

# 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

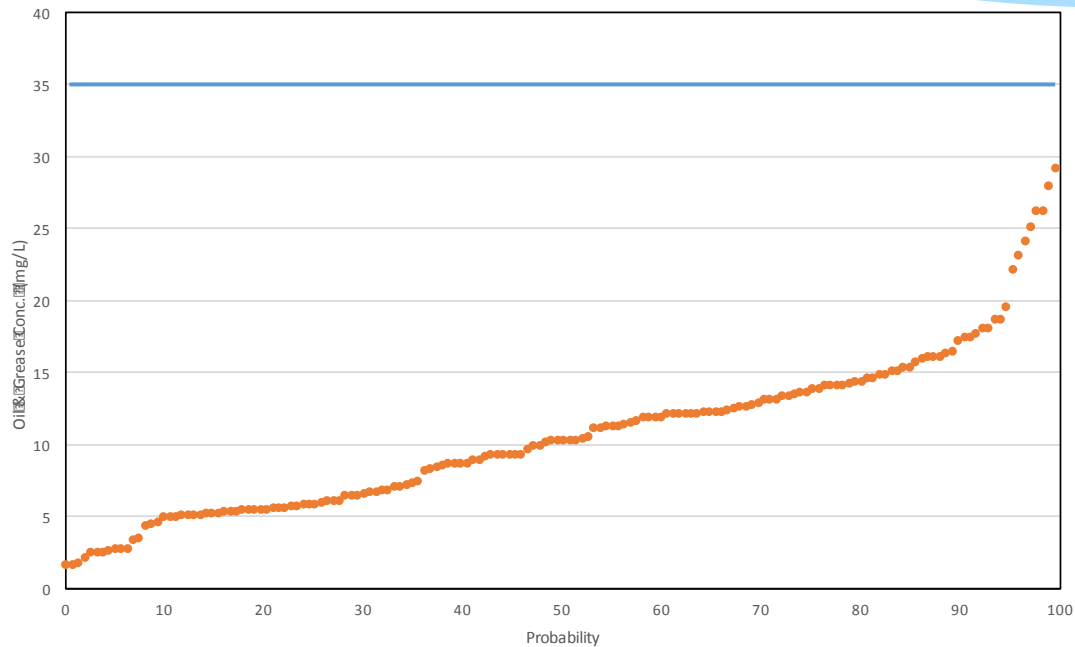
## **Initial Indications Confirm that Cawelo's Produced Water Supply is Safe**

- \* 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



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