

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
CENTRAL VALLEY REGION

ORDER NO. R5-2008-0065

WASTE DISCHARGE REQUIREMENTS

FOR

THERMALITO IRRIGATION DISTRICT  
WATER TREATMENT PLANT  
BUTTE COUNTY

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

1. The Thermalito Irrigation District (hereafter Discharger) owns and operates a water treatment plant (WTP) at 535 Table Mountain Boulevard, Oroville, in Butte County. The WTP is located on 3.8 acres, on the north side of the Thermalito Power Canal, approximately a quarter mile east of State Route Highway 70. The WTP is in Section 6, T19N, R4E, MDB&M, as shown on Attachment A, a part of this Order. The property is located at Assessors Parcel Number 031-040-038.
2. On 19 June 2006, the Discharger submitted a Report of Waste Discharge (RWD) to expand the potable WTP capacity from 6 million gallons per day (MGD) to 10 MGD. On 14 November 2007, a supplemental RWD was submitted. The WTP does not have a permit with the Regional Water Board for current operations. The current treatment processes are flocculation, coagulation, pressure filtration, and disinfection. Filter backwash is discharged to two unlined settling ponds. The settling ponds do not discharge to surface waters. The increased treatment capacity will consist of microfiltration and disinfection.
3. The WTP provides water to approximately 2,800 customers, residential and commercial, approximately 1/3 of which are in Oroville and 2/3 in unincorporated areas of Butte County.
4. Raw water supply is from the Thermalito Power Canal. The Discharger has water rights to 7,200 acre-feet of water from the Concow Reservoir. This water is diverted into Concow Creek to Lake Oroville and ultimately to the Thermalito Power Canal.

**Existing Pressure Filtration Plant**

5. The current potable water treatment processes consist of prechlorination, coagulant and polymer addition, pressure filtration, and post-chlorination (of finished water only).
6. Hypochlorite and aluminum sulfate (alum), a non-ionic coagulant polymer, are added directly after the raw water pump station. The alum is dosed between 8 and 17 parts per million (ppm) and the polymer below 0.06 ppm. The alum and polymer aid in the

removal of suspended solids in the raw water. The hypochlorite helps reduce algae growth in the treatment system.

7. Two banks of three pressure filters each are currently in operation. Each bank has a capacity of 3 MGD. Each pressure filter is 8 feet in diameter and 30 feet long. The filter media in the pressure filters is comprised of coal anthracite, sand, gravel, and rocks. The polymer aids the filter media in holding the alum and contaminants within the confines of the media.
8. Backwash of the pressure filters is initiated when a predetermined pressure differential is reached. The 6 MGD pressure filter system creates approximately 170,000 gallons per day (gpd) of backwash wastewater when run at full capacity. Backwash wastewater is discharged to two unlined ponds and eventually recycled into the raw water intake.
9. After filtration, the finished drinking water is chlorinated with sodium hypochlorite and transferred to a one million gallon clearwell on site. Water from the clearwell is pumped directly into the distribution system or to a 2.5 million gallon storage tank located a quarter mile due north of the WTP. Residual chlorine is continuously monitored at the distribution line from the clearwell; it is maintained at 0.8 mg/L. Treated water from the storage tank is delivered by gravity flow. The backwash wastewater is not chlorinated after pressure filtration.
10. The following table summarizes raw water (Thermalito Power Canal) and pressure treated backwash wastewater data provided in the RWD for samples obtained on 17 May 2007.

<u>Constituent/Parameter</u>	<u>Units</u>	<u>Raw Water</u>	<u>Backwash Wastewater</u>
Aluminum, total	ug/L	20	280
Arsenic	ug/L	<2	<2
Boron	mg/L	<0.05	0.05
Cadmium, total	ug/L	<0.2	<0.2
Chromium, total	ug/L	<1	<1
Copper, total	ug/L	10	<10
Hardness, Total	mg/L	32.3	34.8
Calcium	mg/L	8	9
Magnesium	mg/L	3	3
Manganese	ug/L	<10	20
Mercury, total	ug/L	<0.02	<0.02
Nickel, total	ug/L	<1	<1
Potassium	mg/L	1	1
Silver, total	ug/L	<1	<1
Sodium	mg/L	3	4
Zinc, total	ug/L	<10	<10
Alkalinity (as CaCO <sub>3</sub> )	mg/L	40	40
Bicarbonate	mg/L	50	40
Carbonate	mg/L	<10	<10
Hydroxide	mg/L	<10	<10

Bromide	mg/L	<20	<20
Chloride	mg/L	<1	1
Electrical Conductivity	umhos/cm	82	95
Fluoride	mg/L	<0.1	<0.1
pH	pH units	6.7	6.5
Ortho-Phosphate	mg/L	<0.5	<0.5
Total Dissolved Solids	mg/L	50	60
Sulfate	mg/L	2	7
Fecal Coliform	MPN/100mL	4	2
Total Coliform	MPN/100mL	13	23

The results show elevated levels of aluminum in the backwash water, which is likely due to the addition of alum. Once the microfiltration plant is operational, the concentration of aluminum in the wastewater should decrease significantly because alum will not be used at the microfiltration plant.

### New Microfiltration Plant

11. A 4 MGD microfiltration (MF) water treatment plant is being built. The MF plant is rated at a nominal 4 MGD capacity, but can treat up to 4.5 to 4.8 MGD for sustained periods of time. Once the MF plant is operational, one of the two banks of pressure filters will be maintained in standby mode, and will be available for service. The second bank of three filters will be inactive (emergency use only). During periods when the system demand exceeds the capacity of the MF plant, but is less than 6 MGD, the Discharger will utilize their supply wells to meet demand. The one bank of pressure filters will only be used when demand exceeds 6 MGD.
12. The MF system will not use coagulants. Sodium hypochlorite will be injected prior to and after the membranes.
13. The recovery rate of the MF plant (volume of filtered water produced divided by the total raw water flow) is expected to be a minimum of 97% during peak raw water turbidity conditions. At a flow rate of 4.8 MGD, the wastewater volume will be approximately 144,000 gpd. At normal raw water turbidity conditions (less than 2 NTU), the recovery rate is expected to be a minimum of 98% (approximately 96,000 gpd backwash wastewater). Approximately 1 mg/L of chlorine will be present in the backwash water.
14. Chemical cleaning (CIP) of the membranes is anticipated to occur every one and a half to two months. During each CIP, approximately 2,000 gallons of blended caustic and sodium hypochlorite plus 2,000 gallons of citric acid solutions will be generated (both less than 2% in strength). After the CIP, the solutions will be neutralized in the neutralization tank with sodium bisulfite (neutralizes the chlorine) and citric acid (neutralizes the caustic). The neutralization process will produce sodium citrate, sodium hydrosulfate, and water. The sodium citrate and sodium hydrosulfate concentrations in the return flow from the backwash ponds to the WTP would be 0.07 mg/L and 0.0007 mg/L, respectively. After neutralization, the 4,000 gallons of CIP waste will be discharged to the backwash ponds over a period of at least 30 days (approximately

133 gpd). The CIP waste will be discharged only when backwash wastewater is being discharged to the ponds to optimize dilution.

### **Wastewater Storage and Disposal**

15. Backwash wastewater is discharged to two unlined settling/evaporation ponds with a cumulative capacity of 353,000 gallons (allowing for 1 foot of solids accumulation, two feet of freeboard, and a maximum daily rainfall of 5.06 inches). The net available volume of the north pond is 190,000 gallons and 163,000 gallons for the south pond. The ponds are constructed in clayey soils and do not percolate rapidly.
16. Once the backwash wastewater is discharged to the ponds, the wastewater is recycled back through the filtration systems, after allowing adequate settling time (approximately 12 hours). The recycle rate of flow is limited to a maximum of 10% of the raw water flow, to comply with drinking water regulations. At 4.8 MGD, the maximum allowable recycle volume is 480,000 gallons, more than twice the maximum amount to be discharged to the ponds from the MF plant (144,000 gpd). When one bank of pressure filters is operated, it generates 85,000 gpd of backwash wastewater. If both the MF plant and one bank of pressure filters are run at a full capacity of 7.8 MGD, approximately 229,000 gpd of backwash wastewater will be generated, which is significantly less than the allowable 10% recycle rate flow of 780,000 gallons.
17. The RWD included a one-day water balance because 100% of the backwash produced in one day will be recycled in one day. The ponds were sized using the maximum daily precipitation (5.06 inches), allowing for two feet of freeboard, one foot of solids accumulation, and the backwash wastewater flows from the MF plant and one bank of pressure filters.

### **Sludge Removal and Disposal**

18. Sludge will need to be removed from the ponds every 12 to 18 months. During this time, one pond will be taken out of service, allowing the other pond to drain and dry. If water demand exceeds the limitation of the one backwash pond in use, water demand will be supplemented with the Discharger's supply wells.
19. On 1 December 2005, the sludge and virgin soil were analyzed for aluminum. The aluminum content in the virgin soil was reported as 17,400 ug/kg and the sludge was reported as 98,700 ug/kg. The aluminum concentration was much higher in the sludge than virgin soil. It is expected that once the new MF plant is operational, the aluminum levels in the backwash ponds will decrease since alum will not be used in the MF plant.
20. The Discharger also sampled the removed sludge from the settling ponds to determine the total threshold limit concentration (TTLc), which is summarized below. The percent moisture content of the sample was 8.6%.

<u>Constituent/Parameter</u>	Sludge Analytical Results - TTL (mg/kg)	Hazardous Waste TTL Levels (mg/kg)
Antimony	<2.5	500
Arsenic	12.8	500
Barium	240	10,000
Beryllium	0.6	75
Cadmium	<0.3	100
Chromium	40	2,500
Chromium VI	2	500
Cobalt	15.1	8,000
Copper	37.9	2,500
Lead	5.3	1,000
Mercury	0.03	20
Molybdenum	<0.5	3,500
Nickel	33.1	2,000
Selenium	<0.5	100
Silver	<0.5	500
Thallium	<2.5	700
Vanadium	113	2,400
Zinc	53	5,000

21. The Discharger disposes of sludge at a local landfill. This Order requires the Discharger to characterize removed sludge for Title 22 metals and aluminum.

### **Site Specific Conditions**

22. Based on the geotechnical report presented in the RWD, soils at the MF plant site consist of up to two feet of sandy clay, up to five feet of slightly cemented sandy gravel, and clayey gravel at seven feet.
23. Depth to groundwater at the site is unknown. A geotechnical investigation of the site occurred in September 2005, and no groundwater was encountered at eight and a half feet.
24. The mean annual precipitation for Oroville from 1953 to 2007 was 28.67 inches. The annual average pan evaporation rate for Chico is 67.63 inches.
25. The land immediately adjacent to the WTP is either vacant or is used for cattle grazing. The Department of Water Resources owns the vacant land south of the WTP, from the plant property to the Thermalito Power Canal.
26. The Discharger samples the raw water, water after pressure filtration, and clearwell water daily for turbidity and residual chlorine. The samples are also tested weekly for pH and temperature.

27. A domestic well is located on site. It is tested daily for residual chlorine, quarterly for bacteria, and annually for general minerals and nitrates.

### **Basin Plan, Beneficial Uses, and Regulatory Considerations**

28. The Regional Water Board adopted a Water Quality Control Plan, Fourth Edition, for the Sacramento River Basin and the San Joaquin River Basin, (hereafter Basin Plan) which 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 Resources Control Board (State Water Board). Pursuant to Section 13263(a) of the California Water Code (CWC), waste discharge requirements must implement the Basin Plan.
29. The WTP lies within the Marysville Hydrologic Unit and the Lower Feather River Hydrologic Area (515.40), as depicted on interagency hydrologic maps prepared by the California Department of Water Resources in 1986. Surface water drainage from the WTP is to the Thermalito Power Canal, a tributary to the Feather River.
30. The beneficial uses of the Thermalito Power Canal are not identified in the Basin Plan. However, the Basin Plan states, "The beneficial uses of any specifically identified water body generally apply to its tributary streams." The Thermalito Power Canal is a tributary to the Feather River; the Regional Water Board finds that the beneficial uses identified in the Basin Plan for the Feather River are applicable to the Thermalito Power Canal. Therefore, the beneficial uses of the Thermalito Power Canal are municipal and domestic supply; agricultural supply; water contact recreation; canoeing and rafting recreation; noncontact water recreation; warm freshwater habitat; cold freshwater habitat; warm migration; cold migration; warm spawning; cold spawning; and wildlife habitat.
31. The beneficial uses of the underlying groundwater are municipal and domestic water supply, agricultural supply, industrial service supply, and industrial process supply.
32. The Basin Plan establishes numerical and narrative water quality objectives for surface water and groundwater within the basin. Numerical water quality objectives are maximum limits directly applicable to the protection of designated beneficial uses of the water. The Basin Plan requires that the Regional Water Board, on a case-by-case basis, to follow specified procedures to determine maximum numerical limitations that apply the narrative objectives when it adopts waste discharge requirements.
33. The Basin Plan contains narrative water quality objectives for Chemical Constituents, Tastes and Odors, and Toxicity. The Toxicity Objective, in summary, requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life associated with designated beneficial uses. The Chemical Constituents objective requires that groundwater "shall not contain chemical constituents in concentrations that adversely affect beneficial uses". The Tastes and Odors objective requires that groundwater

“shall not contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses”. Implementation of the Basin Plan contains the “Policy for Application of Water Quality Objectives”. This Policy specifies, in part, that compliance with narrative water quality objectives may be evaluated considering numerical criteria and guidelines developed and/or published by other agencies and organizations.

34. Section 13241 of the California Water Code (CWC) requires the Regional Water Board to consider various factors, including economic considerations, when adopting water quality objectives into its Basin Plan. Section 13263 of the CWC requires the Regional Water Board to address these in adopting waste discharge requirements. However, the State Water Board has held that a Regional Water Board need not address the factors in Section 13241 when implementing water quality objectives through waste discharge requirements, because those factors were considered in the Basin Plan process. These waste discharge requirements implement adopted water quality objectives and no additional analysis of Section 13241 factors is required.

#### **Groundwater Degradation**

35. State Water Board Resolution 68-16 requires that discharge of waste maintain high quality waters of the State until it is demonstrated that any change in quality is consistent with maximum benefits to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in water quality policies (i.e. change results in exceedances of water quality objectives). The discharge is required to meet waste discharge requirements that will result in the best practicable treatment or control (BPTC) of the discharge necessary to assure that pollution or nuisance will not occur and the highest water quality consistent with maximum benefit to the people of the State will be maintained.
36. Some degradation of groundwater in the wastewater storage and reuse areas is consistent with Resolution 68-16 provided that degradation:
- a. Is confined to a reasonable area;
  - b. Is minimized by means of full implementation, regular maintenance, and optimal operation of BPTC measures;
  - c. Is limited to waste constituents typically encountered in water treatment filter backwash water; and
  - d. Does not result in water quality less than that prescribed in the applicable Basin Plan.
37. Based on the good chemical character of the raw water treated at the WTP, the installation of a MF plant (which uses no coagulant or polymers), the low permeability of the settling ponds, and complete recycling of the backwash wastewater generated in

one day within one day, the discharge poses little threat to groundwater quality. Therefore, groundwater monitoring is not relevant and the Discharger is required to monitor backwash wastewater.

### **Antidegradation Analysis**

38. Some degradation of groundwater by some of the typical waste constituents released with discharge from a WTP after effective source control, treatment, and control is consistent with maximum benefit to the people of California. The technology, energy, water recycling, and waste management advantages of municipal utility service far exceed any benefits derived from a community otherwise reliant on numerous domestic water wells, and the impact of the water resource will be substantially less. Degradation of groundwater by constituents that can be effectively removed by conventional treatment is prohibited. When allowed, the degree of degradation permitted depends upon many factors (i.e. background water quality, the waste constituents, the beneficial uses and most stringent water quality objective, source control measures, and waste constituent treatability).
39. Economic prosperity of local communities is of maximum benefit to the people of California, and therefore sufficient reason exists to accommodate growth and groundwater degradation around the WTP, provided that the terms of the Basin Plan are met.

### **Treatment and Control Practices**

40. The design of the MF WTP expansion incorporates BPTC because coagulants and polymers will not be used. The Discharger is required to evaluate the potential impact on underlying groundwater by monitoring the backwash wastewater for residual chlorine weekly, pH and electrical conductivity monthly, trihalomethanes quarterly, and dissolved metals and standard minerals annually. If it has been determined that the discharge has the potential to degrade groundwater, then the Discharger will be required to evaluate and implement additional BPTC measures for each treatment, storage, and disposal component of the pressure filtration and MF plants. Completion of these tasks will ensure that BPTC and the highest water quality consistent with the maximum benefit to the people of the State will be achieved.

### **Other**

41. The discharge authorized herein and the treatment and storage facilities associated with the discharge, except for discharges of residual sludge and solid waste, are exempt from the requirements of Title 27, California Code of Regulations (CCR), Section 20005 et seq. (hereafter Title 27). The exemption, pursuant to Title 27 CCR Section 20090(b), is based on the following:
  - a. The waste consists primarily of backwash water and treated raw water and the Regional Water Board is issuing waste discharge requirements;



- b. The waste discharge requirements are consistent with water quality objectives; and;
  - c. The treatment and storage facilities described herein are associated with a municipal water treatment plant and neither the wastewater nor solids need to be managed according to Chapter 11, Division 4.4, Title 22 of this code as a hazardous waste.
42. The State Water Board adopted Order No. 97-03-DWQ (General Permit No. CAS000001) specifying waste discharge requirements for discharges of storm water associated with industrial activities, and requiring submittal of a Notice of Intent by all affected industrial dischargers. The RWD did not specify whether storm water is discharged from the current or future portions of the WTP. Therefore, it is appropriate for this Order to require that the Discharger either obtain coverage under General Permit No. CAS000001 or submit a Notice of Non-Applicability to demonstrate that the General Permit is not applicable to the current or future WTP.
43. Section 13267(b) of the CWC provides that: "In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters 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."
44. The technical reports required by this Order and the attached Monitoring and Reporting Program No. R5-2008-0065 are necessary to assure compliance with these waste discharge requirements.
45. Pursuant to Section 13263(g) of the CWC, discharge is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.
46. On 18 April 2006, a Mitigated Negative Declaration (MND) was adopted by the Discharger and a Notice of Determination was recorded with Butte County for the expansion of the WTP shortly thereafter. The Regional Water Board has considered the MND prepared for the facility. Compliance with the requirements of this Order will mitigate or avoid environmental effects to water quality.
47. All the above and the supplemental information and details in the attached Information Sheet, which is incorporated by reference herein, were considered in establishing the following conditions of discharge.
48. The Regional Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge and

has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

49. The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.

**IT IS HEREBY ORDERED** that pursuant to CWC Sections 13263 and 13267, the Thermalito Irrigation District, its agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the CWC and regulations adopted hereunder, shall comply with the following:

*[Note: Other prohibitions, conditions, definitions, and some methods of determining compliance are contained in the attached "Standard Provisions and Reporting Requirements for Waste Discharge Requirements" dated 1 March 1991.]*

**A. Discharge Prohibitions:**

1. Discharge of finished water at a location or in a manner different from that described in Finding No. 9 is prohibited.
2. Discharge of backwash wastewater at a location or in a manner different from that described in Finding No. 15 is prohibited.
3. The by-pass or overflow of wastes (including backwash wastewater discharge and finished water overflow from the clear well) to surface waters or surface water drainage courses is prohibited, except as allowed by Provision E.2 of the Standard Provisions and Reporting Requirements for Waste Discharge Requirements, dated 1 March 1991.
4. Discharge of waste classified as 'hazardous' under Section 2521, Chapter 15 of Title 23 or 'designated', as defined in Section 13173 of California Water Code is prohibited.

**B. Discharge Specifications:**

1. The dry monthly average backwash wastewater flow shall not exceed 170,000 gallons per day as currently built and operated. The dry monthly average backwash wastewater flow shall not exceed 229,000 gallons per day once the MF plant is fully operational.
2. Plant operation shall not cause pollution or a nuisance as defined by Section 13050 of the CWC.
3. Water treatment facilities, storage facilities, and the backwash wastewater settling ponds shall be operated and maintained to prevent inundation or washout due to floods with a 100-year return frequency.

4. The Discharger shall operate all systems and equipment to maximize treatment of backwash wastewater and optimize the quality of this discharge.
5. The backwash wastewater ponds shall have sufficient treatment, storage, and disposal capacity to accommodate allowable wastewater flow and design seasonal precipitation during the winter months. 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. Freeboard shall not be less than two feet (measured vertically to the lowest point of overflow), except if lesser freeboard does not threaten the integrity of the pond, no overflow of the pond occurs, and lesser freeboard is due to direct precipitation with greater than a 100-year recurrence interval, or a storm event with an intensity greater than a 25-year, 24-hour storm event. This Order contains a Provision that requires the Discharger to prepare and implement, as appropriate, a Contingency Plan to ensure that the backwash wastewater ponds do not overflow.
6. The ponds shall be managed to prevent breeding of mosquitoes. In particular,
  - a. An erosion control program should assure that small coves and irregularities are not created around the perimeter of the water surface.
  - b. Weeds shall be minimized through control of water depth, harvesting, or herbicides.
  - c. Dead algae, vegetation, and debris shall not accumulate on the water surface.
7. Objectionable odors originating at this facility shall not be perceivable beyond the limits of the water treatment plant site boundaries.
8. **On 1 October** of each year, available pond storage capacity shall at least equal the volume necessary to comply with Discharge Specification No. 5.

**C. Groundwater Limitation:**

1. The discharge, in combination with other sources, shall not cause underlying groundwater to contain waste constituents in concentrations statistically greater than background water quality.

**D. Sludge Disposal:**

1. Collected screenings, sludges, and other solids removed from liquid wastes shall be disposed of in a manner approved by the Executive Officer, and consistent with *Consolidated Regulations for Treatment, Storage, Processing, or Disposal of Solid Waste*, as set forth in Title 27, CCR, Division 2, Subdivision 1, Section 20005, et seq.

2. Any proposed change in sludge use or disposal practice from a previously approved practice shall be reported to the Executive Officer and USEPA Regional Administrator at least 90 days in advance of the change.

**E. Provisions:**

1. All of the following reports shall be submitted pursuant to Section 13267 of the CWC.
  - a. **Within 30 days** of the adoption of this Order, the Discharger shall provide material safety data sheets (MSDS) for all products used in the water treatment process. If new products are proposed for use at a later date, the MSDS sheets shall be submitted to the Regional Water Board at that time.
  - b. **Within 30 days** of the adoption of this Order, the Discharger shall provide the name and certificate grade of the primary plant operator. Fifteen days prior to any change in the primary plant operator, the Discharger shall notify the Regional Water Board, and shall certify that the new operator has been familiarized with the Plant Operations and Maintenance (O&M) Manual and this Order within fifteen days after the changeover.
  - c. **Within 90 days** of adoption of this Order, the Discharger shall submit a sludge disposal plan describing the annual volume of sludge generated by the WTP and specifying the disposal practices.
  - d. **Within 90 days** of adoption of this Order, the Discharger shall submit a *Contingency Plan* describing the steps it will take if the backwash wastewater in the storage ponds encroaches within two foot of freeboard. The plan shall consider any and all steps necessary to prevent wastewater overflows, for example, restricting water usage, hauling wastewater to another permitted facility, utilizing supply wells, and shutting down portions of the facility. This plan shall be implemented whenever wastewater levels encroach within two foot of freeboard in the wastewater ponds.
  - e. **Within 90 days** of adoption of this Order, the Discharger shall submit an O&M Manual for the WTP. Regional Water Board staff will review the O&M Manual; the O&M Manual shall be implemented within **30 days** of its acceptance by staff. The O&M Manual shall instruct field personnel on managing the day-to-day backwash wastewater and finished water discharge operations to comply with the terms and conditions of this Order and how to make field adjustments, as necessary, to preclude nuisance conditions. The O&M manual shall include a troubleshooting flowchart with recommended remedial actions and a description of notification requirements. Operating personnel shall keep a copy of the O&M Manual at the WTP for reference. Key personnel shall be familiar with its contents. The O&M Manual shall include the following elements regarding compliance with this Order:

- i. A discussion of backwash practices, including: a) time, duration, and frequency of backwash, b) description of area of land discharge of backwash water, and c) inspection procedures to assure there is no discharge of backwash wastewater or backwash solids to the Thermalito Power Canal.
  - ii. Inspection procedure for the backwash ponds to assure they are operating at their optimum level and there is no danger of excessive solids carryover from either of these units or overflow from the ponds.
3. The Discharger shall provide certified water treatment plant operators in accordance with Title 22 CCR, Division 4, Chapter 13.
4. The Discharger shall comply with Monitoring and Reporting Program No. R5-2008-0065, which is part of this Order, and any revisions thereto as ordered by the Executive Officer.
5. The Discharger shall comply with all items of the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements", dated 1 March 1991, which are part of this Order. This attachment and its individual paragraphs are referred to as "Standard Provisions."
6. The Discharger shall report promptly to the Regional Water Board any material change or proposed change in the character, location, or volume of the discharge.
7. The Discharger shall report to the Regional Water Board any toxic chemical release data reported to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to Section 313 of the "Emergency Planning and Community Right to Know Act of 1986."
8. In the event of any change in control or ownership of land or waste discharge 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 this office. To assume operation as Discharger 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 name and address and telephone number of the persons responsible for contact with the Regional 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 CWC. Transfer shall be approved or disapproved by the Executive Officer.

9. Operation personnel shall keep a copy of this Order at the WTP for reference. Key operating personnel shall be familiar with its contents.
10. The Regional Water Board will review this Order periodically and will revise requirements when necessary.
11. The Discharger shall comply with all conditions of this Order, including timely submittal of technical and monitoring reports as directed by the Executive Officer. Violations may result in enforcement action, including Regional Water Board or court orders requiring corrective action or imposing civil monetary liability, or in revision or rescission of this Order.

I, PAMELA C. CREEDON, Executive Officer, do certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 25 April 2008.

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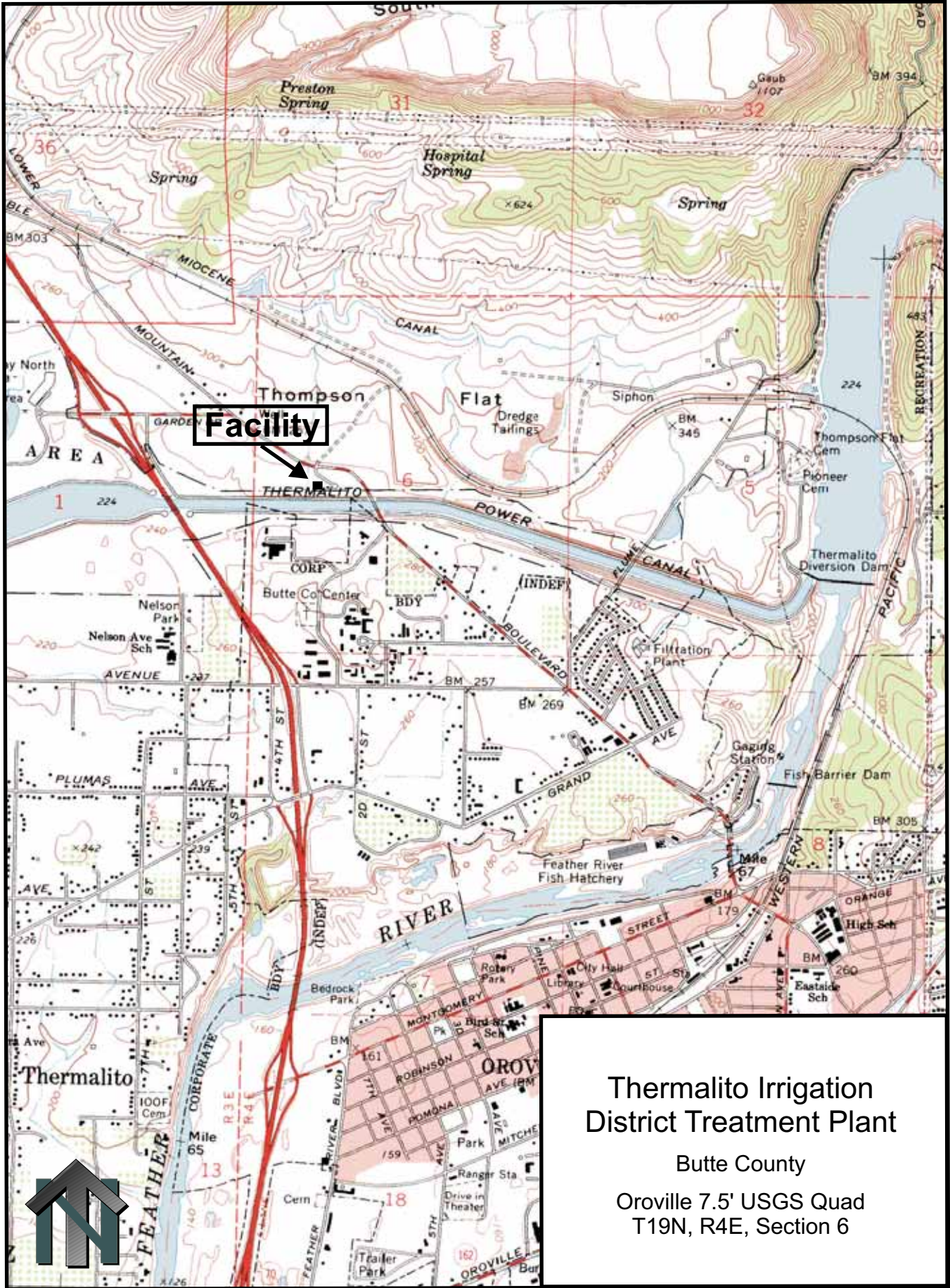
PAMELA C. CREEDON, Executive Officer

25 April 2008

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Date

JMM: 5/9/2008

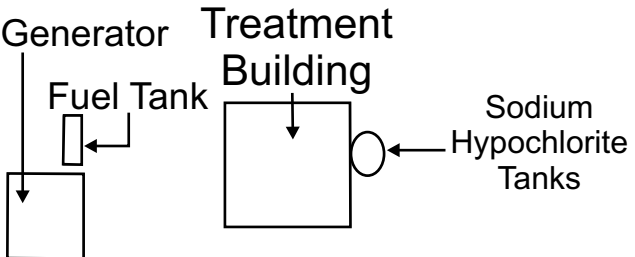




Membrane  
Filtration  
System  
(future site)



One Million Gallon  
Clearwell

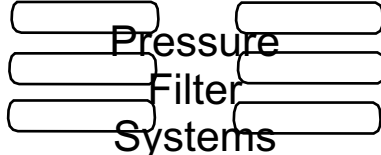


Generator

Treatment  
Building

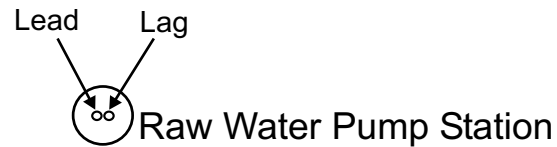
Fuel Tank

Sodium  
Hypochlorite  
Tanks



Pressure  
Filter  
Systems

○ Corrosion  
Inhibitor Tank

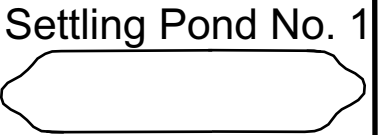


Lead

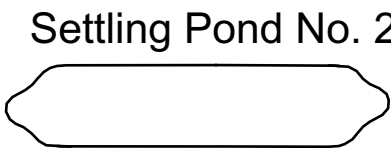
Lag

Raw Water Pump Station

Thermalito Power Canal



Settling Pond No. 1



Settling Pond No. 2

Thermalito Irrigation District  
Water Treatment Plant

Site Map  
Not to Scale



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2008-0065  
FOR  
THERMALITO IRRIGATION DISTRICT  
WATER TREATMENT PLANT  
BUTTE COUNTY

This Monitoring and Reporting Program (MRP) describes requirements for monitoring operations of a water treatment plant, including backwash wastewater discharged to unlined settling ponds. This MRP is issued pursuant to Section 13267 of the California Water Code (CWC). The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer. Central Valley Regional Water Quality Control Board (Regional Water Board) staff shall approve specific sample station locations prior to implementation of sampling activities.

All samples shall be representative of the volume and nature of the discharge or matrix of material sampled. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form. Field instruments (such as those used to measure residual chlorine) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are calibrated prior to each monitoring event;
3. The instruments are serviced and/or calibrated per the manufacturer's recommended frequency; and
4. Field calibration reports are submitted with the monthly reports.

**BACKWASH WASTEWATER MONITORING**

The Discharger shall report the following regarding the backwash wastewater:

<u>Parameter/Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Frequency</u>
Flow	gpd	Continuous	Daily
Residual Chlorine	mg/L	Grab	Weekly
pH	standard	Grab	Monthly
Electrical Conductivity	umhos/cm	Grab	Monthly
Trihalomethanes <sup>1</sup>	ug/L	Grab	Quarterly
Dissolved Metals <sup>2</sup>	ug/L	Grab	Annually
Standard Minerals <sup>3</sup>	mg/L	Grab	Annually

<sup>1</sup>Trihalomethane sampling shall include: bromoform, bromodichloromethane, chloroform, and dibromochloromethane.

<sup>2</sup>At a minimum, the following metals shall be included: aluminum, antimony, arsenic, cadmium, total chromium, hexavalent chromium, copper, cyanide, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc. Samples shall be filtered through a 0.45-micron filter prior to preservation.

<sup>3</sup>Standard minerals shall include at a minimum the following elements/compounds: boron, calcium, chloride, fluoride, iron, phosphate, potassium, sulfate, total alkalinity (including alkalinity series), and hardness.

### POND MONITORING

Each unlined pond shall be monitored as specified below:

<u>Parameter/Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Frequency</u>
Liquid Depth and Freeboard <sup>1</sup>	0.1 feet	Staff gauge observation	Monthly

<sup>1</sup>If the pond is empty on the scheduled monitoring date, the Discharger may report the freeboard monitoring result as "dry".

### SLUDGE MONITORING

The Discharger shall maintain a written log of all sludge disposal activities. For each discrete quantity of sludge removed from the facility, the log shall contain the following information:

1. Date;
2. Name and signature of the recorder of entry;
3. Volume or weight of sludge removed;
4. A representative characterization of removed sludge quality including **sludge percent solids** and quantitative results of chemical analyses for **Title 22 metals and aluminum**;
5. Name of user (business, contractor, or landowner, as applicable);
6. Transport method;
7. Transporter;
8. Destination and planned use.

### REPORTING

In reporting the data, the Discharger shall arrange the data in tabular form so that the date, sample type (e.g. backwash wastewater, backwash pond, etc), and reported analytical result for each sample are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with waste discharge requirements and spatial or temporal trends, as applicable. The results of any monitoring done more frequently than required at the locations specified in the Monitoring and Reporting Program shall be reported in the next scheduled monitoring report.

Monthly reports shall be submitted to the Regional Water Board on the **1<sup>st</sup> day of the second month** following sampling (i.e. the January report is due by 1 March).

An annual report shall be submitted to the Regional Water Board by **1 February** each year if requested by Regional Water Board staff. In addition to the data normally presented, the annual report shall include the following:

1. Total annual wastewater flows into the backwash ponds.
2. Volume of raw water treated during the previous year.
3. A detailed description of any operational changes.

4. If requested by staff, tabular and graphical summaries of all data collected during the year with data arranged to confirm compliance with the WDR.
5. A discussion of compliance and the corrective actions taken, as well as any planned or proposed actions needed to bring the discharge into full compliance with waste discharge requirements.
6. A forecast of influent flows for the coming year, as described in Standard Provisions No. E.4.
7. A discussion of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program.
8. Summary of maintenance and repair activities that were performed on the plant or distribution system.

A letter transmitting all self-monitoring reports shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions General Reporting Requirements Section B.3 and as shown below:

*I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my knowledge and on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.*

The Discharger shall implement the above monitoring program on the effective date of this Order.

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PAMELA C. CREEDON, Executive Officer

25 April 2008

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Date

JMM 5/9/2008

## INFORMATION SHEET

ORDER NO. R5-2008-0065  
THERMALITO IRRIGATION DISTRICT  
WATER TREATMENT PLANT  
BUTTE COUNTY

### **Background**

The Thermalito Irrigation District (hereafter Discharger) operates a potable water treatment plant (WTP) in Oroville, at 535 Table Mountain Boulevard, in Butte County. The WTP is located in Section 6, T19N, R4E, MDB&M. The WTP is located on a 3.8-acre site, on the north side of the Thermalito Power Canal, approximately a quarter mile east of State Route Highway 70. The Discharger submitted a report of waste discharge (RWD) on 19 June 2006 to expand the WTP capacity from 6 million gallons per day (MGD) to 10 MGD. On 14 November 2007, a supplemental RWD was submitted. The WTP was originally constructed in 1973 with a capacity of 3 MGD and was expanded to a capacity of 6 MGD in 1995. A 4 MGD microfiltration (MF) plant is currently under construction, with startup scheduled for 2008. The WTP has never had Waste Discharge Requirements. The WTP serves 2,811 connections, approximately 1/3 of which are in Oroville and 2/3 in unincorporated areas of Butte County.

The water source for the WTP is the Thermalito Power Canal. The Discharger has a water right to 7,200 acre-feet of water from Concow Reservoir. This water is diverted through Concow Creek to Lake Oroville and ultimately to the Thermalito Power Canal. The Discharger also has four supply wells to augment drinking water supply. Average annual rainfall for the Oroville area from 1953 to 2007 was 28.67 inches. The annual average pan evaporation rate for Chico is 67.63 inches.

The land immediately adjacent to the WTP is either vacant or is used for cattle grazing. The Department of Water Resources owns the vacant land south of the WTP, from the WTP property to the Thermalito Power Canal. Groundwater in the vicinity of the plant is unknown. A geotechnical investigation occurred in September 2005. Exploratory trenches were excavated to a depth of eight and a half feet and no groundwater was encountered. Soils described in the geotechnical report showed sandy clays, slightly cemented sandy gravel, and clayey gravels.

A domestic well is located on site; it is tested daily for residual chlorine, quarterly for bacteria, and annually for general minerals and nitrates.

### **Current Treatment Plant**

The existing WTP consists of: raw water pump station, 6 MGD pressure filter system, treatment building, hypochlorite tanks, one million gallon clearwell, and two unlined settling ponds. When the pressure filter system is operated, aluminum sulfate (alum) is dosed between 8 and 17 parts per million (ppm) and a non-ionic polymer filter aid is dosed below 0.06 ppm. The alum is positively charged, which attracts the negatively charged contaminants in the untreated water. Combined alum-contaminant particles grow in size and form floc. The polymer helps the filter media in holding the floc within the confines of the filter media. Two banks of three pressure filters each are currently in operation. Each bank has a capacity of

3 MGD. Each filter is 8 feet in diameter and 30 feet long. The water is then sent through the pressure filters to remove the floc, polymer, alum, and contaminants. The filter media is comprised of coal anthracite, sand, gravel, and rocks. During the rainy season, the pressure filters are periodically turned off when raw water turbidities are too high for the pressure filters to operate. The turbidity episodes usually last up to 48 hours, during which time the WTP utilizes four supply wells to meet water demand. Once the water is filtered, it is disinfected with sodium hypochlorite and transferred to a one million gallon clearwell. From the clearwell, the water is pumped directly to the distribution system or to the 2.5 million gallon storage tank located a quarter mile due north of the WTP. Residual chlorine is monitored continuously at the distribution line from the clearwell; the residual chlorine level is maintained at 0.8 mg/L. The filter media is backwashed when a predetermined pressure differential is reached. Approximately 170,000 gallons per day of backwash wastewater is produced when the pressure filters are run at full capacity. The backwash wastewater is discharged to two unlined settling ponds. The supernatant from the first pond is transferred to the second unlined pond for additional settling. The water from second pond is recycled back into the raw water intake.

### **WTP Expansion Project**

The expansion will consist of installing a 4 MGD microfiltration (MF) plant; the plant can deliver up to 4.5 to 4.8 MGD for sustained periods of time. After the MF plant is operational, one of the two banks of pressure filters will be maintained in standby mode and the other bank of pressure filters will be for emergency use only. When customer demand exceeds the MF plant treatment capacity, but is less than 6 MGD, the Discharger will utilize their supply wells to meet demand. One bank of three pressure filters will only be used when demand exceeds 6 MGD. The MF system will produce filtered water without the use of coagulants or other filter aid material because the MF membranes are a permanent barrier for particles and other solids in water. The recovery rate of the MF plant is expected to be a minimum of 97% during peak raw water turbidity conditions. At a flow rate of 4.8 MGD, the backwash wastewater generated will be approximately 144,000 gpd. At normal raw water turbidities (less than 2 NTU), the recovery rate is expected to be 98%, which equates to approximately 96,000 gpd backwash wastewater. Approximately 1 mg/L of chlorine will be present in the backwash wastewater. The MF racks will backwash about every 30 minutes.

The membranes in the MF plant will require a chemical cleaning (CIP) approximately every one and a half to two months. Each CIP requires the use of 2,000 gallons of blended caustic and sodium hypochlorite and 2,000 gallons of citric acid solutions (both less than 2% in strength). After the CIP, the solutions will be neutralized in the neutralization tank. Sodium bisulfite will be used to neutralize the chlorine in the sodium hypochlorite. Citric acid will be added as needed to neutralize the caustic. The neutralization process will produce sodium citrate, sodium hydrosulfate, and water. The sodium citrate and sodium hydrosulfate concentrations in the return flow from the backwash ponds to the WTP would be 0.07 mg/L and 0.0007 mg/L, respectively. After neutralization, the 4,000 gallons of CIP waste will be discharged to the backwash ponds over a period of at least 30 days. The waste will only be discharged when the membranes are being backwashed to optimize dilution in the ponds. To

ensure complete neutralization of the chlorine, the Discharger will be required to monitor residual chlorine levels in the backwash ponds.

### **Wastewater Storage and Disposal**

Backwash wastewater is discharged to two unlined evaporation/settling ponds. The ponds have a cumulative capacity of 353,000 gallons (allowing for two feet of freeboard, one foot of solids accumulation, and a maximum daily rainfall of 5.06 inches). The net available volume of the north pond is 190,000 gallons and 163,000 gallons for the south pond. The dimensions of the north pond are 238 feet long by 32 feet wide (bottom) by 6.7 feet deep. The dimensions of the south pond are 290 feet long by 16 feet wide (bottom) by 7 feet deep. The ponds are constructed in clayey soil and therefore do not percolate rapidly. The accumulation of fine particulate matter from the treatment process on the pond bottoms also retards percolation.

The backwash wastewater is allowed to settle for approximately 12 hours before it is recycled back into the raw water intake of the WTP. 100% of the backwash wastewater produced in 24 hours is recycled within 24 hours. The recycle rate of flow is limited to a maximum of 10% of the raw water flow, to comply with drinking water regulations. At 4.8 MGD, the maximum allowable recycle volume is 480,000 gallons, more than twice the maximum amount to be discharged to the ponds from the MF plant (144,000 gpd). One bank of pressure filters generates 85,000 gpd of backwash wastewater. If both the MF plant and one bank of pressure filters are run at a full capacity of 7.8 MGD, approximately 229,000 gpd of backwash wastewater will be generated, which is significantly less than the allowable 10% recycle rate flow of 780,000 gallons.

The RWD included a 'one-day' water balance because all the backwash wastewater generated in one day is recycled in one day. The maximum amount of backwash wastewater that will be generated in a day is 229,000 gallons, if both the MF plant and one bank of pressure filters are operated. The total storage capacity of the settling/evaporation ponds is 353,000 gallons (allowing for two feet of freeboard, one foot of solids accumulation, and a maximum daily rainfall of 5.06 inches). Therefore the settling/evaporation ponds are adequately sized for the WTP. The WDR contains a provision that requires the Discharger to develop a *Contingency Plan* for the ponds in the event that the wastewater encroaches within two feet of freeboard.

### **Sludge Removal and Disposal**

Sludge is removed from the ponds every 12 to 18 months. One pond is taken out of service and is drained and dried. The dried sludge is removed from the pond in late spring and disposed of at a landfill. If water demand and backwash wastewater exceeds the storage capacity of the pond in use, water demand is supplemented by the Discharger's supply wells.

On 1 December 2005, the backwash pond sludge and virgin soil were analyzed for aluminum. The results show that the aluminum concentration is much higher in the sludge (98,700 ug/kg) than in the virgin soil (17,400 ug/kg). Once the MF system is operational and the use of the

pressure filter system decreases or is eliminated, it is expected that aluminum levels in the sludge will significantly decrease.

The Discharger also sampled the sludge for Title 22 metals on 26 October 2006; the results showed that the concentrations of metals in the sludge is significantly lower than hazardous waste levels. The Monitoring and Reporting Program requires the Discharger to sample the sludge for Title 22 metals and aluminum when a discrete amount of sludge is removed from the ponds.

### **Basin Plan, Beneficial uses, and Regulatory Considerations**

Surface water drainage is to the Thermalito Power Canal, a tributary to the Feather River. The *Water Quality Control Plan for the California Regional Water Quality Control Board Central Valley Region, Fourth Edition* (Basin Plan), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin. Beneficial uses often determine the water quality objectives that apply to a water body. For example, waters designated as municipal and domestic supply must meet the maximum contaminant levels (MCLs) for drinking waters. The Basin Plan sets forth the applicable beneficial uses (industrial, agricultural, and domestic supply in this instance) of groundwater, procedure for application of water quality objectives, and the process for and factors to consider in allocating waste assimilation capacity.

### **Antidegradation**

The antidegradation directives of Section 13000 of the California Water Code (CWC) require that waters of the State that are better in quality than established water quality objectives be maintained "consistent with the maximum benefit to the people of the State." Waters can be of high quality for some constituents or beneficial uses and not others. Policies and procedures for complying with this directive are set forth in the Basin Plan (including by reference State Water Board Resolution No. 68-16, "Statement of Policy With Respect to Maintaining High Quality Waters in California," or "Antidegradation" Policy).

Resolution 68-16 is applied on a case-by-case, constituent-by-constituent basis in determining whether a certain degree of degradation can be justified. It is incumbent upon the Discharger to provide technical information for the Regional Water Board to evaluate that fully characterizes:

- All waste constituents to be discharged;
- The background quality of the uppermost layer of the uppermost aquifer;
- The background quality of other waters that may be affected;
- The underlying hydrogeologic conditions;
- Waste treatment and control measures;
- How treatment and control measures are justified as best practicable treatment and control;
- The extent the discharge will impact the quality of each aquifer; and
- The expected degree of degradation.

In allowing a discharge, the Regional Water Board must comply with CWC Section 13263 in setting appropriate conditions. The Regional Water Board is required, relative to the groundwater that may be affected by the discharge, to implement the Basin Plan and consider the beneficial uses to be protected along with the water quality objectives essential for that purpose. The Regional Water Board need not authorize the full utilization of the waste assimilation of the groundwater (CWC 13263(b)) and must consider other waste discharges and factors that affect that capacity.

Some degradation of the groundwater for certain constituents is consistent with maximum benefit to the people of California because the technology, energy, and waste management advantages of municipal water treatment plants far outweigh the environmental impact of a community that would otherwise be reliant on numerous domestic wells. Economic prosperity of local communities is of maximum benefit to the people of California, and therefore sufficient reason to accommodate this wastewater discharge provided terms of reasonable degradation are defined and met.

Trihalomethanes (a by-product of chlorination of the filtered water) is a constituent that could potentially affect water quality. Trihalomethanes are volatile and most will be lost to the atmosphere during backwash and settling; in addition, trihalomethanes will be monitored in the backwash wastewater. Groundwater monitoring would not be relevant at the WTP, as there is little recharge to groundwater due to the low-permeability of the ponds and the complete recycling of wastewater. Based on the good chemical character of the raw water treated at the WTP, the installation of a MF plant (which uses no coagulant or polymers), the use of two settling ponds with low permeability, and complete recycling of the backwash wastewater generated in one day within one day, the discharge poses little threat to groundwater quality.

On 18 April 2006, a Mitigated Negative Declaration (MND) was adopted by the Discharger and a Notice of Determination was recorded with Butte County for the expansion of the WTP shortly thereafter. The Regional Water Board has considered the MND prepared for the facility. Compliance with the requirements of this Order will mitigate or avoid environmental effects to water quality.

### **Proposed Order Terms and Conditions**

The proposed Order establishes a dry monthly average backwash wastewater discharge flow limit of 170,000 gpd for the current pressure filtration system. The Order also establishes a dry monthly average backwash wastewater discharge flow limit of 229,000 gpd for the WTP once the MF plant is operational.

Section 13267 of the CWC authorizes the Regional Water Board to require monitoring and technical reports as necessary to investigate the impact of a waste discharge on waters of the State. The Regional Water Board and staff, in recent years, have been increasing their efforts on obtaining all necessary information to implement State Water Board and Regional Water Board policies, and assuring that discharge and receiving water information is timely as well as representative and accurate, thereby improving accountability of any discharger for meeting



the conditions of discharge. Section 13268 of the CWC authorizes assessment of civil administrative liability where appropriate, e.g. in the case of a Discharger's failure to submit required monitoring or technical reports.

The proposed Order requires the Discharger to conduct monitoring of: backwash wastewater, settling/evaporation ponds, and the sludge removed from the ponds.

JMM 5/9/2008