduces the pore size, thereby increasing dieldrin and DDx removal, or increase adsorption sites for removal of dieldrin and DDx. Removal through cake filtration can evidently be significant and equivalent to removal through filters with nominal pore sizes 100 times smaller (e.g., compare "solids contactor effluent & 10-µm filtered Blanco Drain" mixture to the mixtures filtered through 0.1-µm filters).

In the event of a process upset at the RTP, where higher concentrations of VSS, and possibly associated higher levels of dieldrin and DDx, enter the AWTF, these data suggest that MF removal may be well fortified through cake filtration, thereby maintaining low dieldrin and DDx concentrations in the MF filtrate (*i.e.*, RO feed).

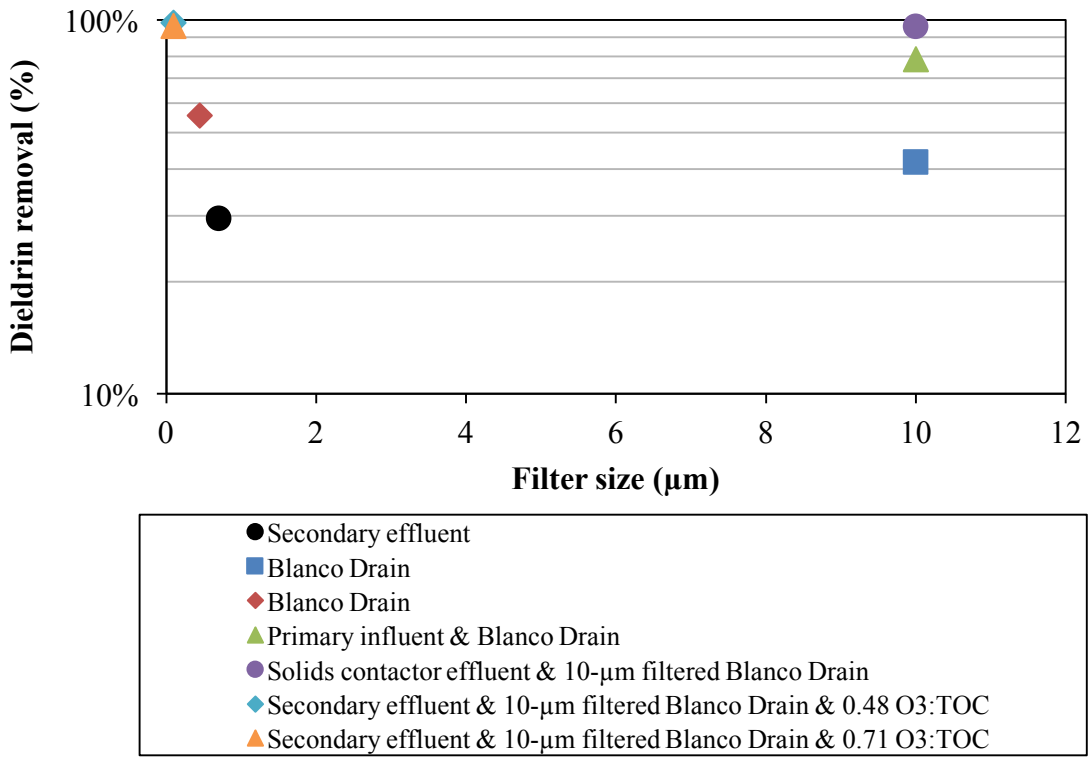

Figure 3-5: Dieldrin removal through filtration as function of filter size and water quality

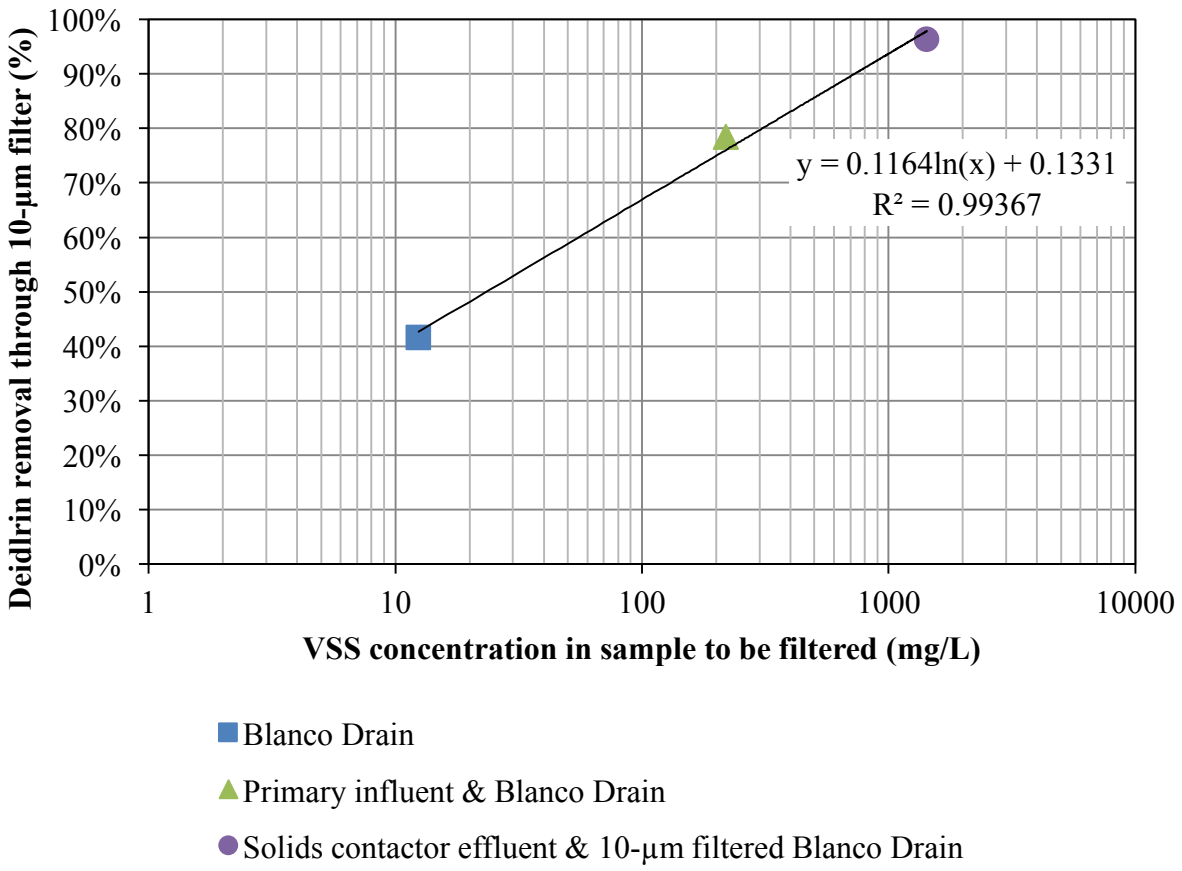

Figure 3-6: 10-µm filter removal of dieldrin and VSS concentration

4 SUMMARY AND CONCLUSIONS

A summary of removals observed through full-scale sampling of the RTP and bench-scale testing is shown in Table 4-1. A summary of removals previously assumed for COP compliance, required for COP compliance, and observed through the RTP sampling and bench-scale testing with respect to COP compliance and RTP and AWTF processes is shown in Table 4-2.

Table 4-1: Summary of dieldrin and DDx removals observed through full-scale sampling and bench-sale testing

Process	Test	Removal (%)	
		Dieldrin	DDx
RTP	Full-scale sampling	84%	93%
RTP[1]	Bench-scale (RTP-Blanco blend)	84%	93%
Ozone[2]	Bench-scale (RTP-Blanco blend)	44% - 63%	36% - 48%
Membrane filtration	Bench-scale (RTP-Blanco blend)	97% - 98%	92% - 94%

[1] Blanco Drain contribution adjusted for accumulation of dieldrin and DDx observed at the RTP
[2] O_3:TOC ratios of 0.24 to 0.71 gO_3:gC, accounting for nitrite demand

Table 4-2: Summary of dieldrin and DDx removals through RTP and AWTF processes related to COP compliance

Constituent	Qualifier[1]	Removal (%)			
		RTP[2]	Ozone[3]	MF[4]	Total
Dieldrin	DEIR assumption	20%	90%	--	92%
	Required for COP	--	--	--	61% RTP or 78% O_3
	Observed	84%	44% - 63%	1% - 98%	91% - 99.9%
DDx	DEIR assumption	20%	70%	--	76%
	Required for COP	--	--	--	58% RTP or 71% O_3
	Observed	93%	36% - 48%	2% - 94%	96% - 99.8%

[1] "Draft Environmental Impact Report (DIER) assumption" refers to previous COP analysis (Trussell Technologies, 2015b); "Required for COP" refers to the values needed to meet COP objectives, where the requirements depend on where the removal is achieved; and "Observed" refers to removals observed through RTP sampling and bench-scale testing for RTP and AWTF processes relating to COP compliance
[2] Ambient dieldrin and DDx removal observed through RTP and adjusted RTP bench-scale removals
[3] O_3:TOC ratios of 0.24 to 0.71 gO_3:gC, accounting for nitrite demand
[4] Considering the recycling of backwash solids to the head of the RTP: additional removal through RTP and ozone processes when 26.2 MGD of secondary effluent (max flow) is discharged through the ocean outfall with 1.6 MGD going to the AWTF, 0.7-µm glass fiber filtration of ambient dieldrin and DDx in secondary effluent assumed for MF removal and the high-end ozone removal assumed to 0.1-µm filtration of ozonated Blanco Drain-RTP secondary effluent mixture, accounting for potential increases in dieldrin and DDx concentrations, where the latter represents the case where no secondary effluent is discharged through the ocean outfall (see discussion in 3.3).

The following conclusions can be drawn from the sampling and bench-scale testing:

- Significant dieldrin and DDx removal occurred through the RTP, ozonation, and filtration;
- Removal through the RTP alone was sufficient to meet COP objectives (based on previous COP compliance analysis); and

- Removal through ozonation and MF offer additional layers of redundancy and robustness.

5 REFERENCES

Ormad et al. (2008). *Pesticides removal in the process of drinking water production*. Chemosphere, 71, 97-106.

State Water Resources Control Board, California Environmental Protection Agency (SWRCB), 2012. *California Ocean Plan: Water Quality Control Plan, Ocean Waters of California*.

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Trussell Technologies, 2015b. *Ocean Plan Compliance Assessment for the Pure Water Monterey Groundwater Replenishment Project*. Technical Memorandum. February 2015.

Trussell Technologies, 2016. *Bench-Top Dieldrin and DDT Removal Testing for the MRWPCA Groundwater Replenishment Project*. Technical Memorandum. January 2016.

APPENDIX A – ADDITIONAL FIGURES AND TABLES

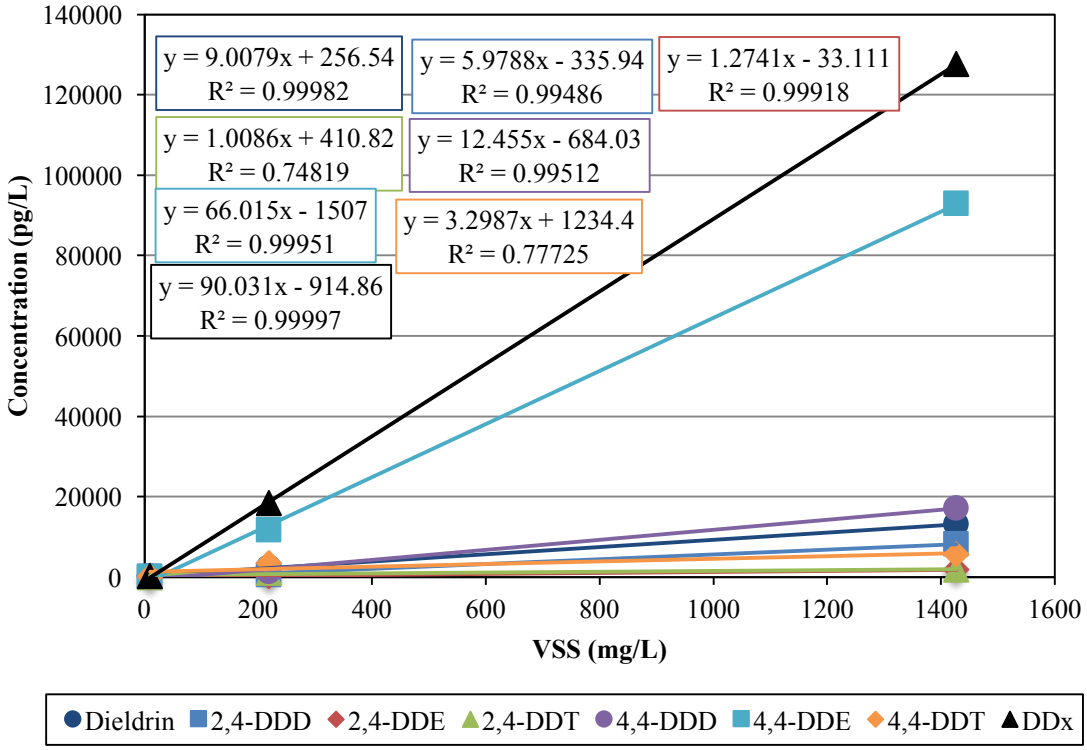


Figure A-1: Relationship between VSS and dieldrin and DDx congeners

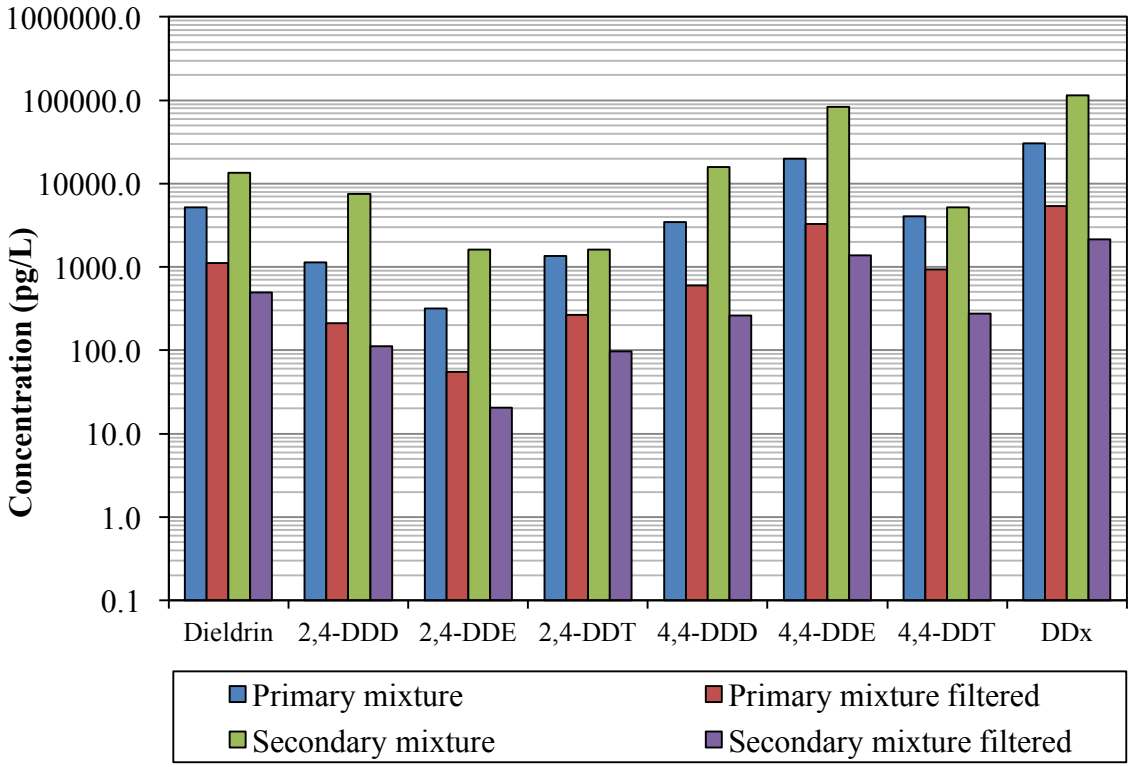


Figure A-2: RTP bench testing dieldrin and DDX congener removal without adjusting for accumulation of the Blanco Drain dieldrin and DDx in the secondary process (mixtures are blends of RTP and Blanco Drain samples**)**

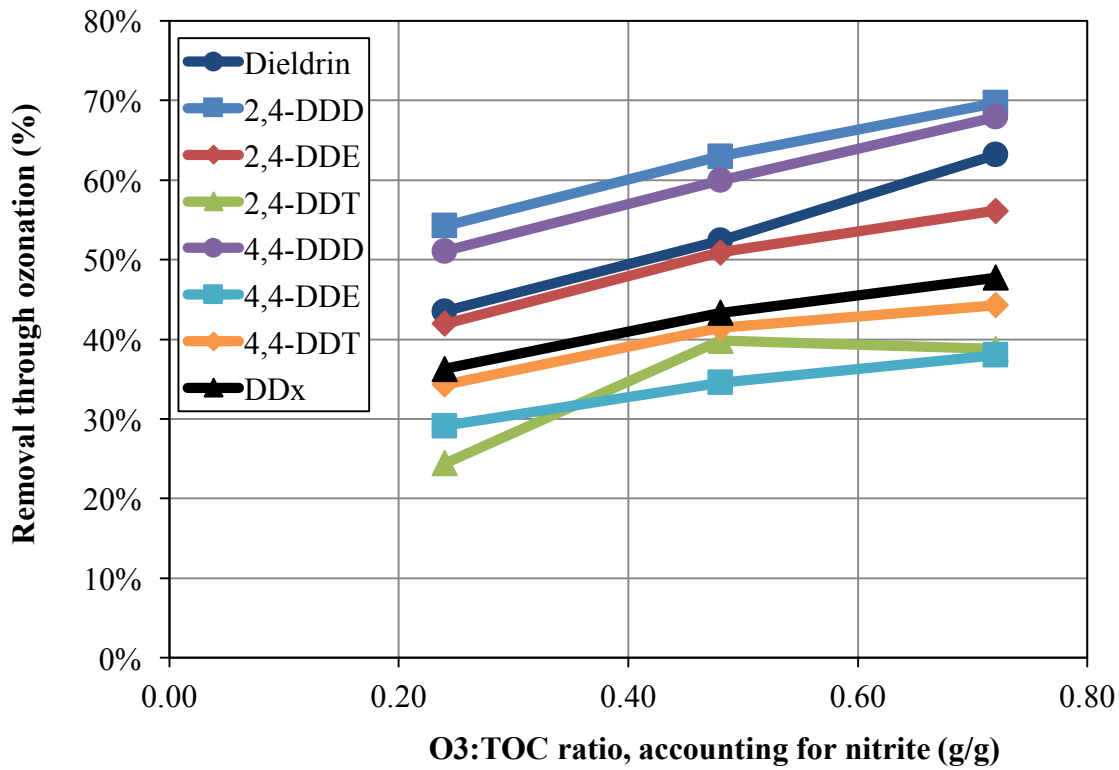


Figure A-3: Relationship between O_3:TOC ratio and dieldrin and DDx congener removal

Table A-1: General quality parameters and operational conditions at RTP during sampling

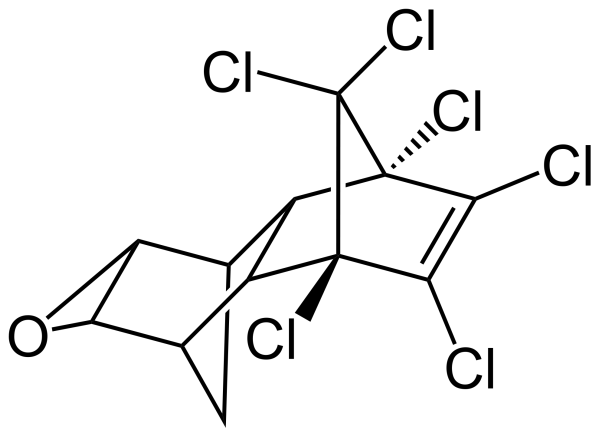
Collect Date	Parameter	Site							Units	Sample Type	Reporting Limit	Method
		Blanco Drain	Salinas Pump Station	Monterey Pump Station	RTP Headworks	Primary Influent	Solids Contact Eff (MLSS)	Sec Eff				
09-Feb-16	CBOD	4.5	--	--	--	310	810	9	mg/L	Grab	1	SM 5210 B
09-Feb-16	COD	38.6	--	--	--	740	2303	61.6	mg/L	Grab	--	Hach 8000
09-Feb-16	pH	7.7	--	--	--	6.99	7.26	7.44	--	Grab	--	SM 4500-H+ B
09-Feb-16	TBOD	1.2	--	--	--	314	1274	31.3	mg/L	Grab	--	SM 5210 B
09-Feb-16	TDS	2380	--	--	--	876	810	883	mg/L	Grab	20	SM 2540 C
09-Feb-16	Temperature	11.7	--	--	--	18.9	17.5	19.2	°C	Grab	--	SM 2550 B
09-Feb-16	TSS	89	--	--	--	248	1830	10	mg/L	Grab	1	SM 2540 D
09-Feb-16	Turbidity	52.9	--	--	--	200	869	5	NTU	Grab	0.4	SM 2130 B
09-Feb-16	VSS	14	--	--	--	88	78	94	%	Grab	--	SM 2540 E
09-Feb-16	Ferric Dose	--	21	235	0	--	--	--	mg/L	Composite	--	Meter Reading
09-Feb-16	Flow Rate	--	10.91	2.65	17.7	--	--	--	MGD	Composite	--	Meter Reading

Notes:
1. SIWTF shunted into the RTP collection system during sampling
2. Average primary clarifier surface loading rate of 623 gallons per day per square foot (gpd/sf), with maximum and minimum of 1001 and 247, respectively
3. Trickling filter recycle ratio of 5%
4. Solids contact SRT of 1.38 days
5. Solids contact dissolved oxygen (DO) of 1.28 mg/L
6. Average secondary clarifier overflow rate of 10225 gallons per day per foot (gpd/ft), with maximum and minimum of 16442 and 4053, respectively

APPENDIX B – EXPERIMENTAL PLAN

Bench-Top Dieldrin and DDT Removal Testing for the MRWPCA Groundwater Replenishment Project

TEST PROTOCOL



Prepared for:
Monterey Regional Water Pollution Control Agency &
Monterey Peninsula Water Management District

January 2016

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1 Introduction

1.1 Background

Pending reductions in Carmel River water diversions are spurring the development of additional potable water supplies on the Monterey peninsula. The Monterey Peninsula Water Management District (MPWMD) and the Monterey Regional Water Pollution Control Agency (MRWPCA) are developing the Pure Water Monterey Groundwater Replenishment (GWR) Project to help address the water shortage. The project includes diversion of additional waters to the Regional Treatment Plant (RTP), which produces a secondary treated wastewater that would be the influent to an Advanced Water Treatment Facility (AWTF). The AWTF will produce high quality recycled water suitable for groundwater replenishment. The main components of the RTP and AWTF treatment train are the following:

- **Headworks and primary treatment** (RTP): screening, primary clarification, and optional Chemically Enhanced Primary Treatment (CEPT);
- **Secondary treatment (RTP)**: non-nitrifying trickling filters, bio-flocculation (solids contact basins), and secondary clarification; and,
- **Advanced treatment (AWTF)**: ozonation, membrane filtration (MF), reverse osmosis (RO), advanced oxidation (AOP) with hydrogen peroxide and ultraviolet (UV) light, and product water stabilization.

Additional raw water sources would be diverted to the RTP collection system including agricultural wash water, agricultural tile drainage and runoff waters, which could include waters from the Blanco Drain, Reclamation Ditch, and/or Tembladero Slough. Source water monitoring was conducted from July 2013 to June 2014 to characterize the proposed new source waters for the GWR Project (Trussell Technologies, 2014). Two legacy pesticides that have been banned for decades, dieldrin and Dichlorodiphyenyldichloroethylene (DDE), were detected during the monitoring in the Blanco Drain water. The median concentration of dieldrin detected was 17 ng/L, with a range of <10 to 31 ng/L; 4,4'DDE was detected once in four samples at a concentration of 21 ng/L.

DDE is a breakdown degradate of dichlorodiphenyltrichloroethane (DDT), and exists as one of two congeners: 4,4'DDE or 2,4'DDE, where the 4,4'DDE isomer was the isomer detected in the Blanco Drain. Although only one of the congeners of DDT was detected in the source water monitoring, all six congeners of DDT (2,4'DDT, 2,4'DDE, 2,4'DDD, 4,4'DDT, 4,4'DDE, 4,4'DDD) will be included in this investigation, and will be referred to as DDx.

Both dieldrin and DDx have established water quality objectives in the 2012 California Ocean Plan ("Ocean Plan") (State Water Resources Control Board, 2012)[1]. Ocean discharges in California must meet the water quality objectives described in the Ocean Plan. The AWTF would produce an RO concentrate that would be discharged along with different quantities of secondary treated wastewater. Modeling efforts of the various discharge scenarios related to the GWR Project have indicated that the future discharges would comply with the COP objectives

[1] DDT in the Ocean Plan is the sum of the two DDT congeners and the congeners of the DDT byproducts, DDE and dichlorodiphenyldichloroethanet (DDD), 4,4'DDT, 2,4'DDT, 4,4'DDE, 2,4'DDE, 4,4'DDD, and 2,4'DDD.

(Trussell Technologies, 2015); however, the estimated concentrations of dieldrin and DDx congeners in the RO concentrate were estimated using assumed removals (90% reduction of dieldrin and 30% reduction of DDx) from scientific literature (Ormad 2008).

The overall objective of this test protocol is to verify these previous assumptions used for dieldrin and DDx removal from a blend of Blanco Drain water and wastewater through sedimentation, ozonation, and membrane filtration.

1.2 Literature Review

The existing literature on dieldrin and DDx removal through the relevant treatment processes (i.e., adsorption, sedimentation, filtration and ozone destruction) was reviewed; however, conflicting results were observed for ozone oxidation. Certain factors will likely influence the destruction of these pesticides via ozone, specifically the type of water (*i.e.* source water quality) and the applied ozone doses. Two studies conducted by Ormad et al. on pesticides removal through oxidation yielded different results. Using the same ozone to total organic carbon (TOC) ratio for both studies of 0.14, and the same initial dieldrin concentration of 500 ng/L, the first study cited a removal efficiency of 90% with ozonation (Ormad et al., 2008), whereas the second study reported only 20% removal (Ormad et al., 2010). The ozone to TOC ratio is typically used in ozonation studies to normalize the effects of ozonation across differing water qualities. An investigation by Westerhoff et al., using ozone to TOC ratios between 0.63 and 1, cited minimal oxidation in the presence of ozone (<20%) (Westerhoff et al., 2005).

Both dieldrin and DDx are very hydrophobic, with K_{OW} values of 5.40 for dieldrin and between 6.02 and 6.91 for the congeners of DDx (Westerhoff, 2005). Therefore, significant removal (55%) of dieldrin and DDx through adsorption and sedimentation with enhanced coagulation and then filtration has also been reported (Robeck et al., 1965). Due to the differences observed in the level of destruction, and the variability of removal rates based on influent water quality, treatment processes and ozone dose, it was decided that bench-scale testing specific to the GWR project would be conducted.

1.3 Protocol Objectives

The objectives of this protocol are the following:

1. Determine the removal of dieldrin and DDx through adsorption onto particulate material and then course filtration (10 µm), which will be used to estimate removal through primary and secondary treatment at the RTP;
2. Determine dieldrin and DDx degradation through bench-scale ozone testing, using the design ozone to TOC ratio[2] for the proposed AWTF, to estimate the removal through the future ozone system; and,
3. Determine the remaining dissolved component of dieldrin and DDx after ozonation by filtering the ozonated water through a membrane disk filter (0.1 µm), which will be used to estimate removal through an MF filter.

Testing will be conducted at the Trussell Tech Laboratory in Pasadena, CA, using a laboratory blend of filtered (10 µm filter to represent solids removal during RTP treatment) Blanco Drain

[2] The design ozone to TOC ratio incorporates immediate nitrite demand based on the detected nitrite concentration prior to ozonation.

water with RTP secondary effluent at a ratio that represents the highest expected future contribution of agricultural drainage water to the wastewater collection system. Additionally, testing will be conducted on a blend of Blanco Drain water and RTP primary influent at the same ratio to investigate the potential of dieldrin and DDx adsorption onto organic solids. Bench testing, including the membrane filtration and solution ozone test, will be conducted by Trussell Tech, and the dieldrin and DDx analyses will be performed by commercial laboratories (Eurofins and Vista Laboratories).

2 Experimental Design

Water samples from the RTP will be collected, put on ice and shipped overnight to the Trussell Tech laboratory in Pasadena, CA. Water samples from the Blanco Drain will be shipped overnight to three different locations to minimize handling times prior to analysis: Eurofins Eaton Analytical Laboratory ("Eurofins"), Vista Laboratory ("Vista") and the Trussell Tech laboratory. MRWPCA staff will collect samples from the RTP, and Monterey Bay Analytical Services (MBAS) will be contracted to collect the water sample from the Blanco Drain. Trussell Tech staff will conduct the filtration and ozonation tests described in detail below. Throughout the bench-scale test, untreated samples (*i.e.*, non-filtered and non-ozonated Blanco Drain samples) and treated samples (*i.e.*, filtered and ozonated) will be collected and shipped to a certified laboratory for dieldrin and DDx analysis.

2.1 Sample Collection and Preparation

Trussell Tech performed an assessment of the impact the brine discharge, including the additional source waters, could have on the Monterey Bay in relation to the California Ocean Plan Objective (Trussell Technologies, 2015). For this assessment, water quality data for several types of discharge waters were used to estimate the future combined water quality in the ocean outfall discharge, including consideration of (1) different flow scenarios that varied based on time of year and/or drought conditions, (2) variation in the volume of water from each new source water, and (3) an estimate of the highest concentrations of Ocean Plan constituents from all data received during the source water monitoring. From this analysis, a worst-case scenario concerning dieldrin and DDx was identified to occur during times of maximum contribution from the Blanco Drain, which was determined to be 12% of the total influent water volume based on 2019 projected RTP flows.

To estimate the removal of dieldrin and DDx through the RTP and proposed AWTF, water samples will be collected from the Blanco Drain, RTP primary influent, solids contactor effluent and RTP secondary effluent. The amount of water collected will be as follows:

- 12 L from Blanco Drain,
- 5 L from RTP primary influent autosampler,
- 4.5 L from RTP solids contactor effluent, and
- 14 L from RTP secondary effluent.

These water samples will then be shipped overnight to Vista Laboratories, Eurofins, Caltest and the Trussell Tech laboratory. The temperature of the water will be recorded on the Chain of Custody when the samples are received. The samples will be stored at 6 degrees Celsius for a maximum of 24 hours.

Prior to the start of testing, the water will be brought to room temperature (similar to expected temperature of the wastewater) so that results are not impacted by slower reaction kinetics associated with lower temperatures. Three test mixtures will then be created:

1. **Primary:** 0.26 L Blanco Drain water combined with 2.14 L RTP primary influent,
2. **Secondary:** 0.26 L filtered Blanco Drain water combined with 2.14 L RTP solids contactor effluent, and
3. **AWTF Influent:** 1.32 L filtered Blanco Drain water combined with 10.68 L RTP secondary effluent.

The Primary mixture will be used to focus on the removal of dieldrin and DDx through adsorption and subsequent sedimentation during primary treatment at the RTP. Therefore, this mixture will only be filtered (see Section 2.2) and not subjected to ozonation. The average residence time through the RTP's primary treatment process will be applied during the bench-scale testing to mimic the time available for adsorption to occur. Therefore, the Primary mixture will be filtered after the respective residence time for primary treatment has passed.

The Secondary mixture will be used to estimate the removal of dieldrin and DDx through adsorption and subsequent sedimentation during secondary treatment at the RTP.

The AWTF Influent mixture most accurately represents the proposed AWTF influent water quality, and so it will be used to study the impacts of ozonation and membrane filtration on dieldrin and DDx destruction and removal. Specifically, the amount of total organic carbon (TOC) present in the AWTF Influent mixture will be more similar to the actual RTP effluent water. This is important because the ozone to TOC ratio can significantly impact the ozone demand of the water, which could affect the observed dieldrin and DDx destruction.

2.2 Filtration

Filtration will be used to mimic primary, secondary, and membrane filtration treatment. Several filtration scenarios will be done to investigate the amount of dieldrin and DDx removal attributable to adsorption of the constituents onto suspended solids and subsequent removal through sedimentation and straining. A 10-micron filter will be used to simulate primary and secondary treatment, and a 0.1-micron filter will be used for membrane filtration.

The Primary mixture testing will involve first combing the Blanco Drain and RTP primary influent waters as specified in Section 2.1. The mixed water will then be filtered through a 10-micron filter. For the Secondary mixture, Blanco Drain water will first be filtered through a 10-micron filter, and then will be mixed with the RTP solids contactor effluent water. The Blanco Drain water is filtered separately in this scenario because in the full-scale plant, this water will first go through primary treatment prior to membrane filtration, and the RTP solids contactor effluent water collected will have already gone through this treatment. Similarly, the AWTF Influent mixture will be made with filtered Blanco Drain water (10-micron) mixed with RTP secondary effluent water.

The AWTF Influent mixture only will receive ozone treatment, to simulate the first process in the AWTF treatment train. Ozonation procedures are discussed in Section 2.3. Following

ozonation, the AWTF Influent mixture will be filtered through a 0.1-micron filter to simulate membrane filtration. Depending on the final design of the full-scale AWTF, there will either be a microfiltration (0.1 – 10 micron pore size) or an ultrafiltration (0.01 – 0.1 micron pore size) treatment step. To be conservative, a pour size similar to a typical microfiltration membrane was chosen for this study.

2.3 Ozonation

The first step of the proposed AWTF will be ozonation to control the amount of fouling on the downstream membranes, and allow a higher operating flux. The degree of fouling is related to the amount of TOC in the membrane influent water, and so the ozone dose required to be effective at preventing fouling is based on the ozone to TOC ratio. The ozonation test in this study will be performed using the AWTF Influent mixture to most accurately mimic the AWTF influent water quality, specifically the amount of TOC and nitrite present. Once the AWTF Influent mixture has been made, approximately 200 mL will be sampled and used for TOC and nitrite analysis, which will be conducted in the Trussell Tech laboratory. Once the results have been obtained, a transferred ozone dose will be selected such that the ozone to TOC ratio (accounting for nitrite demand) matches the ratio that will be targeted at the AWTF, which is 0.48 (w./w.). Two additional ozone doses will also be tested, +/- 50% of the design ozone to TOC ratio, to determine degradation based on a range of ozone doses.

Trussell Tech staff will then perform the Solution Ozone Test (SOT) method to mimic full-scale ozonation. This method utilizes a stock ozone solution, which will be prepared by bubbling ozone through deionized water (apparatus shown in Figure 1). The ozone concentration will be quantified using the gravimetric indigo method, as described by Rakness (2005). The results from the TOC analysis will be used to calculate the ozone dose required to produce an ozone to TOC ratio of 0.48. A known volume of the stock ozone solution will then be added to the water sample of interest to deliver the dose associated with the target ozone to TOC ratio.

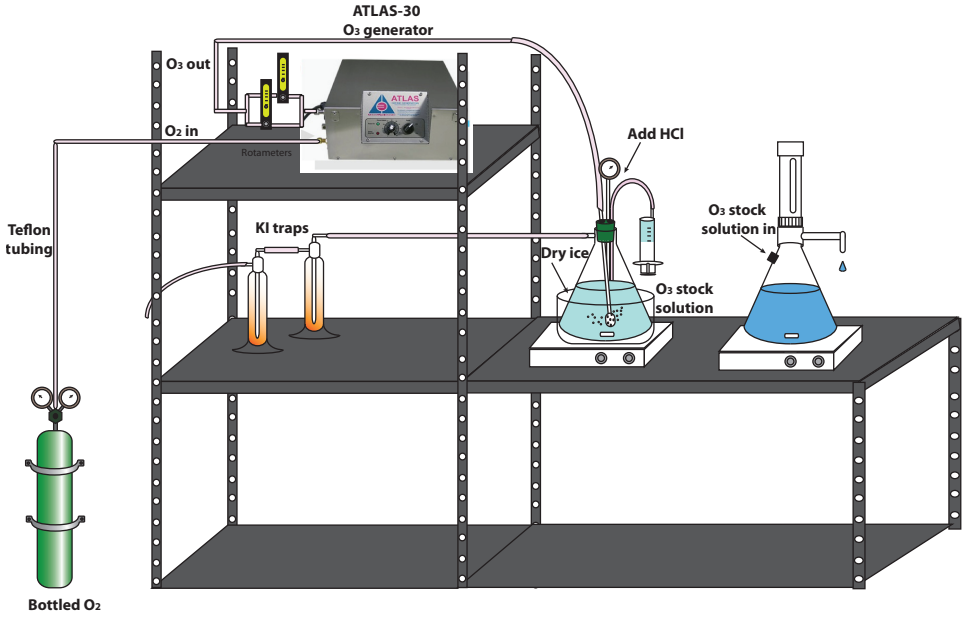

Figure 1 - Solution Ozone Test apparatus

2.4 Laboratory Analysis

Certified laboratories will be contracted for the analysis of dieldrin and DDx throughout the filtration and ozonation steps described above. Eurofins Eaton Analytical ("Eurofins") is a California certified laboratory that will be consulted for the analysis of dieldrin in the particulate and dissolved phases using EPA Method 505. This method has a method-reporting limit (MRL) of 0.012 ug/L, and requires six 40-mL vials, or a total of 240-mL per sample for analysis of both phases. Caltest Analytical Laboratory ("Caltest") will be consulted for the analysis of DDx using EPA Method 608, which will also be used to analyze the samples for particulate and dissolved phases separately. These methods have MRLs ranging from 0.005 – 0.01, depending on the congener, and require two 1-L bottles, or a total of 8-L per sample. DDE was found in one sample at a concentration of 21 ng/L and dieldrin was found in the Blanco drain at a median concentration of 17 ng/L; therefore, these laboratory methods will only be used on the initial raw water sample of Blanco Drain water, and will not be used to analyze the Primary, Secondary and AWTF Influent mixtures due to the MRL.

Vista Laboratories ("Vista") is another California certified laboratory that will be contracted for the low-detection limit analysis of dieldrin and DDx using EPA Method 1699. This method has an MRL of 40 pg/L and 80 pg/L for dieldrin and DDx respectively, and the sample volume required per analysis is 2 L. Method 1699 will be used to analyze all of the initial source waters, and all of the samples once the mixtures have been made, which will include the samples collected from the following:

1. Primary influent raw water;

2. Solids contactor effluent raw water;
3. Secondary effluent raw water;
4. Blanco Drain raw water;
5. Primary mixture after filtration through the 10-micron filter;
6. Blanco Drain raw water after filtration through the 10-micron filter;
7. Secondary mixture after filtration through the 10-micron filter;
8. The AWTF Influent mixture:
    a. After ozonation (3 samples), and
    b. After filtration through the 0.1-micron filter (2 samples).

2.5 Testing Supplies

The following supplies will be obtained and prepared in advance of testing:

- Sample bottles, cooler, gel-ice and Chain of Custody documentation (delivered to sampling location),
- Filtration equipment,
- 47-mm diameter filters with 10-micron and 0.1-micron pore sizes,
- TOC, turbidity and nitrite analysis equipment, and
- SOT apparatus.

2.6 Laboratory Procedure

The testing and sampling procedure is described in this section and graphically shown in Figure 2.

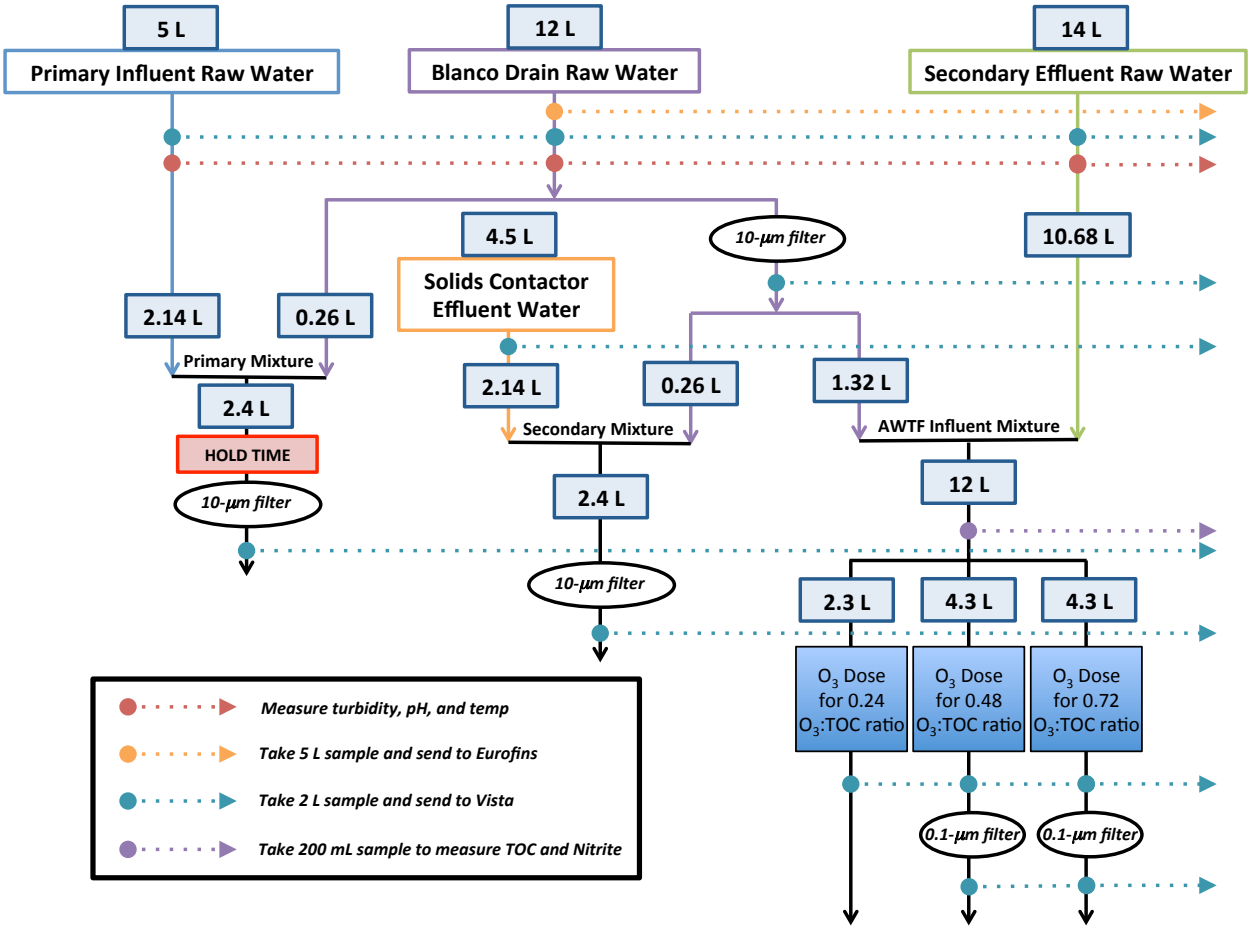

Figure 2 - Testing and sampling procedure. Note: the O_3:TOC ratio accounts for nitrite demand

Field:
Collect water samples as follows:

- **Blanco Drain:** fill six 40-mL amber glass vials for EPA Method 505, four 1-L amber glass bottles for EPA Method 608. Send these bottles directly to Eurofins. Fill two 1-L amber glass bottles for EPA Method 1699 and send directly to Vista. Fill four 1-L amber glass bottles and send to Trussell Tech laboratory in Pasadena, CA.
- **RTP Primary Influent:** Fill two 1-L amber glass bottles from the auto-sampler for the primary influent and send to Vista. Fill three 1-L amber glass bottles and send to Trussell Tech laboratory.
- **RTP Solids Contactor Effluent:** Fill two 1-L amber glass bottles from the solids contactor effluent water and send to Vista. Fill three 1-L amber glass bottles and send to Trussell Tech laboratory.
- **RTP Secondary Effluent:** Fill two 1-L amber glass bottles from the secondary effluent and send to Vista. Fill twelve 1-L amber glass bottles and send to Trussell Tech laboratory.

Lab:

1. Take a 10-mL water sample from each source and measure turbidity, pH and temperature.

2. Combine 2.14-L RTP primary influent water with 0.26-L Blanco Drain water to create the Primary mixture.
3. After the simulated primary treatment residence time (1.7 hours), filter the Primary mixture through a 10-micron pore size filter.
4. Fill two 1-L Vista laboratory analysis bottles with the Primary mixture filtered water, set aside.
5. Filter 3.7-L Blanco Drain water through a 10-micron filter.
6. Combine 0.26-L filtered Blanco Drain water with 2.14-L RTP solids contactor effluent water to create the Secondary mixture.
7. Filter the Secondary mixture through a 10-micron pore size filter.
8. Fill two 1-L Vista laboratory bottles with the Secondary mixture filtered water, set aside.
9. Combine 1.32-L of the remaining filtered Blanco Drain water with 10.68-L RTP secondary effluent water to create the AWTF Influent mixture.
10. Fill two 1-L Vista laboratory analysis bottles with the filtered Blanco Drain water, set aside.
11. Take a 40-mL sample of the AWTF Influent mixture and measure the total organic carbon and take a 20-mL sample and measure the total nitrite. Determine the ozone doses needed for ozone:TOC ratios of 0.24, 0.48 and 0.72 accounting for nitrite demand.
12. Divide the AWTF Influent mixture into three separate beakers labeled A, B and C containing 2.3 L, 4.3 L and 4.3 L respectively.
13. Once waters have reach room temperature, perform the SOT on the three filtered AWTF Influent mixtures:
    A. 2.3 L AWTF Influent mixture = ozone:TOC of 0.24
    B. 4.3 L AWTF Influent mixture = ozone:TOC of 0.48
    C. 4.3 L AWTF Influent mixture = ozone:TOC of 0.72
14. From tests A through C of the ozonated AWTF Influent mixtures, fill two 1-L Vista laboratory analysis bottles and set aside.
15. Filter the ozonated mixtures from tests B and C through a 0.1-micron filter.
16. Fill two 1-L Vista laboratory analysis bottles with the filtered AWTF Influent mixtures of tests B and C, set aside.
17. Send the 16 reserved Vista analysis bottles to Vista labs for analysis.

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APPENDIX L

Central Coast Regional Water Quality Control Board Order No. R3-2017-0003, Waste Discharge Requirements and Water Recycling Requirements for the Pure Water Monterey Advanced Water Purification Facility and Groundwater Replenishment Project Issued to the Monterey Regional Water Pollution Control Agency

STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION
ORDER NO. R3-2017-0003

WASTE DISCHARGE REQUIREMENTS AND WATER RECYCLING REQUIREMENTS

FOR THE

PURE WATER MONTEREY ADVANCED WATER PURIFICATION FACILITY AND GROUNDWATER REPLENISHMENT PROJECT

ISSUED TO

MONTEREY REGIONAL WATER POLLUTION CONTROL AGENCY

The California Regional Water Quality Control Board, Central Coast Region (Central Coast Water Board) finds that:

I. BACKGROUND

1. The Monterey Regional Water Pollution Control Agency (MRWPCA) in partnership with the Monterey Peninsula Water Management District (MPWMD) has developed the "Pure Water Monterey Groundwater Replenishment Project" (Project) to deliver 3,500 acre-feet per year (AFY) of purified recycled water to replenish the Seaside Groundwater Basin (Seaside Basin), in Monterey County.

2. The MRWPCA is a joint powers authority (JPA) operating in the Monterey Bay area, with 11 members including Monterey County, City of Salinas, Boronda County Sanitation District, Castroville Community Services District, City of Del Rey Oaks, City of Monterey, City of Pacific Grove, City of Sand City, City of Seaside, Marina Coast Water District, and Moss Landing County Sanitation District.

3. The MRWPCA is the facility owner and is responsible for complying with all requirements of this Order and the Monitoring and Reporting Program.

4. Each JPA member has had sewage conveyance or treatment responsibilities in the past for its respective area of jurisdiction and is currently responsible for maintaining and operating its own collection system. The collection systems of the 11 member agencies all connect to MRWPCA's Regional Treatment Plant (RTP).

5. The MRWPCA currently serves a population of approximately 250,000 people and treats approximately 18.5 million gallons per day (MGD) of municipal wastewater at its RTP located two miles north of the City of Marina.

6. The RTP currently has a design capacity of 29.6 MGD.

7. California American Water Company (CalAm) is under a State Water Resources Control Board (SWRCB) cease and desist order (SWRCB Order No. 2009-0060) to secure replacement water supplies and cease over-pumping of the Carmel River. The Project will help CalAm to comply with the cease and desist order by allowing it to reduce diversions from the Carmel River system by 3,500 AFY by injecting the same amount of purified recycled product water into the Seaside Basin.

8. The Project will also include a drought reserve component by providing for an additional 200 AFY of product water that will be injected in the Seaside Basin in wet and normal years up to a total of 1,000 acre-feet (AF). Thus, the Project will inject up to 3,700 AF of product water into the Seaside Basin in some years, rather than the 3,500 AF needed for CalAm supplies. This will result in a “banked” drought reserve.

9. The Advanced Water Treatment Facility (AWPF) will be located adjacent to the RTP and will consist of ozone pre-treatment, low-pressure membrane filtration, reverse osmosis treatment, advanced oxidation, and product water stabilization.

10. Purified recycled water from the AWPF will be conveyed by pipeline to the Seaside Basin for groundwater recharge using both deep injection and vadose zone wells. The injected water will then mix with existing groundwater and be stored for future urban use, including use as a potable water source.

11. Additional recycled water from the RTP’s tertiary treatment system will augment the existing Castroville Seawater Intrusion Project’s agricultural irrigation supply.

12. The Project will supplement sewage flows to the RTP in order to increase the quantity of secondary effluent available as feed water. The sewage flows will be supplemented with:
    - agricultural wash water from the City of Salinas;
    - storm water flows from the southern part of Salinas;
    - storm water and urban agricultural runoff from the Reclamation Ditch; and
    - surface and agricultural tile drain waters from the Blanco Drain.

13. AWPF treated water will be conveyed by pipeline to the Seaside Basin for groundwater recharge using injection and vadose zone wells owned by MRWPCA. The injection wells will be arrayed just east of General Jim Moore Blvd. and south of Eucalyptus Road (see Figure 1).

II. PURPOSE OF ORDER

14. This Order authorizes the treatment of recycled water at the AWPF and injection of the treated water into the Seaside Basin aquifer.

15. On February 25, 2016, the MRWPCA submitted a Report of Waste Discharge requesting new waste discharge requirements and water recycling requirements (WDRs/WRRs) to reflect a proposal to operate the AWT facility and inject recycled water into the Seaside Basin.

16. On November 29, 2016, the Water Board sent a letter to MRWPCA notifying it that the Report of Waste Discharge letter was complete.

17. On August 22, 2016, the MRWPCA held a public hearing on the draft Title 22 Engineering Report for this project and on October 21, 2016, submitted a final version the Title 22 Engineering Report (Pure Water Monterey Groundwater Replenishment Title 22 Engineering Report) for operation of the Facility to the Central Coast Water Board and the State Water Resources Control Board Division of Drinking Water (DDW). The final Engineering Report was accepted by DDW on November 7, 2016.

18. MRWQCA has made changes to the project since the final Engineering Report was accepted by DDW.

19. DDW submitted a letter to the Central Coast Water Board with recommendations for conditions to properly regulate the Project on November 10, 2016.

20. The DDW conditions are incorporated into the provisions of this Order.

III. PURE WATER MONTEREY ADVANCED WATER PURIFICATION PROJECT

21. The Monterey Regional Water Pollution Control Agency (hereafter "MRWPCA" or "Discharger") owns and operates the Advanced Water Purification Facility located at 14811 Del Monte Boulevard, located north east of Marina in Monterey County (see Figure 1). The facility is located just south of the Salinas River.

22. **Primary Project Components**:

    1. The following source waters will be treated to secondary standards at the RTP:
        - Sewage from the MRWPCA member entities
        - Agricultural wash water from the City of Salinas
        - Storm water flows from the southern part of Salinas
        - Storm water and urban and agricultural runoff from the Reclamation Ditch
        - Surface and agricultural tile drain waters from the Blanco Drain
    2. The Advanced Water Purification Facility (AWPFAWPF) has the following major components:
        - Supply water pump station
        - Ozonation (membrane filtration pretreatment)
        - Membrane filtration feed water pump station
        - Low Pressure Membrane Filtration (MF)
        - Reverse osmosis (RO) feed water pump station
        - RO system
        - Ultraviolet light (UV) with hydrogen peroxide advanced oxidation Process (AOP)
        - Post treatment stabilization
        - Product water pump station
    3. Aquifer recharge by injection of purified recycled water into the Seaside

Basin.

Figure 1 - shows the approximate locations of the AWPF and the injection wells site.

Figure 2 - shows a simplified process flow diagram of the existing RTP and the AWPF.

Figure 3 - is a map of wells associated with and in the vicinity of the Project.

23. **AWPF Design Flows and Waste Streams** - The proposed AWPF will have a design capacity to produce 4.0 MGD of advanced treated recycled water. The facility will also produce seven waste streams: ozone injection strainer waste, MF backwash waste, neutralized MF enhanced flux maintenance waste, neutralized MF clean-in-place waste, neutralized RO clean-in-place waste, analytical instrument waste, and RO concentrate. The RO concentrate will be piped to MRWPCA's existing ocean outfall along with secondary wastewater effluent, and trucked brine. The other AWPF waste streams will be diverted to the RTP headworks or the RTP sludge thickening process for treatment.

24. **Ocean Discharge** - The RO concentrate will be sent to the existing ocean outfall regulated by Water Board Order No. R3-2014-0013, NPDES No. CA0048551 for disposal.

    Because there will be new waste streams entering the RTP, and these waste streams will have seasonal variations in water quality, the Central Coast Water Board must modify MRWPCA's existing NPDES permit for discharge to the Pacific Ocean prior to project operation.

IV. RECYCLED WATER INJECTION SYSTEM

25. **Injection Facilities** – Injection facilities will be constructed along a strip of land on the eastern boundary of the City of Seaside, about 1.5 miles inland from Monterey Bay, in an area is located within the Northern Inland Subarea of the Seaside Basin. Each vadose zone well will be paired with a deep injection well (i.e. a well cluster) at each of the four proposed injection well locations. (Figure 3)

26. **Vadose Zone Wells** - Up to four vadose zone injection wells are planned (VZW-1 through VZW-4) in the Paso Robles aquifer. These wells are targeted to receive 10 percent of the advanced treated recycled water.

27. **Deep Injection Wells** - Up to four deep water injection wells (DIW-1 through DIW-4) are planned in the Santa Margarita aquifer. These wells are targeted to receive 90 percent of the advanced treated recycled water**.**

28. **Water Supply Wells Near the Injection Area** - Most supply wells near the injection facilities are located in the adjacent Northern Coastal Subarea. The closest water supply wells include Seaside No. 4 (operated by the City of Seaside) and two aquifer storage and recovery (ASR) wells, ASR-1 and ASR-2 (operated by the Monterey Peninsula Water Management District for CalAm). Each of these wells is located about 1,000 feet downgradient from a Project injection well (Figure 3).

29. **Monitoring Wells** - MRWPCA will construct two monitoring wells downgradient of each injection well cluster. One monitoring well must be located between two weeks to six months travel time and at least 30 days upgradient of the nearest drinking water well, and one monitoring well must be located between each well cluster and the nearest downgradient drinking water well. The monitoring wells will allow for samples to be obtained independently from each aquifer and validated as receiving recharge water from the Project.

30. **Recycled Water Retention Time** - The SWRCB Division of Drinking Water (DDW - formerly the California Department of Public Health) has adopted groundwater replenishment regulations (June 2014) for the recharge of recycled water. The DDW regulations contain requirements for underground retention time of recycled water that could also potentially affect well spacing. Recycled water must be retained underground for a sufficient period of time to identify and respond to any treatment failure so that inadequately treated recycled water does not enter a potable water system (referred to as the response retention time). The response retention time must be at least two months. The 1,000-ft distance between proposed project wells and the closest downgradient production wells is expected to result in a travel time of approximately one year. MRWPCA will propose a tracer study to DDW and the Central Coast Water Board and when approved, will conduct the study to confirm the underground retention time.

V. SEASIDE GROUNDWATER SUBBASIN

31. **Seaside Groundwater Basin** - Groundwater Bulletin 118 defines the Salinas Valley Groundwater Basin - Seaside Area Subbasin 3-4.08 as having a surface area of 25,900 acres, or approximately 40 square miles. The subbasin underlies the coastal communities of Seaside and Marina as well as the western portion of the former Fort Ord. The main water-bearing units of the subbasin are the Santa Margarita Formation and the Paso Robles Formation. The Santa Margarita Formation is poorly consolidated marine sandstone, has a maximum thickness of 225 feet, and underlies the Paso Robles Formation. The Paso Robles Formation is the major water-bearing unit in the Seaside area and consists of sand, gravel, and clay interbedded with some minor calcareous beds. The storage capacity of the subbasin is estimated to be 1,000,000 acre-feet.

32. **Seaside Groundwater Basin Salt & Nutrient Management Plan -** A salt and nutrient management plan (SNMP) was prepared for the Monterey Peninsula Management District, pursuant to the State Water Board's Recycled Water Policy in June of 2014. The SNMP has not been adopted by the Central Coast Water Board and will not be brought before the Board in its current form.

VII. REGULATION OF RECYCLED WATER

33. Legislation was adopted, effective July 1, 2014, that transferred personnel in the California Department of Public Health Drinking Water Program, which includes those working on permitting of recycled water projects, to the State Water Board as the new Division of Drinking Water (DDW). The regional water quality control boards are responsible for issuing water reclamation requirements for the beneficial use of recycled water. The State Water Board and regional water quality control boards are responsible for issuing waste discharge requirements for the production

of recycled water.

34. State authority to oversee production and reuse of recycled water use is shared by the State Water Board Division of Drinking Water and the Regional Water Boards. DDW is the division with the primary responsibility for establishing water recycling criteria under Title 22 of the Code of Regulations to protect the health of the public using the groundwater basins as a source of potable water.

35. The State Water Board adopted Resolution No. 77-1, Policy with Respect to Water Reclamation in California, which includes principles that encourage and recommend funding for water recycling and its use in water-short areas of the state. On September 26, 1988, the Central Coast Water Board adopted Resolution No. 88-012, which encourages the beneficial use of recycled water and supports water recycling projects.

36. The State Water Board adopted the Recycled Water Policy (State Water Board Resolution No. 2009-0011) on February 3, 2009, and amended the Policy on January 22, 2013. The purpose of the Recycled Water Policy is to protect groundwater resources and to increase the beneficial reuse of recycled water from municipal wastewater sources in a manner consistent with state and federal water quality laws and regulations. The Recycled Water Policy describes the respective authorities of DDW and the regional water quality control boards as follows:

> *Regional Water Boards shall appropriately rely on the expertise of DDW for the establishment of permit conditions needed to protect human health.* (section 5.b)
>
> *Nothing in this paragraph shall be construed to limit the authority of a Regional Water Board to protect designated beneficial uses, provided that any proposed limitations for the protection of public health may only be imposed following regular consultation by the Regional Water Board with DDW, consistent with State Water Board Orders WQ 2005-0007 and 2006-0001.* (section 8.c)
>
> *Nothing in this Policy shall be construed to prevent a Regional Water Board from imposing additional requirements for a proposed recharge project that has a substantial adverse effect on the fate and transport of a contaminant plume or changes the geochemistry of an aquifer thereby causing dissolution of constituents, such as arsenic, from the geologic formation into groundwater.* (section 8.d)

In addition, the Policy notes the continuing obligation of the Regional Water Boards to comply with the state's anti-degradation policy, Resolution No. 68-16:

> *The State Water Board adopted Resolution No. 68-16 as a policy statement to implement the legislature's intent that waters of the state shall be regulated to achieve the highest water quality consistent with the maximum benefit to the people of the state.* (section 9.a)

37. Section 13523(a) of the Water Code provides that a regional water quality control board, after consulting with and receiving recommendations from DDW, and after any necessary hearing, shall, if it determines such action to be necessary to protect the health, safety, or welfare of the public, prescribe water recycling requirements for water that is used or proposed to be used as recycled water. Pursuant to Water Code section 13523, the Central Coast Water Board has consulted with DDW and received its recommendations. On August 22, 2016, DDW participated in a public hearing to consider the proposed Pure Water Monterey Groundwater Replenishment Project. On October 21, 2016, DDW transmitted to the Central Coast Water Board its conditions concerning the Pure Water Monterey Project. DDW's recommendations are included in this order as requirements.

38. Section 13540 of the Water Code requires that recycled water may only be injected into an aquifer used as a source of domestic water supply if DDW finds the recharge will not degradethe quality of the receiving aquifer as a source of water supply for domestic purposes. DDW determined that as long as the water reclamation requirements meet all of its conditions, the Pure Water Monterey Groundwater Replenishment Project can provide injection recharge water that will not degrade groundwater basins as a source of water supply for domestic purposes. This Order requires that the Discharger comply with all of the recommended DDW conditions.

39. Section 13523(b) of the Water Code provides that reclamation requirements shall be established in conformance with the uniform statewide recycling criteria established pursuant to Water Code section 13521. Section 60320 of Title 22 currently includes requirements for groundwater recharge projects.

40. The State Water Resources Control Board adopted uniform water recycling criteria for groundwater recharge on July 15, 2014. This Order is consistent with those criteria.

VIII. OTHER APPLICABLE PLANS, POLICIES AND REGULATIONS

A. Regional Board Water Quality Control Plan (Basin Plan)

41. The Central Coast Water Board has adopted the *Water Quality Control Plan for the Central Coastal Basin* (Basin Plan). The Basin Plan designates beneficial uses for surface water and groundwater; establishes narrative and numeric water quality objectives that must be attained or maintained to protect the designated (existing and potential) beneficial uses and to conform with the state's anti-degradation policy; and includes implementation provisions, programs, and policies to protect all waters in the region. In addition, the Basin Plan incorporates applicable State Water Board and Central Coast Water Board plans and policies and other pertinent water quality policies and regulations.

42. The Basin Plan incorporates the California Code of Regulations (CCR) Title 22 primary Maximum Contaminant Levels (MCLs) by reference. This incorporation is prospective, including future changes to the incorporated provisions as the changes take effect. The Basin Plan states that groundwater designated for use as domestic or municipal supply shall not contain concentrations of chemical

constituents and radionuclides in excess of the MCLs. The Basin Plan also specifies concentrations that cause nuisance or adversely affect beneficial uses.

43. For the Seaside Basin, the Basin Plan includes general narrative groundwater objectives for taste and odor and radioactivity and numeric objectives for:

- Bacteria - the median concentration of coliform organisms (i.e., total coliform) over any seven-day period must be less than 2.2/100 mL; and
- Chemical constituents - groundwater shall not contain chemical concentrations in excess of primary and secondary MCLs.:

Table 1 – Water Quality Goals

	Receiving Water		Beneficial Uses			
	Seaside Aquifer		**Municipal and Domestic Water Supply (MUN)** **Industrial Service Supply (IND)** **Agricultural Supply (AGR)**			
			Water Quality Goals - Sources			
	WQG	**Units**	**CA Primary MCL**	**CA Secondary MCL**	**CA Public Health Goal for Drinking Water**	**Water Quality for Agriculture (Basin Plan)**
Aluminum	1,000	µg/L	X			
Arsenic	10	µg/L	X			
Barium	1,000	µg/L	X			
Boron	750	µg/L				X
Cadmium	10	µg/L				X
Chloride	250	mg/L		X		
Chromium VI	0.02	µg/L			X	
Iron	300	µg/L		X		
Lead	0.2	µg/L			X	
Manganese	50	µg/L		X		
Nitrate - N	10	mg/L	X			
pH	6.5-8.4	pH Units				X
Sodium	69	mg/L	*WQ Goals – Marshak, WQ for Ag (Ayers & Wescot)*			
Sulfate	250	mg/L		X		
TDS	500	mg/L		X		
Zinc	**2.0**	**mg/L**				X

44. Four wells were used to establish existing groundwater water quality and assimilative capacity of the aquifer and sub-aquifers. The most recent five years of data (2011-2016) were analyzed for each well and the data are presented in Table 2. Two of the wells draw their water from both the Paso Robles and Santa Margarita aquifers (Ord Grove No. 2 and Paralta). One well draws water exclusively from the Paso Robles aquifer (City of Seaside No. 4) and one well draws exclusively from the Santa Margarita aquifer (ASR-1).

Table 2 - Existing Groundwater Quality in the Seaside Basin

Constituent	City of Seaside No.4	ASR-1	Ord Grove No. 2	Paralta	Basin-Wide Averages
Aluminum	50	50	26	50	42
Arsenic	1.2	1.8	2.0	2.5	2.1
Barium	28	100	100	100	94
Boron	46	95	132	96	108
Chloride	72	63	129	94	103
Chromium-total	3.6	9.3	10	10	9.1
Chromium VI	-	1.0	0.8	2.3	1.4
Lead	5	3.7	5.0	5.0	4.5
Nitrate as N	1.9	0.1	1.7	0.5	1.1
Sodium	50	60	94	79	79.7
Sulfate	13	77	63	58	54.9
TDS	237	406	524	435	449
TOC	0.5	1.0	0.6	0.6	0.7

**Source: averages of well water quality data submitted by MRPCA on November 9, 2016*

**Concentrations are in µg/L except chloride, nitrate, sodium, sulfate, TDS, and TOC, which are mg/L*

45. MRWPCA completed a focused groundwater quality evaluation, utilizing the available groundwater quality data for the four water supply wells named in Table 2, and constructed a three-dimensional solute transport model to predict localized and basin-wide groundwater quality changes resulting from the mixing of injected recycled water and ambient groundwater. The model analyzed the percentage of assimilative capacity consumed by the Project after 25 years. The results of the evaluation are presented in Table 3. MRWPCA also demonstrated that when effluent limits are equal to the applicable water quality objective for each constituent, the percentage of recycled water present in the aquifer equals the percentage of assimilative capacity consumed. This analysis confirms that less than 10% of the basin's assimilative capacity will be utilized by this project and that beneficial uses will be protected.

Table 3. Volume-Weighted Average = % Assimilative Capacity Consumed

Modeled Layer	Volume–Weighted Average Recycled Water Percentage				
	Northern Coastal	Northern Inland	Southern Coastal	Laguna Seca	All Subareas
1	0.1%	0.0%	0.0%	0.0%	0.0%
2	0.5%	2.2%	0.0%	0.0%	1.0%
3	4.0%	2.1%	0.0%	0.0%	1.7%
4	2.1%	0.6%	0.0%	0.0%	0.8%
5	5.3%	7.2%	0.0%	0.0%	3.8%
Paso Robles Aquifer	1.8%	1.7%	0.0%	0.0%	1.1%
Santa Margarita Aquifer	5.3%	7.2%	0.0%	0.0%	3.8%
All Model Layers	3.3%	4.2%	0.0%	0.0%	2.4%

46. Any constituent that currently exceeds its applicable water quality objective in the groundwater basin will see its water quality improved by discharges of recycled water below the water quality objective concentration.

47. The Basin Plan contains the following specific water quality objectives for groundwater:

MUNICIPAL AND DOMESTIC SUPPLY (MUN)

- Bacteria - The median concentration of coliform organisms over any seven-day period shall be less than 2.2/100 mL.
- Organic Chemicals - Ground waters shall not contain concentrations of organic chemicals in excess of the limiting concentrations set forth in California Code of Regulations, Title 22, Chapter 15, Article 5.5, Section 64444.5 Table 5, and listed in Basin Plan Table 3-1.
- Chemical Constituents - Ground waters shall not contain concentrations of chemical constituents in excess of the limits specified in California Code of Regulations, Title 22, Chapter 15, Article 4, Section 64435, Tables 2 and 3. Radioactivity - Ground waters shall not contain concentrations of radionuclides in excess of the limits specified in California Code of Regulations, Title 22, Chapter 15, Article 5, Section 64443, Basin Plan Table 4.

AGRICULTURAL SUPPLY (AGR)

- Ground waters shall not contain concentrations of chemical constituents in amounts that adversely affect such beneficial use. Interpretation of adverse effect shall be as derived from the University of California Agricultural Extension Service guidelines provided in Basin Plan Table 3-3.
- In addition, water used for irrigation and livestock watering shall not exceed the concentrations for those chemicals listed in Basin Plan Table 3-4. No controllable water quality factor shall degrade the quality of any ground water resource or adversely affect long-term soil productivity. The salinity control aspects of ground water management will account for effects from all sources.

This Order protects Seaside Basin groundwater water quality objectives and is therefore consistent with the Basin Plan.

B. State Water Resources Control Board Policies

48. The Sources of Drinking Water Policy (Resolution No. 88-63) provides that all waters of the state, with certain exceptions, are to be protected as existing or potential sources of municipal and domestic supply. Exceptions include waters with existing high dissolved solids (i.e., greater than 3,000 mg/L), low sustainable yield (less than 200 gallons per day for a single well), waters with contamination that cannot be treated for domestic use using best management practices or best economically achievable treatment practices, waters within particular municipal, industrial and agricultural wastewater conveyance and holding facilities, and regulated geothermal ground waters. This Order protects existing or potential sources of drinking water and is therefore consistent with Resolution No. 68-63.

49. On October 28, 1968, the State Water Board adopted Resolution No. 68-16,

Statement of Policy with Respect to Maintaining High Quality of Waters in California (Resolution 68-16), establishing an anti-degradation policy for the State Water Board and Regional Water Boards. Resolution No. 68-16 requires that existing high quality of waters be maintained unless a change is demonstrated to be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial uses of waters, and will not result in water quality less than that prescribed in applicable policies. Resolution No. 68-16 also requires that waste discharge requirements be prescribed for discharges to high quality waters that will result in the best practicable treatment or control of the discharge necessary to ensure that a pollution or nuisance will not occur and the highest water quality consistent with maximum benefit to the people of the State will be maintained. The Central Coast Water Board's Basin Plan implements, and incorporates by reference, the state anti-degradation policy.

50. This order is consistent with Resolution No. 68-16 (anti-degradation policy). Groundwater recharge with recycled water for later extraction and use in accordance with the Recycled Water Policy and state and federal water quality laws is to the benefit of the people of the State of California.

    Compliance with this Order will protect present and anticipated beneficial uses of groundwater, ensure attainment of water quality prescribed in applicable policies, and avoid any conditions of pollution or nuisance. Although this Order may allow some degradation to water quality, the Order does not authorize the Project to cause exceedances of applicable water quality goals or objectives for the basin.

51. A goal of the Recycled Water Policy, Resolution No. 2013-0003, is to increase the beneficial use of recycled water from municipal wastewater sources in a manner consistent with state and federal water quality laws and regulations. The Policy directs the Regional Water Boards to collaborate with generators of municipal wastewater and interested parties in the development of salt and nutrient management plans (SNMPs) to manage the loading of salts and nutrients to groundwater basins in a manner that is protective of beneficial uses, thereby supporting the sustainable use of local waters. No SNMP has been adopted by the Central Coast Water Board for the Seaside Basin.

    The Recycled Water Policy also states that until such time as a salt and nutrient management plan has been approved by the Water Board and is in effect, compliance with Resolution No. 68-16 for projects that consume less than 10 percent of the available assimilative capacity in a basin/sub-basin may be demonstrated by conducting an antidegradation analysis verifying the use of assimilative capacity. This Order supports the sustainable use of local waters and ensures that the Project will consume less that 10 percent of available assimilative capacity, which is consistent with the Recycled Water Policy

52. DDW has established a notification level of 10 nanograms per liter (ng/L) for N-nitrosodimethylamine (NDMA). NDMA can be produced by reactions that occur during chlorination and has been determined to be a potent carcinogen. The notification level is the concentration of a contaminant in drinking water delivered for human consumption that DDW has determined, based on available scientific information, does not pose a significant health risk but warrants notification. Notification levels are established as precautionary measures for contaminants that

may be considered candidates for establishment of maximum contaminant levels, but have not yet undergone or completed the regulatory standard setting process prescribed for the development of maximum contaminant levels and are not drinking water standards. DDW has established a response level of 300 ng/L for NDMA. The response level is the concentration of a contaminant in drinking water delivered for human consumption at which DDW recommends that additional steps, beyond notification, be taken to reduce public exposure to the contaminant.

C. California Water Code

53. Pursuant to California Water Code (Water Code) section 106.3, it is the policy of the State of California that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking and sanitary purposes.

54. Pursuant to Water Code section 13263(g), discharges of waste into waters of the state are privileges, not rights. Nothing in this order creates a vested right to continue the discharge. Water Code section 13263 authorizes the Central Coast Water Board to issue waste discharge requirements that implement any relevant water quality control plan.

55. Section 13267(b) of the Water Code states, in part:

    In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging or who proposes to discharge within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste outside of its region shall furnish under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs of these reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.

    Section 13267(d) of the Water Code states, in part:

    [A] regional board may require any person, including a person subject to waste discharge requirements under section 13263, who is discharging, or who proposes to discharge, wastes or fluid into an injection well, to furnish the state board or regional board with a complete report on the condition and operation of the facility or injection well, or any other information that may be reasonably required to determine whether the injection well could affect the quality of the waters of the state.

56. The need for the technical and monitoring reports required by this order, including the Monitoring and Reporting Program, is based on the Report of Waste Discharge (ROWD), the DDW's recommended conditions, the California Environmental Quality Act (CEQA) environmental impact report, the Title 22 Engineering Report, and other information in the Central Coast Water Board's files for the facility. The technical and

monitoring reports are necessary to ensure compliance with these waste discharge requirements and water recycling requirements. The burden, including costs, of providing the technical reports required by this Order bears a reasonable relationship to the need for the reports and the benefits to be obtained from the reports.

57. This order includes limits on quantities and concentrations of chemical, physical, biological, and other pollutants in the advanced treated recycled water that is injected into groundwater.

58. This order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code, §§ 2050 to 2097) or the federal Endangered Species Act (16 U.S.C.A. §§ 1531 to 1544). This Order requires compliance with requirements to protect the beneficial uses of waters of the state. The Discharger is responsible for meeting all applicable requirements of the endangered species acts.

IX. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) AND NOTIFICATION

59. An environmental impact report (EIR) was prepared for the proposed Pure Water Monterey Groundwater Replenishment Project with MRWPCA serving as the lead agency. (State Clearinghouse # 2013051094)

    a. Notices regarding the April 2015 draft EIR were emailed to 700 agencies, interested organizations, and individuals; placed as newspaper advertisements; distributed to state agencies through the State Clearinghouse; placed in public locations such as libraries, MRWPCA's and Monterey Peninsula Water Management District's (MPWMD's) websites and offices and key project sites; and posted with the Monterey County Clerk.

    b. Public meetings to provide information on the Project and CEQA process were held on May 20 and 21, 2015.

    c. The public was provided a 45-day comment period for the draft EIR.

    d. Notices about the availability of the final EIR were distributed in September 2015 to all entities that received the draft EIR, commented on the Draft EIR, or requested a copy or copies.

    e. The MRWPCA adopted Resolution No. 2015-24 on October 8, 2015, after a public hearing, which certified the final EIR, adopted the CEQA findings, approved mitigation measures and a mitigation monitoring and reporting program, adopted a statement of overriding considerations, and approved the project as modified. This Order, at General Requirement IV.10, requires that the Discharger comply with the mitigation measures and mitigation monitoring program identified in the final EIR.

    f. The final EIR contains oral and written comments received on the draft EIR and presents responses to environmental issues raised in the comments. In addition to the responses to comments, the final EIR contains revisions, updates, and clarifications in response to public comment on the draft EIR.

g. A notice of determination (NOD) was filed with the State Clearinghouse and the Monterey County Clerk's office on October 8, 2015. The Project has completed the notification and review process required by CEQA. The Central Coast Water Board is a responsible agency for purposes of CEQA. The Central Coast Water Board, as a responsible agency under CEQA, has considered the EIR and associated documents and concurs with MRWPCA's approval of the relevant CEQA documents. The Central Coast Water Board finds that all environmental effects have been identified for project activities that it is required to approve and that the Project will not have significant adverse impacts on the environment provided that the mitigation presented in the EIR for components of the Project being approved by this Order and the required Operation Optimization Plan are carried out as conditioned in this Order (see General Requirement IV.10 in this Order). In adopting this Order, the Central Coast Water Board has eliminated or substantially lessened the less-than-significant effects on water quality, and therefore approves the project.

60. Any person aggrieved by this action may petition the State Water Resources Control Board (State Water Board) to review the action in accordance with Water Code section 13320 and California Code of Regulations, Title 23, section 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the internet at:

    http://www.waterboards.ca.gov/public_notices/petitions/water_quality/

61. The Central Coast Water Board has notified the MRWPCA and interested agencies and persons of its intent to issue this Order for the production and use of recycled water and has provided them with an opportunity to submit written comments. The Central Coast Water Board, in a public meeting, heard and considered all comments pertaining to these WDRs/WRRs.

THEREFORE, IT IS HEREBY ORDERED that Order No. R3-2017-0003, with MRP No. R3-2017-0003, is effective as of the date of this order, and, in order to meet the provisions contained in division 7 of the Water Code (commencing with section 13000) and regulations and guidelines adopted thereunder, and California Code of Regulations Title 22, division 4, chapter 3, the MRWPCA shall comply with the requirements in this Order.

I. INFLUENT SPECIFICATIONS

The influent to the MRWPCA Advanced Water Treatment Facility shall consist of secondary treated wastewater discharged from the RTP. The wastewater coming into the RTP will be augmented with agricultural wash water from the City of Salinas, storm water flows from the southern part of Salinas, and surface and agricultural tile drain waters from the Reclamation Ditch and Blanco Drain as described in the approved 2016 Title 22 Engineering Report.

II. RECYCLED WATER TREATMENT SPECIFICATION

Treatment of the recycled water is as described in the findings of this Order and in the recommended conditions issued by DDW.

III. RECYCLED WATER DISCHARGE LIMITS

1. The advanced treated recycled water injected into any well at the injection facility shall not contain pollutants in excess of the following limits:

Table 4 – Recycled Water Reinjection Discharge Limits

Constituents	Units	Concentration	Monitoring Frequency	Compliance Interval
***Arsenic**	mg/L	0.01	Monthly	Running Annual Average
***Boron**	µg/L	750	Monthly	Running Annual Average
***Chloride**	mg/L	250	Monthly	Running Annual Average
***Nitrate as N**	mg/L	10	Weekly	Sample Result: no averaging
****Nitrogen - Total**	mg/L	10	Twice per Week	Average of Last 4 Results
***Sodium**	mg/L	69	Monthly	Running Annual Average
***Sulfate**	mg/L	250	Monthly	Running Annual Average
***TDS**	mg/L	500	Monthly	Running Annual Average
****Total Organic Carbon (TOC)**	mg/L	0.5	Weekly	20-week running average and average of last 4 results
****Total Coliform**	MPN/ 100mL	<2.2	Daily	7-day Median

**Limits equal to Water Quality Objectives, except **TOC, Total Nitrogen, and Total Coliform, which are Title 22 limits*

IV. GENERAL REQUIREMENTS

1. Recycled water shall not be used for direct human consumption or for the processing of food or drink intended for human consumption.

2. Bypass, discharge, or delivery to the use area of inadequately treated recycled water, at any time, are prohibited.

3. The AWPF and all injection wells shall be adequately protected from inundation and damage by storm flows.

4. Recycled water use or disposal shall not result in earth movement in

geologically unstable areas.

5. Odors of sewage origin shall not be perceivable at any time outside the boundary of the Facility.

6. The MRWPCA shall at all times properly operate and maintain all treatment facilities and control systems (and related appurtenances) that are installed or used by the MRWPCA to achieve compliance with the conditions of this order. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls (including appropriate quality assurance procedures).

7. A copy of these requirements shall be maintained at the Facility and available at all times to operating personnel.

8. For any material change or proposed change in character, location, or volume of recycled water or its uses, the MRWPCA shall submit at least 120 days prior to the proposed change an engineering report or addendum to the existing engineering report to the Central Coast Water Board and DDW (pursuant to Water Code Division 7, Chapter 7, Article 4, section 13522.5 and CCR Title 22, Division 4, Chapter 3, Article 7, section 60323) for approval. The engineering report shall be prepared by a qualified engineer registered in California.

9. MRWPCA shall revise the Title 22 Engineering Report to reflect operational choices made and to correct no longer applicable and incorrect information discovered during the permitting process. MRWPCA shall have the revised report approved by DDW and the Water Board prior to commencing groundwater injection discharges to the Seaside Basin.

10. MRWPCA shall comply with the mitigation measures and mitigation monitoring and reporting program described in the final EIR for this project, as described in the findings of this Order. Mitigation measures of concern to and within the jurisdiction of the Central Coast Water Board include BT-1a, BF-1a, BF-1b, BF-1c, BF-2a, alternate BF-2a, and HS-4.

V. PROVISIONS

1. Injection of the advanced treated recycled water shall not cause or contribute to an exceedance of water quality objectives in Seaside Basin groundwater.

2. The MRWPCA shall submit to the Central Coast Water Board, under penalty of perjury and signed by a designated responsible party, self-monitoring reports according to the specifications contained in the MRP, as directed by the Executive Officer.

3. The MRWPCA shall notify the Central Coast Water Board, DDW and all water purveyors drawing potable water from the Seaside Basin (immediately following notification to the Water Board and DDW) by telephone or electronic means as soon as MRWPCA becomes aware, but no later than 24 hours after obtaining knowledge of any violations of this order, or any adverse conditions as a result of the use of recycled water from this facility; written confirmation shall

follow to the Central Coast Water Board and DDW within five working days from date of notification. The report shall include, but not be limited to, the following information, as appropriate:

a. The nature and extent of the violation;

b. The date and time when the violation started, when compliance was achieved, and when injection was suspended and restored, as applicable;

c. The duration of the violation;

d. The cause(s) of the violation;

e. Any corrective and/or remedial actions that have been taken and/or will be taken with a time schedule for implementation to prevent future violations; and,

f. Any impact of the violation.

4. This Order does not exempt the MRWPCA from compliance with any other laws, regulations, or ordinances which may be applicable, it does not legalize the recycling and use facilities, and it leaves unaffected any further constraint on the use of recycled water at certain sites that may be contained in other statutes or required by other agencies.

5. This Order does not alleviate the responsibility of the MRWPCA to obtain other necessary local, state, and federal permits to construct facilities necessary for compliance with this Order, nor does this Order prevent imposition of additional standards, requirements, or conditions by any other regulatory agency.

6. This Order may be modified, revoked and reissued, or terminated for cause, including but not limited to, failure to comply with any condition in this Order; endangerment of human health or environment resulting from the permitted activities in this Order; obtaining this Order by misrepresentation or failure to disclose all relevant facts; or acquisition of new information that could have justified the application of different conditions if known at the time of Order adoption. The filing of a request by the MRWPCA for modification, revocation and reissuance, or termination of the Order or a notification of planned changes or anticipated noncompliance does not stay any condition of this Order.

7. The MRWPCA shall furnish, within a reasonable time, any information the Central Coast Water Board or DDW may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order. The MRWPCA shall also furnish the Central Coast Water Board, upon request, with copies of records required to be kept under this Order for at least three years.

8. In an enforcement action, it shall not be a defense for the MRWPCA that it would have been necessary to halt or to reduce the permitted activity in order to maintain compliance with this Order. Upon reduction, loss, or failure of the treatment facility, the MRWPCA shall, to the extent necessary to maintain

compliance with this Order, control production of all discharges until the facility is restored or an alternative method of treatment is provided. This provision applies, for example, when the primary source of power of the treatment facility fails, is reduced, or is lost.

9. This Order includes the attached *Standard Provisions and Reporting Requirements for Waste Discharge Requirements*. If there is any conflict between the provisions stated in this Order and the Standard Provisions, the provisions stated in this Order shall prevail.

10. This Order includes the attached MRP No. R3-2017-0003. If there is any conflict between provisions stated in the MRP and the Standard Provisions, those provisions stated in the MRP prevail. The MRP may be modified by the Central Coast Water Board's Executive Officer; however, any such modified requirements must still achieve the MRP's primary purpose, which is to detect violations, confirm effective treatment, and to ensure that neither excessive degradation in the aquifer nor adverse impacts to beneficial uses occurs. Excessive degradation is defined as the discharge consuming 10 percent or more of available assimilative capacity.

11. The DDW conditions that are not explicitly included in this Order are incorporated herein by this reference, and are enforceable requirements of this Order. Any violation of a term in this Order that is identical to a DDW condition will constitute a single violation.

VI. STATE WATER RESOURCES CONTROL BOARD DIVISION OF DRINKING WATER (DDW) REQUIREMENTS

1. The Pure Water Monterey Groundwater Replenishment Project (Project) shall comply with Article 5.2 - Indirect Potable Reuse: Groundwater Replenishment-Subsurface Application, sections 60320.200 through 60320.228 of Title 22, California Code of Regulations.
2. The Project's advanced water treatment facility (AWPF) shall conduct startup and commissioning testing that meets the requirement in Title 22 section 60320.201. Advanced Treatment Criteria. A test protocol must be submitted to DDW for approval prior to commencement of testing.
3. The Project AWPF shall be operated to meet the requirements in section 60320.222. Operation Optimization and Plan.
4. As required by Title 22 section 60320.222. (Operation Optimization Plan), prior to operation, MRWPCA shall submit an Operation Optimization Plan for review and approval to DDW and the Central Coast Water Board. At a minimum, the Operation Optimization Plan shall identify and describe the operations, maintenance, analytical methods, monitoring (grab and online) necessary for the Project to meet the requirements and the reporting of monitoring results. MRWPCA must submit a draft of the Operation Optimization Plan prior to completion of construction and commissioning. The draft Operation Optimization Plan can be amended and finalized after the completion of full-scale commissioning and startup testing. A final Operation Optimization Plan must be submitted to DDW 90 days after completion of startup operations.

5. AWPF commissioning shall validate and confirm the actual setpoints for hydrogen peroxide and UV parameters, demonstrating that the advanced oxidation process (AOP) will provide no less than 0.5-log (69 percent) reduction of 1,4-dioxane.
6. MRWPCA shall follow what is described in the approved Operation Optimization Plan.
7. The Project's Operation Optimization Plan shall, at all times, be representative of the current operations, maintenance, and monitoring.
8. The Project's AWPF shall provide continuous real-time monitoring and reporting of UV dose, UV Transmittance, and power used in the AOP.
9. The Project must have alarms as stated in the approved Title 22 Engineering Report. Commissioning shall validate and confirm the actual setpoints and they shall be specified in the Operation Optimization Plan.
10. For reporting, MRWPCA shall submit to DDW a summary of monthly operational parameters for UV dose and hydrogen peroxide for the AWPF.
11. MRWPCA shall verify that the recycled municipal wastewater used for the Project meets the requirements in Title 22 section 60320.206. Wastewater Source Control.
12. Pursuant to Title 22 section 60320.208 (a) Pathogenic Microorganism Control (a), MRWPCA shall operate the Project such that the recycled municipal wastewater used as recharge water receives treatment that achieves at least 12-log enteric virus reduction, 10-log Giardia cyst reduction, and 10-log Cryptosporidium oocyst reduction.
13. If a pathogen reduction in Title 22 section 60320.208 (a) is not met based on the on-going monitoring required pursuant to subsection (c), within 24 hours of being aware, MRWPCA shall immediately investigate the cause and initiate corrective actions. MRWPCA shall immediately notify the DDW and the Central Coast Water Board if the Project fails to meet the pathogen reduction criteria longer than 4 consecutive hours, or more than a total of 8 hours during any 7-day period. Failures of shorter duration shall be reported to the Central Coast Water Board by MRWPCA no later than 10 days after the month in which the failure occurred.
14. Per the approved Title 22 Engineering Report, the initial maximum Recycled Water Contribution (RWC) shall be 1.0, meaning that the Project is approved to use 100% recycled water for recharging the aquifer at the beginning. As long as the Project can demonstrate that it can reliably meet Total Organic Carbon (TOC) requirements, they will be allowed to maintain the RWC of 1.0.
15. The Project contains a multi-barrier treatment facility in order to comply with the Groundwater Replenishment Regulations. The following monitoring (grab and online) and reporting requirements will need to be included in the Operation Optimization Plan and reported to DDW and the Central Coast Water Board monthly.
    a. Membrane integrity testing (MIT) shall be performed on each of the MF membrane units, a minimum of once every 24 hours of operation.

i. The log removal value (LRV) for Cryptosporidium shall be calculated and the value reported after the completion of each MIT.

ii. The MIT shall have a resolution that is responsive to an integrity breach on the order of 3 µm or less.

iii. Calculations of the LRV shall be based on a pressure decay rate (PDR) value with an ending pressure that provides a resolution of 3 µm or less.

iv. The MIT shall have a sensitivity to verify a LRV equal to or greater than 4.0.

b. The Reverse Osmosis (RO) system shall be credited pathogen reduction at this facility in accordance with the amount demonstrated via online monitoring to ensure the integrity of the RO system. MRWPCA must monitor the effluent of each RO train (including each stage) continuously for conductivity at the AWPF. The daily average and maximum conductivity reading, and the percent of time that the reduction of conductivity is less than 1.0 log removal must be reported. The MRWPCA shall calculate the minimum removal achieved at the AWPF. An alternative surrogate may be utilized if approved by the Division of Drinking Water and the Central Coast Water Board.

c. The RO effluent will be monitored for TOC via grab sample weekly and reported in the monthly report. The RO influent and effluent will be monitored for TOC online and reported in the monthly report. The daily average and maximum TOC reading and the percent of time that the TOC is greater than 0.5 mg/L must be reported.

d. In accordance with the Recycled Water Policy, NDMA and sucralose are performance surrogates for RO and shall be analyzed quarterly both prior to the RO and after RO prior to the AOP.

e. The UV/peroxide system shall be operated, as has been designed, to meet the Groundwater Replenishment Regulations, providing a minimum 0.5-log reduction of 1,4- dioxane. AOP commissioning will validate and confirm the actual setpoints for peroxide and UV parameters

f. The UV system must be operated with online monitoring and built-in automatic reliability features that must trigger automatic diversion of effluent to waste by the following critical alarm setpoints.

i. UV dose less than 900 mJ/cm^2, or a new setpoint approved by DDW after the AOP commissioning.

ii. UV transmittance less than 95%

iii. Complete UV reactor failure

iv. Peroxide residual less than 3.0 mg/L, or a new setpoint approved by DDW after the AOP commissioning.

g. On-line monitoring of UV dose, UV intensity, flow, and UV transmittance must be provided at all times. Flow meters, UV intensity sensors, and UV transmittance monitors must be properly calibrated.

h. At least monthly, all duty UV intensity sensors must be checked for calibration against a reference UV intensity sensor.

i. The UV transmittance meter must be inspected and checked against a reference bench-top unit weekly to document accuracy.

j. The monitoring and reliability features, including automatic shutdown capability, shall be demonstrated to DDW during a plant inspection prior to final approval.

k. Based on the calculation of log reduction achieved daily by the entire treatment facility, from the WWTP to the public water supply wells, the MRWPCA will report a "Yes" or "No" for each day as to whether the necessary log reductions (12-logs virus, 10-logs for Giardia and Cryptosporidium) have been achieved. An overall log reduction calculation will be provided only for those days when a portion of the treatment facility does not achieve the necessary log reductions.

16. MRWPCA shall submit the required annual and five-year reports per Title 22, section §60320.228 (Reporting).

17. MRWPCA must submit for approval a draft AOP commissioning and testing protocol, to demonstrate the AOP will provide no less than 0.5-log (69 percent) reduction of 1,4-dioxane.

18. MRWPCA must submit a draft of the Operation Optimization Plan prior to completion of construction and commissioning. This draft Operation Optimization Plan can be amended and finalized after the completion of full-scale commissioning and startup testing. A final Operation Optimization Plan must be submitted to DDW 90 days after completion of startup operations.

19. MRWPCA must submit an addendum to the Title 22 Engineering Report to include information on final well configurations and locations (injection wells, vadose zone wells, and monitoring wells). MRWPCA must conduct a Water Board-approved tracer test, and submit a completed tracer study report to DDW and the Central Coast Water Board.

VII. REOPENER

1. This Order may be reopened to include the most scientifically relevant and appropriate limitations for this discharge, including a revised Basin Plan limit based on monitoring results, anti-degradation studies, or other Central Coast Water Board or State Water Board policy, or the application of an attenuation factor based upon an approved site-specific attenuation study.

2. This Order may be reopened to modify limitations for pollutants to protect beneficial uses, based on new information not available at the time this Order was adopted, including additional monitoring, reporting and trend analysis documenting aquifer conditions.

3. After additional monitoring, reporting, and trend analysis documenting aquifer conditions, this Order may be reopened to ensure the groundwater is protected in a manner consistent with state and federal water quality laws, policies and regulations.

4. This Order may be reopened to incorporate any new regulatory requirements for sources of drinking water or injection of recycled water for groundwater recharge to aquifers that are used as a source of drinking water, that are adopted after the effective date of this Order.

5. This Order may be reopened upon a determination by DDW that treatment and disinfection of the Monterey Regional Water Pollution Control Agency advanced treated product water is not sufficient to protect human health.

VIII. ENFORCEMENT

The requirements of this Order are subject to enforcement under Water Code sections 13261, 13265, 13268, 13350, and enforcement provisions in Water Code, Division 7, Chapter 7 (Water Reclamation).

IX. EFFECTIVE DATE OF THE ORDER

This Order takes effect on March 9, 2017.

I, John M. Robertson, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an order adopted by the Regional Water Quality Control Board, Central Coast Region on March 9, 2017.

_____

John M. Robertson
Executive Officer

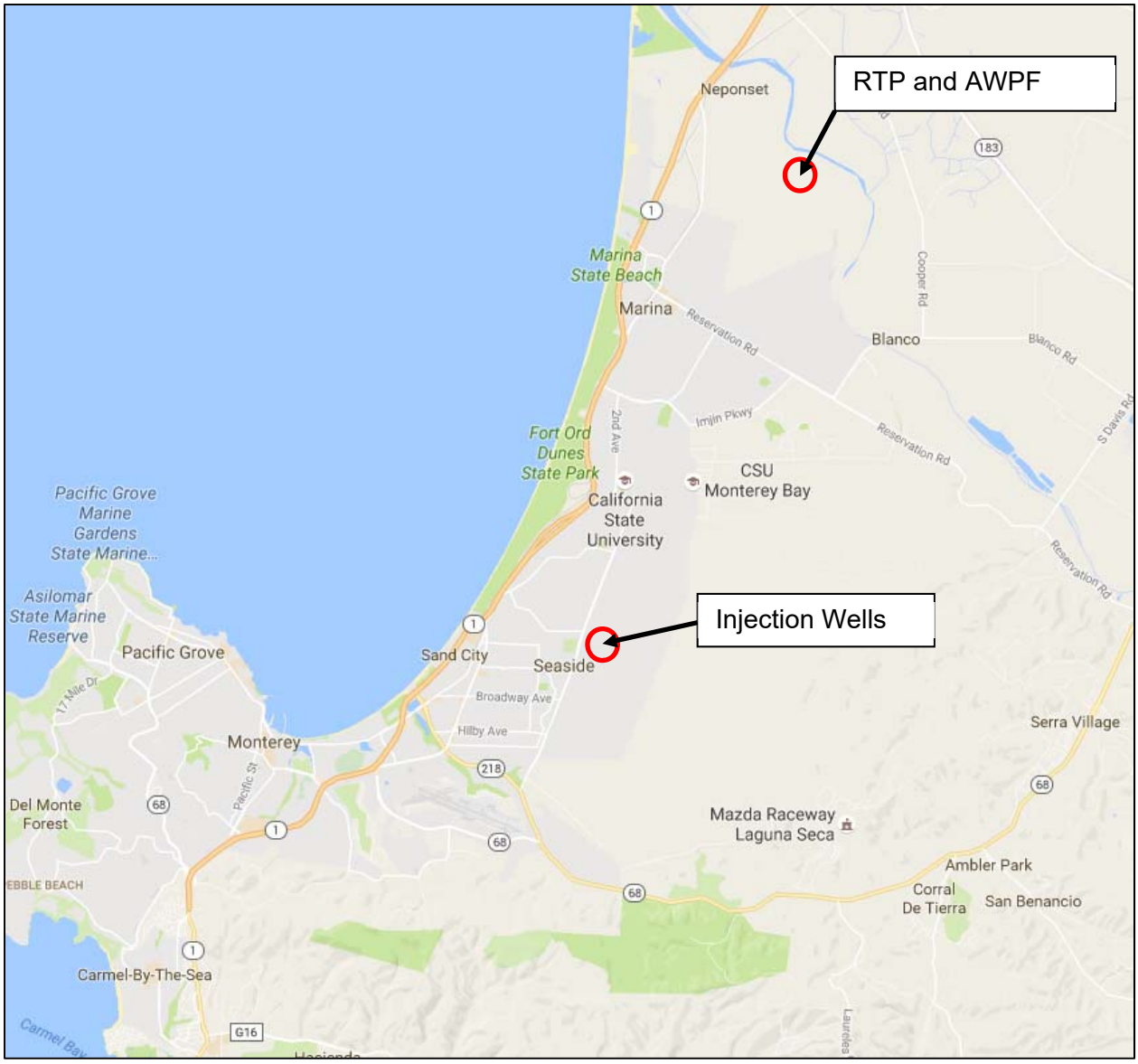

Figure 1 - Location of MRWPCA's RTP, AWPF and Injection Wells

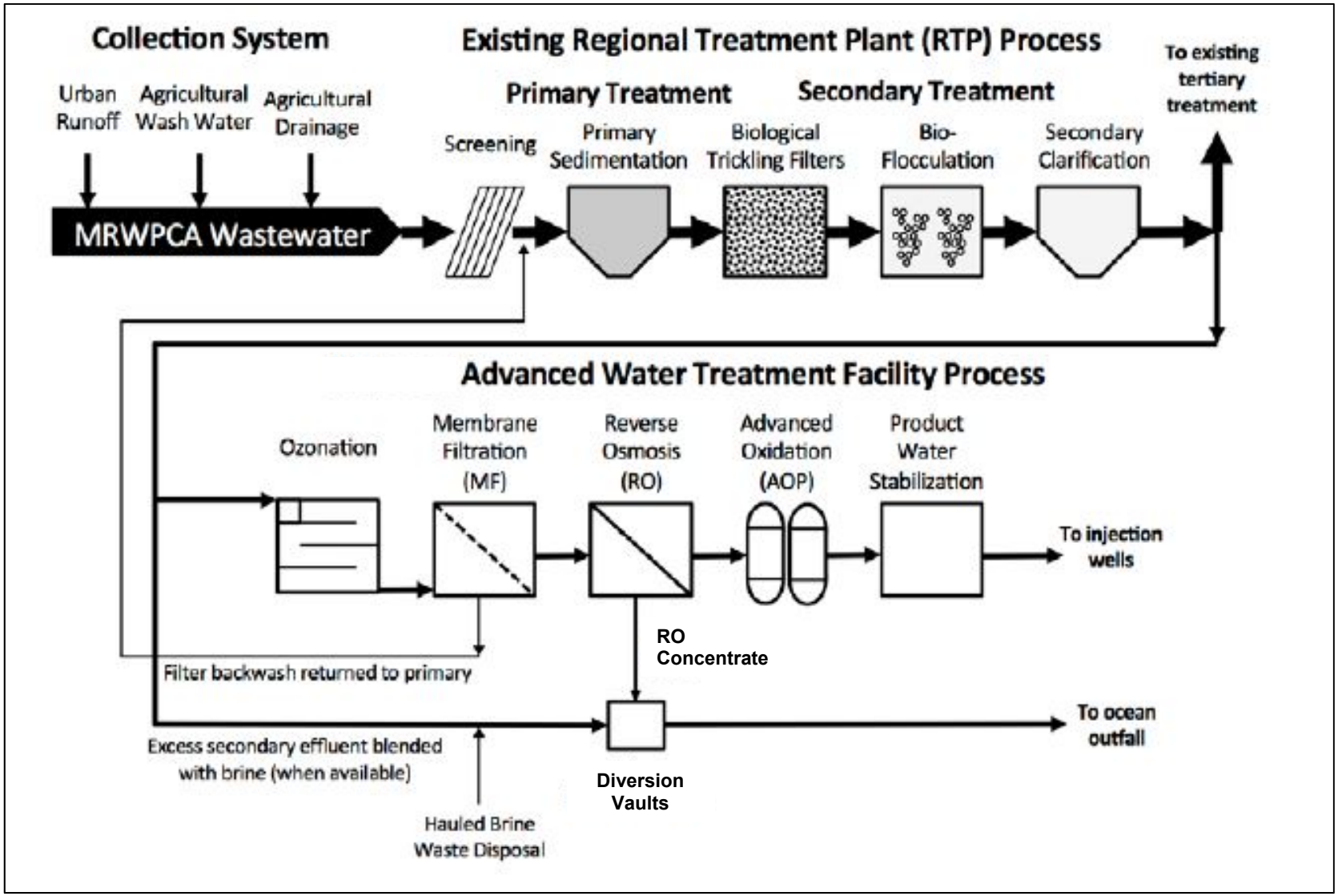

Figure 2 – Simplified Process Flow Diagram of MRWPCA RTP and AWPF

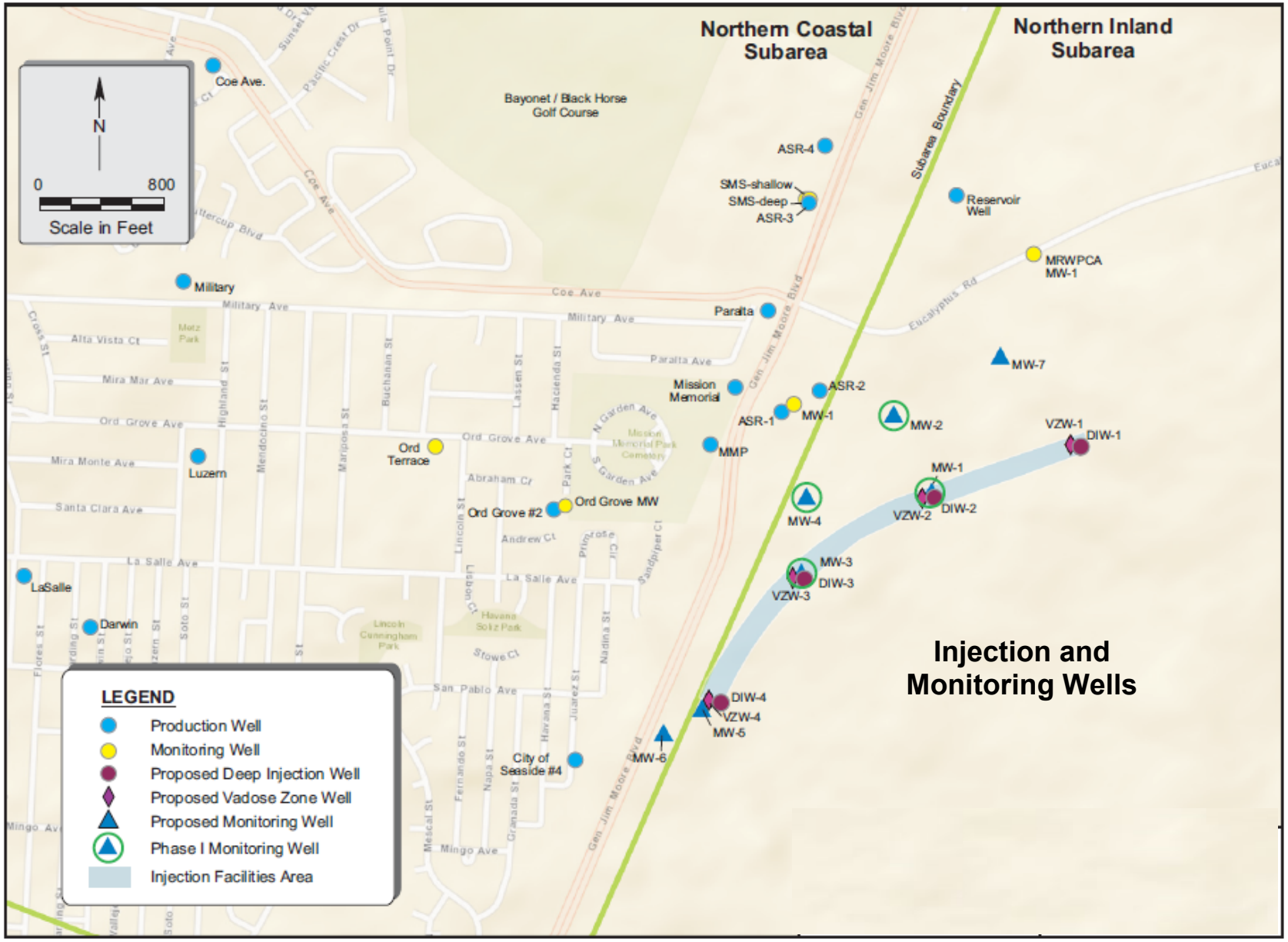

Figure 3- Proposed Injection Wells, Monitoring Wells and Production Wells

STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION
MONITORING AND REPORTING PROGRAM
NO. R3-2017-0003

FOR THE

PURE WATER MONTEREY
ADVANCED WATER PURIFICATION FACILITY
AND
GROUNDWATER REPLENISHMENT PROJECT

ISSUED TO

MONTEREY REGIONAL WATER POLLUTION CONTROL AGENCY

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The Monterey Regional Water Pollution Control Agency (MRWPCA) shall implement this Monitoring and Reporting Program (MRP) on the effective date of Order No. R3-2017-0003.

I. SUBMITTAL OF REPORTS

1. The MRWPCA shall submit the required reports outlined in the following paragraphs in the appropriate electronic format to the State Water Resources Control Board (State Water Board)'s California Integrated Water Quality System (CIWQS[1]) program for all monitoring data. Groundwater monitoring data shall also be submitted to the Geotracker database (in Electronic Data Format[2]) and to the Division of Drinking Water (DDW), Drinking Water Field Operations, by the dates indicated.

AWPF

a. Monthly Reports:
Consistent with section III.REPORTING REQUIREMENTS, monthly reports for monitoring and reporting requirements included in the Operations Optimization Plan shall be received by the 15th day after the end of the month in which monitoring occurred.

b. Quarterly Monitoring:
Quarterly Monitoring Reports shall be received by the 15th day of the second month following the end of each quarterly monitoring period according to Table M-1.

Table M-1: Quarterly Report Periods and Due Dates

Reporting Period	Report Due
January – March	May 15
April – June	August 15
July – September	November 15
October – December	February 15

1. For help with CIWQS go to: http://www.waterboards.ca.gov/water_issues/programs/ciwqs/chc_npdes.shtml
2. For help with EDF go to: http://www.waterboards.ca.gov/ust/electronic_submittal/

The contents of the CIWQS and Geotracker Quarterly Monitoring Reports shall include a one-page summary of operational concerns that addresses changes in reporting conditions, including influent, recycled water, and groundwater monitoring results, since the last report.

c. Annual Summary:
The Annual Summary Report shall be received by April 15th of each year. This Annual Summary Report shall contain a discussion of the previous calendar year's analytical results, as well as graphical and tabular summaries of the monitoring analytical data.

Public water systems and owners of small water systems and other active

production wells having downgradient sources potentially affected by the MRWPCA groundwater injection project or within 10 years groundwater travel time from the MRWPCA groundwater injection project shall be notified by direct mail and/or electronic mail of the availability of the annual report.

d. Operations Optimization Plan:
Prior to startup of the AWPF, the MRWPCA shall submit an Operations Optimization Plan (OOP) to DDW and the Central Coast Water Board for approval. After six months of operation of the Plant, the OOP shall be updated as necessary and submitted to the Central Coast Water Board and the DDW for review and approval.

i. The OOP covers critical operational parameters to include routine testing procedures for the ozone pre-treatment, microfiltration (MF), reverse osmosis (RO), and ultraviolet (UV)/advanced oxidation process (AOP) systems, optimization of the UV dose for disinfection and AOP for reduction of light-sensitive contaminants, and all treatment processes, maintenance and calibration schedules for all monitoring equipment, process alarm set points, and response procedures for all alarms in each treatment process of the AWPF, including responses if water quality requirements are not met, start-up, emergency response and contingency plans. During the first year of operation of the AWPF, all treatment processes shall be operated in a manner to provide optimal reduction of microbial, regulated and nonregulated contaminants. Based on this experience and anytime operational changes are made, the OOP shall be updated.

ii. The OOP includes staffing levels with applicable certification levels for Facility operations personnel. Significant changes in the operation of any of the treatment processes shall be reported to the DDW and Central Coast Water Board. Significant changes in the approved OOP must be approved by the DDW and the Central Coast Water Board prior to instituting changes. The MRWPCA is responsible for ensuring that the OOP is, at all times, representative of the current operations, maintenance, and monitoring of the AWPF.

e. Well Installation Reports: No later than two weeks of the completion of a new injection or monitoring well, MRWPCA shall submit a well completion report to both the Central Coast Water Board and DDW detailing the following:

i. well location;
ii. well purpose (injection or monitoring);
iii. well designation (MW-1 etc.);
iv. well depth;
v. screened intervals;
vi. depth to groundwater (below ground surface)

2. Five-Year Engineering Report: MRWPCA shall update the 2016 Title 22 Engineering Report and submit the updated report to the State Water Board's CIWQS and Geotracker databases and to DDW five years from the date of the initial approval of the engineering report, and every five years thereafter.

3. All reports to the State Water Board's Geotracker shall reference Order No. R3-2017-0003. Compliance monitoring reports shall be submitted separately from other technical reports.

4. All reports shall be submitted as a portable data format file and uploaded electronically to the State Water Board's CIWQS and Geotracker databases and provided via email to the DDW (if the file exceeds 10 MB, either a CD containing the file shall be mailed to DDW, or a link for downloading an electronic copy of the file shall be provided). Upon request the data shall be provided in excel format

5. By the reporting due dates specified in Table M-1, groundwater data shall be uploaded electronically to the State Water Board's Geotracker in an electronic deliverable format specified by the State Water Board. All data shall be uploaded electronically to the CIWQS database. Upon request the data shall be provided in excel format.

II. MONITORING REQUIREMENTS

1. MRWPCA shall monitor the flow and quality of the following according to the manner and frequency specified in this MRP:

    a. Influent to the AWPF;

    b. Recycled water from AWPF after all treatment and chemical injection and before injection into the Seaside Basin;

    c. If potable water is used, blend of recycled water and diluent water;

    d. Receiving groundwater (monitoring wells associated with each injection well will be installed prior to recharge from associated injection wells); and,

2. Monitoring reports shall include, but not limited to, the following:

    a. Analytical results;

    b. Location of each sampling station where representative samples are obtained, including a map, at a scale of 1 inch equals 1,200 feet or less, that clearly identifies the locations of all injection wells, monitoring wells, and production wells;

    c. Analytical test methods used and the corresponding minimum reporting levels (MRLs);

    d. Name(s) of the laboratory, which conducted the analyses;

    e. Copy of laboratory certifications by the DDW's Environmental Laboratory Accreditation Program (ELAP);

f. Quality assurance and control information, including documentation of chain of custody; and,

g. Maximum contaminant level (MCL), notification level, response level, DDW Condition or Recycled Water Discharge Limit.

3. Though not required to be submitted in the monitoring reports unless specifically requested by the Central Coast Water Board Executive Officer or the DDW, the MRWPCA shall have in place written sampling protocols. For groundwater monitoring, the sampling protocols shall outline the methods and procedures used for measuring water levels; purging wells; collecting samples; decontaminating equipment; containing, preserving, and shipping samples, and maintaining appropriate documentation. Also, the sampling protocols shall include the procedures for handling, storing, testing, and disposing of purge and decontamination waters generated from the sampling events.

4. Where multiple EPA-approved methods are available, drinking water (500 series) or wastewater (600 series) may be used as appropriate.

5. The samples shall be analyzed using analytical methods described in 40 Code of Federal Regulations (CFR) Part 141, or where no methods are specified for a given pollutant, by methods approved by the DDW, Central Coast Water Board and/or State Water Board. The MRWPCA shall select the analytical methods that provide Minimum Reporting Levels (MRLs) lower than the limits prescribed in this Order or as low as possible that will provide reliable data.

6. The MRWPCA shall instruct its laboratories to establish calibration standards so that the MRLs (or its equivalent if there is a different treatment of samples relative to calibration standards) are the lowest calibration standard. At no time shall analytical data derived from extrapolation beyond the lowest point of the calibration curve be used.

7. Upon request by the MRWPCA, the Central Coast Water Board, in consultation with the DDW and the State Water Board Quality Assurance Program, may establish MRLs, in any of the following situations:

   a. When the pollutant has no established method under 40 CFR 141;

   b. When the method under 40 CFR 141 for the pollutant has an MRL higher than the limit specified in this Order; or,

   c. When the MRWPCA agrees to use a test method that is more sensitive than those specified in 40 CFR Part 141.

8. For regulated constituents, the laboratory conducting the analyses shall be certified by ELAP or approved by the DDW, Central Coast Water Board, or State Water Board, for a particular pollutant or parameter.

9. Samples shall be analyzed within allowable holding time limits as specified in 40 CFR Part 141. All Quality Assurance/Quality Control (QA/QC) analyses shall be run on the same dates that samples are actually analyzed. The MRWPCA shall retain the QA/QC documentation in its files for three years and make available for inspection and/or submit them when requested by the Central Coast Water

Board or the DDW. Proper chain of custody procedures shall be followed, and a copy of this documentation shall be submitted with the quarterly report.

10. For all bacterial analyses, sample dilutions shall be performed so the range of values extends from 1 to 800. The detection methods used for each analysis shall be reported with the results of the analyses.

11. Quarterly monitoring for recycled water and groundwater shall be performed during the months of February, May, August, and November. Semiannual monitoring for recycled water shall be performed during the months of February and August. Semiannual monitoring for groundwater shall be performed during the months of May and November. Should there be instances when monitoring cannot be done during these specified months, the MRWPCA shall conduct the monitoring as soon as it can and state in the monitoring report the reason monitoring could not be conducted during the specified month. Results of quarterly analyses shall be reported in the quarterly monitoring report following the analysis.

12. For unregulated chemical analyses, the MRWPCA shall select methods according to the following approach:

    a. Use the drinking water methods or waste water method sufficient to evaluate all water quality objectives and protect all beneficial uses;

    b. Use DDW-recommended methods for unregulated chemicals, if available;

    c. If there is no DDW-recommended drinking water method for a chemical, and more than a single United States Environmental Protection Agency (USEPA)- approved method is available, use the most sensitive of the USEPA-approved methods;

    d. If there is no USEPA-approved method for a chemical, and more than one method is available from the scientific literature and commercial laboratory, after consultation with DDW, use the most sensitive method;

    e. If no approved method is available for a specific chemical, the Project Sponsors' laboratory may develop or use its own methods and should provide the analytical methods to DDW for review. Those methods may be used until DDW-recommended or USEPA-approved methods are available.

    f. For constituents of emerging concern (CECs) subject to the State Water Board Recycled Water Policy as amended January 22, 2013, analytical methods for laboratory analysis of CECs shall be selected to achieve the reporting limits (RLs) presented in Table 1 of Attachment A of the Recycled Water Policy. The analytical methods shall be based on methods published by the USEPA, methods certified by the DDW, or peer review reviewed and published methods that have been reviewed by DDW, including those published by voluntary consensus standards bodies such as the Standards Methods Committee and the American Society for Testing and Materials International. Any modifications to the published or certified methods shall be reviewed by DDW and subsequently submitted to the Central Coast Water Board Executive Officer in an updated quality assurance project plan.

III. REPORTING REQUIREMENTS

1. **Monthly Reports**: The following monitoring and reporting requirements must be included in the OOP and reported to the DDW and the Central Coast Water Board monthly.

   a. Membrane Filtration Effluent Monitoring - The MRWPCA will monitor the Membrane Filtration Effluent for turbidity continuously. The turbidity shall not exceed 0.2 nepholometric turbidity units (NTU) more than 5 percent of the time within a 24-hour period and 0.5 NTU at any time. Turbidity measurements shall be recorded every 15 minutes. The daily average, and daily maximum, and whether the 0.2 NTU was exceeded more than 5 percent of the time in any 24-Hour period shall be reported monthly.

   b. The membrane filtration (MF) integrity - Daily pressure decay tests (PDTs) shall be performed on each MF membrane unit a minimum of once every 24 hours of operation based on the criteria described in the Order. Submit the results of the daily Membrane Integrity Testing (MIT) conducted during the month..

      - The PDT will be conducted to confirm no broken fibers or other breach of membrane integrity, based on product-specific minimum test pressure and maximum allowable pressure decay.

   c. The Reverse Osmosis (RO) system will be credited for virus, Giardia cysts and Cryptosporidium oocysts based upon reduction demonstrated via an approved surrogate, such as conductivity. MRWPCA shall monitor conductivity continuously in both the RO feed and RO permeate of each RO train, in order to demonstrate membrane integrity and a conductivity. The daily average and maximum conductivity reading and percent of time that the reduction of conductivity is less than 1.0 log removal must be reported. The report shall include calculation of minimum removal achieved at the AWPF. An alternative surrogate may be utilized (e.g., TOC) if approved by the Division of Drinking Water and the Central Coast Water Board. The proposal to change surrogates may also include different monitoring locations (e.g., combined RO permeate instead of train RO permeate), if approved by DDW and the Central Coast Water Board.

   d. On-line continuous monitoring of UV dose, UV intensity, flow, UV transmittance (UVT), and power must be provided at all times. Flow meters UV intensity sensors, and UVT monitors must be properly calibrated to ensure proper disinfection. At least monthly, all duty UV intensity sensors must be checked for calibration against a reference UV intensity sensor. The UVT meter must be inspected and checked against a reference bench-top unit weekly to document accuracy.

      i. For AOP (UV and hydrogen peroxide at the AWPF), MRWPCA shall report the calculated daily hydrogen peroxide dose (based on the pump speed and bulk feed concentration)
      ii. For UV, MRWPCA shall report the UVT (daily minimum, maximum, and average), UV dose for each reactor (daily minimum, maximum, and average), and the total flow (daily minimum, maximum, and average).

   e. Based on the calculation of log reduction achieved daily by the entire

treatment facility, from the AWPF to the public water supply wells, the MRWPCA will report a "Yes" or "No" for each day as to whether the necessary log reductions (12-logs virus, 10-logs for Giardia and Cryptosporidium) have been achieved. An overall log reduction calculation will be provided only for those days when a portion of the treatment facility does not achieve the credits listed in Table 5-4 of the ER.

f. MRWPCA shall sample the monitoring wells for general mineral/physicals, inorganics, radioactivity (gross alpha and uranium) and volatile organic chemicals. MRWPCA shall take these samples monthly for the first year of operation. MRWPCA may request, from the Division of Drinking Water, a reduction in this monitoring after the first year.

g. MRWPCA shall monitor the RO effluent for TOC via grab sample weekly and report in the monthly report. MRWPCA shall also monitor RO influent and effluent for TOC online and report monthly. The daily average and maximum TOC reading and the percent of time that the TOC is greater than 0.5 mg/L must be reported.

h. MRWPCA shall monitor final effluent daily (7 days per week) for total coliform concentrations. The effluent 7-day median of the analyses for total coliform shall be reported monthly

2. **Quarterly Reports:** These reports shall include, at a minimum, the following information:

a. The volume of:

- AWPF Influent – Secondary effluent from the RTP.
- Waste EQ effluent discharged into the RTP.
- Fully treated recycled water injected into the Seaside Basin.
- RO concentrate sent to the ocean outfall.
- If no water was pumped, the report shall so state.

i. The date and time of sampling and analyses.

ii. All analytical results of samples collected during the monitoring period of the:

- AWPF Influent,
- RO feed water,
- RO recycled water, and
- Groundwater.

iii. Records of any operational problems, plant upset and equipment breakdowns or malfunctions, and any diversion(s) of off-specification recycled water and the location(s) of final disposal.

iv. Discussion of compliance, noncompliance, or violation of requirements.

v. All corrective or preventive action(s) taken or planned with schedule of implementation, if any.

vi. Certification by the MRWPCA that no groundwater for drinking purposes has been pumped from wells within the boundary representing the greatest of the horizontal and vertical distances reflecting two months.

vii. A summary of operational concerns describing changes in reporting conditions, including influent, MF filtrate, RO permeate, UV/AOP water, and groundwater monitoring results, since the last report.

b. Monitoring results associated with the evaluation of pathogenic microorganism removal as described in the Order.

c. For the purpose of reporting compliance with numerical limitations, analytical data shall be reported using the following reporting protocols:

i. Sample results greater than or equal to the MRL must be reported "as measured" by the laboratory (i.e., the measured chemical concentration in the sample); or

ii. Sample results less than the MRL, but greater than or equal to the laboratory's Minimum Detection Limit (MDL), shall be reported as "Detected, but Not Quantified", "DNQ". The laboratory shall write the estimated chemical concentration of the sample next to "DNQ"; or

iii. Sample results less than the laboratory's MDL shall be reported as "Not-Detected", or ND.

d. If the MRWPCA samples and performs analysis on any sample more frequently than required in this MRP using approved analytical methods, the results of those analyses shall be included in the report. These results shall be reflected in the calculation of the average used in demonstrating compliance with average recycled water, receiving water, etc., limitations.

e. The Central Coast Water Board or DDW may request supporting documentation, such as daily logs of operations.

3. **Annual Summary Reports:** shall include, at a minimum, the following information:

a. Tabular and graphical summaries of the monitoring data obtained during the previous calendar year;

b. A summary of compliance status with all monitoring requirements during the previous calendar year;

c. For any non-compliance during the previous calendar year, a description of:

i. the date, duration, and nature of the violation;

ii. a summary of any corrective actions and/or suspensions of subsurface application of recycled water resulting from a violation; and

iii. if uncorrected, a schedule for and summary of all pending and completed remedial actions;

d. Any detections of monitored chemicals or contaminants, and any observed trends in the monitoring wells;

e. Information pertaining to the vertical and horizontal migration of the recharge water plume;

f. Title 22 drinking water quality data for the nearest drinking water supply well;

g. A description of any changes in the operation of any unit processes or facilities;

h. The estimated quantity and quality of the recycled water to be utilized for the next calendar year;

i. A list of the analytical methods used for each test and associated laboratory quality assurance/quality control procedures shall be included. The report shall identify the laboratories used by the MRWPCA to monitor compliance with this Order, their status of certification, and provide a summary of proficiency test;

j. A list of current operating personnel, their responsibilities, and their corresponding grade of certification.

k. The Annual Report shall be prepared by a properly qualified engineer registered and licensed in California and experienced in the field of wastewater or water treatment; and

l. A summary of monitoring reports, reporting and trend analysis, to describe the changes in water quality and contrast them to background measurements for all constituents exceeding MCLs or where concentration trends increase after the addition of recycled water. Specifically describe studies or investigations made to identify the source, fate and transport path of constituents which exceed the MCL at the monitoring wells.

4. The existing OOP shall be updated to accurately reflect the operations of the AWPF, the date the plan was last reviewed, and whether the plan is valid and current.

5. **Five-Year Engineering Report**: Five years from the date of the initial approval of the engineering report and every five years thereafter, the MRWPCA shall update the engineering report to address any project changes and submit the report to the Central Coast Water Board and the DDW. The Five-Year Engineering Report Update shall include, but not be limited to:

a. A description of any inconsistencies between previous groundwater model predictions and the observed and/or measured values. For this requirement, the MRWPCA shall summarize the groundwater flow and transport including the injection and extraction operations for the MRWPCA groundwater injection project during the previous five calendar years. This

summary shall also use the most current data for the evaluation of the transport of recycled water; such evaluations shall include, at a minimum, the following information:

i. Total quantity of advanced treated recycled water injected into Seaside Basin, and quantities of water injected into each individual injection well;

ii. Estimates of the rate and path of flow of the injected water within the aquifer;

iii. Projections of the arrival time of the recycled water at all monitoring and extraction wells and the percent of recycled water at each location.

iv. Clear presentation on any assumptions and/or calculations used for determining the rates of flow and for projecting arrival times and dilution levels;

v. A discussion of the underground retention time of recycled water, a numerical model, or other methods used to determine the recycled water contribution to each aquifer;

vi. A revised flow and transport model to match actual flow patterns observed within the aquifer if the flow paths have significantly changed; and,

vii. Revised estimates, if applicable, on hydrogeologic conditions including the retention time and the amount of the recycled water in the aquifers and at the production well field at the end of that calendar year. The revised estimates shall be based upon actual data collected during that year on recharge rates (including recycled water and native water), hydrostatic head values, groundwater production rates, basin storage changes, and any other data needed to revise the estimates of the retention time and the amount of the recycled water in the aquifers and at the production well field. Significant differences, and the reasons for such differences, between the estimates presented in the 2016 Engineering Report and subsequently revised estimates, shall be clearly presented. Additionally, the MRWPCA shall use the most recently available data to predict the retention time of recycled water in the subsurface.

b. Evaluation of the ability of MRWPCA to comply with all regulations and provisions over the following five years.

c. The Five-Year Engineering Report shall be prepared by a properly qualified engineer registered and licensed in California and experienced in the field of wastewater or water treatment.

IV. MONITORING PROGRAMS

1. AWPF Influent Monitoring

a. Monitoring is required to determine compliance with water quality conditions and standards and assess AWPF performance.
b. The influent sampling station is located before clarified secondary effluent from the RTP enters the ozone pre-treatment system of the AWPF. Influent samples shall be obtained on the same day that stabilized advanced treated recycled water samples are obtained. The date and time of sampling shall be reported

with the analytical values determined. Table M-2 constitutes the influent monitoring program.

Table M-2: Influent Monitoring

Constituents	Units	Type of Sample	Minimum Frequency of Analysis
Ammonia-N	mg/L	grab	Weekly
$CBOD_5$	mg/L	24-hour composite	Weekly
Boron	mg/L	grab	Weekly
Chloride	mg/L	24-hour composite	Weekly
Nitrate-N	mg/L	24-hour composite	Weekly
Nitrite-N	mg/L	24-hour composite	Weekly
Nitrogen - Total	mg/L	grab	Weekly
pH	pH units	Metered	Continuous
Sodium	mg/L	24-hour composite	Weekly
Sulfate	mg/L	grab	Weekly
Total Suspended Solids	mg/L	24-hour composite	Weekly
Total coliform	MPN/100	grab	Weekly
Total Dissolve Solids	mg/L	24-hour composite	Weekly
Total flow	mgd	Metered	Continuous[3]
Total Kjeldahl nitrogen-N	mg/L	grab	Weekly
Total nitrogen[4]	mg/L	grab	Weekly
Total Organic Carbon (TOC)	mg/L	24-hour composite[5]	Weekly
Turbidity	NTU	Metered	Continuous[5]
UV transmittance	%	grab	Weekly

[3] For those pollutants that are continuously monitored, the MRWPCA shall report the monthly minimum and maximum, and daily average values.
[4] Total Nitrogen includes nitrate-N, nitrite-N, ammonia-N, and organic-N.
[5] May change to grab after MRWPCA demonstrates that grab sampling is adequate.

2. Recycled Water (AWPF Product Water) Discharge Limit Monitoring.

   a. Advanced treated recycled water monitoring is required to:

      i. Determine compliance with the Permit conditions;

      ii. Identify operational problems and aid in improving facility performance; and,

      iii. Provide information on recycled water characteristics and flows for use in interpreting water quality and biological data.

   Samples shall be collected downstream of the last chemical injection point, with the exception of constituents specified in Tables M-12 and M-13. Should the need for a change in the sampling station(s) arise in the future, the MRWPCA shall seek approval of the proposed station by the Executive Officer prior to use.

Table M-3 shall constitute the recycled water monitoring program. After the first full year of monitoring, MRWPCA shall compile results and submit a revised monitoring program to DDW and the Central Coast Water Board for review and approval.

Table M-3: Recycled Water Discharge Limits Monitoring

Constituent/Parameters	Units	Type of Sample	Minimum Frequency of Analysis	Reference Table Number
Conductivity	mmho/c	Metered	Continuous[5]	M-3
Total chlorine residual	mg/L	Metered	Continuous	M-3
Total recycled water flow	mgd	Metered	Continuous	M-3
UV dose for each reactor	mJ/cm^2	Metered	Continuous	-
UV Transmittance[8]	%	Metered	Continuous	-
pH	pH units	Metered	Continuous	M-3
Arsenic	µg/L	Grab	Monthly	M-3
Boron	µg/L	Grab	Monthly	M-3
Chloride	mg/L	Grab	Monthly	M-3
Chromium - Total	µg/L	Grab	Monthly	M-3
Total nitrogen[6]	mg/L	grab	At least two samples per week at least 3 days apart	M-3
Nitrate-N	mg/L	grab	Weekly	M-3
Total Kjeldahl nitrogen-N	mg/L	Grab	Weekly	M-3
Sodium	mg/L	Grab	Monthly	M-3
Sulfate	mg/L	Grab	Monthly	M-3
Total Dissolved Solids - TDS	mg/L	Grab	Monthly	M-3
Total coliform	MPN/ 100 ml	Grab	Daily	M-3
Total Organic Carbon (TOC)	mg/L	24-hour composite[7]	Weekly	M-3
Turbidity	NTU	Metered	Continuous	M-3
Inorganics with Primary MCLs	µg/L	Grab	Monthly	M-4

[8]Samples shall be collected at the influent point to the UV system.

Table M-3: Recycled Water Discharge Limits Monitoring				
Constituents/parameters with Secondary MCLs	various	Grab	Monthly	M-5
Radioactivity	pCi/L	Grab	Monthly	M-6
Regulated organic chemicals	µg/L	grab	Monthly	M-7
Disinfection byproducts	µg/L	grab	Monthly	M-8
General physical	various	Grab	Quarterly	M-9
General minerals	µg/L	Grab	Quarterly	M-9
Constituents with Notification Levels	µg/L	Grab	Monthly	M-10
Remaining priority pollutants	µg/L	Grab	Annually	M-11
Constituents of Emerging Concern (CECs)	ng/L	Grab	Varies	M-12
Surrogates	Varies	Varies	Varies	M-13
Lead and Copper	mg/L	Grab	Quarterly	M-3

For those constituents that are continuously monitored, the Project Sponsors shall report the daily minimum, maximum, and average values.

[6] If no problem is detected, analysis of nitrogen can be reduced to weekly after 12 months of data collection.

[7] May change to grab after MRWPCA demonstrates that grab sampling is adequate.

Table M-4: Inorganics with Primary MCLs		
Constituent		
Aluminum	Chromium (Total)	Nitrite (as nitrogen)
Antimony		Nitrate + Nitrite
Arsenic	Cyanide	Perchlorate
Asbestos	Fluoride	Selenium
Barium	Mercury	Thallium
Beryllium	Nickel	
Cadmium	Nitrate (as nitrogen)	

Table M-5: Constituents/parameters with Secondary MCLs		
Constituents		
Aluminum	Manganese	Thiobencarb
Chloride	Methyl-tert-butyl-ether (MTBE)	Total Dissolved Solids
Color	Odor – Threshold	Turbidity
Copper	Silver	Zinc
Foam Agents (MBAS)	Specific Conductance	
Iron	Sulfate	

Table M-6: Radioactivity		
Constituent		
Gross Alpha Particle Activity (Including Radium-226 but Excluding Radon and Uranium)	Combined Radium-226 and Radium-228	Tritium
Gross Beta Particle Activity	Strontium-90	Uranium

Table M-7: Regulated Organics		
Constituents		
(a) Volatile Organic Chemicals	1,1,1-Trichloroethane	Endothal
Benzene	1,1,2-Trichloroethane	Endrin
Carbon Tetrachloride (CTC)	Trichloroethylene (TCE)	Ethylene Dibromide (EDB)
1,2-Dichlorobenzene	Trichlorofluoromethane	Glyphosate
1,4-Dichlorobenzene	1,1,2-Trichloro-1,2,2-	Heptachlor
1,1-Dichloroethane	Vinyl Chloride	Heptachlor Epoxide
1,2-Dichloroethane (1,2- DCA)	Xylenes (m,p)	Hexachlorobenzene
1,1-Dichloroethene (1,1- DCE)	(b) Non-Volatile synthetic Organic Constituents	Hexachlorocyclopentadiene
Cis-1,2-Dichloroethylene	Alachlor	Lindane
Trans-1,2-Dichloroethylene	Atrazine	Methoxychlor
Dichloromethane	Bentazon	Molinate
1,2-Dichloropropane	Benzo(a)pyrene	Oxamyl
1,3-Dichloropropene	Carbofuran	Pentachlorophenol
Ethylbenzene	Chlordane	Picloram
Methyl-tert-butyl-ether (MTBE)	Dalapon	Polychlorinated Biphenyls
Monochlorobenzene	1,2-Dibromo-3-chloropropane (DBCP)	Simazine
Styrene	2,4-Dichlorophenoxyacetic acid	Thiobencarb
1,1,2,2-Tetrachloroethane	Di(2-ethylhexyl)adipate	Toxaphene
Tetrachloroethylene (PCE)	Di(2-ethylhexyl)phthalate	2,3,7,8-TCDD (Dioxin)
Toluene	Dinoseb	2,4,5-TP (Silvex)
1,2,4-Trichlorobenzene	Diquat	

Table M-8: Disinfection Byproducts		
Constituent		
Total Trihalomethanes (TTHM)	Haloacetic Acid (five) (HAA5)	Bromate
Bromodichloromethane	Monochloroacetic acid	Chlorite
Bromoform	Dichloroacetic acid	
Chloroform	Trichloroacetic acid	
Dibromochloromethane	Monobromoacetic acid Dibromoacetic acid	

Table M-9: General Physical and General Minerals		
Constituent		
Asbestos	Potassium	Foaming Agents
Calcium	Sodium	Odor
Chloride	Sulfate	Specific Conductance
Copper	Zinc	Total Dissolved Solids
Iron	Color	Total Hardness
Manganese	Corrosivity	

Table M-10: Constituents with Notification Levels

Constituents	Units	Type of Sample	Minimum Frequency of Analysis
Boron	µg/L	Grab	Quarterly
n-Butylbenzene	µg/L	Grab	Annually
sec-Butylbenzene	µg/L	Grab	Annually
tert-Butylbenzene	µg/L	Grab	Annually
Carbon disulfide	µg/L	Grab	Quarterly
Chlorate	µg/L	Grab	Quarterly
2-Chlorotoluene	µg/L	Grab	Annually
4-Chlorotoluene	µg/L	Grab	Annually
Diazinon	µg/L	Grab	Annually
Dichlorodifluoromethane (Freon 12)	µg/L	Grab	Annually
1,4-Dioxane	µg/L	Grab	Quarterly
Ethylene glycol	µg/L	Grab	Annually
Formaldehyde	µg/L	Grab	Annually
HMX	µg/L	Grab	Annually
Isopropylbenzene	µg/L	Grab	Annually
Manganese	µg/L	Grab	Quarterly

Table M-10: Constituents with Notification Levels			
Constituents	**Units**	**Type of Sample**	**Minimum Frequency of Analysis**
Methyl isobutyl ketone (MIBK)	µg/L	Grab	Annually
Naphthalene	µg/L	Grab	Annually
n-Nitrosodiethyamine (NDEA)	µg/L	Grab	Annually
n-Nitrosodimethylamine (NDMA)	µg/L	Grab	Quarterly
n-Nitrosodi-n-propylamine (NDPA)	µg/L	Grab	Annually
Propachlor	µg/L	Grab	Annually
n-Propylbenzene	µg/L	Grab	Annually
RDX	µg/L	Grab	Annually
Tertiary butyl alcohol (TBA)	µg/L	Grab	Quarterly
1,2,3-Trichloropropane (1,2,3-TCP)	µg/L	Grab	Annually
1,2,4-Trimethylbenzene	µg/L	Grab	Annually
1,3,5-Trimethylbenzene	µg/L	Grab	Annually
2,4,6-Trinitrotoluene (TNT)	µg/L	Grab	Annually
Vanadium	µg/L	Grab	Annually

Table M-11: Remaining Priority Pollutants		
Constituent		
Pesticides	Metals	Di-n-butyl phthalate
Aldrin	Chromium III	Di-n-octyl phthalate
Dieldrin		Diethyl phthalate
4,4'-DDT	Base/Neutral Extractables	Dimethyl phthalate
4,4'-DDE	Acenaphthene	Benzo(a)anthracene
4,4'-DDD	Benzidine	Benzo(a)fluoranthene
Alpha-endosulfan	Hexachloroethane	Benzo(k)fluoranthene
Beta-endosulfan	Bis(2-chloroethyl)ether	Chrysene
Endosulfan sulfate	2-chloronaphthalene	Acenaphthylene
Endrin aldehyde	1,3-dichlorobenzene	Anthracene
Alpha-BHC	3,3'-dichlorobenzidine	1,12-benzoperylene
Beta-BHC	2,4-dinitrotoluene	Fluorene
Delta-BHC	2,6-dinitrotoluene	Phenanthrene
Acid Extractables	1,2-diphenylhydrazine	1,2,5,6-dibenzanthracene
2,4,6-trichlorophenol	Fluoranthene	Indeno(1,2,3-cd)pyrene
P-chloro-m-cresol	4-chlorophenyl phenyl ether	Pyrene
2-chlorophenol	4-bromophenyl phenyl ether	Volatile Organics
2,4-dichlorophenol	Bis(2- chloroisopropyl) ether	Acrolein

Table M-11: Remaining Priority Pollutants		
Constituent		
2,4-dimethylphenol	Bis(2- chloroethoxyl)methane	Acrylonitrile
2-nitrophenol	Hexachlorobutadiene	Chlorobenzene
4-nitrophenol	Isophorone	Chloroethane
2,4-dinitrophenol	Nitrobenzene	1,1-dichloroethylene
4,6-dinitro-o-cresol	N-nitrosodiphenylamine	Methyl chloride
Phenol	Bis(2- ethylhexyl)phthalate	Methyl bromide
Chlorodibromomethane	Butyl benzyl phthalate	2-chloroethyl vinyl ether
2,4-Diphenylhydrazine		

Table M-12: Constituents of Emerging Concern						
Constituent	**Relevance/ Indicator Type**	**Type of Sample**	**Minimum Frequency of Analysis**	**Reporting Limit (µg/L)**	**Monitoring Locations[7]**	
					Prior to RO	**Following treatment prior to well injection**
17β-estradiol	Health	grab	Annually	0.001		X
Caffeine	Health & Performance	grab	Annually	0.05	X	X
NDMA	Health & Performance	grab	Quarterly	0.002	X	X
Triclosan	Health	grab	Annually	0.05		X
DEET	Performance	grab	Annually	0.05	X	X
Sucralose	Performance	grab	Quarterly	0.1	X	X

Table M-13: Surrogates				
Constituent	**Type of Sample**	**Minimum Frequency**	**Monitoring Locations**	
			Prior to RO Treatment	**Following Treatment prior to Well Injection**
Electrical Conductivity	Online	Continuous	X	X

[7] The January 22, 2013 Recycled Water Policy Attachment A makes a distinction between health-based and performance-based CEC indicators for purposes of monitoring locations. For subsurface applications, the health-based CECs are 17β-estradiol, caffeine, NDMA, and triclosan, with monitoring required for final recycled water only. The health-based and performance-based CECs are caffeine, NDMA, DEET, and sucralose, with monitoring required prior to reverse osmosis and post treatment prior to release to the aquifer. Caffeine and NDMA serve both as health-based and performance based indicators.

Table M-13: Surrogates				
Constituent	**Type of Sample**	**Minimum Frequency**	**Monitoring Locations**	
			Prior to RO Treatment	**Following Treatment prior to Well Injection**
Total Organic Carbon (TOC)	24-hour composite	Weekly	X	X

b. Consistent with the January 22, 2013 amended Recycled Water Policy, the MRWPCA may request the removal of specific CECs from the monitoring program if supported by the data.

i. Analytical methods for CECs shall be selected to achieve the reporting limits presented in Table M-12 in accordance with the Recycled Water Policy. The analytical methods shall be based on methods published by the USEPA, methods certified by DDW, or peer reviewed and published methods that have been reviewed by DDW. Any modifications to the published or certified methods shall be reviewed and approved by the Central Coast Water Board and DDW.

ii. For performance indicator CECs and surrogates, removal percentages shall be reported in addition to the measured concentrations.

[1] The removal percentage shall be calculated based on the following formula:

Removal Percentage = $([X_{in} – X_{out}]/X_{in})*100$
X_{in} = Concentration in recycled water prior to a treatment process
X_{out} = Concentration in recycled water after a treatment process

[2] The removal percentages for the surrogates shall be determined based on the daily averages for electrical conductivity and weekly values for TOC and included in the quarterly compliance monitoring reports.

[3] The removal percentages for the performance indicator CECs shall be included in the Annual Summary Report.

c. Evaluation of Pathogenic Microorganism Removal

For the purposes of evaluating the performance of the following treatment facilities/units with regards to pathogenic microorganism removal, the MRWPCA shall include the results of the monitoring specified below in its monthly compliance monitoring reports:

i. For the purpose of demonstrating that the necessary log reductions are achieved at the AWPF, MRWPCA shall report the daily average and maximum turbidity, percent of time more than 5 nephelometric turbidity units (NTU), and daily coliform results measured in the recycled water (as

specified in Table M-3);

ii. Advanced Oxidation Process (AOP) - (UV and hydrogen peroxide at the AWPF): For each day of operation, MRWPCA shall report the calculated daily peroxide dose (based on the peroxide pump speed and bulk feed concentration). For UV, MRWPCA shall report the UV system dose (expressed as greater than a certain threshold such as 300 milli-joules/cm^2), UV transmittance (daily minimum, maximum, and average), UV intensity for each reactor (daily minimum, maximum, and average) and the total UV power applied; and

iii. Based on the calculation of log reduction achieved each day by the entire treatment system, MRWPCA shall report the value and "Yes" or "No" for each day as to whether the necessary log reductions (i.e. 10-logs for *Giardia*, 10-logs for *Cryptosporidium*, and 12-logs for virus) have been attained. An overall log reduction calculation shall be provided only for those days when a portion of the treatment system does not achieve the credits proposed in Table 5-4 of the engineering report.

3. Treatment Conditions

If a sample of the advanced- treated recycled water is greater than 10 ng/L for NDMA, within 72 hours of knowledge of the result, the MRWPCA shall collect another sample as confirmation. The MRWPCA shall notify DDW and the Central Coast Water Board within 48 hours of knowledge of the exceedance and, if directed by DDW or the Central Coast Water Board, suspend injection of the advanced treated recycled water.

4. Groundwater Monitoring

a. As required by Title 22, Section 60320.226, prior to operating any injection well, a MRWPCA shall site and construct at least two monitoring wells downgradient of the injection well, such that:
(1) at least one monitoring well is located;
(A) no less than two weeks but no more than six months of travel time from the injection wells, and
(B) at least 30 days upgradient of the nearest drinking water well;
(2) <u>in addition the well(s) in paragraph (1) and after consultation with DDW, at least two monitoring wells will be located between the injection wells and the nearest downgradient drinking water well; and</u>
(3) samples from the monitoring wells in paragraphs (1) and (2) can be;
(A) obtained independently from each aquifer, initially receiving the water used as a source of drinking water supply, that will receive the injection wells recharge water, and
(B) validated as receiving recharge water from the injection well.

b. In addition to the monitoring required pursuant to section 60320.220, from each monitoring well in subsection (a)(1), and each monitoring well in subsection (a)(2) that has recharge water located within one year travel time of the well(s), MRWPCA shall collect two samples prior to injection well operation and at least

one sample each quarter after operations begins. Each sample shall be analyzed for nitrogen, nitrate, nitrite and constituents with secondary MCL's.

New monitoring wells will be installed to ensure ongoing project performance and to comply with the Title 22 Criteria. The objectives of the groundwater monitoring well program are to demonstrate compliance with the Title 22 and Basin Plan groundwater criteria and applicable state policies regarding protection of groundwater by:

- Siting one downgradient well with groundwater travel times (underground retention time) no less than two weeks and no more than six months from the injection wells (well also has to be greater than 30 days travel time from the nearest drinking water source).
- Siting an additional downgradient well between the Injection Facilities and the nearest downgradient potable water supply (in addition to the downgradient monitoring well used to demonstrate retention time as described in the bullet point above).
- Monitoring groundwater levels and water quality; the well design will allow for sample collection from each aquifer receiving recycled water.
- Collecting baseline water quality samples prior to startup of the Project operation.

Monitoring well installation will be phased to coincide with the phasing of the deep injection wells and vadose zone wells. Initially, two monitoring well clusters will be installed at the site of the first two deep injection wells, DIW-2 and DIW-3 and vadose zone wells, VZW-2 and VZW-3. These Phase I monitoring wells are labeled MW-1, MW-2, MW-3, and MW-4 on Figure 3 of Waste Discharge Requirements Order No. R3-2017-0003. Phase II monitoring wells will be proposed based on the location of additional injection wells and project operation information. For planning purposes, current locations of the additional Phase II monitoring wells MW-5, MW-6, and MW-7, are also included on Figure 3.

At each monitoring well location, two adjacent, but separate boreholes will be drilled in close proximity (within about 20 feet) of each other at the same location – one for the Paso Robles Aquifer and one for the Santa Margarita Aquifer (referred to as a monitoring well cluster).

For the injection well cluster at DIW-1, no adjacent monitoring well is proposed. Travel times from this well are very long and one monitoring well is presumed sufficient to document performance of this eastern-most injection well cluster. A tracer test will confirm whether or not one monitoring well is sufficient associated with the DIW-1 injection well cluster.

Representative samples of groundwater shall be collected from all monitoring wells installed for this project. Table M-15 sets forth the minimum constituents and parameters for monitoring groundwater quality in MRWPCA monitoring wells.

The MRWPCA shall implement the following groundwater monitoring program as described in Tables M-14, M-15, and M-16. Some constituents may be eligible for reduced monitoring due to the consistent historic lack of detection, upon approval by the Executive Officer.

If any of the monitoring results indicate that an MCL has been exceeded or coliforms are present in the monitoring wells at the MRWPCA groundwater injection project as a result of the use of the recycled water, the MRWPCA shall notify the DDW and Central Coast Water Board within 72 hours of receiving the results and make note of any positive finding in the next monitoring report submitted to the Central Coast Water Board.

Upon an exceedance of 10 ng/L for NDMA in monitoring samples in groundwater wells and within 30 days, the MRWPCA shall notify DDW and the Central Coast Water Board and begin monthly sampling of groundwater for NDMA from the well with the exceedance. Groundwater sampling may return to the frequency stated in this MRP if the average of three consecutive monthly samples is 10 ng/L or below.

Table M-14: Groundwater Monitoring

Constituents/Parameters	Units	Type of Sample	Minimum Frequency of Analysis	Reference Table Number
Water level elevation[8]	Feet	---	Quarterly	M-14
Chlorine residual	mg/L	Grab	Quarterly	M-14
Chloride	mg/L	Grab	Quarterly	M-14
Nitrate-N	mg/L	Grab	Quarterly	M-14
Nitrite-N	mg/L	Grab	Quarterly	M-14
Nitrate plus Nitrite	mg/L	Grab	Quarterly	M-14
pH	pH units	Grab	Quarterly	M-14
Sodium	mg/L	Grab	Quarterly	M-14
Sulfate	mg/L	Grab	Quarterly	M-14
TOC	mg/L	Grab	Quarterly	M-14
Total coliform	MPN/100ml	Grab	Quarterly	M-14
BOD_5 20°C	mg/L	Grab	Semi-annually	M-14
Oil and grease	mg/L	Grab	Quarterly	M-14
Total nitrogen	mg/L	Grab	Quarterly	M-14
Total Suspended Solids	mg/L	Grab	Semi-annually	M-14
Turbidity	NTU	Grab	Quarterly	M-14
Inorganics with primary MCLs	µg/L	Grab	Monthly	M-4

[8] Water level elevations shall be measured to the nearest 0.01 feet, and referenced to mean sea level.

Table M-14: Groundwater Monitoring				
Constituents/parameters with secondary MCLs				
Fluoride	µg/L	Grab	Quarterly	M-4
Radioactivity	pci/L	Grab	Quarterly	M-15
Regulated organics	µg/L	Grab	Quarterly	M-15
Disinfection byproducts (DBPs)	µg/L	Grab	Quarterly	M-15
General physical		Grab	Monthly	M-16
General minerals	µg/L	Grab	Monthly	M-16
Chemicals with NLs	µg/L	Grab	Quarterly or Annually	M-15
N-Nitrosopyrrolidine	µg/L	Grab	Annually	M-14
Remaining priority pollutants	µg/L	Grab	Quarterly	M-15
Silver	mg/L	Grab	Quarterly	M-14

Table M-15: Groundwater Monitoring Frequency	
Constituent	**Frequency**
Total Suspended Solids (TSS)	Quarterly
Turbidity	Quarterly
Radioactivity	
Gross Alpha Particle Activity (including Radium-226 but excluding radon and uranium)	Quarterly
Gross Beta Particle Activity	Quarterly
Radium-226	Quarterly
Radium-226 & Radium-228 (Combined)	Quarterly
Radium-228	Quarterly
Strontium-90	Quarterly
Tritium	Quarterly
Uranium	Quarterly

Table M-15: Groundwater Monitoring Frequency	
Organic Chemicals	
(a) Volatile Organic Chemicals	
1,1,1-Trichloroethane	Quarterly
1,1,2,2-Tetrachloroethane	Quarterly
1,1,2-Trichloro-	Quarterly
1,2,2- Trifluoroethane	Quarterly
1,1,2-Trichloroethane	Quarterly
1,1-Dichloroethane	Quarterly
1,1-Dichloroethene (1,1 DCE)	Quarterly
1,2,4-Trichlorobenzene	Quarterly
1,2-Dichlorobenzene	Quarterly
1,2-Dichloroethane (1,2 DCA)	Quarterly
1,2-Dichloropropane	Quarterly
1,3-Dichloropropene	Quarterly
1,4-Dichlorobenzene	Quarterly
Benzene	Quarterly
Carbon Tetrachloride (CTC)	Quarterly
cis-1,2-Dichloroethylene	Quarterly
Dichloromethane	Quarterly
Ethylbenzene	Quarterly
Methyl-tert-butyl-ether (MTBE)	Quarterly
Monochlorobenzene	Quarterly
Styrene	Quarterly
Tetrachloroethylene (PCE)	Quarterly
Toluene	Quarterly
trans-1,2-Dichloroethylene	Quarterly
Trichloroethylene (TCE)	Quarterly
Trichlorofluoro-methane	Quarterly
Vinyl Chloride	Quarterly
Xylenes (m, p)	Quarterly
(b) non-volatile synthetic organic chemical	
1,2-Dibromo-3-Chloropropane (DBCP)	Quarterly
2,3,7,8-TCDD (Dioxin)	Quarterly
2,4,5-TP (Silvex)	Quarterly
2,4-Dichlorophenoxyacetic acid (2,4-D)	Quarterly

Table M-15: Groundwater Monitoring Frequency	
Alachlor	Quarterly
Atrazine	Quarterly
Bentazon	Quarterly
Benzo (a) pyrene	Quarterly
Carbofuran	Quarterly
Chlordane	Quarterly
Dalapon	Quarterly
Di (2-ethylhexyl) adipate	Quarterly
Di (2-ethylhexyl) phthalate	Quarterly
Dinoseb	Quarterly
Diquat	Quarterly
Endothal	Quarterly
Endrin	Quarterly
Ethylene Dibromide (EDB)	Quarterly
Glyphosate	Quarterly
Heptachlor	Quarterly
Heptachlor Epoxide	Quarterly
Hexachlorobenzene	Quarterly
Hexachlorocyclo-pentadiene	Quarterly
Lindane (Gamma BHC)	Quarterly
Methoxychlor	Quarterly
Molinate	Quarterly
Oxamyl	Quarterly

Table M-15: Groundwater Monitoring Frequency	
PCB 1016	Quarterly
PCB 1221	Quarterly
PCB 1232	Quarterly
PCB 1242	Quarterly
PCB 1248	Quarterly
PCB 1254	Quarterly
PCB 1260	Quarterly
Pentachlorophenol	Quarterly
Picloram	Quarterly
Simazine	Quarterly
Thiobencarb	Quarterly
Toxaphene	Quarterly
Disinfection Byproducts	
Bromate	Quarterly
Bromodichloro-methane	Quarterly
Bromoform	Quarterly
Chlorite	Quarterly
Chloroform	Quarterly
Dibromoacetic Acid	Quarterly
Dibromochloro-methane	Quarterly
Dichloroacetic Acid	Quarterly
Haloacetic Acid (Five) (HAA5)	Quarterly
Monobromoacetic Acid	Quarterly
Monochloroacetic Acid	Quarterly
Total Trihalomethanes	Quarterly
Trichloroacetic Acid	Quarterly

Table M-15: GroundwaterMonitoring Frequency	
Chemicals with Notification Levels	
1,2,3-Trichloropropane (1,2,3 TCP)	Quarterly
1,2,4-Trimethylbenzene	Annual
1,3,5-Trimethylbenzene	Annual
1,4-Dioxane	Annual
2-Chlorotoluene	Annual
2,4,6-Trinitrotoluene (TNT)	Annual
4-Chlorotoluene	Annual
Boron	Quarterly
Carbon Disulfide	Annual
Chlorate	Annual
Diazinon	Annual
Dichlorodifluoro-methane (Freon 12)	Annual
Ethylene Glycol	Annual
Formaldehyde	Annual
HMX	Annual
Isopropylbenzene	Annual
Manganese	Annual
Methyl-isobutyl-keytone (MIBK)	Annual
Naphthalene	Quarterly
n-Butylbenzene	Annual
n-Nitrosodiethyl-amine (NDEA)	Annual
n-Nitrosodimethylamine (NDMA)	Quarterly
n-Nitrosodi-n-propylamine (NDPA)	Quarterly
n-Propylbenzene	Annual
Propachlor	Annual
RDX	Annual
sec-Butlybenzene	Annual
tert-Butylbenzene	Annual
Tertiary-butyl-alcohol (TBA)	Annual
Vanadium	Annual

Table M-15: Groundwater Monitoring Frequency	
Remaining Priority Pollutants	
Pesticides	
4,4,4'-DDD	Annual
4,4,4'-DDE	Annual
4,4,4-DDT	Annual
Aldrin	Quarterly
Alpha BHC	Quarterly
Alpha Endosulfan	Quarterly
Beta BHC	Quarterly
Beta Endosulfan	Quarterly
Chromium III	Quarterly
Chromium VI	Quarterly
Delta BHC	Quarterly
Dieldrin	Quarterly
Endosulfan Sulfate	Quarterly
Endrin Aldehyde	Quarterly
Acid Extractables	
2,4,6-Trichlorophenol	Quarterly
2,4-Dichlorophenol	Quarterly
2,4-Dimethylphenol	Quarterly
2,4-Dinitrophenol	Quarterly
2-Chlorophenol	Quarterly
2-Nitrophenol	Quarterly
4,6-Dinitro-o-Cresol (2-Methly-4,6-Dinitrophenol)	Quarterly
4-Nitrophenol	Quarterly
p-Chloro-m-Cresol (3-Methyl-4-Chlorophenol)	Quarterly
Phenol	Quarterly
Base/Neutral Extractables	
1,12-Benzoperylene ((Benzo(g,h,i)-perylene))	Quarterly
1,2,5,6-Dibenzanthracene ((Dibenzo(a,h) anthracene))	Quarterly
1,2-Diphenylhydrazine	Quarterly
1,3-Dichlorobenzene	Quarterly
2,4-Dinitrotoluene	Quarterly
2,6-Dinitrotoluene	Quarterly
2-Chloronaphthalene	Quarterly
3,3'-Dichlorobenzidine	Quarterly
4-Bromophenyl phenyl ether	Quarterly

Table M-15: Groundwater Monitoring Frequency	
4-Chlorophenyl phenyl ether	Quarterly
Acenaphthene	Quarterly
Acenaphthylene	Quarterly
Anthracene	Quarterly
Benzidine	Quarterly
Benzo(a)anthracene	Quarterly
Benzo(b)fluoranthene	Quarterly
Benzo(k)fluoranthene	Quarterly
Bis(2-chloroethoxyl)-methane	Quarterly
Bis(2-chloroethyl)ether	Quarterly
Bis(2-chloroisopropyl)ether	Quarterly
Butyl benzyl phthalate	Quarterly
Chrysene	Quarterly
Di(2-ethylhexyl) phthlate	Quarterly
Dimethyl phthalate	Quarterly
Di-n-butyl phthalate	Quarterly
Di-n-octyl phthalate	Quarterly
Fluoranthene	Quarterly
Fluorene	Quarterly
Hexachlorobutadiene	Quarterly
Hexachloroethane	Quarterly
Indeno(1,2,3-cd) pyrene	Quarterly
Isophorone	Quarterly
Nitrobenzene	Quarterly
n-Nitrosodi-n-propylamine	Quarterly
n-Nitrosodiphenylamine	Quarterly
Phenanthrene	Quarterly
Pyrene	Quarterly
1,1-Dichloroethylene	Quarterly
2-Chloroethyl vinyl ether	Quarterly
Acrolein	Quarterly
Acrylonitrile	Quarterly
Chlorobenzene	Quarterly
Chloroethane	Quarterly
Methyl bromide	Quarterly
Methyl chloride	Quarterly

Table M-16: General Physical and General Minerals		
Constituent		
Asbestos	Potassium	Foaming Agents
Calcium	Sodium	Odor
Chloride	Sulfate	Specific Conductance
Copper	Zinc	Total Dissolved Solids
Iron	Color	Total Hardness
Manganese	Corrosivity	

V. CERTIFICATION STATEMENT

Each report shall contain the following declaration:

"I certify under penalty of law that this document, including all attachments and supplemental information, was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a find and imprisonment.

Executed on the _____day of _____at _____

_____(Signature)

_____(Title)"

VI. OTHER MONITORING REQUIREMENTS

The MRWPCA shall submit written documentation identifying the responsible party who certifies the perjury document.

The list of parameters and monitoring frequencies may be adjusted by the Executive Officer if the MRWPCA makes a request and the Executive Officer determines that the modification is adequately supported by statistical trends of monitoring data submitted.

VII. CERTIFICATION

Ordered by _____
Executive Officer

Date March 9, 2017

APPENDIX M

Justification for Additional Pathogen Removal Credits

TECHNICAL MEMORANDUM

Draft Date: March 28, 2019
Final Date: April 2, 2019

Authors: Elaine W. Howe, P.E., BCEE
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Reviewers: R. Shane Trussell, PhD, P.E., BCEE

Subject: Justification for Additional Pathogen Treatment Credit for Monterey One Water's Advanced Water Purification Facility

EXECUTIVE SUMMARY

Monterey One Water (M1W) is following recommendations from the National Water Research Institute's (NWRI) Independent Advisory Panel (IAP) to maximize pathogen treatment credit through its existing wastewater Regional Treatment Plant (RTP) and the Advanced Water Purification Facility (AWPF) that will be operational this summer. The IAP recommended credit through the (1) the RTP, (2) ozonation, (3) enhanced RO credit, and (4) chlorination, noting that these credits will provide redundancy to offset unforeseen unit process excursions.

M1W's previously submitted (November 2017) Title 22 Engineering Report showed 12.4-log virus (V), 11-log *Giardia* cyst (G), and 11-log *Cryptosporidium* oocyst (C) treatment credit, which exceeded the 12/10/10 log regulatory requirements for V/G/C. As a first step towards implementing additional pathogen treatment credit, M1W is proposing a three-surrogate membrane integrity monitoring approach—based on strontium, total organic carbon (TOC) and/or electrical conductivity (EC) rejection—consistent with the approach used at the City of San Diego's North City Pure Water Facility for which DDW recently granted conditional approval. Using this approach, M1W expects to achieve a minimum of 2.5-log V/G/C removal credit for the RO system, which increases the overall treatment credit to 13.9/12.5/12.5 log V/G/C.

This technical memorandum (TM) provides justification for the three-surrogate approach for RO integrity monitoring to achieve the increased treatment credit, as well as an estimate of treatment credit for the other processes included in the IAP recommendation. M1W may pursue credit for the other processes in the future, following demonstration validation testing for DDW approval.

1 - BACKGROUND

Monterey One Water (M1W) is implementing the Pure Water Monterey (PWM) groundwater replenishment project (Project) that will provide (1) purified recycled water for replenishment of the Seaside Groundwater Basin that serves as a drinking water supply; (2) purified recycled water for landscape irrigation by the Marina Coast Water District (MCWD); and (3) additional tertiary disinfected recycled water to augment the Castroville Seawater Intrusion Project's (CSIP) agricultural irrigation supply. M1W's Advanced Water Purification Facility (AWPF) is currently under construction and expected to startup in the summer of 2019, with a production capacity of 5 MGD.

The Project will enable the California American Water Company (CalAm) to reduce its diversions from the Carmel River system by 3,500 acre-feet per year (AFY) by injecting the same amount of product water into the Seaside Basin. The first 1,000 AF will constitute an operational reserve, which will be augmented to 1,750 AF over the first years of operation. An additional 200 AFY of purified water may be injected for development of a drought reserve for the CSIP for a maximum drought reserve of 1,000 AF.

M1W contracted with the National Water Research Institute (NWRI) to coordinate an Independent Advisory Panel (IAP) to provide expert peer review of the technical, scientific, regulatory, policy, and outreach aspects of the Project. The most recent meeting of the IAP was October 3 and 4, 2018. At this meeting, additional pathogen crediting alternatives were presented to the IAP, including crediting the primary and secondary process of the Regional Treatment Plant, ozonation, reverse osmosis (RO) using total organic carbon (TOC) and strontium, and chloramine disinfection in the conveyance pipeline. The Panel recommended maximizing pathogen treatment credit through the RTP and the AWPF in order to provide pathogen credit redundancy to offset unforeseen unit process excursions, and to prioritize the four alternatives presented. These alternatives utilize existing treatment processes.

In September 2016, the Division of Drinking Water (DDW) approved the Engineering Report for M1W's 4 MGD AWPF. Since that time, M1W entered into an agreement with MCWD to provide 600 AFY of purified water from the product water conveyance pipeline. In order to provide the additional production, the capacity of the AWPF was revised from 4 MGD to 5 MGD. The pathogen treatment credit approved by DDW in the initial 4 MGD Engineering Report (shown in **Table 1)**, was not impacted by the capacity increase as the treatment train remained the same and the injection flowrate did not increase.

M1W updated the Engineering Report in November 2017 to address the AWPF production increase, final design, and waste discharge and water recycling reporting requirements. The updated Engineering Report included the pathogen crediting table from the September 2016 version. As indicated, the pathogen treatment credit exceeded the required credit for virus, *Giardia* cysts, and *Cryptosporidium* oocysts. Per the IAP's recommendation, and due to uncertainty with the underground retention time, since the required tracer test has not yet been conducted, M1W is pursuing additional pathogen treatment credit for processes that are presently under-credited

but that are known to effective treat (remove and/or deactivate) pathogens and viruses.

This technical memorandum provides justification for receiving higher pathogen reduction credit through the RO membranes based on rejection of additional surrogates besides electrical conductivity (EC). DDW has already conditionally approved this crediting option at another advanced treatment potable reuse facility—the City of San Diego's North City Pure Water Facility—as will be discussed in this technical memorandum (TM).

Table 1. Pathogen Log Reduction Credit in M1W's Approved September 2016 and Draft November 2017 Engineering Reports

Treatment Process	Treatment Confirmation	Log Reduction Credits		
		Virus	*Giardia*	*Crypto*
Regional Treatment Plant, Primary and Secondary	Credit not pursued	0	0	0
Ozone	Credit not pursued	0	0	0
Membrane Filtration (MF)	Pressure decay test; filtrate turbidity	0	4	4
Reverse Osmosis (RO)	Electrical conductivity removal	1	1	1
UV/AOP	UV dose	6	6	6
Disinfection with Chlorine	Credit not pursued	0	0	0
Underground Residence Time in Aquifer	Modeled underground time with 0.5 modeling credit factor	5.4	0	0
Total Expected Credit		**12.4**	**11**	**11**
Required Credit		**12**	**10**	**10**

2 - PATHOGEN REMOVAL THROUGH REVERSE OSMOSIS

Pure Water Monterey has been approved for a log removal credit of 1 through the RO system, using daily average reduction of EC, with the option for using TOC as an alternate surrogate parameter. Through this TM, M1W is providing justification and requesting DDW approval to use a three-surrogate monitoring approach, like what DDW approved for the Pure Water San Diego (PWSD) Project—that is, the use of strontium, TOC, and EC.

The Pure Water San Diego Program has a philosophy of exceeding minimum pathogen log removal value (LRV) requirements for improved operational reliability, and sought to enhance the awarded pathogen removal credit for processes that are potentially under credited, such as reverse osmosis. Typically, reverse osmosis integrity monitoring via TOC or EC provides no greater than 2-logs of treatment credit, yet studies have shown that RO membranes can reject as much as 6-logs of virus, the smallest in size of the regulated pathogens. Microbial surrogates, specifically male-specific bacteriophage (MS2), are often used to validate pathogen removal across RO membranes due to their similarities to enteric virus (Pype et al., 2016a). **Table 2** provides a summary of recent studies evaluating removal of MS2 by RO membranes.

Table 2. Log removal values of studies evaluating removal of MS2 by RO

MS2 Log Removal Value (LRV)	Reference
3 – 4.8	Kruithof et al. (2001)
4	Lozier et al. (2003)
5.4	Mi et al. (2004)
7	Casani et al. (2005)
4.2 – > 6	Pype et al. (2016b)
> 6.2	Antony et al. (2016)
4.6 – 7.3	Trussell Technologies (2017)

Demonstrating pathogenic microorganism control in the RO process involves the use of surrogate parameters for performance and integrity monitoring. Most facilities measure TOC or electrical conductivity (EC) reduction across the RO membranes as surrogates for pathogen log reduction.

The City of San Diego recently completed a monitoring program at their 1 MGD North City Demonstration Pure Water Facility (NCDPWF) to test alternative surrogate molecular markers for RO integrity monitoring and pathogen crediting. This demonstration testing showed that strontium rejection through the RO membranes provided a conservative assessment of MS2 virus rejection under both intact and compromised conditions, while providing higher log removal values (LRVs) than the typical surrogates EC and TOC. This demonstration testing used the Hydranautics ESPA2 LD RO elements, which are the same membranes being installed in the PWM AWPF.

As a result of the City of San Diego's monitoring program, a three-tiered RO approach for integrity monitoring and pathogen reduction crediting (for virus, *Giardia* cysts and *Cryptosporidium* oocysts) was included in its Title 22 Engineering Report for the North City Pure Water Facility for the Pure Water San Diego (PWSD) Project (City of San Diego, June 2018). As discussed in the PWSD Engineering Report, the first tier of pathogen credit will be based on strontium rejection as measured once daily in the combined RO feed and the permeate of each RO train. The second tier of pathogen credit will be based on TOC rejection calculated from continuous online monitoring of the combined RO feed and the combined RO permeate. The third and last tier for pathogen credit will be based on continuous on-line EC monitoring of the combined RO feed and combined RO permeate of each RO train.

The City of San Diego's ranking of tier priority for Virus/*Giardia*/*Cryptosporidium* (V/G/C) LRV credit is (1) Tier 1 strontium rejection, (2) Tier 2 TOC rejection and (3) Tier 3 EC rejection. Tier 1 supersedes all other tiers under normal operation. Tier 2 is applied if strontium data are not available. Tier 3 is applied if both strontium and TOC data are not available. PWSD was given conditional approval of this pathogen crediting approach from DDW. The expected LRV credit for V/G/C at the NCPWF is shown in **Table 3**.

Table 3. Tiered Pathogen Crediting Approach for the City of San Diego's NCPWF (City of San Diego, June 2018)

RO Monitoring Approach	Tier 1	Tier 2	Tier 3
Marker used to monitor integrity	Strontium	TOC	TDS as EC
Frequency	No less than once every 24 hours of operation	Continuous (15-min data)	Continuous (15-min data)
Monitoring location	Combined RO feed & permeate of each RO train	Combined RO feed & combined RO permeate	Combined RO feed & permeate of each RO train
Expected LRV for V/G/C	at least 2.5	at least 2.0	no less than 1.0
Proposed awarded LRV	Based on actual removal determined by tiered methodology (must meet 1.0 minimum to run at normal operation)		
Notes	Supersedes all other tiers under normal operation	Is applied if strontium data are not available	Is applied if strontium and TOC data are not available

To provide justification for implementing a similar three-surrogate approach at the AWPF, M1W has conducted parallel sampling of EC, TOC, and strontium rejection across the ESPA2 LD RO elements at its Demonstration Facility for the past 8 months. Conductivity and strontium results were based on grab samples, while RO permeate TOC values were based on an online TOC analyzer. Results are presented in **Figure 1**. Monitored LRVs can be summarized as follows:

- Strontium LRVs were all greater than 2.5-log, and ranged from 2.6-log to greater than 3.4-log. EPA Method 200.8 was used for strontium analyses, with a lab determined Reporting Limit of 0.15 µg/L.
- TOC LRVs were always greater than 1.5-log, and ranged from 1.6-log to 2.3-log.
- EC LRVs were always greater than the currently approved minimum of 1.0-log, and ranged from 1.3-log to 1.5-log.

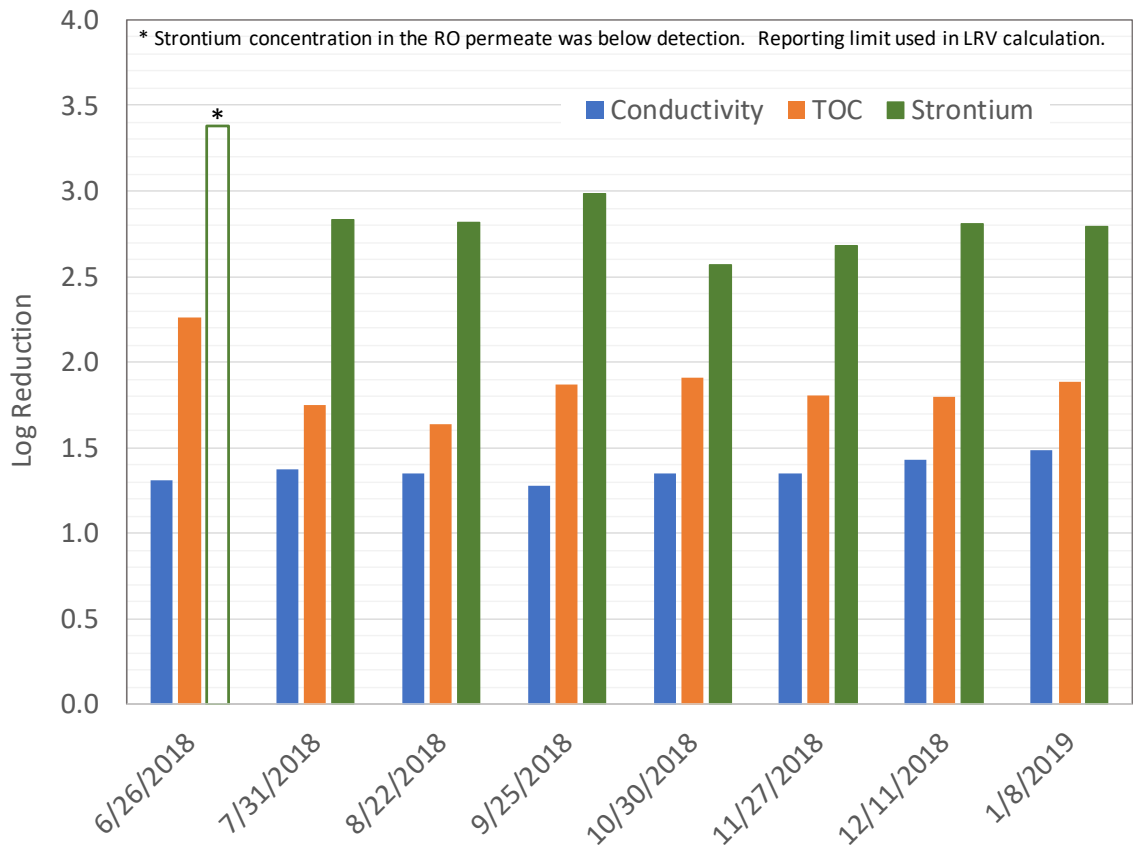

Figure 1. Log Removals for EC, TOC and Strontium Measured at M1W's Demonstration Facility with ESPA2 LD RO Elements

Like what was use for PWSD, M1W will monitor rejection of all three surrogates—strontium, TOC and conductivity—across the RO membranes. M1W proposes to report LRVs for all three surrogates, as long as data is available, and to receive pathogen removal credit for the largest measured LRV.

Strontium rejection across the RO system will be calculated based on measured strontium concentrations, from grab samples collected once daily in the RO feed and the combined permeate of each RO train. Concurrently, pathogen credit will be calculated from TOC rejection across the RO system, as determined from continuous online monitoring of the RO feed and the combined RO permeate. The third measure of membrane integrity and pathogen LRV will be based on continuous on-line EC monitoring of the RO feed and combined RO permeate of each RO train. Log reduction will be reported to DDW for all three surrogates (unless data is not available for the other surrogate(s)) and the surrogate that provides the largest log reduction will be used for calculating pathogen LRV. Where LRV is measured and calculated for each RO train (e.g., strontium), the lowest per train LRV will be reported. The expected minimum pathogen LRV for each surrogate is (a) at least 2.5 log for strontium rejection, (b) 1.5 log for TOC rejection, and (c) 1.0 log for EC rejection.

A summary of M1W's proposed pathogen LRV crediting approach for the Title 22 Engineering Report is provided in **Table 4**. The revised table of pathogen log

reduction credit for M1W's revised Engineering Report, including RO LRV credit based on strontium rejection, is provided in **Table 5**.

Table 4. Proposed Pathogen Crediting Approach for M1W's AWPF RO System

RO Monitoring Approach	Strontium	Total Organic Carbon (TOC)	Electrical Conductivity (EC)
Marker used to monitor integrity	Strontium, TOC and EC if data is available for all surrogates		
Frequency	No less than once every 24 hours of operation	Continuous (15-min data)	Continuous (15-min data)
Monitoring location	Combined RO feed and permeate of each RO train	Combined RO feed and combined RO permeate	Combined RO feed, permeate of each RO train, and combined RO permeate
Expected LRV for V/G/C	at least 2.5	at least 1.5	at least 1.0
Proposed awarded LRV	The maximum calculated LRV based on strontium, TOC and EC rejection, from available data		
Notes	LRV based on the minimum per train strontium rejection	LRV based on continuously measured combined RO feed and combined RO permeate	

Table 5. Proposed Pathogen Log Removal Expectations for the PWM Project's Engineering Report

Treatment Process	Treatment Confirmation	Log Reduction Credits		
		Virus	*Giardia*	*Crypto*
Regional Treatment Plant, Primary and Secondary	Credit not pursued	0	0	0
Ozone	Credit not pursued	0	0	0
Membrane Filtration (MF)	Pressure decay test; filtrate turbidity	0	4	4
Reverse Osmosis (RO)	Electrical conductivity removal	2.5	2.5	2.5
UV/AOP	UV dose	6	6	6
Disinfection with Chlorine	Credit not pursued	0	0	0
Underground Residence Time in Aquifer	Modeled underground time with 0.5 modeling credit factor	5.4	0	0
Total Expected Credit		**13.9**	**12.5**	**12.5**
Required Credit		**12**	**10**	**10**

3 - FUTURE DEMONSTRATION OF PATHOGEN TREATMENT CREDIT

In the future, M1W may decide to pursue additional pathogen credit for above-ground treatment that is already in place, as recommended by the IAP. This additional treatment credit will provide a buffer so that M1W does not have to divert water or

shutdown the AWPF for treatment excursions that might prevent M1W from achieving the required 12/10/10 credit for virus/Giardia/Cryptosporidium log removal. Additionally, having this additional pathogen treatment buffer in place is advantageous since results of the tracer test of underground residence time (and associated virus credit) are currently unknown since it cannot begin until the AWPF starts up and injection of purified water begins, and to facilitate future AWPF expansion should the additional capacity of purified water be needed to meet regional water demands.

The following treatment alternatives are considered in this TM for future additional credit:

- Wastewater treatment credit through the RTP for virus, *Giardia* cyst and *Cryptosporidium* oocyst removal credit
- Preozonation disinfection credit for virus
- Chloramine disinfection credit in the conveyance pipeline for virus and *Giardia* cyst credit

These treatment alternatives make use of existing facilities by characterizing them as pathogen treatment barriers. Pathogen log removal credit for these options, however, may require validation study, either at the full-scale facilities or M1W's AWPF Demonstration Facility, for DDW approval. The purpose of this section of this TM is to provide an estimate of the pathogen treatment credit that M1W could claim for in-place treatment processes, contingent upon validation demonstration and DDW approval.

3.1 Pathogen Removal through M1W's Regional Treatment Facility

While pathogen densities in drinking water have been well characterized, there have not been strong drivers to investigate pathogens in wastewaters. Accordingly, few studies have been conducted to date aimed at characterizing pathogens such as enteric virus, *Giardia* cysts, or *Cryptosporidium* oocysts through wastewater treatment facilities. A 2004 study conducted by Dr. Joan Rose and colleagues under a collaborative Water Environment Research Foundation (WERF) research effort has been used as a benchmark for potable reuse projects in the state of California (Rose, 2004). Agencies have proposed estimates of pathogen removal based on values within the literature. More recently, agencies have also conducted pathogen monitoring programs involving measurements of pathogen concentrations (or approved surrogates) through wastewater treatment. Wastewater pathogen crediting approaches must be reviewed by DDW on a case-by-case basis.

3.1.1 Literature-Based Crediting in California

Potable reuse projects in CA have historically requested wastewater pathogen credit based on the Rose et al. (2004) study. This study surveyed six water reclamation facilities in the U.S., with five to six samples collected at each facility. Capacities ranged from 0.9 to 25 mgd, and treatment included conventional activated sludge and nitrification-denitrification. Due to the limited applicability of these results, DDW is moving away from granting significant credit based on these data.

3.1.2 Estimated Removal of Pathogenic Microorganisms at M1W's RTP

The removal of pathogenic microorganisms at M1W's RTP has been studied during two projects: the Recycled Water Food Safety Study ("Food Safety Study") and the Pure Water Monterey Advanced Water Purification Pilot Study ("AWP Pilot Study"). The Food Safety Study was conducted by Bahman Sheikh (consultant), Bob Cooper (University of California at Berkeley and BioVir Laboratories), and Rick Danielson (BioVir Laboratories) from 1997 to 1998 and included seven samples collected on the raw wastewater entering the RTP and from the secondary effluent, and enumerated for *Giardia* cysts[1], *Cryptosporidium* oocysts[1], and fecal coliform. The AWP Pilot Study (conducted 2013 to 2014) included six samples collected from the raw wastewater entering the RTP and six samples from the secondary effluent, with enumeration of *Giardia* cysts[2] and *Cryptosporidium* oocysts[2] on each sample. No virus data were collected during either of these studies. The results from these studies are plotted in **Figures 2 and 3**.

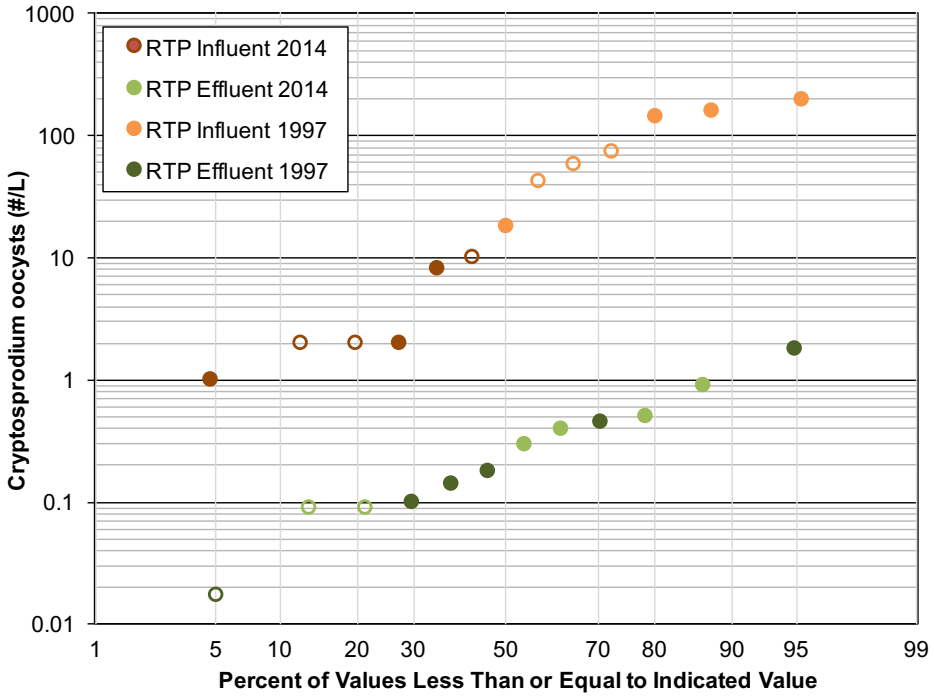

Figure 2. RTP *Cryptosporidium* oocyst distributions (open circles indicate the concentration was below the plotted value, which was the detection limit)

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[1] *Giardia* cysts and *Cryptosporidium* oocysts were enumerated using USEPA Information Collection Request (ICR) methodologies (1996), which used phase separation with a Percoll-sucrose solution rather than the immunomagnetic separation (IMS) technique in USEPA method 1623.

[2] Laboratory analyses were conducted by BioVir, using the fluorescent microscopy analysis detailed in USEPA Method 1623 and USEPA Method 1693

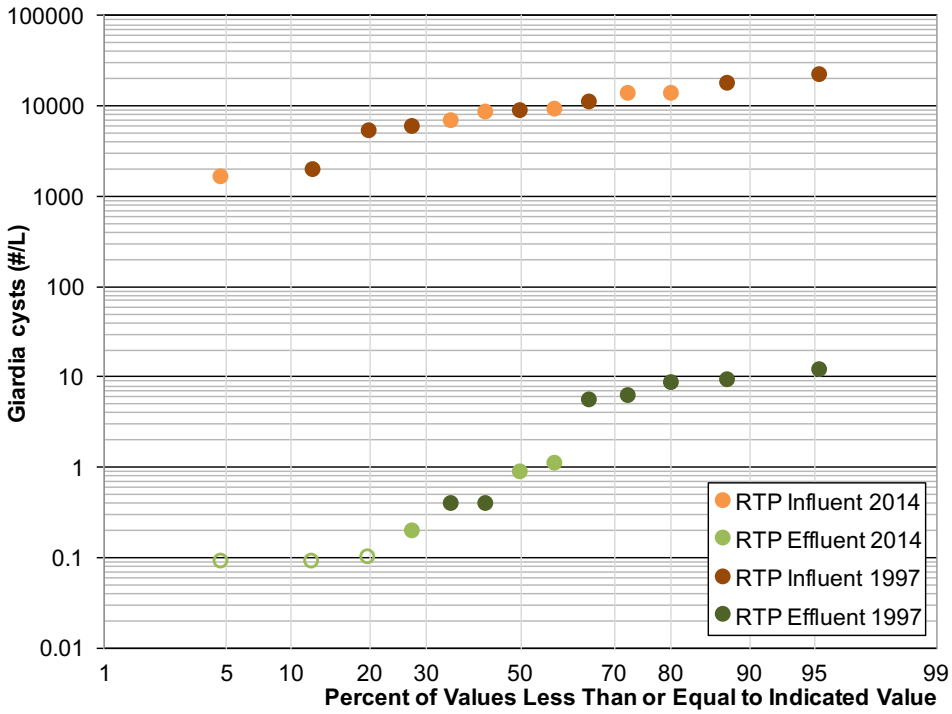

Figure 3. RTP *Giardia* cyst distributions (open circles indicate the concentration was below the plotted value, which was the detection limit)

Two recent potable reuse pathogen monitoring studies at wastewater treatment facilities in California, conducted for the purpose of pathogen crediting, include site-specific work for the City of San Diego's Pure Water Program ("San Diego Pathogen Study") and the City of Oceanside's Pure Water Oceanside project ("Oceanside Pathogen Study"). The Pure Water Oceanside work was conducted at the San Luis Rey Water Reclamation Facility (SLRWRF) and the City of San Diego work was conducted at the North City Reclamation Plant (NCWRP). Process summaries for the SLRWRF and NCWRP (with RTP for reference) are shown in **Table 6**.

Table 6. Process details for wastewater treatment plants with site-specific monitoring studies

Plant	Capacity (mgd)	Primary Clarifiers	Biological Treatment	Solids Retention Time (d)
SLRWRF	13.5	Yes	Conventional Activated Sludge	2-4
NCWRP	30	Yes	Nitrification-Denitrification	10
RTP	29.6	Yes	Trickling Filters + Solids Contact	1-2

Through involvement with both the Oceanside Pathogen Study and San Diego Pathogen Study, Trussell Technologies has been engaged with DDW regarding site-specific monitoring for wastewater pathogen reduction credit. A statistical analysis approach has been presented to and approved by DDW as an acceptable

methodology for calculating LRVs through secondary treatment. This approach has required the use of DDW-approved assays, a minimum number of samples, and a Monte Carlo simulation and statistical analysis of the resulting data.

Using this method, credit values have been estimated for the RTP and summarized alongside results from San Diego, Oceanside and Rose et al. (2004) facilities, as shown in **Table 7**. For this analysis, both cases considering (a) all facilities from Rose et al. (2004) as well as (b) only the facilities with flows larger than 10 MGD were analyzed. The analysis for the RTP was performed by combining data from the Food Safety Study and AWPF Pilot Study. These data provide insights into an estimation of the pathogen reduction that could be achieved through M1W's RTP.

The RTP is observed to achieve better levels of *Giardia* cyst and *Cryptosporidium* oocyst removal than the Rose et al. (2004) facilities. Data from Oceanside and San Diego suggest that virus removals up to 2 logs may be achievable; thus, the RTP might demonstrate 0.7-log to 2.0-log reduction of enteric virus if a well-run monitoring study was conducted at the facility.

Table 7. Pathogen LRVs through secondary treatment at M1W, San Diego, Oceanside, and facilities from Rose et al. (2004) via the statistical analysis approach accepted by DDW

Pathogen	RTP (M1W)	NCWRP (San Diego)	SLRWRF (Oceanside)	Rose et al. (2004)[4]	Rose et al. (2004)[5]
Enteric virus[1]	No data	0.8	2.0[2]	0.4	0.7
Giardia cysts[1]	2.5[2,3]	3.2	2.5[2]	0.2	0.9
Cryptosporidium oocysts[1]	0.3[2,3]	1.0	0.6[2]	0	0.2

1 – All non-detects are included in the analysis at the detection limit
2 – Deviates from the DDW-approved approach since a minimum of 20 samples was not taken
3 – Deviates from the DDW-approved approach since non-USEPA Method 1623/1693 data is included
4 – For reference; all facilities were analyzed
5 – For reference; only facilities larger than 10 mgd were analyzed

3.2 Pathogen Disinfection through Ozonation

Ozonation is increasingly being used for non-potable and potable reuse due to its ability to simultaneously disinfect and oxidize wastewater for chemical abatement/pretreatment. The USEPA's Surface Water Treatment Rule (SWTR) has established procedures for accounting for pathogen disinfection credit using ozone for drinking water applications. These guidelines require monitoring of ozone residual through the ozone contactor and calculating the corresponding CT (residual concentration x time) to determine pathogen inactivation credit from the USEPA's CT tables (USEPA, 1990). With ozone, the CT approach accounts for the rapid decay of ozone by allowing integration under the ozone decay curve to determine measured CT.

Applying this CT approach to potable reuse is challenging for secondary and tertiary wastewater matrices. One challenge is that ozone demand in wastewater is high, so it can be difficult to sustain the dissolved ozone residual necessary for CT calculation. A second challenge is that the high ozone doses necessary to generate sufficient residuals can form disinfection by-products (e.g., bromate, NDMA, formaldehyde).

M1W's AWPF design ozone dose does not yield significant ozone residuals, so attempting to apply the drinking water CT concept would require an increase in ozone dose, with associated drawbacks. Instead, the ozone system was designed based around an ozone to total organic carbon (O_3:TOC) ratio, which correlates to CEC destruction and improvement of water quality for downstream membrane operations, as determined from pilot testing. Based on these design assumptions, the AWPF ozonation system will initially be operated at an O_3:TOC ratio of approximately 0.5 g/g including correction for additional ozone demand exerted by nitrite[3]. This O_3:TOC ratio was determined to be sufficient to minimize fouling of microfiltration membranes while also providing significant removal of constituents of emerging concern (CECs).

The O_3:TOC ratio has also been shown to relate to virus inactivation, which offers a potential alternative to the traditional CT approach. Wedeco, the ozone system supplier for the PWM AWPF, conducted a disinfection validation study in 2014 and 2015 that was submitted to DDW for review and approval (Xylem, 2015). The report evaluated virus inactivation as a function of O_3:TOC ratio, and compared the 2014/2015 results with past validation studies done by Wedeco, APTwater, and H2O Engineering in California. A correlation was found to exist between virus inactivation and O_3:TOC ratio (see **Figure 4**), and it was confirmed that significant virus inactivation occurs rapidly, before generating a measurable CT.

Gamage, et al. (2013), did a similar study on filtered secondary effluents from five wastewater treatment plants in the U.S. This study was conducted at the bench-scale and their results were similar to the pilot-scale Wedeco study results, with MS2 inactivation ranging from approximately 5-log to 7.5-log with an O_3:TOC ratio of 0.5.

Therefore, it can be estimated that M1W's AWPF ozonation system will provide approximately 5-log to 7-log inactivation of MS2, at the design O_3:TOC ratio of 0.5. If M1W were to pursue virus inactivation credit for the AWPF ozonation system based on the applied O_3:TOC ratio, validation testing would be performed either at the full-scale AWPF or at its Demonstration Facility, depending on test conditions and test organism (e.g., native phage or MS2). Test results would be submitted to DDW for review and approval of the requested virus inactivation credit.

[3] Nitrite exerts an immediate ozone demand on a 1:1 stoichiometric basis.

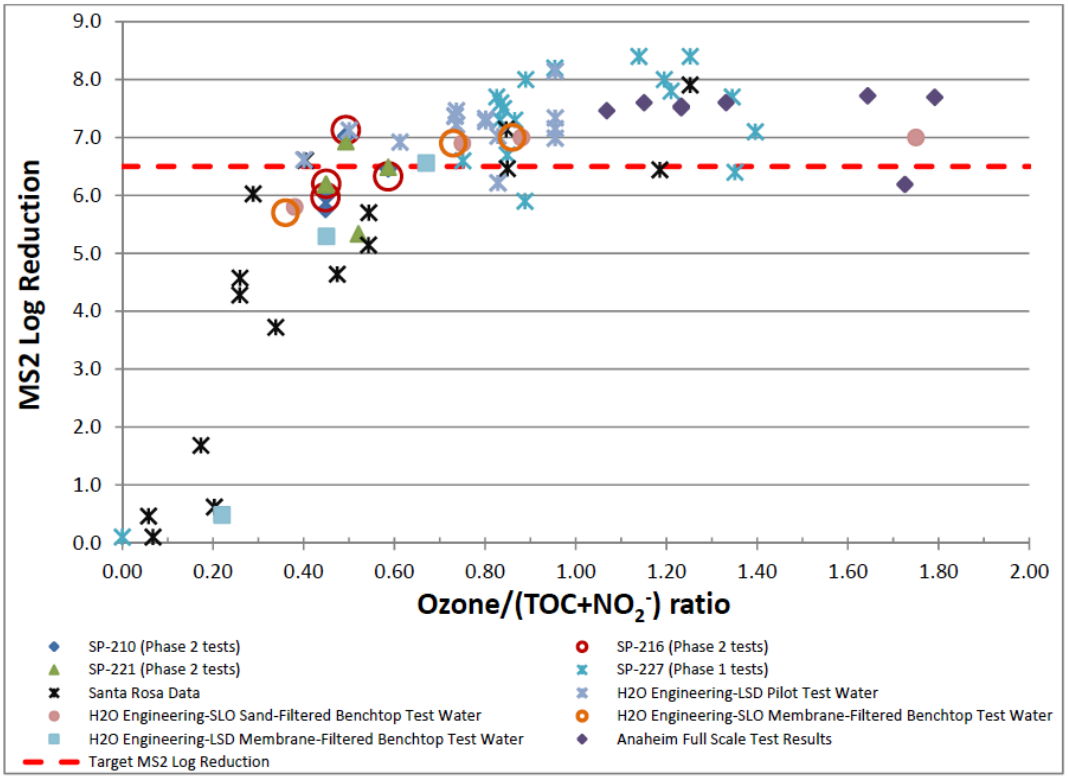

Figure 4. Compilation of Ozone Validation Studies for MS2 Inactivation as a Function of O3:TOC Ratio (Xylem, 2015)

3.3 Disinfection Credit through the Transmission Pipeline

The USEPA's Surface Water Treatment Rule (SWTR) requires potable water treatment facilities using a surface water as its source water to achieve a minimum of 4-log virus removal/inactivation and 3-log *Giardia* cyst removal/inactivation through treatment. The companion SWTR Guidance Manual (USEPA, 1990) defines conditions for receiving treatment credit for virus and *Giardia* cyst inactivation with commonly used water treatment disinfectants, such as free chlorine and combined chlorine (i.e., chloramines). Disinfection requirements are defined by the required CT_{10} that must be achieved for a specified log inactivation, as a function of water temperature and pH, where CT_{10} is the product of disinfectant residual concentration (C) and hydraulic detention time (T) multiplied a baffle factor (T_{10}/T[4]) which accounts for short-circuiting in a basin or pipeline.

The 5 MGD AWPF design includes provisions for use of chloramines in the conveyance system to control biological growth at the wellhead. Sodium hypochlorite will be dosed into the secondary effluent, which is rich in ammonia, forming

[4] T_{10} is the time for which 90 percent of the water has been in contact with at least the disinfectant residual concentration, C. A pipeline will have plug flow conditions, with an applicable baffle factor of 1.0 (USEPA, 1990).

chloramines. Chloramines will be carried through the ozone, MF, RO, and UV/H_2O_2 process, with provisions for boosting both the chlorine residual and the ammonia concentration, as needed, prior to the product water pump station and conveyance pipeline. The target wellhead residual combined chlorine concentration is 2 to 4 mg/L as Cl_2, as shown in **Table 8**. The relative location of the PWM injection wellfield to the AWPF PWPS is shown in **Figure 5**. The conveyance pipeline from the PWPS to the injection wellfield is 46,500 feet long (8.8 miles) and made up of pipe segments ranging in diameter from 24-inches to 16 inches.

Table 8. Design Total Chlorine and pH Targets, and Range of Expected Temperature, for the Purified Water at M1W's Injection Wellfield.

Parameter	Unit	Value
Temperature	°C	16 - 24
pH	pH units	7.5 - 8.5
Total Chlorine Residual	mg/L as Cl_2	2 - 4
AWPF Production Capacity	MGD	1.2 – 5.0

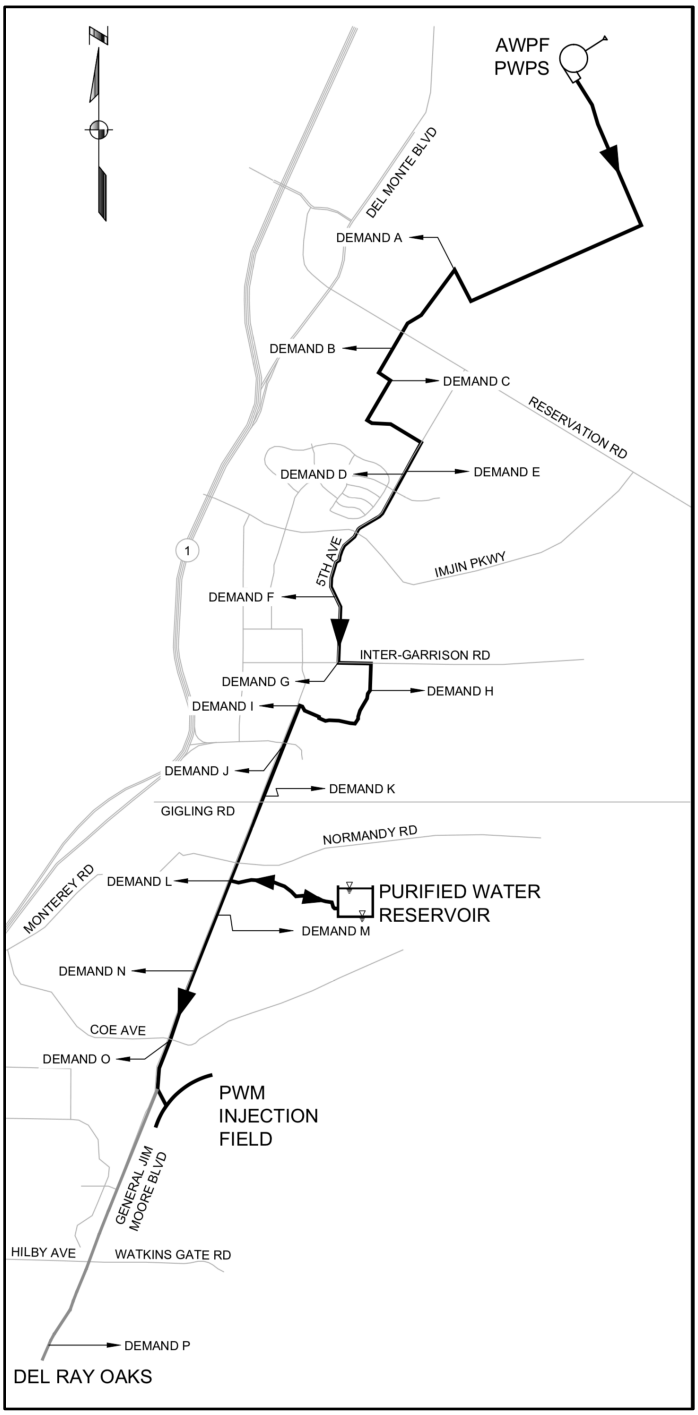

Figure 5. Schematic of the Relative Location of the AWPF Product Water Pump Station and the Purified Water Injection Wellfield, Along the Conveyance Pipeline

The USEPA's SWTR Guidance Manual includes the following caveat regarding use of the USEPA's chloramine CT requirements:

> *For systems applying ammonia ahead of chlorine or preformed chloramines, the EPA recommends that the system demonstrate effective virus inactivation according to the protocol in Appendix G, since the CT values for virus inactivation in Table E-13 only apply to the addition of chlorine prior to ammonia.*

Therefore, in order to claim pathogen inactivation credit for disinfection with chloramines in the conveyance pipeline, M1W will need to consider implementing one of the following two options:

- Add sodium hypochlorite to breakpoint the chloramines to free chlorine at the product water pump station, and then add ammonia at the entry of the conveyance pipeline to form chloramines. This option would allow use of the USEPA's chloramine CT tables for the conveyance pipeline, as well as potentially take advantage of free chlorine CT credit in the AWPF.
- Conduct a virus inactivation study in accordance with the protocol required by the USEPA's SWTR Guidance Manual (USEPA, 1990, Appendix G), using the recommended MS2 bacteriophage, to demonstrate virus inactivation that would be achieved in the conveyance pipeline with chloramines, given that ammonia is present prior to chlorine addition in the AWPF design.

Disinfection credit using the USEPA CT tables was estimated assuming breakpoint chlorination upstream of adding ammonia. Disinfection credit through the conveyance pipeline was calculated for the range of target purified water chlorine residual and pH conditions, temperatures, and flows. Although a pipeline should exhibit plug flow conditions, with a baffle factor close to 1.0, a conservative baffle factor of 0.9 was assumed in the LRV calculations shown in **Table 9**. The maximum virus and *Giardia* cyst credits available under the SWTR Guidance Manual are 4 logs 3 logs, respectively. Additional virus inactivation credit could be available during breakpoint chlorination.

Table 9. Virus and Giardia LRVs Available to PWM for Disinfection with Chloramines in the Conveyance Pipeline

Total Chlorine Residual at Injection Wellfield (mg/L as Cl_2)	Purified Water Production (MGD)	Hydraulic Detention Time[2] (hours)	Water Temp = 15ºC		Water Temp = 25ºC	
			Virus LRV (log)	Giardia LRV (log)	Virus LRV (log)	Giardia LRV (log)
2	1.2 (minimum)	21	4[1]	3[1]	4[1]	3[1]
4			4[1]	3[1]	4[1]	3[1]
2	5.0 (maximum)	5.1	2.4	1.1	4[1]	2.2
4			4[1]	2.2	4[1]	3[1]

[1]Limited by credits available in the Surface Water Treatment Rule Guidance Manual
[2]Conservatively assumes bypassing the Purified Water Reservoir

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