INFORMATION SHEET

WASTE DISCHARGE REQUIREMENTS R5-2012-XXXX
CITY OF OAKDALE
OAKDALE WASTEWATER TREATMENT FACILITY
STANISLAUS COUNTY

Background

The City of Oakdale Wastewater Treatment Facility (WWTF) treats and disposes of domestic wastewater from residential and commercial sources in the City of Oakdale and has one industrial wastewater discharger. The Discharger receives industrial wastewater from Sconza Candy, a candy manufacturer. Based on data provided in the RWD, Sconza Candy accounts for about 4 percent of the flow at the wastewater treatment plant, 30 percent of the BOD mass load, and about 17 percent of the total dissolved solids (TDS) mass loading.

WDRs Order 5-01-094 specified an average daily influent flow limit of 2.4 MGD. The average influent daily flow to the WWTF from January 2006 to December 2010 was 1.69 MGD.

The previous wastewater treatment plant (WWTP) consisted of a headworks, two aeration basins that operate in parallel, secondary clarification, sludge drying beds, and wastewater disposal to fourteen rapid infiltration ponds. In the past, the treatment capacity of the plant was limited by a single 90-foot secondary clarifier that was built in 1965. The single secondary clarifier did not have capacity to treat peak wastewater flows, which resulted in sludge bypass to the rapid infiltration ponds. Additionally, there was no backup clarifier to use when the unit was taken out of service for maintenance or repair.

The uncovered sludge drying beds do not adequately dry out the sludge solids during the wet winter months. This resulted in extended storage of sludge in the sludge drying beds, the sludge storage tank, and in the wastewater treatment system, which impacted operation of the biological treatment system. In 2008, a screw press was added for year-round mechanical sludge dewatering.

Modifications to the Wastewater Treatment Plant

The Discharger completed major upgrades to the WWTP to improve biological treatment, provide UV disinfection of effluent, provide a back-up secondary clarifier, and mechanically dewater the sludge. The Discharger states that three rapid infiltration Ponds are no longer used due to their close proximity to the Stanislaus River. Both aeration basins have been lined with a 60 mil HDPE single liner. Additionally, the aeration system was rehabilitated and upgraded with two additional100-horsepower blowers. A 120-foot diameter secondary clarifier was constructed in addition to the existing clarifier. The existing 90-foot secondary clarifier will be used in parallel as needed or serve as a backup when the 120-foot clarifier is out of service for maintenance. Cloth media filters and a ultraviolet light (UV) disinfection system were installed to protect shallow groundwater quality from coliform organism contamination. As part of the WWTP upgrades, an additional screw press was added and both screw presses were installed under a permanent canopy structure. The sludge drying beds are uncovered and may be used in the summer for additional drying or for backup dewatering.

The Discharger states that the mechanical sludge dewatering system has been prone to dysfunction since it was installed and the Discharger has been working to fix the system. This Order requires the Discharger to submit a sludge dewatering system operational report that describes the measures that will be taken to correct the problems and ensure that the system is operational by 30 December 2012.

A comparison of historical effluent data with effluent data obtained after a majority of the WWTP upgrades were completed in April 2011 shows UV disinfection has reduced total coliform organisms (TCO). However, the nitrate concentration has not improved. The Discharger states that the upgraded WWTP treatment system was designed to meet an average nitrate-nitrogen effluent limit of 10 mg/L. To protect groundwater quality this Order sets a time schedule for the Discharger to meet an average total nitrogen concentration of 10 mg/L.

Groundwater Considerations

Groundwater underlying the site ranges from 3 to 14 feet below the bottom of the rapid infiltration ponds. Discharges to the rapid infiltration ponds have resulted in groundwater mounding. Without discharge to the rapid infiltration ponds, shallow groundwater would likely flow consistently from north to south towards the Stanislaus River.

Eight groundwater monitoring wells monitor first encountered groundwater at the WWTP. Monitoring data from OMW-6 and its location relative to the WWTP indicate that it is cross-gradient of the WWTP, representative of shallow background groundwater quality, and unaffected by the wastewater treatment plant discharge.

Based on groundwater monitoring data, the discharger has degraded groundwater quality with TDS, chloride, nitrate, arsenic, manganese, and total coliform organisms. In the case of nitrate, arsenic, manganese, and coliform organism, the degradation of groundwater exceeds applicable water quality objectives.

The elevated concentrations of TDS and chloride in the groundwater are typical for a municipal wastewater treatment facility given the quality of the water supply. The recent facility upgrades are not expected to improve effluent salinity or groundwater quality. Therefore, to prevent further degradation, this Order sets TDS effluent and groundwater limits and a chloride groundwater limit.

The short separation between the ponds and the groundwater may have led to the coliform and nitrate degradation in groundwater. The Discharger's previous problems of sludge overflow and the subsequent drying of sludge in the ponds may have exacerbated the nitrate and coliform organism degradation. The Discharger has lined the aeration basins, improved aeration capacity, installed UV disinfection, and installed a mechanical sludge dewatering system to improve groundwater quality protection. This Order sets nitrate and total coliform effluent and groundwater limits to ensure compliance with the Basin Plan.

Elevated concentrations of arsenic and manganese are not typical for a domestic wastewater treatment plant such as Oakdale with low concentrations in the potable source water and without significant industrial dischargers. The Discharger has not indicated any industrial dischargers that would contribute a source of arsenic or manganese and the discharge is not expected to be contributing arsenic or manganese to the groundwater. The unlined treatment ponds and the Discharger's previous problems of sludge bypass into the ponds may have temporarily created anaerobic conditions that mobilize naturally occurring arsenic and manganese. As noted above, the Discharger has taken measures to improve protection of groundwater. This Order sets a time schedule for the Discharger to determine if the treatment and control measures have improved arsenic and manganese groundwater quality and whether further treatment or control is required.

Basin Plan, Beneficial Uses, and Regulatory Considerations

The beneficial uses of the Stanislaus River, as stated in the Basin Plan, are municipal and domestic supply; agricultural supply; industrial service and process supply; hydropower generation; contact and non-contact water recreation; warm and cold freshwater habitat; migration of aquatic organisms; spawning, reproduction, and/or early development; and wildlife habitat. The Basin Plan designates the beneficial uses of underlying groundwater as municipal and domestic supply, agricultural supply, and industrial supply. Local drainage in the area flows to the Stanislaus River, but the Discharger collects all storm water generated at the WWTP and disposes of it in a stormwater holding pond.

Antidegradation Analysis

The Discharger has been monitoring groundwater quality at the current WWTF site since 1989. Based on the data available, it is not possible to determine pre-1968 groundwater quality. Therefore, determination of compliance with Resolution 68-16 for this facility must be based on existing background groundwater quality.

Constituents of concern that have the potential to degrade groundwater include salts (primarily TDS, sodium, and chloride), nutrients, coliform organisms, and metals. The Central Valley Water Board is currently implementing the CV-SALTS initiative to develop a Basin Plan Amendment that will establish a salt and nitrate Management Plan for the Central Valley. Through this effort the Basin Plan will be amended to define how the narrative water quality objective is to be interpreted for the protection of agricultural use. All studies conducted through this Order to establish an agricultural limit to implement the narrative objectives will be reviewed and consistent with the efforts underway by CV-SALTS.

The secondary MCL for TDS is 500 mg/L as a recommended level, 1,000 mg/L as an upper level, and 1,500 mg/L as a short-term maximum. The Central Valley Water Board must determine the applicable numeric limit to implement the narrative objective for the protection of agricultural supply. The most limiting agricultural water quality goal may be as low as 450 mg/L. However, the water quality goal is not a site-specific goal or objective, but rather a general measure that was determined to protect salt-sensitive crops. Only the most salt-sensitive crops require irrigation water of 450 mg/L or less to prevent loss of yield. Site specific TDS levels of the receiving waters are necessary to interpret the narrative chemical constituent objective for protection of agricultural supply.

The average effluent TDS concentration is 384 mg/L, with a range from 374 mg/L to 439 mg/L, which are similar concentrations found in the downgradient monitoring wells. Compared to the source water TDS concentration, the effluent TDS concentration is elevated approximately 200 mg/L, which is typical for a domestic wastewater treatment facility and indicates that the Discharger's current treatment and control practices are effective. The average TDS concentration in the cross-gradient groundwater well MW-6 is 118 mg/L with a range from 30 mg/L to 180 mg/L. Based on these results, it appears that some degradation has occurred as a result of the discharge. However, this Order does not allow degradation beyond that which may already exist. Therefore, this Order sets a performance based TDS effluent limit of 450 mg/L and sets a TDS groundwater limit of 500 mg/L

The secondary MCL for chloride is 250 mg/L as a recommended level, 500 mg/L as an upper level, and 600 mg/L as a short-term maximum. The Central Valley Water Board must determine the applicable numeric limit to implement the narrative objective for the protection of agricultural supply. The most limiting agricultural water quality goal may be as low as 106 mg/L as a long-term average, which is intended to protect against adverse effects on sensitive crops when irrigated via sprinklers. However, the water quality goal is not a site-specific goal or objective, but rather a general measure to protect salt-sensitive crops. Site specific chloride levels of the receiving waters are necessary to interpret the narrative chemical constituent objective for protection of agricultural supply.

A review of the Discharger's monitoring reports shows that the average chloride concentration in the downgradient wells varies from 52 mg/L to 58 mg/L and ranges from 19 mg/l to 120 mg/L. The average chloride concentration in the cross-gradient groundwater well MW-6 is 5 mg/L with a range from 2 mg/L to 14 mg/L. Based on these results, it appears that some degradation has occurred as a result of the discharge. However, this Order does not allow degradation beyond that which may already exist. Therefore, this Order sets a chloride groundwater limit of 106 mg/L.

For nutrients such as nitrate, the potential for unreasonable degradation depends not only on the quality of the treated effluent, but the ability of the vadose zone below the effluent disposal ponds to provide an environment conducive to nitrification and denitrification to convert the effluent nitrogen to nitrate and the nitrate to nitrogen gas before it reaches the water table. Downgradient groundwater monitoring wells have exceeded the Basin Plan water quality objective for nitrate-nitrogen (10 mg/L), while the background groundwater concentration averages 1.5 mg/L. Therefore, the shallow vadose zone may not provide an environment conducive for denitrification. Prior to upgrades, effluent monitoring data show that the nitrate-nitrogen concentration historically averaged 11.3 mg/L. After upgrades and between April 2011 and October 2011, the effluent nitrate-nitrogen concentration averaged 19.3 mg/L. The Discharger states that the upgraded WWTP treatment system was designed to meet an average nitrate-

nitrogen effluent limit of 10 mg/L and required an optimization period. Between October 2011 and February 2012, the effluent nitrate-N concentration averaged 7.1 mg/L with a maximum of 8.0 mg/L.

To protect groundwater quality, this Order sets an effluent limit for total nitrogen of 15 mg/L. Since monitoring data shows that the discharge may not be able to meet this limit immediately, this Order also sets a three-year time schedule for compliance with the effluent limit for total nitrogen.

While the Discharger has lined and improved sludge handling, the discharge has caused an exceedance of the nitrate-nitrogen water quality objective. Because groundwater quality is expected to improve as a result of effluent quality improvements, this Order sets a three-year time schedule for the Discharger to meet the Basin Plan water quality objective for nitrate-nitrogen in groundwater.

For coliform organisms, the discharge has caused an exceedance of the Basin Plan's numeric water quality objective. The potential to exceed the water quality objective depends on the ability of the vadose zone soils below the effluent storage/disposal ponds and saturated soils within the shallow water bearing zone to provide adequate filtration. Historically, total coliform organisms (TCO) detections in groundwater monitoring wells exceeded the Basin Plan limit suggesting that the shallow vadose zone and soil types at the facility may not provide adequate filtration. The Discharger has lined the aeration basins and begun disinfecting the effluent with UV. This Order sets an effluent limit for TCO based on the design specifications provided in the RWD to ensure the UV disinfection system is operating correctly. To ensure that the monitoring wells have not been colonized with coliform organisms this Order requires the Discharger to disinfect all monitoring wells. The Discharger is required to meet the Basin Plan water quality objective for coliform organisms in groundwater after the wells have been disinfected.

For metals such as arsenic and manganese, the potential for unreasonable degradation depends on the quality of the treated effluent and the capacity of the vadose zone below the effluent disposal ponds to immobilize metals before percolate reaches the water table. The discharge is not expected to be contributing arsenic or manganese to the groundwater. The Discharger's problems of sludge bypass into the ponds may have created conditions that mobilize naturally occurring arsenic and manganese. This Order sets a three-year time schedule for the Discharger to meet the Basin Plan water quality objective for arsenic and manganese in groundwater.

This Order requires the Discharger to institute a pretreatment program because the Discharger accepts industrial wastewater that constitutes a substantial percentage of the BOD and TDS mass loading, which may have resulted in upsets of the treatment process and sludge bypass.

Other Regulatory Considerations

The Discharger states that effluent is no longer discharged to Ponds 3, 6, and 7 due to their close proximity to the Stanislaus River. Because the Discharger has had previous bypass of sludge through the secondary clarifier and used some ponds for extended sludge storage, it is likely that accumulated sludge needs to be removed from the ponds. Therefore, this Order requires the Discharger to submit and implement a pond closure plan and prevent future discharge to these ponds by backfilling them and physically blocking or disconnecting these ponds from the disposal pipeline.

Discharge Prohibitions, Specifications, and Provisions

The Discharger's water balance capacity analysis indicates the WWTF will provide the following capacities:

Flow Measurement	Flow Limit
Total Annual Flow [1]	935 MG

Flow Measurement	Flow Limit
Average Dry Weather Flow [2]	2.45 MGD
Maximum Monthly Average Flow [3]	2.7 MGD

[1] As determined by the total flow for the calendar year.

[2] As determined by the total flow for the months of August through October, inclusive, divided by 92 days.

[3] As determined by the total flow during the calendar month with the highest influent flow total, divided by the number of days in that month.

Discharge of waste to former rapid infiltration Ponds 3, 6, and 7 is prohibited.

This Order contains performance-based effluent limits for BOD, TDS, total nitrogen and total coliform organisms. A time schedule is given for the effluent total nitrogen concentration to comply with 10mg/L. This Order contains groundwater limits that implement Basin Plan groundwater water quality objectives for total coliform organisms, nitrate-nitrogen, arsenic, and manganese. This Order also contains groundwater limits for TDS and chloride that allow the current level of degradation to continue but prevent degradation beyond water quality objectives. A time schedule is given for the groundwater concentrations of nitrate-nitrogen, arsenic, and manganese to comply with the Basin Plan groundwater water quality objectives. Compliance with these limitations will be determined annually based on intrawell analysis using approved statistical methods.

The Provisions require the submittal of technical reports that describe the statistical methods used to determine compliance with groundwater limits. The Discharger is also required to close the former rapid infiltration ponds, disinfect all groundwater monitoring wells, certify the correct operation of the sludge dewatering system, and institute a pre-treatment program.

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