

INFORMATION SHEET

ORDER NO. ___
LAKE COUNTY SANITATION DISTRICT
KELSEYVILLE WATER WORKS DISTRICT NO. 3 WWTF
LAKE COUNTY

Background

The Kelseyville WWTF serves approximately 3,800 residents (1,297 single family dwelling units) of Kelseyville County Water Works District No. 3, Corinthian Bay, and Clear Lake State Park. The community is small and has a financial hardship.

The WWTF is currently regulated by Waste Discharge Requirements (WDRs) Order No. 99-094. The treatment plant currently provides secondary treatment and chlorine disinfection, and effluent is pumped to a remote disposal site that has seven percolation/evaporation (P/E) ponds. A small amount of treated effluent is recycled at a 5-acre vineyard owned and operated by Michael Fowler. The recycled water discharge is regulated under separate WDRs (Order No. 99-070). The current average dry weather influent flow rate is about 0.21 mgd.

Beginning in 2001, the WWTF began to have capacity problems as a result of excessive inflow and infiltration (I/I). This led to instances where freeboard in the treatment and P/E ponds was less than one foot. In January 2005, the Regional Water Board adopted CDO No. R5-2005-0007 to require the Discharger to address the capacity issue and other violations of the WDRs, which included low dissolved oxygen concentrations in the ponds, high pH, a 270-gallon sanitary sewer overflow, and failure to monitor groundwater. The CDO requires that the Discharger correct the conditions that led to the violations and install groundwater monitoring wells.

As a result of work completed to comply with the CDO, the Discharger determined that I/I is a significant problem that creates peak wet weather flows that greatly exceed both the treatment capacity and the capacity of the lift station/pipeline that conveys treated effluent to the P/E pond system. The storage and disposal capacity deficit is partly due to deterioration of the effluent lift station pumps and the effluent pipeline.

The Discharger proposes to upgrade the WWTF to improve the treatment system and increase effluent storage/disposal capacity to comply with Cease and Desist Order (CDO) No. R5-2005-0007, and has secured approval for \$3.5 million in loans and grants from the State Water Resources Control Board for this purpose.

The improvements project currently planned (known as Phase I) will consist of increasing the effluent lift station capacity to 0.79 mgd; replacing 3,000 feet of effluent pipeline; reconfiguring the treatment ponds; and improving the treatment system to provide full secondary treatment within the footprint of the existing plant. The new treatment lagoon will be lined with 60-mil high density polyethylene (HDPE). The remainder of the treatment plant ponds will serve as effluent storage ponds. According to the RWD, Phase I will provide a firm treatment, storage and disposal capacity of 0.30 mgd as an average annual flow, and should accommodate projected growth through 2015, assuming a one percent population growth rate.

Groundwater Conditions

Kelseyville is within the Big Valley Basin, one of twelve groundwater basins in Lake County. Groundwater is contained in shallow alluvial deposits and deposits of the Clear Lake Volcanics over the fractured basement rock of the Franciscan Formation. Groundwater is used extensively for municipal, domestic, agriculture uses, and there are about 960 known wells in the Big Valley basin, most of which are 25 to 150 feet deep.

The P/E pond site is on the western flank of Mt. Konocti, a composite volcano. The primary sources of groundwater recharge in the Big Valley Basin are infiltration from Kelsey Creek and underflow from the Adobe Creek-Manning Creek Subbasin southwest of Kelseyville. Recharge from Mt. Konocti and the Central Upland System west of Kelseyville are believed to be smaller recharge sources.

Groundwater in the Big Valley Basin has lower concentrations of sodium, chloride, and sulfate than the other Lake County Basins. Geothermal influences can cause relatively high levels of iron and boron when groundwater levels are low, typically in the late fall. Boron is reportedly present at moderate levels, and iron, manganese, and/or hardness are problematic in some parts of the basin.

There are no monitoring wells at the P/E pond site, but three groundwater monitoring wells were installed at the wastewater treatment plant in July 2008. Soils encountered during drilling were typically four feet of sandy silt underlain by ten feet of silty sand and silty gravelly sand to a depth of thirty feet below ground surface (bgs). Following well development, the three monitoring wells were sampled on 21 October 2008. Static groundwater levels prior to sampling ranged from 4.7 to 11.1 feet bgs, with an east-northeast gradient of approximately 0.014 feet per foot. Based on the October 2008 data, MW-1 is upgradient of the plant and MW-3 is downgradient. MW-2 appears to be cross gradient of the plant.

Analytical data for the October 2008 groundwater sampling event indicates significant spatial variability between the three wells with respect to salinity constituents. However, one sampling event is not sufficient to determine spatial and temporal trends in groundwater quality, and there are no monitoring wells at the P/E pond site. Therefore, there is not sufficient data to determine whether the wastewater treatment plant and/or the P/E ponds have unreasonably degraded the underlying groundwater.

It is appropriate to require that the Discharger install additional monitoring wells designed to monitor groundwater up- and downgradient of the P/E ponds. It is also appropriate, after sufficient data have been collected, to require a formal determination of background groundwater quality and the degree to which degradation has occurred.

Basin Plan, Beneficial Uses, and Water Quality Objectives

The Kelseyville WWTF is in the Sacramento River Basin. Surface water drainage is to Clear Lake via Cole Creek. The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (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.

Increasing salinity in groundwater is a significant problem throughout most of the Central Valley Region. Although not directly applicable to the Sacramento River and San Joaquin River Basins, the Tulare Lake Basin Plan's salt management requirements have been successfully implemented for several decades. The Regional Water Board encourages proactive management to control addition of salt through use, and has established a guideline for allowable incremental salinity increase of 500 umhos/cm over the electrical conductivity of the source water in the Sacramento River and San Joaquin River Basins. When appropriate to assure compliance with a groundwater limitation for any constituent, more restrictive limitations on salt constituents added through use may be established by the Regional Water Board.

The Basin Plan encourages water recycling where practicable. The Discharger currently recycles less than one percent of its wastewater. However, the Discharger has developed and partially implemented a project that conveys recycled wastewater from other WWTFs in the Clear Lake area to The Geysers Geothermal Project where the water is used to recharge a deep geothermal reservoir that generates electricity. The third phase of this project will convey recycled water from the Kelseyville WWTF to The Geysers. However, funding has not yet been committed, so this remains part of the Discharger's long-range plans. Additionally, the Discharger has been investigating other recycling opportunities and is attempting to fund the extensive capital improvements needed.

Antidegradation Analysis

The antidegradation directives of State Water Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality Waters in California," or "Antidegradation Policy" requires 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. Policy and procedures for complying with this directive are set forth in the Basin Plan.

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 concentrated individual wastewater systems. Degradation of groundwater by some of the typical waste constituents released with discharge from a municipal wastewater utility after effective source control, treatment, and control is consistent with maximum benefit to the people of the State provided terms of the Basin Plan are met. Constituents of concern that have the potential to degrade groundwater include salts (primarily EC, sodium, and chloride), nutrients and coliform organisms, as discussed below:

1. The EC of the effluent currently averages approximately 600 umhos/cm. Based on best professional judgment, an incremental increase of 500 umhos/cm over the source is BPTC for this discharge is appropriate as an effluent limit.
2. Nutrients such as nitrate may pose a threat of unreasonable degradation. Although groundwater is quite shallow at the wastewater treatment plant, there is not enough site-specific data to determine the threat.

3. Coliform organisms may pose a threat of exceeding the Basin Plan's numeric water quality objective. The fact that total and fecal coliform organisms were not detected after many years of percolation from the unlined treatment and storage ponds indicates that there may be adequate filtration at the wastewater treatment plant site. Although disinfection would reduce the potential threat, the use of sodium hypochlorite would also increase the salinity of the effluent and create trihalomethanes. Therefore, pending completion of the *Background Groundwater Quality Study*, there is no reason to require disinfection at this time.

There is not sufficient data at this time to determine whether unreasonable groundwater degradation has, or likely will, result from the discharge. It is the responsibility of the Discharger to provide information for the Regional Water Board to evaluate whether any degradation caused by the discharge is consistent with Resolution No. 68-16. Although this Order allows expansion of the WWTF, the growth rate used for the Phase I design is minimal and the primary purpose of the project is to correct a long-standing capacity deficit rather than to accommodate growth. Sufficient reason exists to accommodate this minimal growth as long as future expansion proposals include maximizing recycling efforts, additional BPTC measures, and a complete antidegradation analysis.

Treatment and Control Practices

Upon completion of the proposed Phase I project, the Discharger will provide treatment and control of the discharge that incorporates:

1. Alarm and backup power systems to prevent bypass or overflow;
2. Secondary treatment of the wastewater;
3. A geosynthetic liner for the new wastewater treatment pond system to protect groundwater quality.
4. Recycled water use at agronomic rates;
5. A Sanitary Sewer Operation, Maintenance, Overflow Prevention and Response Plan;
6. An operation and maintenance (O&M) manual; and
7. Certified operators to ensure proper operation and maintenance.

However, the effluent storage ponds and P/E ponds do not incorporate any specific measures to reduce the potential for groundwater degradation. As noted above, it has not been established that the wastewater treatment plant and P/E ponds pose no significant threat to groundwater quality, and the level of degradation that complies with Resolution No. 68-16 has not been fully evaluated. Therefore, this Order establishes a schedule for tasks to formally evaluate groundwater quality, and to develop and begin to implement a salinity reduction program and evaluate additional BPTC measures if unreasonable groundwater degradation has, or will, occur. Completion of these tasks, and implementation of the approved strategies developed from that work, will ensure that BPTC and the highest water quality consistent with the maximum benefit to the people of the State will be achieved.

Title 27

Title 27, CCR, 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 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.

Discharges of domestic sewage and treated effluent can be treated and controlled to a degree that will not result in unreasonable degradation of groundwater. For this reason, they have been conditionally exempted from Title 27. Treatment and storage facilities for sludge that are part of the WWTF are considered exempt from Title 27 under section 20090(a), provided that the facilities not result in a violation of any water quality objective. However, residual sludge (for the purposes of the proposed Order, sludge that will not be subjected to further treatment by the WWTF) is not exempt from Title 27. Solid waste (e.g., grit and screenings) that results from treatment of domestic sewage and industrial waste also is not exempt from Title 27. This residual sludge and solid waste are subject to the provisions of Title 27.

Accordingly, the municipal discharge of effluent and the operation of treatment or storage facilities associated with a municipal wastewater treatment plant can be allowed without requiring compliance with Title 27, but only if the resulting groundwater degradation is in accordance with the Basin Plan.

Discharge Prohibitions, Specifications and Provisions

The Discharger’s water balance capacity analysis indicates that the upgraded WWTF will provide the following capacities:

<u>Condition</u>	<u>Current Capacity</u>	<u>Phase I Capacity</u>
Average daily flow	0.21 mgd	0.31 mgd
Average daily dry weather flow	0.12 mgd	0.22 mgd
Peak month daily flow	0.39 mgd	0.48 mgd

However, the model shows that the P/E pond percolation rates are critical to the WWTF’s effluent disposal capacity. Because of the uncertainty regarding sustainable P/E percolation rates, the proposed Order requires that the discharger submit and implement a plan to increase the frequency of scarification, re-evaluate percolation rates periodically, and continue its I/I reduction efforts. Because the current WWTF storage/disposal capacity is less than the current flows cited in the Findings, this Order also limits influent flows rates to the maximum values tabulated above until the Phase I project is complete.

The effluent limits for BOD and TSS of 40 mg/L monthly average and 80 mg/L daily maximum are based on reasonable expectations of performance of the secondary treatment system.

ORDER NO. ___
LAKE COUNTY SANITATION DISTRICT
KELSEYVILLE WATER WORKS DISTRICT NO. 3 WWTF
LAKE COUNTY

Although the Discharger has historically used sodium hypochlorite to disinfect effluent discharged to the P/E ponds, disinfection is not required to comply with the Title 22 water recycling requirements set forth in WDRs Order No. 99-070. Therefore, this Order does not require disinfection or set effluent limits for total coliform organisms.

As noted above, the EC of the treated effluent is currently within the generally accepted range of 500 umhos/cm over the EC of the water supply. This Order imposes an effluent limit of 800 umhos/cm, which accommodates the temporal variability of the effluent EC without allowing any overall increase.

The proposed Order prescribes groundwater limitations that implement water quality objectives for groundwater from the Basin Plan. The limitations require that the discharge not cause or contribute to exceedance of these objectives or natural background water quality, whichever is greatest.

The Provisions require submittal of certain technical reports to verify completion of the Phase I improvements project and compliance with requirements to install monitoring wells, evaluate groundwater quality, maintain sustainable percolation rates for the P/E ponds and implement salinity reduction and/or BPTC measures as necessary to comply with the groundwater limitations.

The Monitoring and Reporting Program is designed to verify compliance with effluent limitations, groundwater limitations, and operational requirements of the WDRs.

ALO:1/20/09