CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2025-XXXX

# WASTE DISCHARGE REQUIREMENTS FOR TRIO PETROLEUM LLC AND CAWELO WATER DISTRICT

# PRODUCED WASTEWATER RECLAMATION PROJECT SECTION 3 TREATMENT FACILITY KERN FRONT OIL FIELD KERN COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Central Valley Water Board) finds that:

1. On 19 October 2021, a Report of Waste Discharge was submitted to the Central Valley Water Board that proposed the reuse of treated oil field produced wastewater (produced wastewater or discharge) from an oil treatment facility to an irrigation management company as a new water supply for irrigation. A revised Report of Waste Discharge and supplemental technical reports (hereafter collectively referred to as RWD) were submitted on 3 July 2024 and 7 November 2024. On 26 February 2025, the final Notice of Determination for a Mitigated Negative Declaration was submitted to the Central Valley Water Board demonstrating that the proposed project has satisfied the requirements of the California Environmental Quality Act (CEQA). The RWD was prepared by Kennedy Jenks Consultants and the Mitigated Negative Declaration was prepared by Environmental Science Associates. Each of these documents were prepared on behalf of Trio Petroleum LLC (Trio) and Cawelo Water District (Cawelo).

2. Trio owns and operates the Section 3 Treatment Facility (Section 3 Facility). Produced wastewater generated at this facility will be piped to a new surface impoundment (reservoir) constructed, owned, and operated by Cawelo.

3. Cawelo owns the land on which the new reservoir (Cawelo's Reservoir) will be located. Cawelo will operate the reservoir as a temporary storage unit. From the reservoir, produced wastewater will be pumped into Cawelo's water distribution network to be reused for the irrigation of cropland and/or groundwater recharge.

4. Cawelo owns and operates a groundwater recharge facility (Famoso Basins) that has the potential to receive blended produced wastewater during the wet season when irrigation demand is low.

5. Trio and Cawelo (hereafter jointly referred to as Discharger) are jointly responsible for compliance with these Waste Discharge Requirements (WDRs).

## Background and Current Practices

6. Trio is an oil and natural gas exploration and production company that owns and operates the Section 3 Facility in the Kern Front Oil Field (Section 3, Township 28 South, Range 27 East, Mount Diablo Base and Meridian (MDB&M)), as shown on Attachment A, which is attached hereto and made part of this Order by reference.

7. Cawelo was formed for the purpose of obtaining a "supplemental or partial water supply" and delivering it for irrigation of crops within its service territory. Cawelo uses imported surface water, pumped groundwater, and produced wastewater to meet the irrigation demands of farmers within its service territory.

8. Cawelo's Reservoir will have a storage capacity of 13 acre-feet and will be located in Section 10, Township 28 S, Range 27 E, MDB&M. From Cawelo's Reservoir, a 16-inch diameter pipeline will transfer produced wastewater approximately two miles to the west, where it will be connected to Cawelo's distribution network. Attachment B, which is attached hereto and made part of this Order by reference, provides a site map of the Section 3 Facility and Cawelo's Reservoir.

9. Cawelo's distribution network covers approximately 45,000 acres and is generally between State Highway 99 and Highway 65 as shown on Attachment A. Included in this network are the Famoso Basins, Reservoir B, the Distribution Canal, and Pump Station "E" and "F".

10. The Famoso Basins are in Section 8, Township 27 S, Range 26 E, MDB&M. During the irrigation season, blended produced wastewater will be reused for irrigation of crops. During the non-irrigation season, blended produced wastewater will be used for irrigation as needed. During periods where demand is below the incoming rate, blended produced wastewater will be pumped to the Famoso Basins for groundwater recharge. The Famoso Basins include seven basins that have a total recharge area of approximately 374 acres and an operational storage capacity of 834 acre-feet with two feet of freeboard. Emergency storage capacity is 1,208 acre-feet with one-foot of freeboard. Attachment C, which is attached hereto and made part of this Order by reference, provides a site map of the Famoso Basins and groundwater monitoring well network.

11. The primary sources of irrigation water in the region are groundwater and surface water from the Kern River and State Water Project. In addition to these sources, Cawelo receives produced wastewater from Chevron USA, Inc., and California Resources Production Corporation, regulated under Waste Discharge Requirements Order Nos. R5-2012-0058 and R5-2012-0059, respectively. Due to the challenges facing the region related to drought and water shortages, Cawelo and other Water Districts in the area have looked to other sources to supplement the supply of water needed for the area. New sources of water such as recycling of produced wastewater, where the quality of

the water is suitable, may be needed to supplement water resources to support agricultural activities in this part of Kern County.

## Proposed Discharge

12. Trio currently owns and operates five petroleum wells in the Kern Front Oil Field. Upon completion of Cawelo's Reservoir, Trio anticipates that up to 12,000 barrels of produced wastewater will be generated per day and delivered to Cawelo for reuse. Included in the RWD is Trio's tentative plan to expand production beyond the current five wells. The RWD identifies an additional 36 petroleum wells that Trio intends to drill in the near future, following approval by the California Geologic Energy Management Division (CalGEM). The RWD also states that the project is anticipated to be fully built out in five years, and will consist of approximately 70 petroleum wells producing up to 70,000 barrels per day. The RWD identifies the general area where the remaining petroleum wells will be constructed, but final locations will depend on data obtained during project development.

13. Trio recovers crude oil from petroleum wells in the Kern Front Oil Field. The process produces significant amounts of produced wastewater that is treated at the Section 3 Facility. Attachment D, which is attached hereto and made part of this Order by reference, provides a flow schematic of produced wastewater from the Section 3 Facility to Cawelo's distribution network. Treatment starts with the production fluid entering a gas scrubber, then gravity separation of oil and water using a heated wash tank, after which separated water is sent to a Wemco unit. The Wemco unit uses mechanical agitation to induce the formation of small bubbles to capture oil that is then skimmed off and returned to the wash tank. Produced wastewater from the Wemco Unit is pumped to Cawelo's Reservoir for storage and reuse.

14. The RWD includes analytical results of four produced wastewater samples collected in 2020, 2021, and 2022. Table 1 of this Order provides a brief overview of the produced wastewater for select constituents.

**Table 1. Trio Produced Wastewater Quality**

| Constituent | Units | Result Range |
|---|---|---|
| Total Oil and Grease | mg/L [1] | 180 – 1,200 |
| Electrical Conductivity (EC) | µmhos/cm [2] | 610 - 650 |
| Total Dissolved Solids | mg/L | 320 - 460 |
| Chloride | mg/L | 77 - 96 |
| Sulfate | mg/L | <0.40 |
| Boron | mg/L | 0.43 - 0.54 |
| Ammonia as N | mg/L | 0.18 – 0.41 |
| Nitrate as N | mg/L | <0.40 |

| Constituent | Units | Result Range |
|---|---|---|
| Total Kjeldahl N | mg/L | 1 – 7.1 |
| Total N | mg/L | 1 – 7.1 |
| Total Organic Carbon | mg/L | 88 - 290 |
| Arsenic | mg/L | <0.002 - 0.0048 |
| Benzene | µg/L [3] | <10 |
| Ethylbenzene | µg/L | <10 |
| Toluene | µg/L | <10 |
| Xylenes (total) | µg/L | <10 |

1. mg/L = milligrams per liter.
2. umhos/cm = micromhos per centimeter.
3. ug/L = micrograms per liter.

The complete list of analytical results for produced wastewater is available in Attachment 1 of the Information Sheet, which is attached hereto and made part of this Order by reference.

15. The Discharger collected produced wastewater samples on 3 March 2020, 7 July 2021, and duplicate filtered and unfiltered samples were taken on 25 August 2022, which were submitted to an Environmental Laboratory Accreditation Program (ELAP) certified laboratory for chemical analysis. The samples were analyzed for the following: volatile organic compounds, polycyclic aromatic hydrocarbons, oil and grease, total petroleum hydrocarbons, general minerals, stable isotopes, and metals. Detectable analytical results are summarized in Table 2 on the next page.

**Table 2. Detectable Analytical Results**

| Constituent | Sample Date: | 3/3/2020 | 7/7/2021 | 8/25/2022 | 8/25/2022 | 8/25/2022 | 8/25/2022 | Maximum Contaminant Levels (MCLs) [1] |
|---|---|---|---|---|---|---|---|---|
| | | | | Unfiltered | Filtered | Duplicate | | |
| | Units | | | | | Unfiltered | Filtered | |
| Total Oil and Grease | mg/L [2] | 500 | 180 | 1,200 | - | 780 | - | - |
| Diesel Range Hydrocarbons | mg/L | 77 | 30 | 170 | - | 180 | - | - |
| Gasoline Range Hydrocarbons | mg/L | 2,300 | 160 | 2,900 | - | 4,500 | - | - |
| Motor Oil Range Hydrocarbons | mg/L | 150 | 28 | 300 | - | 320 | - | - |
| Boron | mg/L | 0.51 | 0.43 | 0.52 | - | 0.54 | - | - |
| Calcium | mg/L | 5.4 | 2.9 | 2.4 | - | 2.5 | - | - |
| Chloride | mg/L | 96 | 77 | 85 | - | 86 | - | 250 [3] |
| Electrical Conductivity (EC) | µmhos/cm[4] | 650 | 610 | 620 | - | 630 | - | 900 [3] |
| Magnesium | mg/L | 0.73 | 0.15 | 0.17 | - | 0.17 | - | - |
| pH | pH Units | 8.1 | 8.8 | 8.5 | - | 8.7 | - | - |
| Potassium | mg/L | 19 | 4.1 | 5 | - | 5 | - | - |
| Sodium | mg/L | 140 | 120 | 130 | - | 140 | - | - |
| Sulfate | mg/L | <0.40 | <0.40 | <0.40 | - | <0.40 | - | 250 [3] |
| Total Alkalinity as CaCO3 | mg/L | 180 | 190 | 170 | - | 170 | - | - |
| Total Dissolved Solids | mg/L | 460 | 320 | 360 | - | 350 | - | 500 [3] |

| **Constituent** | **Sample Date:** | **3/3/2020** | **7/7/2021** | **8/25/2022** | **8/25/2022** | **8/25/2022** | **8/25/2022** | **Maximum Contaminant Levels (MCLs) [1]** |
|---|---|---|---|---|---|---|---|---|
| | | | | **Unfiltered** | **Filtered** | **Duplicate** | | |
| | **Units** | | | | | **Unfiltered** | **Filtered** | |
| Total Suspended Solids | mg/L | 310 | 140 | 1,400 | - | 1,000 | - | - |
| Bicarbonate as CaCO3 (HCO3) | mg/L | 180 | 160 | 140 | - | 130 | - | - |
| Carbonate as CaCO3 (CO3) | mg/L | <10 | 24 | 23 | - | 39 | - | - |
| Hydroxide as CaCO3 (OH) | mg/L | <10 | <20 | <20 | - | <20 | - | - |
| Ammonia as N | mg/L | - | 0.18 | 0.41 | - | 0.46 | - | - |
| Nitrate as N | mg/L | <0.40 | <0.40 | <0.40 | - | <0.40 | - | 10 [5] |
| Total Kjeldahl N | mg/L | - | 1 | 7.1 | - | 6 | - | - |
| Total N | mg/L | - | 1 | 7.1 | - | 6 | - | - |
| Total Organic Carbon | mg/L | 290 | 88 | <100 | - | 150 | - | |
| Arsenic | mg/L | 0.0048 | <0.002 | <0.004 | - | <0.004 | - | 0.01 [5] |
| Barium | mg/L | 0.099 | 0.21 | 0.44 | - | 0.32 | - | 1 [5] |
| Copper | mg/L | <0.002 | 0.0026 | 0.01 | - | <0.004 | - | 1.3 [5] |
| Iron | mg/L | 0.16 | <0.2 | 3.2 | - | 1.9 | - | 0.3 [3] |
| Lead | mg/L | <0.001 | <0.001 | 0.0024 | - | <0.002 | - | 0.015 [5] |
| Lithium | mg/L | 0.025 | <0.05 | <0.05 | - | <0.05 | - | - |
| Manganese | mg/L | 0.014 | 0.045 | 0.069 | - | 0.034 | - | 0.05 [3] |
| Molybdenum | mg/L | 0.0072 | 0.0062 | 0.0062 | - | 0.0066 | - | - |
| Nickel | mg/L | 0.0037 | 0.0028 | 0.01 | - | 0.0046 | - | 0.1 [5] |

| **Constituent** | **Sample Date:** | **3/3/2020** | **7/7/2021** | **8/25/2022** | **8/25/2022** | **8/25/2022** | **8/25/2022** | **Maximum Contaminant Levels (MCLs) [1]** |
|---|---|---|---|---|---|---|---|---|
| | | | | **Unfiltered** | **Filtered** | **Duplicate** | | |
| | **Units** | | | | | **Unfiltered** | **Filtered** | |
| Selenium | mg/L | 0.015 | 0.0012 | 0.0024 | - | <0.002 | - | 0.05 [5] |
| Strontium | mg/L | 0.051 | <0.02 | 0.035 | - | 0.03 | - | - |
| Vanadium | mg/L | <0.005 | <0.005 | 0.013 | - | <0.01 | - | - |
| Zinc | mg/L | <0.005 | 0.048 | 0.056 | - | <0.016 | - | 5 [3] |
| Chrysene | µg/L [6] | 6.7 | <2.2 | 12 | - | 11 | - | - |
| Gross Alpha | pCi/L [7] | 10.6 | -0.09 | 3.03 | 0.663 | 0 | -0.121 | 15 [5] |
| Gross Beta | pCi/L | 42.2 | 2.51 | -18 | 1.94 | 15.6 | 1.62 | - |
| Radium-226 | pCi/L | 12.2 | 1.67 | 0.755 | -0.056 | 2.46 | -0.0159 | - |
| Radium-228 | pCi/L | 7.97 | 16.3 | 4.79 | 0.714 | -0.445 | 0.47 | - |
| Radium-226+228 | pCi/L | 20.17 | 17.97 | 5.55 | 0.714 | 2.46 | 0.47 | 5 [5] |

[1] Maximum Contaminant Levels are drinking water standards adopted by the State Water Resources Control Board (SWRCB) pursuant to the California Safe Drinking Water Act.

[2] mg/L = milligrams per liter.

[3] Secondary Maximum Contaminant Level – Derived from human welfare considerations (e.g., taste, order, or laundry staining).

[4] umhos/cm = micromhos per centimeter.

[5] Primary Maximum Contaminant Level - Derived from health-based criteria. Primary Maximum Contaminant Levels also include technologic and economic considerations based on the feasibility of achieving and monitoring for these concentrations in drinking water supply systems and at the tap.

[6] ug/L = micrograms per liter.

[7] pCi/L = picocuries per liter.

The analyses show detections for several constituents, including a polycyclic aromatic hydrocarbon, metals, and radionuclides; however, the majority of these detections are below the maximum contaminant levels (MCLs), where the constituent is present. For radium 226+228 and iron, analytical results were found to be greater than the primary and secondary maximum contaminant level (MCL), respectively. For radium 226+228, unfiltered samples yielded concentrations greater than the primary MCL of 5 pCi/L. Since the unfiltered samples consisted of untreated produced wastewater, filtered duplicate samples were collected of untreated produced wastewater, which yielded concentrations of 0.714 and 0.47 pCi/L. The RWD states that the filtered sample results are a better representation of the quality of produced wastewater after treatment, which would represent the quality of produced wastewater that would be reused for irrigation under this project. For iron, the RWD states that this is typically not a constituent associated with oil production and is generally not considered a threat to the environment.

16. Produced wastewater from the Section 3 Facility will be pumped to Cawelo's Reservoir. After Cawelo's Reservoir, produced wastewater will be pumped to Cawelo's distribution canal where it will be blended with groundwater, surface water, and produced wastewater regulated under Waste Discharge Requirements Oder Nos. R5-2012-0058 and R5-2012-0059. Blended produced wastewater in Cawelo's distribution canal will subsequently be reused for the irrigation of crops for human consumption and/or discharged to Famoso Basins for groundwater recharge.

## Water Reclamation Policies

17. The *Water Quality Control Plan for the Tulare Lake Basin, Third Edition – revised May 2018,* (hereafter Basin Plan) specifically states that, "blending of wastewater with surface or groundwater to promote beneficial reuse of wastewater in water short areas may be allowed where the Regional Water Board determines such reuse is consistent with other regulatory policies set forth or referenced herein."

18. The Basin Plan states further, "The irrigation season in the Tulare Lake Basin area typically extends 9 to 10 months, but monthly water usage varies widely. To maximize reuse, users should provide water storage and regulating reservoirs, or percolation ponds that could be used for groundwater recharge of surplus waters when there is no irrigation demand."

19. This Order implements the Basin Plan, which designates beneficial uses for surface water and groundwater and establishes water quality objectives (WQOs) necessary to preserve such beneficial uses.

## Site-Specific Conditions

20. Cawelo's service territory is characterized by hot dry summers and cooler, humid winters. The rainy season generally extends from November through March. Average pan evaporation for the area is in excess of 74 inches per year. Average annual precipitation is about 6.5 inches and annual evapotranspiration is 54.6 inches with monthly average evapotranspiration rates ranging from 1.3 inches in January and December to 8.1 inches in July (California Irrigation Management Information System (CIMIS) Shafter Station # 5). The 100-year, 24-hour maximum precipitation is about 2.9 inches, based on maps obtained from the Kern County Resource Management Agency, Engineering, Survey and Permit Services, Floodplain Management Section.

21. The general area of the Famoso Basins consists of older alluvial soil with a geologic age of Pleistocene. Poso Creek has cut down through this older soil and deposited a relatively narrow and thin area of recent alluvium. The natural soil profile at the Famoso Basins is comprised of a thin (2 to 6 feet) layer of silty sand with trace clay underlain by interbedded and laterally discontinuous layers of clean sand, silty sand, sandy silt, and clayey sand. Previous excavations within Poso Creek revealed a 5 to 6 foot deep scour zone within the bottom of the Poso Creek channel. This scour zone consists of clean sand. The spreading basin berms were created with engineered fill generated from shallow cuts in the upper silty sand horizon. Prior to constructing the berms, the surface soil (silty sand) was excavated to remove disturbed near-surface soil and remnant desiccation cracks. The exposed excavation surface was scarified and compacted. This site preparation for the berms resulted in engineered fill extending at least two feet below original grade for the berms along Poso Creek.

22. The total land use area within Cawelo is about 45,000 acres. Non-agricultural lands comprise about 11 percent of the total area. There is also 12.8 percent that is not farmed. Of the remaining 76.2 percent, 99 percent is planted in permanent crops of citrus, almonds, pistachios, apples, and vineyards irrigated by surface application or drip systems. The remaining one percent of irrigated crops includes alfalfa, potatoes, vegetables, and melons. The primary crops grown within five miles of the Famoso Basins include grapes, citrus, deciduous fruits and nuts according to the land use maps prepared by California Department of Water Resources (DWR) and District records.

23. Farmers are anticipated to grow tree crops (including but not limited to citrus and nuts), grains, oilseed, and silage crops on the proposed cropland, but the crop types are subject to change. The project will not provide produced wastewater directly to livestock or to fields where livestock are present, but may use this water for irrigation of grazing land. A change to the scope of the project will require the Discharger to submit a revised Report of Waste Discharge to the Central Valley Water Board for the new or modified discharge.

24. According to Federal Emergency Management Agency (FEMA) map number 06029C1325E, the Section 3 Facility and Cawelo's Reservoir are not within the 100-year return frequency flood zones.

25. According to the Web Soil Survey published by the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), soils in the project area consist of Chanac-Pleito complex and Chanac clay loam.

26. According to the report *Soil Survey of Kern County, Northeastern Part, and Southeastern Part of Tulare County, California*, published by the USDA NRCS, Chanac-Pleito complex and Chanac clay loam soil types both have a drainage class of "Well Drained." According to the *Soil Survey Manual (Agriculture Handbook No. 18)*, published by the USDA, the drainage class refers to the frequency and duration of wet periods under which the soil was developed. The drainage class consists of seven categories in which "well drained" is ranked third as the maximum draining soil type.

## Basin Plan, Beneficial Uses, and Water Quality Objectives

27. The Basin Plan designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Water Board. The intended use of the water discharged to Cawelo's Reservoir, Cawelo's distribution network, and the Famoso Basins is agricultural supply and groundwater recharge (during low irrigation demands). Surface water flows in the area are to the South Valley Floor hydrologic unit, Valley Floor Waters. The surface water beneficial uses of Valley Floor Waters, as stated in the Basin Plan for Hydrologic Area No. 558, are agricultural supply (AGR); industrial service supply (IND); industrial process supply (PRO); water contact recreation (REC-1); non-contact water recreation (REC-2); warm freshwater habitat (WARM); wildlife habitat (WILD); rare, threatened, or endangered species (RARE); and groundwater recharge (GWR).

28. The project is located in the South Valley Floor Hydrologic Unit, which resides in the Kern County Basin. The Basin Plan has Detailed Analysis Units (DAU) assigned for each hydrologic unit in the Tulare Lake Basin, which identify the beneficial uses of groundwater for specific areas. The project is located in the DAU 257 for the Kern County Basin, which has designated beneficial uses for municipal and domestic supply (MUN), agricultural supply (AGR), industrial supply (IND), and water contact recreation (REC-1).

29. Water in the Tulare Lake Basin is in short supply, requiring importation of surface water from other parts of the State. The Basin Plan encourages use of recycled water on irrigated crops wherever feasible and indicates that evaporation of recyclable wastewater is not an acceptable permanent disposal method where the opportunity exists to replace existing uses or proposed use of fresh water with recycled water.

30. The Basin Plan includes a water quality objective for chemical constituents that, at a minimum, require waters designated as MUN to meet the State drinking water MCLs specified in Title 22. The Basin Plan recognizes that the Central Valley Water Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.

31. The Basin Plan states that when compliance with a narrative objective is required to protect specific beneficial uses, the Central Valley Water Board will, on a case-by-case basis, adopt numerical limitations to implement the narrative objective.

32. In the absence of specific numerical water quality limits, the Basin Plan methodology is to consider any relevant published criteria. General salt tolerance guidelines, such as *Water Quality for Agriculture* by Ayers and Westcot and similar references, indicate that yield reductions in nearly all crops are not evident when irrigating with water having an electrical conductivity (EC) less than 700 umhos/cm. There is, however, an eight- to ten-fold range in salt tolerance for agricultural crops. It is possible to achieve full yield potential for some crops with waters having EC up to 3,000 – 5,000 umhos/cm within the tolerance of the crop.

33. According to *Water Quality for Agriculture* by Ayers and Westcot, boron is an essential element for plant growth that has the potential to become toxic at elevated concentrations. The yield for specific crops is not impacted until the toxicity threshold is reached resulting in a variety of symptoms displayed on the trunk, limbs, leaves, and/or crops. *Water Quality for Agriculture* has a relative boron tolerance threshold category for a variety of crops that ranges from “Very Sensitive” (<0.5 mg/l) to “Very Tolerant” (6-15 mg/l). Crops related to this project that are discussed in *Water Quality for Agriculture* are displayed in Table 3 below.

**Table 3. Crop Sensitivity for Boron**

| Crop(s) | Boron Tolerance Category | Boron Range (mg/l) |
|---|---|---|
| Lemon | Very Sensitive | < 0.5 |
| Orange, Grape, Walnut | Sensitive | 0.5 – 0.75 |
| Wheat, Barley | Moderately Sensitive | 0.75 – 1.0 |
| Alfalfa | Tolerant | 4.0 – 6.0 |

34. The Basin Plan contains the following language regarding oil field discharges:
    - The Basin Plan policy for disposal of produced wastewater includes effluent limits for EC, chloride, and boron of 1,000 umhos/cm, 200 mg/L, and 1.0 mg/L, respectively.
    - In 1982, the Central Valley Water Board amended the Basin Plan to allow discharges of produced wastewater to exceed the above limits to facilitate use for irrigation and other beneficial uses where the exception would not cause an

exceedance of a water quality objective. The Basin Plan, therefore, provides some flexibility to allow produced wastewater exceeding Basin Plan salinity limits to be used for agricultural use in water short areas, provided the discharger first successfully demonstrates to the Central Valley Water Board that the increases will not cause exceedances of water quality objectives. Based on this amendment, this Order includes annual average limits that have the potential to allow single exceedances of the above limits. Central Valley Water Board staff finds that an average annual effluent limitation for the above parameters will provide some flexibility for the Discharger while sufficiently protecting water quality.

35. The rationale for specific effluent limits within this Order follow:
    - **Oil and Grease**: An effluent limit of 35 mg/L for Oil and Grease is established in 40 CFR Part 435.50, Oil and Grease Extraction Point Source Category, Agricultural and Wildlife Water Use Subcategory. While the discharges to land described here are not subject to federal requirements, the Basin Plan requires the Discharger to comply with, or justify a departure from, effluent limitations set forth in 40 CFR 400 et seq., if the discharge is to land. The Discharger has not provided such a justification, but rather has shown that the Section 3 Facility is capable of meeting the oil and grease limit of 35 mg/L. Thus, the limit is applied for this Order.
    - **Electrical Conductivity**: This Order applies the Basin Plan effluent limit for produced wastewater of 1,000 µmhos/cm as an annual average for the discharge to Cawelo.
    - **Boron**: This Order applies the Basin Plan effluent limit of 1.0 mg/L for produced wastewater as an annual average for the discharge to Cawelo.
    - **Chloride:** This Order applies the Basin Plan effluent limit of 200 mg/L for produced wastewater as an annual average for the discharge to Cawelo.

36. The project will provide a new source of irrigation water for cropland in Kern County. Benefits for the reuse of produced wastewater for irrigation include the following:
    - Reduces the demand of groundwater in the area from agricultural uses;
    - Recycles produced wastewater that historically has been injected via water disposal wells; and
    - Provides a drought tolerant source of water for irrigation.

## Groundwater Considerations

37. Basin Plan water quality objectives to protect the beneficial uses of groundwater include numeric and narrative objectives, including objectives for chemical constituents, toxicity of groundwater, and taste and odor. The toxicity objective requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental

physiological responses in humans, plants, or animals. The chemical constituent objective states groundwater shall not contain chemical constituents in concentrations that adversely affect any beneficial use or that exceed the MCLs in Title 22 of the CCR. The Basin Plan requires the application of the most stringent objective necessary to ensure that groundwater does not contain produced wastewater constituents such as chemical constituents, toxic substances, radionuclides, or taste and odor producing substances in concentrations that adversely affect domestic drinking water supply, agricultural supply, or any other beneficial use.

38. The RWD states that Cawelo's Reservoir will be constructed using a high-density polyethylene liner that will prevent the infiltration of produced wastewater to groundwater. Due to the use of a liner for Cawelo's Reservoir, the RWD does not include an investigation of groundwater. Under the Provisions in this Order, the Discharger will be required to demonstrate that Cawelo's Reservoir has been designed and constructed in such a manner that it will prevent the infiltration of produced wastewater to groundwater. If the Discharger is unable to make this demonstration, a groundwater investigation will be required.

39. Under Waste Discharge Requirements Order Nos. R5-2012-0058 and R5-2012-0059, which regulate the discharge of blended produced wastewater to the Famoso Basins for groundwater recharge, Cawelo Water District is required to conduct groundwater monitoring. Groundwater monitoring is achieved using a groundwater monitoring well network that consists of six wells. Specifications regarding these groundwater wells is provided in Table 4 below.

**Table 4. Groundwater Monitoring Well Network Details**

| Well | Total Depth | Ground Surface Elevation | Perforated Length | Elevation of Top Perforation | Elevation of Bottom Perforation |
|---|---|---|---|---|---|
| | (feet bgs[1]) | (feet amsl[2]) | (feet) | (feet amsl) | (feel amsl) |
| 6P1 | 982 | 415 | 587 | 32 | -567 |
| 7F2 | 960 | 425 | 524 | 5 | -535 |
| 17D | 1007 | 444 | 637 | 74 | -563 |
| 12R | 1120 | 415 | 420 | -145 | -705 |
| 18E | 995 | 423 | 500 | -37 | -572 |
| 18N2 | 960 | 422 | 500 | -38 | -538 |

1 bgs = below ground surface.
2 amsl = above mean sea level.

Groundwater near the Famoso Basins fluctuates seasonally and has changed over the years. Based on the most recent monitoring data of this groundwater monitoring well network, the average depth to groundwater for 2024 was 450 feet.

40. Cawelo Water District has collected and analyzed groundwater from the wells identified in Table 4 of this Order. Groundwater samples are collected quarterly and are submitted to an Environmental Laboratory Accredited Program (ELAP) certified laboratory to be analyzed for standard minerals, metals, volatile organic compounds, semi-volatile organic compounds, stable isotopes, and radionuclides. Sampling and analysis of these wells has occurred from 2012 to current, and the number of samples per well range from a total of 38 to 49 samples (number of samples vary due to intermittent dry wells). Table 5 provides a summary of select analytical results averaged in the RWD.

**Table 5. Average Groundwater Quality at the Famoso Basins**

| Constituents | Units | 17D[1] | 7F2[1] | 6P1[1] | 18E[1] | 18N2[1] | 12R[1] |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | mg/L[2] | 513 | 301 | 206 | 564 | 380 | 269 |
| Electrical Conductivity | umhos/cm[3] | 771 | 501 | 350 | 868 | 594 | 428 |
| Chloride | mg/L | 120 | 62 | 37 | 94 | 57 | 36 |
| Boron | mg/L | 0.04 | 0.05 | 0.12 | 0.13 | 0.12 | 0.12 |
| Sodium | mg/L | 40.9 | 35.3 | 28.8 | 40.1 | 33.3 | 34.2 |
| Arsenic | ug/L[4] | 1.5 | 2.6 | 2.2 | 2.1 | 2.2 | 2.4 |

[1] Analytical results presented in this table are an average, which were calculated using analytical results from 2012 to the first quarter of 2024.
[2] mg/L = milligrams per liter.
[3] umhos/cm = micromhos per centimeter.
[4] ug/L = micrograms per liter.

Attachment C includes a site map of the Famoso Basins with the locations of the groundwater wells identified in Tables 4 and 5 in this Order.

41. State Water Board Resolution No. 68-16 (hereafter Resolution 68-16) requires the Central Valley Water Board, in regulating the discharge of waste, to maintain high quality waters of the State until it is demonstrated that any change in quality will be consistent with the maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality lower than that described in the Central Valley Water Board's policies (e.g., quality that exceeds water quality objectives).

## Antidegradation Analysis

42. To determine the potential degradation of groundwater due to the proposed project, the RWD includes an antidegradation analysis that compares the quality of produced wastewater from Trio to blended produced wastewater already being reused for irrigation and groundwater recharge. The RWD concludes that Trio's produced wastewater is of good quality and is not anticipated to increase the concentration of the overall blended produced wastewater product by a significant amount that would likely cause an adverse impact to the environment.

43. The RWD includes a table that compares produced wastewater generated at the Section 3 Facility, Cawelo's water quality in the distribution canal, flow weighted calculations of blending Cawelo's existing water and Trio, and the average groundwater quality at the Famoso Basins. Table 6 below is based on the data presented in the RWD.

**Table 6. Comparison of Various Water Quality Constituents**

| Constituent | Trio's Produced Wastewater[1] | Cawelo's Blended Produced Wastewater[2] | Flow Weighted Blended Produced Wastewater[3] | Average Groundwater Quality at Famoso Basins |
|---|---|---|---|---|
| Total Dissolved Solids (mg/L[4]) | 373 | 356 | 353 – 361 | 372 |
| Electrical Conductivity (umhos/cm[5]) | 628 | 550 | 545 – 564 | 585 |
| Chloride (mg/L) | 86 | 71 | 71 – 73 | 68 |
| Boron (mg/L) | 0.5 | 0.44 | 0.36 – 0.53 | 0.1 |
| Arsenic (ug/L[6]) | 3.7 | 13 | 10 – 16 | 2.1 |
| Nitrate – N (mg/L) | <0.40 | 1.7 | 0.3 – 3.1 | 7.5 |

1 Produced wastewater generated at the Section 3 Facility.

2 Blended produced wastewater currently being used by Cawelo and regulated under Waste Discharge Requirements Order Nos. R5-2012-0058 and R5-2012-0059.

3 Calculated using the flow weighted concentrations of produced wastewater from Trio and blended produced wastewater currently being used by Cawelo.

4 mg/L = milligrams per liter.

5 umhos/cm = micromhos per centimeter.

6 ug/L = micrograms per liter.

The RWD concludes that there does not appear to be a significant threat to groundwater beneath the Famoso Basins for total dissolved solids, electrical conductivity, and Nitrate-N based on the results of Table 6. The RWD states the following for the remaining constituents:

- Chloride – The flow weighted average and average groundwater beneath the Famoso Basins is of similar quality between 68 and 73 mg/L, representing a 4-7% difference depending on the flow weighted average. Although slightly greater, these values are significantly below the 200 mg/L water quality objective identified in the Basin Plan.
- Boron – The flow weighted average is greater than the average groundwater concentration. Due to the increased concentration, there is the potential for degradation. Since the average depth to groundwater is approximately 450 feet below ground surface, this potential threat is decreased since boron is likely to be reduced prior to reaching groundwater. Since the Famoso Basins already have an existing groundwater monitoring well network, boron and

other constituents will continue to be monitored to ensure there is not a significant impact to water quality.

- Arsenic – The flow weighted average is greater than the average concentration in groundwater. In a 2011 antidegradation analysis for Waste Discharge Requirement Order Nos. R5-2012-0058 and R5-2012-0059, Dr. B.A. Manning, of San Francisco State University, demonstrates using a model that soil adsorption for arsenic is expected to occur in this area at a high rate due to the finer particles in the soil. Due to this finding, soil adsorption is expected to reduce the concentration of arsenic to a negligible concentration before it reaches groundwater.

44. The RWD includes an antidegradation analysis for the potential impacts to groundwater beneath cropland irrigated with blended produced wastewater. Appendix I of the RWD states that the potential percolate for specific crop types ranges from 9 to 11.4 inches per year, based on *Water Quality for Agriculture* by Ayers and Westcot. The calculations in Appendix I show that the percolate can increase by a maximum factor of 1.6 when compared to the quality of the irrigation water, but this is also controlled by the climate and the volume of percolation. In addition, the antidegradation analysis references Cawelo's 2020 Groundwater Sustainability Plan, which identifies over 1,000 groundwater samples that were collected. This report found that total dissolved solids ranged from 58 to 2,151 mg/L. The RWD states that the weighted percolate for TDS is approximately 643 mg/L, which is similar to groundwater samples taken in the area.

    Due to the limited percolation observed for the Central Valley, depth to groundwater of approximately 450 feet below groundwater surface, and variability in groundwater across Cawelo's service territory, the RWD states that groundwater quality is not anticipated to be significantly impacted and will not exceed water quality objectives identified in the Basin Plan.

45. Analytical results of the four produced wastewater samples submitted in the RWD indicate:
    - Inorganic compound results appear to be similar to produced wastewater currently being reused by Cawelo;
    - Majority of detectable analytical results for the analyses are below the drinking water primary and secondary MCLs, where applicable; and
    - Groundwater at the Famoso Basins is not likely to be impacted by organics given the low concentrations and depth to groundwater of approximately 450 feet.

46. This Order establishes effluent limitations for discharges that will not unreasonably threaten present and anticipated beneficial uses or result in groundwater quality that exceeds water quality objectives set forth in the Basin Plan.

47. The RWD states that the Discharger will implement the following best practicable treatment or control (BPTC) measures to minimize the potential degradation of water quality:
    - Produced wastewater will be treated to remove solids and oil and grease prior to reuse for irrigation;
    - Cawelo's Reservoir will be used as a buffer to identify poor quality produced wastewater that may need to be disposed of off-site or require additional treatment prior to entering Cawelo's distribution network to be reused for irrigation and/or groundwater recharge;
    - Cawelo's Reservoir will have oil adsorption booms to remove oil from the surface, if necessary;
    - Discharge of produced wastewater to Cawelo will be monitored to ensure that reservoirs do not overflow;
    - Water management practices will be implemented to prevent over-irrigation of crops; and
    - Groundwater at the Famoso Basins will be monitored to ensure that groundwater is not impacted from the discharge into those storage basins.

    Central Valley Water Board staff finds that these treatment and control practices represent BPTC for the discharge which may threaten to degrade waters of the state.

48. The discharge, as regulated by this Order, will provide the following benefits:
    - Provide up to 70,000 barrels per day of recycled water (i.e., produced wastewater) for irrigation;
    - Result in the protection and maintenance of surface water and groundwater resources. Groundwater recharge can reduce the rate of groundwater decline in the project area and decrease pumping costs for any groundwater extraction needed;
    - Provide a new source of water for irrigation to reduce the demand of groundwater in the project area;
    - Make available an additional water supply to support the agricultural economy of the area and the Central Valley region;
    - Provide a 'drought proof' water supply. This has additional benefits for crop production planning; and
    - Convert flows that otherwise would be disposed of by well injection to a beneficial use as irrigation water supply.

    Central Valley Water Board staff finds that these benefits represent a significant benefit to the people of the state.

49. This Order complies with Resolution 68-16 because it ensures that any degradation that may occur as a result of the discharges regulated by this Order will not result in water

quality lower than that prescribed in state and regional policies, that the degradation will not unreasonably affect present and anticipated future beneficial uses, that the Discharger will employ BPTC to minimize degradation, and that the degradation is consistent with the maximum benefit to the people of the state due to the significant benefits provided by the activities regulated by this Order as described in Finding No. 48.

**Other Regulatory Considerations**

50. Title 27 of the CCR (hereafter Title 27) contains regulatory requirements for the treatment, storage, processing, and disposal of solid waste. However, Title 27 exempts certain activities from its provisions. Title 27, section 20090 states, in relevant part:

> (b) Wastewater - Discharges of wastewater to land, including but not limited to evaporation ponds, percolation ponds, or subsurface leachfields if the following conditions are met:
>
> (1) the applicable RWQCB has issued WDRs, reclamation requirements, or waived such issuance;
>
> (2) the discharge is in compliance with the applicable water quality control plan; and
>
> (3) the wastewater does not need to be managed according to Chapter 11, Division 4.5, Title 22 of this code as a hazardous waste.

Discharges of produced wastewater to Cawelo's Reservoir and reuse of produced wastewater for irrigation are exempt from the requirements of Title 27 because the Board is issuing these waste discharge requirements, because the discharge as regulated by this Order will comply with the Basin Plan, and because the wastes subject to regulation under this Order do not need to be managed as hazardous wastes.

51. Water Code section 13267(b) states, in relevant part, that:

> In conducting an investigation … 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 waste within 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 report 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.

The technical and monitoring reports required by this Order and Monitoring and Reporting Program Order No. R5-2025-XXXX (MRP), which is attached hereto and

made part of this Order by reference, are necessary to assure compliance with this Order. The Discharger owns and operates the facility that discharges the waste subject to this Order.

52. The California Department of Water Resources (DWR) sets standards for the construction and destruction of groundwater wells, as described in the *California Well Standards Bulletin 74-90 (June 1991)* and *Water Well Standards: State of California Bulletin 74-81 (December 1981)*. These standards and any more stringent standards adopted by the State or County of Kern pursuant to Water Code section 13801, apply to all monitoring wells.

53. Pursuant to Water Code section 13263(g), discharge is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.

## California Environmental Quality Act (CEQA)

54. The California Environmental Quality Act (CEQA) requires a government agency to comply with certain procedures when it approves or proposes to carry out an activity. (Cal. Code Regs., tit. 14, sec. 15502(e).) This includes private activities which require approval from a governmental agency. (Cal. Code Regs., tit. 14, sec. 15502(b)(3).) The adoption of WDRs therefore requires compliance with CEQA prior to approval of the WDRs.

55. Cawelo Water District is the lead agency for CEQA purposes (Public Resources Code Section 21000, et seq.) under CEQA Guidelines (Title14, Division 6, California Code of Regulations, as amended). On September 24, 2024, the Discharger submitted a Notice of Intent for a Mitigated Negative Declaration (MND) to Kern County's County Clerk and the California State Clearinghouse for Cawelo's Reservoir and the delivery pipeline. The State Review Period started on September 24 and ended on October 24, 2024. A comment from the California Department of Fish and Wildlife was received and incorporated into the Mitigated Negative Declaration. On February 14, 2025, the final Notice of Determination was filed.

56. Additionally, Cawelo prepared a Negative Declaration for the discharge and reuse of produced wastewater for irrigation, which was finalized in April 2007. The Central Valley Water Board reviewed and commented on the Negative Declaration and found that the project, as approved by Cawelo and permitted under Waste Discharge Requirements Order No. R5-2007- 0066, would not have a significant effect on the environment.

    In 2011, the Discharger adopted a Negative Declaration in accordance with CEQA for discharges to the Famoso Basins. Central Valley Water Board staff reviewed the Negative Declaration and concurred that it addressed issues with regards to potential impacts to water quality.

57. The Central Valley Water Board is a responsible agency under CEQA (Public Resources Code, section 21069) and in making its determinations and findings, must presume that Cawelo's MND and Negative Declarations comport with the requirements of CEQA and are valid. (Public Resources Code, section 21167.3; California Code of Regulations, title 14, section 15231.) The Central Valley Water Board has reviewed and considered the MND and Negative Declaration and finds that the environmental documents address the water quality impacts and that no additional environmental review is required. (California Code of Regulations, title 14, section 15096, subdivision (f), 15162, 15163.) The Central Valley Water Board will file a Notice of Determination with the Office of Planning and Research within five (5) working days of issuance of this certification. (California Code of Regulations, title 14, section 15096, subdivision (i).)

**Salt Control Program**

58. The Central Valley Water Board adopted Basin Plan amendments incorporating new programs for addressing ongoing salt and nitrate accumulation in the Central Valley at its 31 May 2018 Board Meeting (Resolution R5-2018-0034). The Basin Plan amendments became effective on 17 January 2020 and were revised by the Central Valley Water Board in 2020 with Resolution R5-2020-0057 (https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/resolutions/r5-2020-0057_res.pdf). The revisions to the Basin Plan amendments became effective on 10 November 2021.

59. Under the Salt Control Program, dischargers that are unable to comply with the stringent salinity requirements may instead, to the extent reasonable, feasible, and practicable (and while accounting for conservation and drought, salinity levels in the water supply source, and some appropriate increment of growth), be subject to performance-based requirements as determined appropriate by the Central Valley Water Board, and participate in a basin-wide effort known as the Prioritization and Optimization Study (P&O Study) to develop a long-term salinity strategy for the Central Valley. The RWD states the proposed project intends to participate in the P&O Study. The Discharger needs to submit a Notice of Intent for the Salt Control Program and receive a CVSALTS ID.

60. As these strategies are implemented, the Central Valley Water Board may find it necessary to modify the requirements of these WDRs. As such this Order may be amended or modified to incorporate any newly applicable requirements to ensure that the goals of the Salt Control Programs are met.

## Nitrate Control Program

61. The Nitrate Control Program is a prioritized program. The proposed discharge is within the Kern Water Collaborative Management Zone, which has assigned a Priority 2 Basin status for the area of the proposed discharge. The Board issued Notices to Comply to dischargers in Priority 1 Basins in May 2020 and Priority 2 Basins in December 2023. These notices provided dischargers with a choice to participate in an individual permitting approach (Pathway A) or in a collective permitting approach (Pathway B). Under the collective approach, dischargers jointly form “Management Zones” that fulfill the requirements of the Nitrate Control Program. The Discharger needs to submit a Notice of Intent for the Nitrate Control Program, where the Discharger will select the preferred Pathway and join the Kern Water Collaborative Management Zone if they decide on the collective permitting approach.

62. As these strategies are implemented, the Central Valley Water Board may find it necessary to modify the requirements of these WDRs. As such this Order may be amended or modified to incorporate any newly applicable requirements to ensure that the goals of the Nitrate Control Programs are met.

## Food Safety Project

63. Due to a public concern regarding the reuse of produced wastewater for irrigation, Central Valley Water Board staff initiated a Food Safety Project and commissioned a panel of experts, the Food Safety Expert Panel (Panel), to help the Central Valley Water Board evaluate the safety of reusing produced wastewater for irrigation of crops grown for human consumption. The Food Safety Project included three main studies (Tasks 1-3) conducted by an independent consultant:
    - Task 1: Identify chemicals that have the potential to be in produced wastewater and conduct a preliminary hazard evaluation to identify which of these were worthy of further evaluation, creating a Chemicals of Interest list.
    - Task 2: Conduct a rigorous evaluation of the Chemicals of Interest in a literature review that considers potential hazards from ingestion, persistence in agricultural ecosystems, and the potential for plant uptake.
    - Task 3: Evaluate the chemical composition of crops irrigated with produced wastewater (treated crops) in comparison to crops that were irrigated with conventional sources of water (control crops).

    On 8 September 2021, a White Paper was published by the Central Valley Water Board that included reports for Task 1, 2, and 3, and summarizes the findings and conclusion by the Panel. Some of the major findings that were identified include the following:
    - Crop sample analyses indicated that the Chemicals of Interest that were measured in crops were within the normal range of concentrations found in food;

- The current monitoring required for produced wastewater used for irrigation by the Central Valley Water Board is sufficiently rigorous;
- The majority of 399 chemicals and constituents routinely monitored in produced wastewater used for irrigation were either not detected or below drinking water standards established by the California Department of Public Health;
- The crop sampling program was not shown to be superior to a water monitoring program for ensuring public health and safety in the context of using produced wastewater for irrigation water; and
- Tasks 1 through 3 did not yield any evidence that the reuse of produced wastewater for irrigation poses an elevated threat to human health or crop safety.

Based on the conclusions of the Panel, Central Valley Water Board staff finds that the practice of reusing produced wastewater for irrigation, as described in the White Paper, is appropriate.

## Public Notice

64. All the above, which is incorporated herein, were considered in establishing the following conditions of the discharge.

65. Cawelo Water District; Trio Petroleum LLC; and interested agencies and persons have been notified of the intent to prescribe WDRs for this discharge, and they have been provided an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

66. All comments pertaining to the discharge were heard and considered in a public hearing.

**IT IS HEREBY ORDERED** that pursuant to sections 13263 and 13267 of the Water Code, Cawelo Water District and Trio Petroleum LLC, their agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted there under, shall comply with the following:

### A. Discharge Prohibitions

1. Discharge of wastes, including produced wastewater, to surface waters or surface water drainage courses is prohibited.

2. Discharge of wastes other than treated produced wastewater to Cawelo in the manner described in the Findings and authorized herein is prohibited.

3. Neither the discharge nor its treatment shall create a nuisance or pollution as defined in Water Code section 13050.

4. Discharge of waste classified as 'hazardous', as defined in the CCR, title 23, section 66261.1 et seq., is prohibited.

5. The discharge of fluids used in "well stimulation treatment," as defined by CCR, title 14, section 1761 (including hydraulic fracturing, acid fracturing, and acid matrix stimulation), to land is prohibited.

6. The discharge of produced wastewater from wells containing well stimulation treatment fluids, as defined by CCR, title 14, section 1761, is prohibited.

7. Treatment system bypass of untreated or partially treated waste is prohibited, except as allowed by section A.13 of Standard Provisions and Reporting Requirements for Waste Discharge Requirements, dated 1 March 1991.

8. Produced wastewater overflow from Cawelo's Reservoir, Famoso Basins, Cawelo's delivery network, or subsequent surface impoundments that contain produced wastewater is prohibited.

**B. Effluent Limitations**

1. The discharge of treated produced wastewater from the Section 3 Facility to Cawelo's Reservoir (**Discharge 001**) shall not exceed the following for the constituents listed:

| **Constituent** | **Units** | **Daily Maximum** [1] | **Annual Average** [2] |
|---|---|---|---|
| Flow | bbl/d [3] | 70,000 [4] | - |
| Electrical Conductivity | umhos/cm [5] | - | 1,000 |
| Boron | mg/L [6] | - | 1.0 |
| Chloride | mg/L | - | 200 |
| Oil & Grease | mg/L | 35 | - |

[1] The **Daily Maximum** is the greatest discharge rate or concentration permitted for one day.

[2] The **Annual Average** is the arithmetic mean of measurements made during the previous 12 months.

[3] bbl/d = barrels per day.

[4] This value represents the final limit of 70,000 barrels per day. The table below shows the incremental changes for the daily maximum flowrate that need to be satisfied prior to increasing the flowrate.

[5] umhos/cm = micromhos per centimeter.
[6] mg/L = milligrams per liter.

The table below shows the incremental changes for the daily maximum flowrate referenced in Footnote 4 in the table above.

**Discharge 001 – Variable Daily Maximum Flow**

| Phase | Unit | Result | A | B |
|---|---|---|---|---|
| Daily Maximum Flowrate [1] | bbl/d [2] | <12,000 [3] | 12,000 – 40,000 [4] | 40,000 – 70,000 [4] |

[1] The **Daily Maximum** is the greatest discharge rate permitted for one day. This value shall not increase until Provision E.3 has been satisfied.
[2] bbl/d = barrels per day.
[3] Effective as of the signature date of this Order.
[4] Provision E.3 needs to be satisfied prior to the Discharger increasing the maximum flow rate into Phase A or B.

2. The discharge of produced wastewater to Cawelo's delivery network shall not cause blended produced wastewater, downstream of the inlet from Cawelo's Reservoir, (Discharge 002) to exceed the following for the constituents listed:

| Constituent | Units | Daily Maximum [1] | Annual Average [2] |
|---|---|---|---|
| Electrical Conductivity | umhos/cm [3] | - | 1,000 |
| Boron | mg/L [4] | - | 1.0 |
| Chloride | mg/L | - | 200 |
| Oil & Grease | mg/L | 35 | - |

[1] The **Daily Maximum** is the greatest discharge rate or concentration permitted for one day.

[2] The **Annual Average** is the arithmetic mean of measurements made during the previous 12 months.

[3] umhos/cm = micromhos per centimeter.

[4] mg/L = milligrams per liter.

**C. Discharge Specifications**

1. The Discharger shall operate all systems and equipment to optimize treatment of wastewater and the quality of the discharge.

2. The discharge of produced wastewater shall not create objectionable odors perceivable beyond the limits of Cawelo's Reservoir and the Famoso Basins at an intensity that creates or threatens to create nuisance conditions.

3. Cawelo's Reservoir and subsequent reservoirs shall have sufficient capacity to accommodate allowable wastewater flow and design seasonal precipitation and ancillary inflow and infiltration during the winter. Design seasonal precipitation shall be based on total annual precipitation using a return period of 100 years, distributed monthly in accordance with historical rainfall patterns.

4. Cawelo's Reservoir and subsequent reservoirs shall be managed to prevent breeding of mosquitos. In particular,
    - Weeds shall be minimized through control of water depth, harvesting and herbicides.
    - Dead algae, vegetation and other debris shall not be allowed to accumulate on the water surface.
    - Vegetation management operations in areas in which nesting birds have been observed shall be carried out either before or after, but not during, the 1 April to 30 June bird nesting season.

5. Newly constructed or rehabilitated berms or levees (excluding internal berms that separate ponds or control the flow of water within a surface impoundment) shall be

designed and constructed under the supervision of a California Registered Civil Engineer.

6. Newly constructed or rehabilitated berms or levees (excluding internal berms that separate ponds or control the flow of water within a surface impoundment) shall be designed and constructed under the direction of persons registered to practice in California pursuant to California Business and Professions Code sections 6735, 7835, and 7835.1.

7. Cawelo's Reservoir and subsequent reservoirs and/or ponds shall be free of visible oil or oil accumulation, or effectively netted to preclude the entry of wildlife.

8. Hydraulic loading of combined effluent and supplemental irrigation water shall be managed to:
    - Provide water only when water is needed and in amounts consistent with crop needs;
    - Maximize crop nutrient uptake;
    - Maximize breakdown of organic waste constituents in the root zone; and
    - Minimize the percolation of waste constituents below the root zone.

9. The Central Valley Water Board recognizes that some leaching of salts is necessary to manage salt in the root zone of the crops. Leaching shall be managed to minimize degradation and maintain or reduce, to the extent practicable, concentrations of saline constituents and nitrate (and other forms of nitrogen speciation) in receiving waters.

**D. Groundwater Limitations**

Release of waste constituents from any portion of the Facility, including but not limited to any treatment, reclamation, or storage component associated with the discharge of produced wastewater, shall not cause or contribute to groundwater:

1. Containing constituent concentrations in excess of the concentrations specified below or in excess of natural background water quality, whichever is greater:

    - Boron of 0.75 mg/L.

    - For constituents identified in Title 22, the MCLs quantified herein.

3. Containing taste or odor producing constituents, toxic substances, or any other constituents in concentrations that cause nuisance or adversely affect beneficial uses.

## E. Provisions

1. The Discharger shall comply with the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements", dated 1 March 1991 (Standard Provisions), which are attached and made part of this Order.

2. The Discharger shall comply with Monitoring and Reporting Program Order No. R5-2025-XXXX, which is part of this Order, and any revisions thereto as adopted by the Central Valley Water Board or approved by the Executive Officer.

3. The project regulated under this Order explores a new area of the Kern Front Oil Field that does not have historical data related to water quality as do other permitted areas. Although the RWD includes evidence that the project location is in an isolated geologic structure, Central Valley Water Board staff finds that ongoing monitoring and verification is needed to ensure produced wastewater quality does not significantly change as the project expands to the full buildout of approximately 70 petroleum wells and daily flowrate of 70,000 barrels per day. The table below shows the different phases of the project development, with respect to the daily flowrate.

| Phase | Unit | Result | A | B |
|---|---|---|---|---|
| Daily Maximum Flowrate | bbl/d | <12,000 | 12,000 – 40,000 | 40,000 – 70,000 |

**The Daily Maximum Flowrate shall not be increased until the Discharger has satisfied the following requirements and received written authorization signed by the Executive Officer.**

| Phase | Requirements |
|---|---|
| A | Prior to increasing the daily maximum flowrate to 12,000 – 40,000 barrels per day, the Discharger shall submit a technical report that demonstrates the produced wastewater quality while discharging near 12,000 barrels per day is of similar or better quality than the produced wastewater quality described in this Order and the RWD. This technical report shall include at least four sampling events. |
| B | Prior to increasing the daily maximum flowrate to 40,000 – 70,000 barrels per day, the Discharger shall submit a technical report that demonstrates the produced wastewater quality while discharging near 40,000 barrels per day is of similar or better quality than the produced wastewater quality described in this Order and the RWD. This technical report shall include at least four sampling events, over a |

| Phase | Requirements |
|---|---|
| | year, while the discharge rate is near 40,000 barrels per day, and a demonstration that the Section 3 Treatment Facility has been adequately designed and constructed to handle a maximum flowrate of 70,000 barrels per day. |

4. **Within 30 days following the signature of this Order,** the Discharger shall submit a Notice of Intent for the Salt and Nitrate Control Programs.

5. The Dischargers shall comply with the applicable provisions of the Salt and Nitrate Control Programs adopted in Resolution R5-2018-0034 (as revised per Resolution R5-2020-0057) to address ongoing salt and nitrate accumulation in the Central Valley developed as part of the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) initiative.

6. **Within 30 days of initiating the discharge to Cawelo's Reservoir,** the Discharger shall submit a technical report to the Central Valley Water Board that adequately demonstrates Cawelo's Reservoir has been designed and constructed to mitigate the percolation of produced wastewater. This demonstration shall also include a leak detection test, or equivalent evidence, that demonstrates the integrity of the liner prior to being used. If the Discharger is unable to adequately demonstrate that percolation will be mitigated, a groundwater investigation may be necessary to ensure that groundwater will not be impacted by the discharge.

   **Failure to adequately demonstrate percolation has been mitigated will result in a groundwater investigation being due by 180 days from the initial date Cawelo's Reservoir became active.** At a minimum, the groundwater investigation shall include the following: identify wells in the area, include groundwater analytical results, include a groundwater contour map, and provide a technical analysis whether produced wastewater has the potential to impact groundwater. If there is good quality groundwater that has the potential to be impacted by the project, the Discharger shall also submit a workplan for the installation of a groundwater monitoring well network for Cawelo's Reservoir.

7. **At least 60 days prior to planting new crops**, the Discharger shall notify, in writing, the Central Valley Water Board. The Discharger shall include at least the following: crop type, acreage, parcel(s), anticipated harvest year for human consumption, and an approximate timeframe for harvesting during the year.

8. The Discharger shall comply with Standard Provisions, General Reporting Requirements A.4, which requires the submittal of a new Report of Waste Discharge to the Central Valley Water Board **at least 140 days** before making any material change to the discharge. Material changes include, but are not limited to,

increasing the volume of produced wastewater, irrigation of lands not identified in Findings 7 and 10 of this Order, and incorporating new sources of produced wastewater not identified in Findings 6 and 8 of this Order.

9. The Discharger shall grant Central Valley Water Board staff, or an authorized representative (including an authorized contractor acting as a Water Board representative), upon presentation of credentials and other documents as may be required by law, permission to:
    a. Enter upon the Project or compensatory mitigation site(s) premises where a regulated facility or activity is located or conducted, or where records are kept.
    b. Have access to and copy any records that are kept and are relevant to the Project or the requirements of this Order.
    c. Inspect any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order.
    d. Sample or monitor for the purposes of assuring Order compliance.

10. The Discharger shall have copies of this Order, including its MRP, Information Sheet, Attachments, and Standard Provisions, available for reference by operating personnel. Key operating personnel shall be familiar with the contents of the documents.

11. The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used to achieve compliance with the conditions of this Order. Proper operation and maintenance also include adequate laboratory controls and appropriate quality assurance procedures. This Provision requires the operation of back-up or auxiliary facilities or similar systems that are installed only when the operation is necessary to achieve compliance with the conditions of the Order.

12. All technical reports and work plans required herein that involve planning, investigation, evaluation, design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of a person registered to practice engineering or geology in California pursuant to California Business and Professions Code Sections 6735, 7835, and 7835.1. As required by these laws, completed technical reports and work plans must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work. All reports required herein are required pursuant to California Water Code Section 13267.

13. The Discharger shall comply with all conditions of this Order, including timely submittal of technical and monitoring reports. On or before each report due date,

the Discharger shall submit the specified document to the Central Valley Water Board or, if appropriate, a written report detailing compliance or noncompliance with the specific schedule date and task. If noncompliance is being reported, then the Discharger shall state the reasons for such noncompliance and provide an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Central Valley Water Board in writing when it returns to compliance with the time schedule. Violations may result in enforcement actions, including Central Valley Water Board or court orders requiring corrective action or imposing civil monetary liability, or in revision or rescission of this Order.

14. In the event of any change in control or ownership of land or waste treatment and storage facilities presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to the Central Valley Water Board.

15. To assume operation under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, the address and telephone number of the persons responsible for contact with the Central Valley Water Board, and a statement. The statement shall comply with the signatory paragraph of Standard Provision B. 3 and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code. If approved by the Executive Officer, the transfer request will be submitted to the Central Valley Water Board for its consideration of transferring the ownership of this Order at one of its regularly scheduled meetings.

16. The Discharger shall use the best practicable cost-effective control technique(s) including proper operation and maintenance, to comply with this Order.

17. As described in the Standard Provisions, the Discharger shall report promptly to the Central Valley Water Board any material change or proposed change in the character, location, or volume of the discharge.

18. The Central Valley Water Board will review this Order periodically and will revise requirements when necessary.

If, in the opinion of the Executive Officer, the Discharger fails to comply with the provisions of this Order, the Executive Officer may refer this matter to the Attorney General for judicial enforcement, may issue a complaint for administrative civil liability, or may take other enforcement actions. Failure to comply with this Order may result in the assessment of Administrative Civil Liability of up to $10,000 per violation, per day, depending on the violation, pursuant to the Water Code, including sections 13268, 13350 and 13385. The

Central Valley Water Board reserves its right to take any enforcement actions authorized by law.

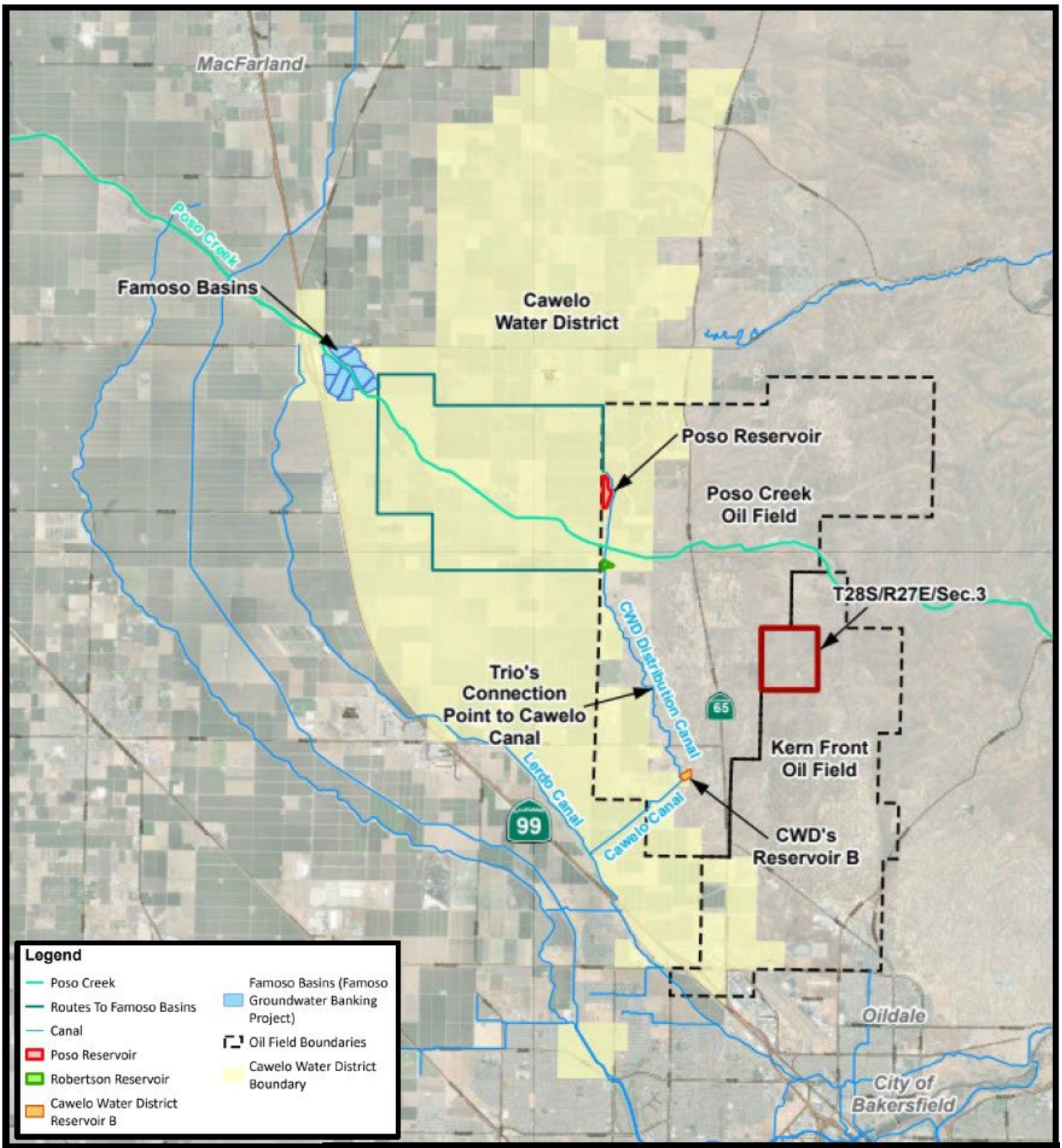
Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and CCR, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date 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 (http://www.waterboards.ca.gov/public_notices/petitions/water_quality) or will be provided upon request.

I, PATRICK PALUPA, Executive Officer, do hereby certify that the foregoing is a full true, and correct copy of an Order adopted by the California Regional Water Quality Control Board on, XX June 2025.

_____
PATRICK PULUPA, Executive Officer

Order Attachments
- Attachment A – Site Map of Project
- Attachment B – Site Map of Incoming Produced Wastewater
- Attachment C – Site Map of the Famoso Basins
- Attachment D – Flow Schematic

Monitoring and Reporting Program R5-2025-00XX
Information Sheet Order R5-2025-00XX
Standard Provisions (1 March 1991)

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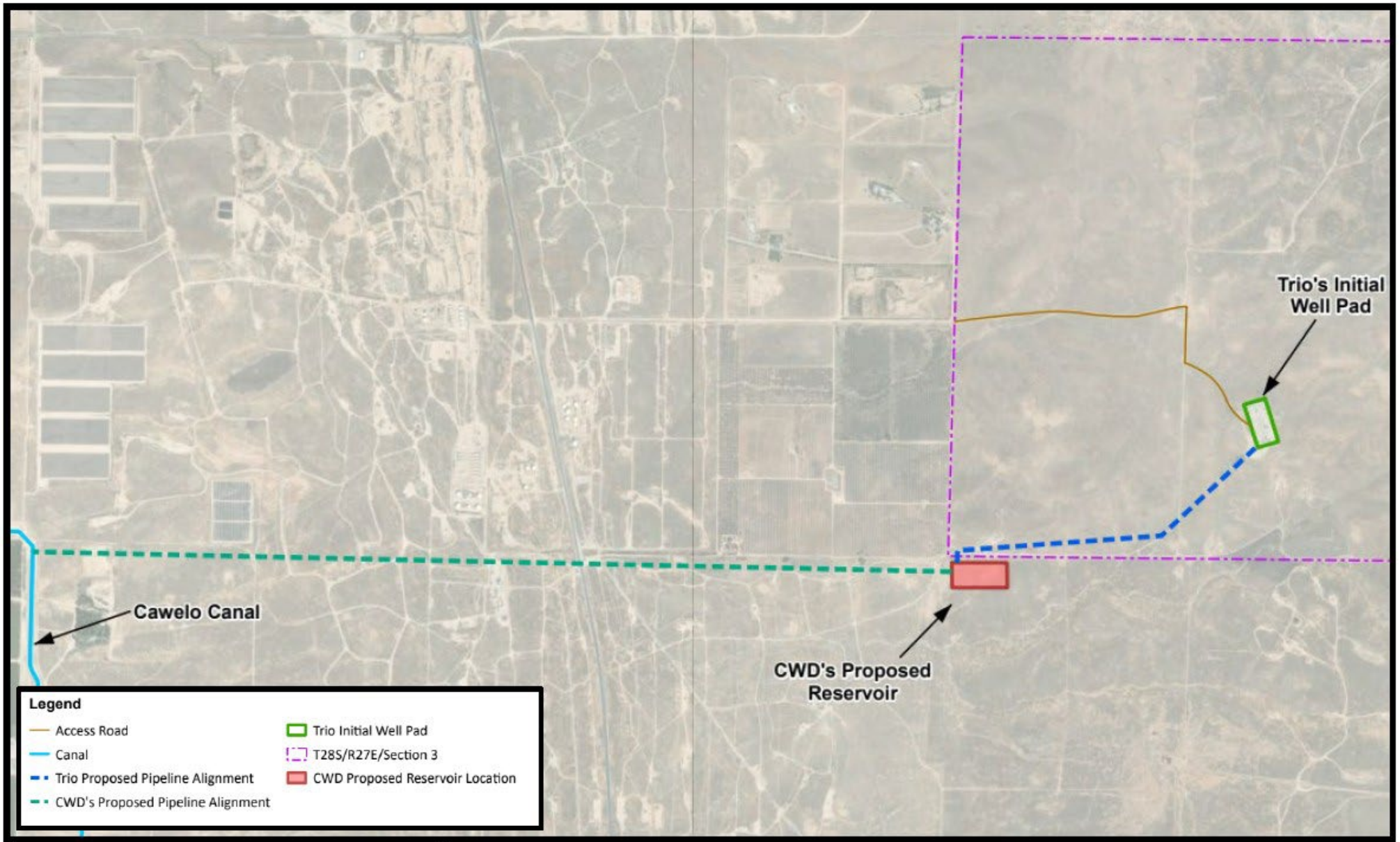
Scale: Feet

*This map was generated by Kennedy Jenks and was included in the Report of Waste Discharge.*

**SITE MAP OF PROJECT**
WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2025-XXXX
FOR
CAWELO WATER DISTRICT AND TRIO PETROLEUM LLC
SECTION 3 TREATMENT FACILITY
KERN COUNTY

**ATTACHMENT A**

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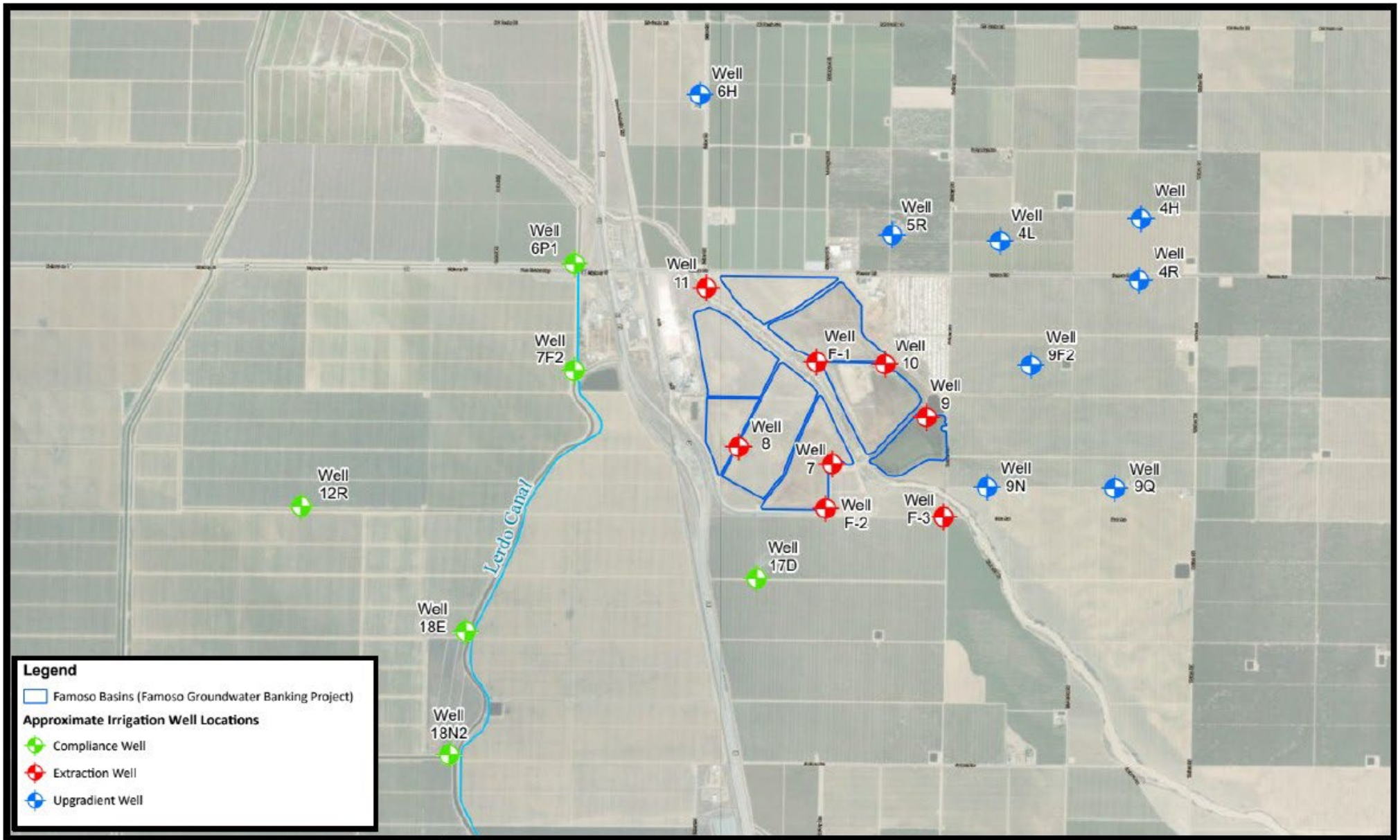
Scale: Feet

*This map was generated by Kennedy Jenks and was included in the Report of Waste Discharge.*

**SITE MAP OF INCOMING PRODUCED WASTEWATER**
WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2025-XXXX
FOR
CAWELO WATER DISTRICT AND TRIO PETROLEUM, LLC
SECTION 3 TREATMENT FACILITY
KERN COUNTY

**ATTACHMENT B**

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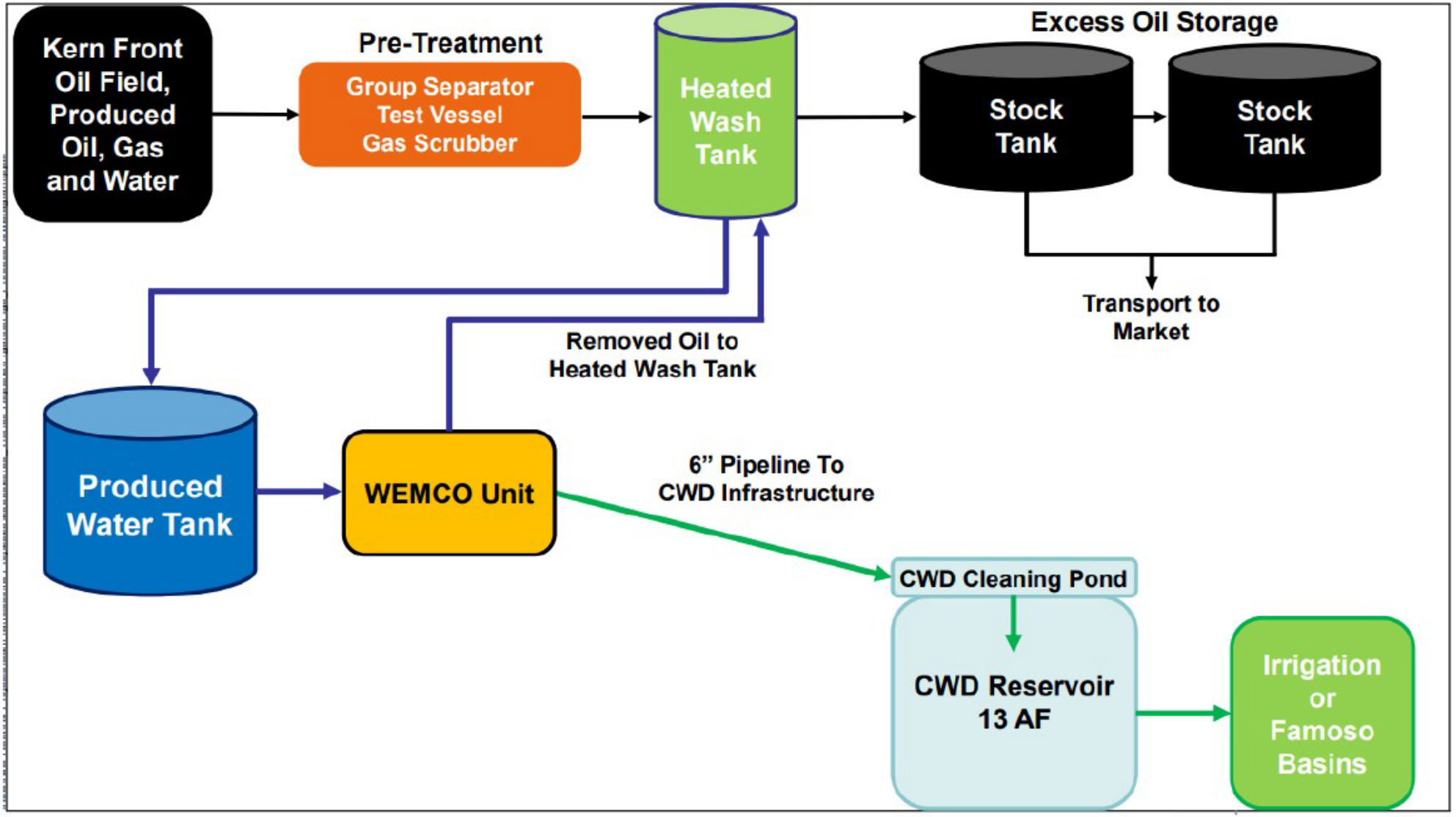
0 500 1,000

Scale: Feet

*This map was generated by Kennedy Jenks and was included in the Report of Waste Discharge.*

**SITE MAP OF THE FAMOSO BASINS**
WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2025-XXXX
FOR
CAWELO WATER DISTRICT AND TRIO PETROLEUM, LLC
SECTION 3 TREATMENT FACILITY
KERN COUNTY

**ATTACHMENT C**




*This image was generated by Kennedy Jenks and was included in the Report of Waste Discharge.*

**FLOW SCHEMATIC**
WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2025-XXXX
FOR
CAWELO WATER DISTRICT AND TRIO PETROLEUM, LLC
SECTION 3 TREATMENT FACILITY
KERN COUNTY

**ATTACHMENT D**

# INFORMATION SHEET

ORDER NO. R5-2025-XXXX
TRIO PETROLEUM LLC AND CAWELO WATER DISTRICT
PRODUCED WASTEWATER RECLAMATION PROJECT
SECTION 3 TREATMENT FACILITY
KERN COUNTY

## Background

On 19 October 2021, a Report of Waste Discharge was submitted to the Central Valley Water Board that proposed the reuse of treated oil field produced wastewater (produced wastewater or discharge) from an oil treatment facility to an irrigation management company as a new water supply for irrigation. A revised Report of Waste Discharge and supplemental technical reports (hereafter collectively referred to as RWD) were submitted on 3 July 2024 and 7 November 2024. On 26 February 2025, the final Notice of Determination for a Mitigated Negative Declaration was submitted to the Central Valley Water Board demonstrating that the proposed project has satisfied the requirements of the California Environmental Quality Act (CEQA). The RWD was prepared by Kennedy Jenks Consultants and the Mitigated Negative Declaration was prepared by Environmental Science Associates. Each of these documents were prepared on behalf of Trio Petroleum LLC (Trio) and Cawelo Water District (Cawelo). Trio and Cawelo (hereafter jointly referred to as Discharger) are jointly responsible for compliance with these Waste Discharge Requirements (WDRs)

The RWD proposes the discharge of produced wastewater from the Section 3 Treatment Facility (Section 3 Facility), owned and operated by Trio, to a lined reservoir (Cawelo's Reservoirs). After Cawelo's Reservoir, produced wastewater will be piped to Cawelo's distribution network where it will either be reused for groundwater recharge or irrigation of crops for human consumption. Cawelo's distribution network covers approximately 45,000 acres and is generally between State Highway 99 and Highway 65 as shown on Attachment A of this Order. The Famoso Basins, used for groundwater recharge, consists of approximately 374 acres and is generally used during the non-irrigation season when irrigation demand is low.

## Proposed Discharge

Trio currently owns and operates five petroleum wells in the Kern Front Oil Field. Upon completion of Cawelo's Reservoir, Trio anticipates that up to 12,000 barrels of produced wastewater will be generated per day and delivered to Cawelo for reuse. Included in the RWD is Trio's tentative plan to expand production beyond the current five wells. The RWD identifies an additional 36 petroleum wells that Trio intends to drill in the near future, following approval by the California Geologic Energy Management Division (CalGEM). The RWD also states that the project is anticipated to be fully built out in five years, and will consist of approximately 70 petroleum wells producing up to 70,000 barrels per day. The RWD identifies the general area where the remaining petroleum wells will be constructed, but final locations will depend on data obtained during project development.

Produced wastewater generated by Trio is treated at the Section 3 Facility. Attachment D, which is attached hereto and made part of this Order by reference, provides a flow schematic of produced wastewater from the Section 3 Facility to Cawelo's distribution network. Treatment starts with the production fluid entering a gas scrubber, then gravity separation of oil and water using a heated wash tank, after which separated water is sent to a Wemco unit. The Wemco unit uses mechanical agitation to induce the formation of small bubbles to capture oil that is then skimmed off and returned to the wash tank. Produced wastewater from the Wemco Unit is pumped to Cawelo's Reservoir for storage and reuse.

The RWD includes analytical results of produced wastewater samples collected on 3 March 2020, 7 July 2021, and duplicate filtered and unfiltered samples taken on 25 August 2022, which were submitted to an Environmental Laboratory Accreditation Program (ELAP) certified laboratory for chemical analysis. The samples were analyzed for the following: volatile organic compounds, polycyclic aromatic hydrocarbons, oil and grease, total petroleum hydrocarbons, general minerals, stable isotopes, and metals. Table 1 below provides a brief overview of the produced wastewater for select constituents.

**Table 1. Trio Produced Wastewater Quality**

| Constituent | Units | Result Range |
|---|---|---|
| Total Oil and Grease | mg/L [1] | 180 – 1,200 |
| Electrical Conductivity (EC) | µmhos/cm [2] | 610 - 650 |
| Total Dissolved Solids | mg/L | 320 - 460 |
| Chloride | mg/L | 77 - 96 |
| Sulfate | mg/L | <0.40 |
| Boron | mg/L | 0.43 - 0.54 |
| Ammonia as N | mg/L | 0.18 – 0.41 |
| Nitrate as N | mg/L | <0.40 |
| Total Kjeldahl N | mg/L | 1 – 7.1 |
| Total N | mg/L | 1 – 7.1 |
| Total Organic Carbon | mg/L | 88 - 290 |
| Arsenic | mg/L | <0.002 - 0.0048 |
| Benzene | µg/L [3] | <10 |
| Ethylbenzene | µg/L | <10 |
| Toluene | µg/L | <10 |
| Xylenes (total) | µg/L | <10 |

1. mg/L = milligrams per liter.
2. umhos/cm = micromhos per centimeter.
3. ug/L = micrograms per liter.

The complete list of analytical results for produced wastewater is on Attachment 1 of this Information Sheet.

Produced wastewater from the Section 3 Facility will be pumped to Cawelo's Reservoir. After Cawelo's Reservoir, produced wastewater will be pumped to Cawelo's distribution canal where it will be blended with groundwater, surface water, and produced wastewater regulated under Waste Discharge Requirements Oder Nos. R5-2012-0058 and R5-2012-0059. Blended produced wastewater in Cawelo's distribution canal will subsequently be reused for the irrigation of crops for human consumption and/or discharged to Famoso Basins for groundwater recharge.

## REGULATORY CONSIDERATIONS

### Basin Plan, Beneficial Uses, and Water Quality Objectives

The Basin Plan designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Water Board. The intended use of the water discharged to Cawelo's Reservoir, Cawelo's distribution network, and the Famoso Basins is agricultural supply and groundwater recharge (during low irrigation demands). Surface water flows in the area are to the South Valley Floor hydrologic unit, Valley Floor Waters. The surface water beneficial uses of Valley Floor Waters, as stated in the Basin Plan for Hydrologic Area No. 558, are agricultural supply (AGR); industrial service supply (IND); industrial process supply (PRO); water contact recreation (REC-1); non-contact water recreation (REC-2); warm freshwater habitat (WARM); wildlife habitat (WILD); rare, threatened, or endangered species (RARE); and groundwater recharge (GWR).

The project is located in the South Valley Floor Hydrologic Unit, which resides in the Kern County Basin. The Basin Plan has Detailed Analysis Units (DAU) assigned for each hydrologic unit in the Tulare Lake Basin, which identify the beneficial uses of groundwater for specific areas. The project is located in the DAU 257 for the Kern County Basin, which has designated beneficial uses for municipal and domestic supply (MUN), agricultural supply (AGR), industrial supply (IND), and water contact recreation (REC-1).

Water in the Tulare Lake Basin is in short supply, requiring importation of surface water from other parts of the State. The Basin Plan encourages use of recycled water on irrigated crops wherever feasible and indicates that evaporation of recyclable wastewater is not an acceptable permanent disposal method where the opportunity exists to replace existing uses or proposed use of fresh water with recycled water.

The Basin Plan includes a water quality objective for chemical constituents that, at a minimum, require waters designated as MUN to meet the State drinking water MCLs

specified in Title 22. The Basin Plan recognizes that the Central Valley Water Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.

The Basin Plan states that when compliance with a narrative objective is required to protect specific beneficial uses, the Central Valley Water Board will, on a case-by-case basis, adopt numerical limitations to implement the narrative objective. In the absence of specific numerical water quality limits, the Basin Plan methodology is to consider any relevant published criteria. General salt tolerance guidelines, such as *Water Quality for Agriculture* by Ayers and Westcot and similar references, indicate that yield reductions in nearly all crops are not evident when irrigating with water having an electrical conductivity (EC) less than 700 umhos/cm. There is, however, an eight- to ten-fold range in salt tolerance for agricultural crops. It is possible to achieve full yield potential for some crops with waters having EC up to 3,000 – 5,000 umhos/cm within the tolerance of the crop.

According to *Water Quality for Agriculture* by Ayers and Westcot, boron is an essential element for plant growth that has the potential to become toxic at elevated concentrations. The yield for specific crops is not impacted until the toxicity threshold is reached resulting in a variety of symptoms displayed on the trunk, limbs, leaves, and/or crops. *Water Quality for Agriculture* has a relative boron tolerance threshold category for a variety of crops that ranges from “Very Sensitive” (<0.5 mg/l) to “Very Tolerant” (6-15 mg/l). Crops related to this project that are discussed in *Water Quality for Agriculture* are displayed in Table 2 below.

**Table 2. Crop Sensitivity for Boron**

| Crop(s) | Boron Tolerance Category | Boron Range (mg/l) |
|---|---|---|
| Lemon | Very Sensitive | < 0.5 |
| Orange, Grape, Walnut | Sensitive | 0.5 – 0.75 |
| Wheat, Barley | Moderately Sensitive | 0.75 – 1.0 |
| Alfalfa | Tolerant | 4.0 – 6.0 |

The Basin Plan contains the following language regarding oil field discharges:

- The Basin Plan policy for disposal of produced wastewater includes effluent limits for EC, chloride, and boron of 1,000 umhos/cm, 200 mg/L, and 1.0 mg/L, respectively.
- In 1982, the Central Valley Water Board amended the Basin Plan to allow discharges of produced wastewater to exceed the above limits to facilitate use for irrigation and other beneficial uses where the exception would not cause an exceedance of a water quality objective. The Basin Plan, therefore, provides some flexibility to allow produced wastewater exceeding Basin Plan salinity limits to be used for agricultural use in water short areas, provided the discharger first successfully demonstrates to the Central Valley Water Board that the increases will

not cause exceedances of water quality objectives. Based on this amendment, this Order includes annual average limits that have the potential to allow single exceedances of the above limits. Central Valley Water Board staff finds that an average annual effluent limitation for the above parameters will provide some flexibility for the Discharger while sufficiently protecting water quality.

The project will provide a new source of irrigation water for cropland in Kern County. Benefits for the reuse of produced wastewater for irrigation include the following:

- Reduces the demand of groundwater in the area from agricultural uses;
- Recycles produced wastewater that historically has been injected via water disposal wells; and
- Provides a drought tolerant source of water for irrigation.

## DISCHARGE PROHIBITIONS, EFFLUENT LIMITATIONS, DISCHARGE SPECIFICATIONS, AND PROVISIONS

This Order will regulate the discharge of produced wastewater to Cawelo's Reservoirs and the reuse of the produced wastewater for irrigation and/or groundwater recharge at the Famoso Basins.

### Discharge Prohibitions

This Order includes Discharge Prohibitions A.1 through A.8 that identify specific prohibitions for the facility regarding the reuse of produced wastewater for irrigation and/or groundwater recharge. This includes prohibiting the discharge of well stimulation fluids and produced wastewater from wells that have undergone well stimulation, as defined by California Code of Regulations, title 14, section 1761.

### Effluent Limits

The WDRs include effluent limits for the discharge of produced wastewater to Cawelo's Reservoir (Discharge 001) and blended produced wastewater downstream in Cawelo's distribution canal (Discharge 002). Rationale for the effluent limitations in this Order follow:

- **Oil and Grease:** An effluent limit of 35 mg/L for Oil and Grease is established in 40 CFR Part 435.50, *Oil and Grease Extraction Point Source Category, Agricultural and Wildlife Water Use Subcategory*. While the discharges to land described here are not subject to federal requirements, the Basin Plan requires the Discharger to comply with, or justify a departure from, effluent limitations set forth in 40 CFR 400 et seq. if discharge is to land. The Discharger has not provided such a justification, but rather has shown that the Treatment Facility is capable of consistently meeting the

oil and grease limit of 35 mg/L. Thus, the limit for the discharge (Discharge 001) is applied for this Order.

- **Conductivity (EC):** This Order applies the Basin Plan effluent limit for produced wastewater of 1,000 µmhos/cm as an annual average for Discharge 001.
- **Boron:** This Order applies the Basin Plan effluent limit of 1.0 mg/L for oilfield wastewater as an annual average for Discharge 001.
- **Chloride:** This Order applies the Basin Plan effluent limit of 200 mg/L for oilfield wastewater as an annual average for Discharge 001.

The WDRs also include variable daily maximum flow limits for the discharge of produced wastewater to Cawelo's Reservoir (Discharge 001). These variable flow limits are included to ensure that the quality of the discharge at the increased flowrate maintains the quality as described in the RWD and findings of the WDRs. Provided below is a table of the variable flowrate included in Effluent Limitation B.1 of the WDRs.

**Discharge 001 – Variable Daily Maximum Flow**

| Phase | Unit | | A | B |
|---|---|---|---|---|
| Daily Maximum Flowrate [1] | bbl/d [2] | <12,000 [3] | 12,000 – 40,000 [4] | 40,000 – 70,000 [4] |

[1] The **Daily Maximum** is the greatest discharge rate permitted for one day. This value shall not increase until Provision E.3 has been satisfied.

[2] bbl/d = barrels per day.

[3] Effective as of the signature date of this Order.

[4] Provision E.3 needs to be satisfied prior to the Discharger increasing the maximum flow rate into Phase A or B.

Prior to the Discharger shifting the flowrate to Phase A and B, the Discharger must first satisfy Provision E.3 of the WDRs. Provision E.3 of the WDRs states that the Discharger shall submit a technical report to the Central Valley Water Board demonstrating, using a minimum of four produced wastewater quality sampling events for each phase, that produced wastewater quality near the increased flowrate is of similar quality to the produced wastewater described in the RWD and findings of the WDRs.

## Monitoring Requirements

Water Code section 13267 authorizes the Central Valley Water Board to require monitoring and technical reports as necessary to investigate the impact of a waste discharge on waters of the State. In recent years there has been an increased emphasis on obtaining all necessary information, assuring the information is timely as well as representative and accurate, and thereby improving accountability of any discharger for meeting the conditions

of discharge. Water Code section 13268 authorizes assessment of civil administrative liability where appropriate.

This Order includes produced wastewater and groundwater monitoring. Produced wastewater monitoring includes the analysis of produced wastewater for specific constituents at specific frequencies. Analysis of produced wastewater will include the analysis of chemicals and additives used during petroleum exploration and production that may be in produced wastewater. Groundwater monitoring requires ongoing sampling of the groundwater monitoring well network at the Famoso Basins. Groundwater monitoring also includes the submittal of groundwater contour maps and analysis of groundwater for specific constituents at specific frequencies.

**Reopener**

The conditions of discharge in this Order were developed based on currently available technical information and applicable water quality laws, regulations, policies, and plans, and are intended to assure conformance with them. This Order will set limitations based on the information provided thus far. If applicable laws and regulations change, or once new information is obtained that will change the overall discharge and its potential to impact groundwater, it may be appropriate to reopen the Order.

## ANTIDEGRADATION

To determine the potential degradation of groundwater due to the proposed project, the RWD includes an antidegradation analysis that compares the quality of produced wastewater from Trio to blended produced wastewater already being reused for irrigation and groundwater recharge. The RWD concludes that Trio's produced wastewater is of good quality and is not anticipated to increase the concentration of the overall blended produced wastewater product by a significant amount that would likely cause an adverse impact to the environment.

The RWD includes a table that compares produced wastewater generated at the Section 3 Facility, Cawelo's water quality in the distribution canal, flow weighted calculations of blending Cawelo's existing water and Trio, and the average groundwater quality at the Famoso Basins. Table 3 below is based on the data presented in the RWD.

**Table 3. Comparison of Various Water Quality Constituents**

| Constituent | Trio's Produced Wastewater[1] | Cawelo's Blended Produced Wastewater[2] | Flow Weighted Blended Produced Wastewater[3] | Average Groundwater Quality at Famoso Basins |
|---|---|---|---|---|
| Total Dissolved Solids (mg/L[4]) | 373 | 356 | 353 – 361 | 372 |
| Electrical Conductivity (umhos/cm[5]) | 628 | 550 | 545 – 564 | 585 |
| Chloride (mg/L) | 86 | 71 | 71 – 73 | 68 |
| Boron (mg/L) | 0.5 | 0.44 | 0.36 – 0.53 | 0.1 |
| Arsenic (ug/L[6]) | 3.7 | 13 | 10 – 16 | 2.1 |
| Nitrate – N (mg/L) | <0.40 | 1.7 | 0.3 – 3.1 | 7.5 |

1 Produced wastewater generated at the Section 3 Facility.

2 Blended produced wastewater currently being used by Cawelo and regulated under Waste Discharge Requirements Order Nos. R5-2012-0058 and R5-2012-0059.

3 Calculated using the flow weighted concentrations of produced wastewater from Trio and blended produced wastewater currently being used by Cawelo.

4 mg/L = milligrams per liter.

5 umhos/cm = micromhos per centimeter.

6 ug/L = micrograms per liter.

The RWD concludes that there does not appear to be a significant threat to groundwater beneath the Famoso Basins for total dissolved solids, electrical conductivity, and Nitrate-N based on the results of Table 3. The RWD states the following for the remaining constituents:

- Chloride – The flow weighted average and average groundwater beneath the Famoso Basins is of similar quality between 68 and 73 mg/L, representing a 4-7% difference depending on the flow weighted average. Although slightly greater, these values are significantly below the 200 mg/L water quality objective identified in the Basin Plan.
- Boron – The flow weighted average is greater than the average groundwater concentration. Due to the increased concentration, there is the potential for degradation. Since the average depth to groundwater is approximately 450 feet below ground surface, this potential threat is decreased since boron is likely to be reduced prior to reaching groundwater. Since the Famoso Basins already have an

existing groundwater monitoring well network, boron and other constituents will continue to be monitored to ensure there is not a significant impact to water quality.

- Arsenic – The flow weighted average is greater than the average concentration in groundwater. In a 2011 antidegradation analysis for Waste Discharge Requirement Order Nos. R5-2012-0058 and R5-2012-0059, Dr. B.A. Manning, of San Francisco State University, demonstrates using a model that soil adsorption for arsenic is expected to occur in this area at a high rate due to the finer particles in the soil. Due to this finding, soil adsorption is expected to reduce the concentration of arsenic to a negligible concentration before it reaches groundwater.

The RWD includes an antidegradation analysis for the potential impacts to groundwater beneath cropland irrigated with blended produced wastewater. Appendix I of the RWD states that the potential percolate for specific crop types ranges from 9 to 11.4 inches per year, based on *Water Quality for Agriculture* by Ayers and Westcot. The calculations in Appendix I show that the percolate can increase by a maximum factor of 1.6 when compared to the quality of the irrigation water, but this is also controlled by the climate and the volume of percolation. In addition, the antidegradation analysis references Cawelo's 2020 Groundwater Sustainability Plan, which identifies over 1,000 groundwater samples that were collected. This report found that total dissolved solids ranged from 58 to 2,151 mg/L. The RWD states that the weighted percolate for TDS is approximately 643 mg/L, which is similar to groundwater samples taken in the area.

Due to the limited percolation observed for the Central Valley, depth to groundwater of approximately 450 feet below groundwater surface, and variability in groundwater across Cawelo's service territory, the RWD states that groundwater quality is not anticipated to be significantly impacted and will not exceed water quality objectives identified in the Basin Plan.

Analytical results of the four produced wastewater samples submitted in the RWD indicate:

- Inorganic compound results appear to be similar to produced wastewater currently being reused by Cawelo;
- Majority of detectable analytical results for the analyses are below the drinking water primary and secondary MCLs, where applicable; and
- Groundwater at the Famoso Basins is not likely to be impacted by organics given the low concentrations and depth to groundwater of approximately 450 feet.

This Order establishes effluent limitations for discharges that will not unreasonably threaten present and anticipated beneficial uses or result in groundwater quality that exceeds water quality objectives set forth in the Basin Plan.

The RWD states that the Discharger will implement the following best practicable treatment or control (BPTC) measures to minimize the potential degradation of water quality:

- Produced wastewater will be treated to remove solids and oil and grease prior to reuse for irrigation;
- Cawelo's Reservoir will be used as a buffer to identify poor quality produced wastewater that may need to be disposed of off-site or require additional treatment prior to entering Cawelo's distribution network to be reused for irrigation and/or groundwater recharge;
- Cawelo's Reservoir will have oil adsorption booms to remove oil from the surface, if necessary;
- Discharge of produced wastewater to Cawelo will be monitored to ensure that reservoirs do not overflow;
- Water management practices will be implemented to prevent over-irrigation of crops; and
- Groundwater at the Famoso Basins will be monitored to ensure that groundwater is not impacted from the discharge into those storage basins.

Central Valley Water Board staff finds that these treatment and control practices represent BPTC for the discharge which may threaten to degrade waters of the state.

The discharge, as regulated by this Order, will provide the following benefits:

- Provide up to 70,000 barrels per day of recycled water (i.e., produced wastewater) for irrigation;
- Result in the protection and maintenance of surface water and groundwater resources. Groundwater recharge can reduce the rate of groundwater decline in the project area and decrease pumping costs for any groundwater extraction needed;
- Provide a new source of water for irrigation to reduce the demand of groundwater in the project area;
- Make available an additional water supply to support the agricultural economy of the area and the Central Valley region;
- Provide a 'drought proof' water supply. This has additional benefits for crop production planning; and
- Convert flows that otherwise would be disposed of by well injection to a beneficial use as irrigation water supply.

Central Valley Water Board staff finds that these benefits represent a significant benefit to the people of the state.

This Order complies with Resolution 68-16 because it ensures that any degradation that may occur as a result of the discharges regulated by this Order will not result in water quality lower than that prescribed in state and regional policies, that the degradation will not unreasonably affect present and anticipated future beneficial uses, that the Discharger will employ BPTC to minimize degradation, and that the degradation is consistent with the maximum benefit to the people of the state due to the significant benefits provided by the activities regulated by this Order.

## SALT CONTROL PROGRAM

The Central Valley Water Board adopted Basin Plan amendments incorporating new programs for addressing ongoing salt and nitrate accumulation in the Central Valley at its 31 May 2018 Board Meeting (Resolution R5-2018-0034). The Basin Plan amendments became effective on 17 January 2020 and were revised by the Central Valley Water Board in 2020 with Resolution R5-2020-0057 (https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/resolutions/r5-2020-0057_res.pdf). The revisions to the Basin Plan amendments became effective on 10 November 2021.

Under the Salt Control Program, dischargers that are unable to comply with the stringent salinity requirements may instead, to the extent reasonable, feasible, and practicable (and while accounting for conservation and drought, salinity levels in the water supply source, and some appropriate increment of growth), be subject to performance-based requirements as determined appropriate by the Central Valley Water Board, and participate in a basin-wide effort known as the Prioritization and Optimization Study (P&O Study) to develop a long-term salinity strategy for the Central Valley. The RWD states the proposed project intends to participate in the P&O Study. The Discharger needs to submit a Notice of Intent for the Salt Control Program and receive a CVSALTS ID.

As these strategies are implemented, the Central Valley Water Board may find it necessary to modify the requirements of these WDRs. As such this Order may be amended or modified to incorporate any newly applicable requirements to ensure that the goals of the Salt Control Programs are met.

## NITRAGE CONTROL PROGRAM

The Nitrate Control Program is a prioritized program. The proposed discharge is within the Kern Water Collaborative Management Zone, which has assigned a Priority 2 Basin status for the area of the proposed discharge. The Board issued Notices to Comply to dischargers in Priority 1 Basins in May 2020 and Priority 2 Basins in December 2023. These notices

provided dischargers with a choice to participate in an individual permitting approach (Pathway A) or in a collective permitting approach (Pathway B). Under the collective approach, dischargers jointly form “Management Zones” that fulfill the requirements of the Nitrate Control Program. The Discharger needs to submit a Notice of Intent for the Nitrate Control Program, where the Discharger will select the preferred Pathway and join the Kern Water Collaborative Management Zone if they decide on the collective permitting approach.

As these strategies are implemented, the Central Valley Water Board may find it necessary to modify the requirements of these WDRs. As such this Order may be amended or modified to incorporate any newly applicable requirements to ensure that the goals of the Nitrate Control Programs are met.

## FOOD SAFETY PROJECT

Due to a public concern regarding the reuse of produced wastewater for irrigation, Central Valley Water Board staff initiated a Food Safety Project and commissioned a panel of experts, the Food Safety Expert Panel (Panel), to help the Central Valley Water Board evaluate the safety of reusing produced wastewater for irrigation of crops grown for human consumption. The Food Safety Project included three main studies (Tasks 1-3) conducted by an independent consultant:

- Task 1: Identify chemicals that have the potential to be in produced wastewater and conduct a preliminary hazard evaluation to identify which of these were worthy of further evaluation, creating a Chemicals of Interest list.
- Task 2: Conduct a rigorous evaluation of the Chemicals of Interest in a literature review that considers potential hazards from ingestion, persistence in agricultural ecosystems, and the potential for plant uptake.
- Task 3: Evaluate the chemical composition of crops irrigated with produced wastewater (treated crops) in comparison to crops that were irrigated with conventional sources of water (control crops).

On 8 September 2021, a White Paper was published by the Central Valley Water Board that included reports for Task 1, 2, and 3, and summarizes the findings and conclusion by the Panel. Some of the major findings that were identified include the following:

- Crop sample analyses indicated that the Chemicals of Interest that were measured in crops were within the normal range of concentrations found in food;
- The current monitoring required for produced wastewater used for irrigation by the Central Valley Water Board is sufficiently rigorous;

- The majority of 399 chemicals and constituents routinely monitored in produced wastewater used for irrigation were either not detected or below drinking water standards established by the California Department of Public Health;
- The crop sampling program was not shown to be superior to a water monitoring program for ensuring public health and safety in the context of using produced wastewater for irrigation water; and
- Tasks 1 through 3 did not yield any evidence that the reuse of produced wastewater for irrigation poses an elevated threat to human health or crop safety.

Based on the conclusions of the Panel, Central Valley Water Board staff finds that the practice of reusing produced wastewater for irrigation, as described in the White Paper, is appropriate.

## TITLE 27

Title 27 of the California Code of Regulations, section 20005 et seq (Title 27) contains regulations to address certain discharges to land. Title 27 establishes a waste classification system, specifies siting and construction standards for full containment of classified waste, requires extensive monitoring of groundwater and the unsaturated zone for any indication of failure of containment, and specifies closure and post-closure maintenance requirements. Generally, no degradation of groundwater quality by any waste constituent in a classified waste is acceptable under Title 27 regulations.

Unless exempt, the treatment, storage, processing, and disposal of solid waste is subject to full containment pursuant to Title 27 requirements. However, Title 27 exempts certain activities from its provisions. Title 27, section 20090 states, in relevant part:

> (b) Wastewater - Discharges of wastewater to land, including but not limited to evaporation ponds, percolation ponds, or subsurface leachfields if the following conditions are met:
>
> (1) the applicable RWQCB has issued WDRs, reclamation requirements, or waived such issuance;
>
> (2) the discharge is in compliance with the applicable water quality control plan; and
>
> (3) the wastewater does not need to be managed according to Chapter 11, Division 4.5, Title 22 of this code as a hazardous waste.

Discharges of produced wastewater to Cawelo's Reservoir and reuse of produced wastewater for irrigation are exempt from the requirements of Title 27 because the Board is issuing these waste discharge requirements, because the discharge as regulated by this

Order will comply with the Basin Plan, and because the wastes subject to regulation under this Order do not need to be managed as hazardous wastes.

## CEQA

The California Environmental Quality Act (CEQA) requires a government agency to comply with certain procedures when it approves or proposes to carry out an activity. (Cal. Code Regs., tit. 14, sec. 15502(e).) This includes private activities which require approval from a governmental agency. (Cal. Code Regs., tit. 14, sec. 15502(b)(3).) The adoption of WDRs therefore requires compliance with CEQA prior to approval of the WDRs.

Cawelo Water District is the lead agency for CEQA purposes (Public Resources Code Section 21000, et seq.) under CEQA Guidelines (Title14, Division 6, California Code of Regulations, as amended). On September 24, 2024, the Discharger submitted a Notice of Intent for a Mitigated Negative Declaration (MND) to Kern County's County Clerk and the California State Clearinghouse for Cawelo's Reservoir and the delivery pipeline. The State Review Period started on September 24 and ended on October 24, 2024. A comment from the California Department of Fish and Wildlife was received and incorporated into the Mitigated Negative Declaration. On February 14, 2025, the final Notice of Determination was filed. Additionally, Cawelo prepared a Negative Declaration for the discharge and reuse of produced wastewater for irrigation, which was finalized in April 2007. The Central Valley Water Board reviewed and commented on the Negative Declaration and found that the project, as approved by Cawelo and permitted under Waste Discharge Requirements Order No. R5-2007- 0066, would not have a significant effect on the environment.

In 2011, the Discharger adopted a Negative Declaration in accordance with CEQA for discharges to the Famoso Basins. Central Valley Water Board staff reviewed the Negative Declaration and concurred that it addressed issues with regards to potential impacts to water quality.

The Central Valley Water Board is a responsible agency under CEQA (Public Resources Code, section 21069) and in making its determinations and findings, must presume that Cawelo's MND and Negative Declarations comport with the requirements of CEQA and are valid. (Public Resources Code, section 21167.3; California Code of Regulations, title 14, section 15231.) The Central Valley Water Board has reviewed and considered the MND and Negative Declaration and finds that the environmental documents address the water quality impacts and that no additional environmental review is required. (California Code of Regulations, title 14, section 15096, subdivision (f), 15162, 15163.) The Central Valley Water Board will file a Notice of Determination with the Office of Planning and Research within five (5) working days of issuance of this certification. (California Code of Regulations, title 14, section 15096, subdivision (i).)

| Constituent | Sample Date: | 3/3/2020 | 7/7/2021 | 8/25/2022 | 8/25/2022 | 8/25/2022 | 8/25/2022 | Maximum Contaminant Levels (MCLs) [1] | |
|---|---|---|---|---|---|---|---|---|---|
| | Units | Unfiltered | Unfiltered | Unfiltered | Filtered | Duplicate | | Primary[2] | Secondary[3] |
| | | | | | | Unfiltered | Filtered | | |
| **Petroleum Hydrocarbons** | | | | | | | | | |
| Total Oil and Grease | mg/L [4] | 500 | 180 | 1,200 | NR [5] | 780 | NR | - [6] | - |
| Diesel Range Hydrocarbons | mg/L | 77 | 30 | 170 | NR | 180 | NR | - | - |
| Gasoline Range Hydrocarbons | mg/L | 2,300 | 160 | 2,900 | NR | 4,500 | NR | - | - |
| Motor Oil Range Hydrocarbons | mg/L | 150 | 28 | 300 | NR | 320 | NR | - | - |
| **General Minerals** | | | | | | | | | |
| Boron | mg/L | 0.51 | 0.43 | 0.52 | NR | 0.54 | NR | - | - |
| Calcium | mg/L | 5.4 | 2.9 | 2.4 | NR | 2.5 | NR | - | - |
| Chloride | mg/L | 96 | 77 | 85 | NR | 86 | NR | - | 250 |
| Electrical Conductivity (EC) | µmhos/cm[7] | 650 | 610 | 620 | NR | 630 | NR | - | 900 |
| Magnesium | mg/L | 0.73 | 0.15 | 0.17 | NR | 0.17 | NR | - | - |
| pH | pH Units | 8.1 | 8.8 | 8.5 | NR | 8.7 | NR | - | - |
| Potassium | mg/L | 19 | 4.1 | 5 | NR | 5 | NR | - | - |
| Sodium | mg/L | 140 | 120 | 130 | NR | 140 | NR | - | - |
| Sulfate | mg/L | <0.40 [8] | <0.40 | <0.40 | NR | <0.40 | NR | - | 250 |
| Total Alkalinity as CaCO3 | mg/L | 180 | 190 | 170 | NR | 170 | NR | - | - |
| Total Dissolved Solids | mg/L | 460 | 320 | 360 | NR | 350 | NR | - | 500 |
| Total Suspended Solids | mg/L | 310 | 140 | 1,400 | NR | 1,000 | NR | - | - |
| Bicarbonate as CaCO3 (HCO3) | mg/L | 180 | 160 | 140 | NR | 130 | NR | - | - |

| **Constituent** | **Sample Date:** | **3/3/2020** | **7/7/2021** | **8/25/2022** | **8/25/2022** | **8/25/2022** | **8/25/2022** | **Maximum Contaminant Levels (MCLs) [1]** | |
|---|---|---|---|---|---|---|---|---|---|
| | **Units** | **Unfiltered** | **Unfiltered** | **Unfiltered** | **Filtered** | **Duplicate** | | **Primary[2]** | **Secondary[3]** |
| | | | | | | **Unfiltered** | **Filtered** | | |
| Carbonate as CaCO3 (CO3) | mg/L | <10 | 24 | 23 | NR | 39 | NR | - | - |
| Hydroxide as CaCO3 (OH) | mg/L | <10 | <20 | <20 | NR | <20 | NR | - | - |
| Ammonia as N | mg/L | NR | 0.18 | 0.41 | NR | 0.46 | NR | - | - |
| Nitrate as N | mg/L | <0.40 | <0.40 | <0.40 | NR | <0.40 | NR | 45 | - |
| Total Kjeldahl N | mg/L | NR | 1 | 7.1 | NR | 6 | NR | - | - |
| Total N | mg/L | NR | 1 | 7.1 | NR | 6 | NR | 10 | - |
| Total Organic Carbon | mg/L | 290 | 88 | <100 | NR | 150 | NR | - | - |
| Total Dissolved Solids | mg/L | 460 | 320 | 360 | NR | 350 | NR | - | - |
| Total Suspended Solids | mg/L | 310 | 140 | 1,400 | NR | 1,000 | NR | - | - |
| **Metals** | | | | | | | | | |
| Antimony | mg/L | <0.002 | <0.002 | <0.004 | NR | <0.004 | NR | 0.006 | - |
| Arsenic | mg/L | 0.0048 | <0.002 | <0.004 | NR | <0.004 | NR | 0.01 | - |
| Barium | mg/L | 0.099 | 0.21 | 0.44 | NR | 0.32 | NR | 1 | - |
| Beryllium | mg/L | <0.001 | <0.001 | <0.002 | NR | <0.002 | NR | 0.004 | - |
| Cadmium | mg/L | <0.001 | <0.001 | <0.002 | NR | <0.002 | NR | 0.005 | - |
| Chromium | mg/L | <0.003 | <0.003 | <0.006 | NR | <0.006 | NR | - | - |
| Cobalt | mg/L | <0.001 | <0.001 | <0.004 | NR | <0.002 | NR | - | - |
| Copper | mg/L | <0.002 | 0.0026 | 0.01 | NR | <0.004 | NR | 1.3 | 1 |
| Hexavalent Chromium | mg/L | <0.50 | <0.50 | <0.50 | NR | <0.50 | NR | 10 | - |
| Iron | mg/L | 0.16 | <0.2 | 3.2 | NR | 1.9 | NR | - | 0.3 |
| Lead | mg/L | <0.001 | <0.001 | 0.0024 | NR | <0.002 | NR | 0.015 | - |

| Constituent | Sample Date: | 3/3/2020 | 7/7/2021 | 8/25/2022 | 8/25/2022 | 8/25/2022 | 8/25/2022 | Maximum Contaminant Levels (MCLs) [1] | |
|---|---|---|---|---|---|---|---|---|---|
| | Units | Unfiltered | Unfiltered | Unfiltered | Filtered | Duplicate | | Primary[2] | Secondary[3] |
| | | | | | | Unfiltered | Filtered | | |
| Lithium | mg/L | 0.025 | <0.05 | <0.05 | NR | <0.05 | NR | - | - |
| Manganese | mg/L | 0.014 | 0.045 | 0.069 | NR | 0.034 | NR | - | 0.05 |
| Mercury | mg/L | <0.0002 | <0.0002 | <0.0002 | NR | <0.0002 | NR | - | - |
| Molybdenum | mg/L | 0.0072 | 0.0062 | 0.0062 | NR | 0.0066 | NR | - | - |
| Nickel | mg/L | 0.0037 | 0.0028 | 0.01 | NR | 0.0046 | NR | 0.1 | - |
| Selenium | mg/L | 0.015 | 0.0012 | 0.0024 | NR | <0.002 | NR | 0.05 | - |
| Strontium | mg/L | 0.051 | <0.02 | 0.035 | NR | 0.03 | NR | - | - |
| Thallium | mg/L | <0.001 | <0.001 | <0.002 | NR | <0.002 | NR | 0.002 | - |
| Uranium | mg/L | <0.001 | <0.001 | <0.002 | NR | <0.002 | NR | - | - |
| Vanadium | mg/L | <0.005 | <0.005 | 0.013 | NR | <0.01 | NR | - | - |
| Zinc | mg/L | <0.005 | 0.048 | 0.056 | NR | <0.016 | NR | - | 5 |
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | |
| 1,1,1,2-Tetrachlroethane | µg/L [9] | <10 | <10 | <10 | NR | <10 | NR | - | - |
| 1,1,1-Trichloroethane | µg/L | <10 | <10 | <10 | NR | <10 | NR | 200 | - |
| 1,1,2,2-Tetrachloroethane | µg/L | <10 | <10 | <10 | NR | <10 | NR | 1 | - |
| 1,1,2-Trichloroethane | µg/L | <10 | <10 | <10 | NR | <10 | NR | 5 | - |
| 1,1,2-Trichlorotrifluoroethane | µg/L | <10 | <10 | <10 | NR | <10 | NR | 1200 | - |
| 1,1-Dichloroethane | µg/L | <10 | <10 | <10 | NR | <10 | NR | 5 | - |
| 1,1-Dichloroethene | µg/L | <10 | <10 | <10 | NR | <10 | NR | 6 | - |
| 1,1-Dichloropropene | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| 1,2,3-Trichlorobenzene | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |

| Constituent | Sample Date: | 3/3/2020 | 7/7/2021 | 8/25/2022 | 8/25/2022 | 8/25/2022 | 8/25/2022 | Maximum Contaminant Levels (MCLs) [1] | |
|---|---|---|---|---|---|---|---|---|---|
| | Units | Unfiltered | Unfiltered | Unfiltered | Filtered | Duplicate | | Primary[2] | Secondary[3] |
| | | | | | | Unfiltered | Filtered | | |
| 1,2,3-Trichloropropane | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| 1,2,4-Trichlorobenzene | µg/L | <10 | <10 | <10 | NR | <10 | NR | 5 | - |
| 1,2,4-Trimethylbenzene | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| 1,2-Dibromo-3-chloropropane | µg/L | <20 | <20 | <20 | NR | <20 | NR | 0.2 | - |
| 1,2-Dibromoethane (EDB) | µg/L | <10 | <10 | <10 | NR | <10 | NR | 0.05 | - |
| 1,2-Dichlorobenzene | µg/L | <10 | <10 | <10 | NR | <10 | NR | 600 | - |
| 1,2-Dichloroethane | µg/L | <10 | <10 | <10 | NR | <10 | NR | 0.5 | - |
| 1,2-Dichloropropane | µg/L | <10 | <10 | <10 | NR | <10 | NR | 5 | - |
| 1,3,5-Trimethylbenzene | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| 1,3-Dichlorobenzene | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| 1,3-Dichloropropane | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| 1,4-Dichlorobenzene | µg/L | <10 | <10 | <10 | NR | <10 | NR | 5 | - |
| 2,2-Dichloropropane | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| 2-Butanone (MEK) | µg/L | <200 | <200 | <200 | NR | <200 | NR | - | - |
| 2-Chloroethylvinyl Ether | µg/L | NR | <20 | <20 | NR | <20 | NR | - | - |
| 2-Chlorotoluene | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| 2-Hexanone | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| 4-Chlorotoluene | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| 4-Isopropyl Toluene | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| 4-Methyl-2-pentanone (MIBK) | µg/L | <40 | <40 | <40 | NR | <40 | NR | - | - |
| Acetone | µg/L | <100 | <100 | <400 | NR | <400 | NR | - | - |

| Constituent | Sample Date: | 3/3/2020 | 7/7/2021 | 8/25/2022 | 8/25/2022 | 8/25/2022 | 8/25/2022 | Maximum Contaminant Levels (MCLs) [1] | |
|---|---|---|---|---|---|---|---|---|---|
| | Units | Unfiltered | Unfiltered | Unfiltered | Filtered | Duplicate | | Primary[2] | Secondary[3] |
| | | | | | | Unfiltered | Filtered | | |
| Benzene | µg/L | <10 | <10 | <10 | NR | <10 | NR | 1 | - |
| Bromobenzene | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| Bromochloromethane | µg/L | <10 | <10 | <10 | NR | <10 | NR | 80 | - |
| Bromodichloromethane | µg/L | <10 | <10 | <10 | NR | <10 | NR | 80 | - |
| Bromoform | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| Bromomethane | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| Carbon disulfide | µg/L | <20 | <20 | <20 | NR | <20 | NR | - | - |
| Carbon tetrachloride | µg/L | <10 | <10 | <10 | NR | <10 | NR | 0.5 | - |
| Chlorobenzene | µg/L | <10 | <10 | <10 | NR | <10 | NR | 70 | - |
| Chloroethane | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| Chloroform | µg/L | <10 | <10 | <10 | NR | <10 | NR | 80 | - |
| Chloromethane | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| cis-1,2-Dichloroethene | µg/L | <10 | <10 | <10 | NR | <10 | NR | 6 | - |
| cis-1,3-Dichloropropene | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| Dibromochloromethane | µg/L | <10 | <10 | <10 | NR | <10 | NR | 80 | - |
| Dibromomethane | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| Dichlorodifluoromethane | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| Diisopropyl Ether | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| Ethanol | µg/L | <10,000 | <10,000 | <10,000 | NR | <10,000 | NR | - | - |
| Ethyl t-Butyl Ether | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| Ethylbenzene | µg/L | <10 | <10 | <10 | NR | <10 | NR | 300 | - |

| Constituent | Sample Date: | 3/3/2020 | 7/7/2021 | 8/25/2022 | 8/25/2022 | 8/25/2022 | 8/25/2022 | Maximum Contaminant Levels (MCLs) [1] | |
|---|---|---|---|---|---|---|---|---|---|
| | Units | Unfiltered | Unfiltered | Unfiltered | Filtered | Duplicate | | Primary[2] | Secondary[3] |
| | | | | | | Unfiltered | Filtered | | |
| Hexachlorobutadiene | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| Iodomethane | µg/L | <20 | <20 | <40 | NR | <40 | NR | - | - |
| Isopropyl alcohol | µg/L | <4,000 | <4,000 | <4,000 | NR | <4,000 | NR | - | - |
| Isopropylbenzene | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| Methylene Chloride | µg/L | <10 | <10 | <10 | NR | <10 | NR | 5 | - |
| Methyl-t-butyl ether | µg/L | <10 | <10 | <10 | NR | <10 | NR | 13 | 5 |
| Napthalene | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| n-Butylbenzene | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| n-Propylbenzene | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| sec-Butylbenzene | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| Styrene | µg/L | <10 | <10 | <10 | NR | <10 | NR | 100 | - |
| t-Amyl Methyl Ether | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| t-Butyl alcohol | µg/L | <200 | <200 | <200 | NR | <200 | NR | - | - |
| tert-Butylbenzene | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| Tetrachloroethene (PCE) | µg/L | <10 | <10 | <10 | NR | <10 | NR | 5 | - |
| Toluene | µg/L | <10 | <10 | <10 | NR | <10 | NR | 150 | - |
| trans-1,2-Dichloroethene | µg/L | <10 | <10 | <10 | NR | <10 | NR | 10 | - |
| trans-1,3-Dichloropropene | µg/L | <10 | <10 | <10 | NR | <10 | NR | - | - |
| Trichloroethene (TCE) | µg/L | <10 | <10 | <10 | NR | <10 | NR | 5 | - |
| Trichlorofluoromethane | µg/L | <10 | <10 | <10 | NR | <10 | NR | 150 | - |
| Vinyl Acetate | µg/L | <40 | <40 | <40 | NR | <40 | NR | - | - |

| **Constituent** | **Sample Date:** | **3/3/2020** | **7/7/2021** | **8/25/2022** | **8/25/2022** | **8/25/2022** | **8/25/2022** | **Maximum Contaminant Levels (MCLs) [1]** | |
|---|---|---|---|---|---|---|---|---|---|
| | **Units** | **Unfiltered** | **Unfiltered** | **Unfiltered** | **Filtered** | **Duplicate** | | **Primary[2]** | **Secondary[3]** |
| | | | | | | **Unfiltered** | **Filtered** | | |
| Vinyl Chloride | µg/L | <10 | <10 | <10 | NR | <10 | NR | 0.5 | - |
| Xylenes (total) | µg/L | <10 | <10 | <10 | NR | <10 | NR | 1750 | - |
| **Polynuclear Aromatic Hydrocarbons (PAHs)** | | | | | | | | | |
| Acenaphthene | µg/L | <3.1 | <2.2 | <4.3 | NR | <4.2 | NR | - | - |
| Acenaphthylene | µg/L | <3.1 | <2.2 | <4.3 | NR | <4.2 | NR | - | - |
| Anthracene | µg/L | <3.1 | <2.2 | <4.3 | NR | <4.2 | NR | - | - |
| Benzo (a) anthracene | µg/L | <3.1 | <2.2 | <4.3 | NR | <4.2 | NR | - | - |
| Benzo (a) pyrene | µg/L | <3.1 | <2.2 | <4.3 | NR | <4.2 | NR | 0.2 | - |
| Benzo (b) fluoranthene | µg/L | <3.1 | <2.2 | <4.3 | NR | <4.2 | NR | - | - |
| Benzo (g,h,i) anthracene | µg/L | <3.1 | <2.2 | <4.3 | NR | <4.2 | NR | - | - |
| Benzo (k) fluoranthene | µg/L | <3.1 | <2.2 | <4.3 | NR | <4.2 | NR | - | - |
| Chrysene | µg/L | 6.7 | <2.2 | 12 | NR | 11 | NR | - | - |
| Dibenzo (a,h) anthracene | µg/L | <3.1 | <2.2 | <4.3 | NR | <4.2 | NR | - | - |
| Fluoranthene | µg/L | <3.1 | <2.2 | <4.3 | NR | <4.2 | NR | - | - |
| Fluorene | µg/L | <3.1 | <2.2 | <4.3 | NR | <4.2 | NR | - | - |
| Indeno (1,2,3-cd) pyrene | µg/L | <3.1 | <2.2 | <4.3 | NR | <4.2 | NR | - | - |
| Naphthalene | µg/L | <3.1 | <2.2 | <4.3 | NR | <4.2 | NR | - | - |
| Phenanthrene | µg/L | <3.1 | <2.2 | <4.3 | NR | <4.2 | NR | - | - |
| Pyrene | µg/L | <3.1 | <2.2 | <4.3 | NR | <4.2 | NR | - | - |
| **Radionuclides** | | | | | | | | | |
| Gross Alpha | pCi/L [11] | 10.6 | -0.09 | 3.03 | 0.663 | 0 | -0.121 | 15 | - |

| Constituent | Sample Date: | 3/3/2020 | 7/7/2021 | 8/25/2022 | 8/25/2022 | 8/25/2022 | 8/25/2022 | Maximum Contaminant Levels (MCLs) [1] | |
|---|---|---|---|---|---|---|---|---|---|
| | Units | Unfiltered | Unfiltered | Unfiltered | Filtered | Duplicate | | Primary[2] | Secondary[3] |
| | | | | | | Unfiltered | Filtered | | |
| Gross Beta | pCi/L | 42.2 | 2.51 | -18 | 1.94 | 15.6 | 1.62 | - | - |
| Radium-226 | pCi/L | 12.2 | 1.67 | 0.755 | -0.056 | 2.46 | -0.0159 | - | - |
| Radium-228 | pCi/L | 7.97 | 16.3 | 4.79 | 0.714 | -0.445 | 0.47 | - | - |
| Radium-226+228 | pCi/L | 20.17 | 17.97 | 5.545 | 0.658 | 2.015 | 0.4541 | 5 | - |
| **Stable Isotopes** | | | | | | | | | |
| d18O H2O | 0/00 | NR | NR | -10.34 | NR | -10.32 | NR | - | - |
| dD H2O | 0/00 | NR | NR | -77.2 | NR | -76.7 | NR | - | - |

1. Maximum contaminant levels (MCLs) are published by the State Water Resources Control Board, Division of Drinking Water.
2. Standard based on chronic, non-acute, or acute human health effects.
3. Guidelines established to manage water for aesthetic considerations, such as taste, color, and odor. These are not considered to present a risk to human health.
4. mg/L = milligrams per liter.
5. NR = No Results.
6. "-" = there is no MCL for this constituent.
7. µmhos/cm = micromhos per centimeter.
8. "<" = less than the minimum detection limit.
9. µg/L = micrograms per liter.
10. NA = Data not available.
11. pCi/L = picocuries per liter.