Fact Sheet - Legacy Pesticides Effects on Water Supply and Ocean Water Quality

In order to produce a stable supply of highly purified water for groundwater replenishment for the Pure Water Monterey Project (Pure Water Project), additional sources of water are needed. One source will be water collected from drains that underlie agricultural farmland in the Salinas Valley (agricultural drainage water). During the California Environmental Quality Act and permitting processes for the Pure Water Project, MRWPCA received comments expressing concerns about the presence of legacy pesticides - in particular DDT, dieldrin, and other organic pesticides – in the agricultural drainage water and if the purified water would be safe to drink and would it adversely affect the ability of the MRWPCA to comply with the California Ocean Plan and Monterey Bay Sanctuary Regulations.

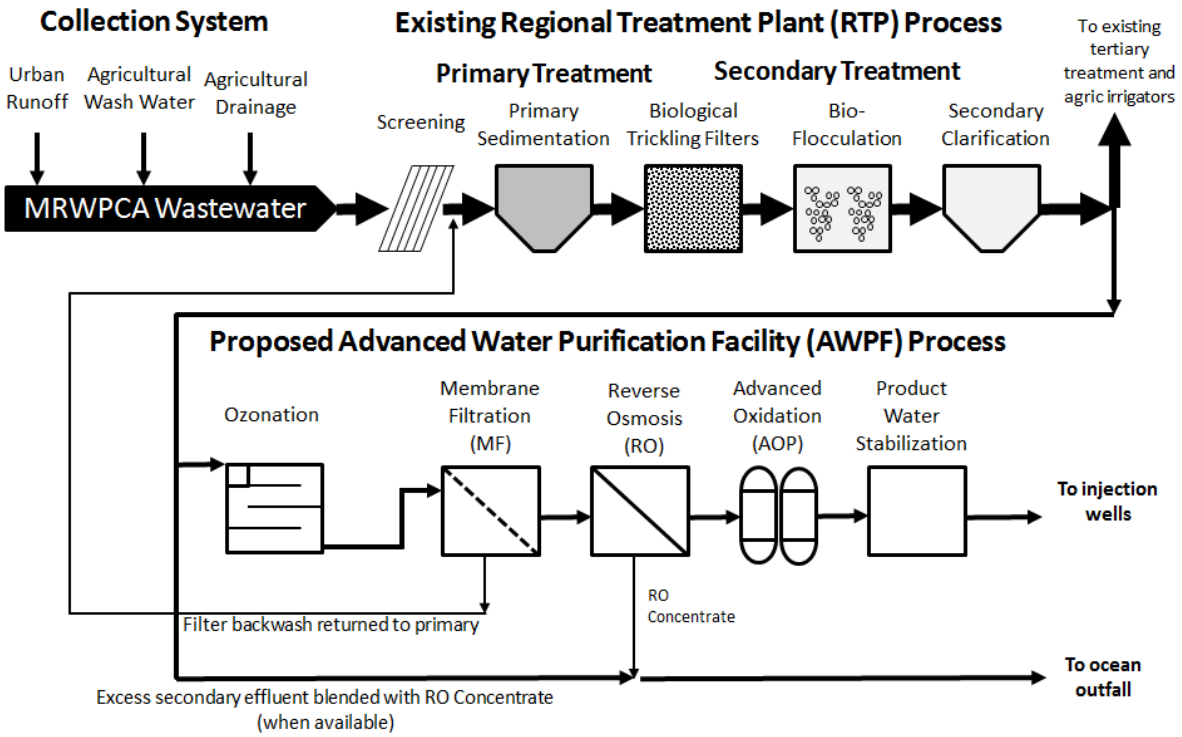
What is DDT? DDT (dichlorodiphenyltrichloroethane) is an insecticide developed in the 1940s. It was initially used with great effect to combat malaria, typhus, and the other insect-borne human diseases among both military and civilian populations. It also was effective for insect control in crop and livestock production, institutions, homes, and gardens.

Why is it called a legacy pesticide? DDT persists in the environment and can cause adverse health effects on wildlife. As a result, the State of California banned the sale and use of DDT in December 1970 (the national ban was enacted in 1972). Despite being out of use for more than 40 years, DDT and its related breakdown products (DDD and DDE) are highly persistent in the environment typically attached to soils, and thus are found the world over, including in soils in the Salinas Valley. The soil half-life for DDT is from 2 to 15 years (meaning the time required for half of the compound to degrade).

Is DDT present in the agricultural drainage water from the Salinas Valley? Sampling conducted for the Pure Water Project did not find DDT in untreated agricultural drainage water. DDE was found in one sample at a concentration of 21 nanograms per liter (ng/L). [1]

Does this present a health concern for the Pure Water Project? No. This pesticide was present in the ***untreated*** agricultural drainage water at concentrations 50 times less than the World Health Organization's drinking water guidance value of 1,000 ng/L (there is no U.S. drinking water standard for DDT). The agricultural drainage water will be collected and blended with other source waters and wastewater that do not contain DDT or its breakdown products[2] and thus will be diluted. The combined source waters will undergo eight steps of treatment at the MRWPCA's Regional Treatment Plant and the new Advanced Water Purification Facility as shown in the following process flow diagram.

[1] Note: 21 ng/L (21 parts per trillion or ppt) = 0.021microgram per liter (or 0.021 parts per billion) = 0.000021 milligram per liter (0.000021 parts per million). Note: 1 ppt is like 1 second in 32,000 years.
[2] Non-detectable with conventional analytical methods used for compliance purposes



Any DDT or its breakdown products coming into these treatment facilities will be removed or destroyed to levels below detection[3] as demonstrated by pilot testing and bench testing conducted by MRWPCA. In fact, the treatment to be provided by the Pure Water Project will effectively remove regulated chemical constituents present in the wastewater and new source waters to levels below regulatory limits and to safe levels prior to groundwater injection.

In order to more thoroughly evaluate the potential for dieldrin and DDx to exceed California Ocean Plan objectives, MRWPCA conducted bench-scale testing with ultra-low-level analytical methods to confirm that dieldrin and DDx would be effectively removed or destroyed through treatment, and not discharged to the ocean in the reverse osmosis by-product. Results of the bench scale testing found that dieldrin and DDx levels were below conventional analytical method detection limits in the secondary effluent (Advanced Water Purification Facility feed water) and significant dieldrin and DDx removal occurs through the Regional Treatment Plant, ozonation, and membrane filtration (91 to 99.9%) prior to the reverse osmosis treatment process.[4] The dieldrin and DDx remaining in the reverse osmosis feed water would be contained in the by-product reverse osmosis concentrate, which would be discharged through the outfall. The concentrations in the discharge are predicted to be below the Ocean Plan objective at the edge of the Zone of Initial Dilution, the designated compliance point. Other hydrophobic pesticides can be expected to be reduced similarly through the Regional Treatment Plant and Advanced Water Purification Facility to the reverse osmosis unit.

[3] Where detection limits are those of conventional analytical methods used for compliance purposes

[4] Additional DDx and dieldrin removal is expected through the ultraviolet advanced oxidation process that follows the reverse osmosis process prior to delivery of the purified recycled water to the Seaside Groundwater Basin for injection, although these processes were not bench tested.