

Irrigation Water Quality Evaluation Report

Cawelo Water District
Bakersfield, CA

April 11, 2016

Irrigation Water Quality Evaluation

- * Summary of findings from a detailed 500 page analysis
- * Report is available online at:
 - * Central Valley Regional Water Quality Control Board
 - * Cawelo Water District

Water Quality Study Team

- * **Analytical Data:** Amec Foster Wheeler Environmental & Infrastructure, Inc., Weck Laboratories, Inc.
- * **Evaluation:** Dr. Heriberto Robles, Enviro-Tox Services, Inc.

Credentials

- * **Heriberto Robles, M.S., Ph.D., D.A.B.T.**
 - * 35 years experience in environmental toxicology and human health and environmental risk assessment
 - * Certified by the American Board of Toxicology
 - * One of 3,125 in the world
 - * Expertise:
 - * Human and Occupational Toxicology
 - * Environmental Toxicology
 - * Human and Ecological Risk Assessment
 - * Environmental Chemical Fate and Transport

Water Quality Study Results

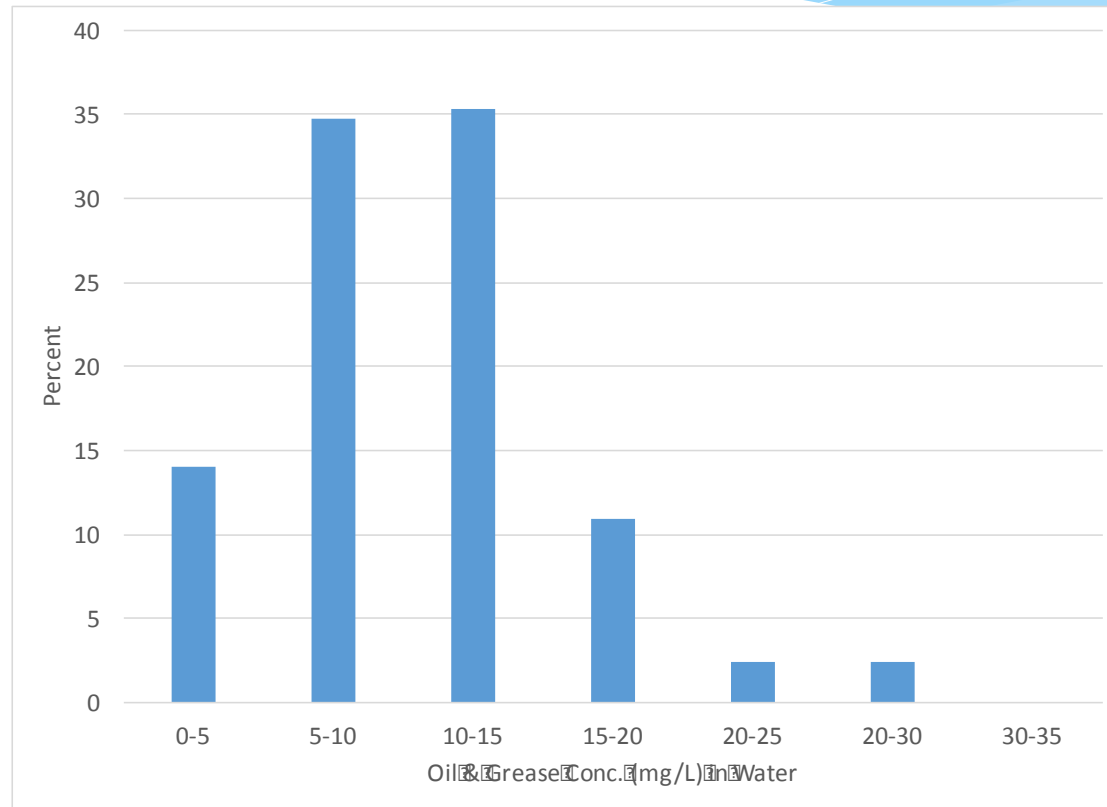
Initial Indications Confirm that Cawelo's Produced Water Supply is Safe

- * Meets regulatory standards for agricultural use
- * Organic compounds either at or below levels considered safe for drinking water
- * Water is safe for irrigation of crops

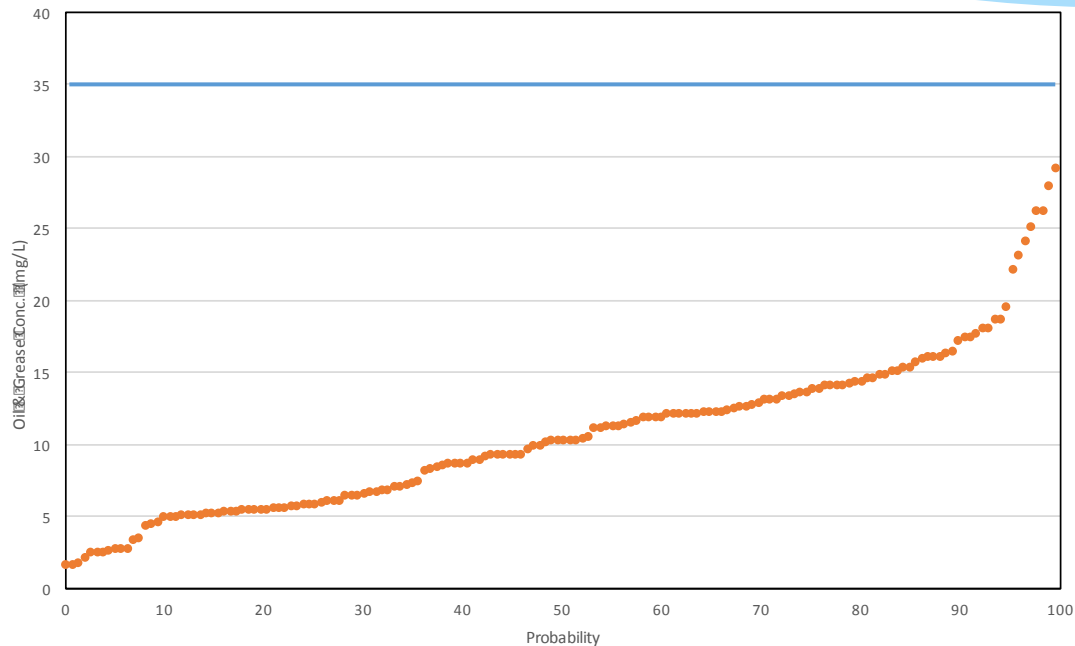
Cawelo Water District

- * Monitored by the Central Valley Regional Water Quality Control Board:
 - * Monthly sampling, testing and reporting
 - * Water tested for over 70 different constituents of concern (COCs)

Oil & Grease in Water



Oil & Grease in Water



Legend:

- Maximum Allowable Concentration
- Oil and Grease Concentration (mg/L) in Water

Data Evaluation

- * Data quality and quantity
- * Evaluation of analytical methods
- * Evaluation of sample quantitation limits
- * Evaluation of qualified data
- * Water quality data
- * Crop analytical data

Water Quality Standards

- * **Water Quality Standards:**
 - * U.S. EPA regional screening levels for tap water
 - * Cal/EPA Environmental screening levels
- * Drinking water standards ensure the highest and strictest (safest) water quality standards were applied for testing

Produced Water Quality

- * **Petroleum Hydrocarbons:** nontoxic to plants
 - * Detected concentration = 80 parts per billion
 - * 750-times below safe concentration for drinking water
- * **Acetone:** a naturally occurring compound produced by humans, animals, plants and algae
 - * Detected concentration = 50 parts per billion
 - * 280-times below safe concentration for drinking water

Crop Sampling and Analysis

Results Confirmed Crops Irrigated with Produced Water Safe for Public Consumption

- * COCs in the water were not detected in the crops
- * Crops irrigated with produced water have the same composition as crops grown with any other water supply

Crop Chemical Analysis Results

- * **Organic Oils:** Naturally occurring in almonds and pistachios
 - * Detected in both test and control samples
 - * Not detected in grapes
- * **Acetone:** Naturally occurring in plants, animals and humans
 - * Detected in both test and control samples, all crops tested
- * **Methylene Chloride:** Not known to be petroleum-derived chemical
 - * Detected in one test almond sample and one pistachio control sample
 - * Maximum detected concentration in the control sample

Conclusion

Produced Water: Constituent Levels Safe for Agricultural Use

- * Organic compounds are either at or below levels considered safe for drinking water
- * Additional crop test results and reports are expected in the coming months

Recommendations

Continue Pond Water Sampling and Analysis

- * Total petroleum hydrocarbons using U.S. EPA Method 8015B
- * Volatile organic compounds using U.S. EPA Method 8260B
- * Polycyclic aromatic hydrocarbons using U.S. EPA Method 8270C-SIM