

INFORMATION SHEET

WASTE DISCHARGE REQUIREMENTS ORDER R5-2012-XXXX
CITY OF HUGHSON
STANISLAUS COUNTY

Background

The City of Hughson Wastewater Treatment Facility (WWTF) treats and disposes of domestic wastewater from residential and commercial sources from the City of Hughson, as well as one industrial wastewater discharger. The Discharger receives industrial wastewater from a milk processing facility owned by Dairy Farmers of America (DFA). In January 2005, the Discharger began regulating DFA under a pretreatment program, which sets effluent limits for biological oxygen demand (BOD), fats and grease, and salinity. To comply with the pretreatment program, DFA has implemented improvements to reduce BOD, TSS, and salinity discharged to the sewer.

Waste Discharge Requirements (WDRs) Order 5-00-0024 prescribes requirements for the WWTF and allows an average dry weather flow of 0.8 million gallons per day (MGD). The Discharger has built a new wastewater treatment plant and requested an average dry weather flow of 1.8 MGD.

The previous wastewater treatment plant consisted of a headworks, an aeration tank, a secondary clarifier, a sludge dewatering press, and three uncovered sludge drying beds. Since 2003, the Discharger has been disinfecting the treated wastewater with sodium hypochlorite prior to disposal to nine rapid infiltration disposal ponds (Ponds 1 through 3, and Ponds 5 through 10). Ponds 1 through 3 are used regularly. Ponds 5 through 10 are located within the 100-year flood plain of the Tuolumne River, but have not been used since 2006. The headworks, treatment plant, and Ponds 1 through 3 are located on a terrace that is out of the 100-year flood plain.

Modifications to the Wastewater Treatment Plant

The Discharger constructed a new wastewater treatment plant that began operating in September 2011. The new plant replaces the old plant and consists of a concrete-lined oxidation ditch, two new concrete clarifiers, an indoor filter press sludge dewatering system, and two new rapid infiltration disposal ponds (Ponds 1W and 2W). All components of the new treatment plant are constructed on the terrace above the 100-year flood plain. The previous headworks, aeration tank, secondary clarifier, and sludge dewatering press have been abandoned. The pipeline leading to Ponds 5 through 10 has been plugged with cement so the ponds cannot be used in the future. Treated wastewater from the new system is discharged to one of five rapid infiltration disposal ponds (Ponds 1 through 3, 1W, and 2W) throughout the year. The effluent quality of the new wastewater treatment plant is expected to remain the same quality or potentially improve in regards to biological oxygen demand, nitrogen, and salinity.

The Discharger proposes to stop disinfecting the effluent and states that previous detections of coliform organisms in the groundwater monitoring wells were a result of cross-contamination and/or inadequate sampling techniques. Additionally, chlorine disinfection has resulted in degradation of groundwater with trihalomethanes (THMs), specifically chloroform,

bromodichloromethane, and dibromochloromethane. In 2006, the Discharger rehabilitated and disinfected the groundwater monitoring wells and implemented improved sampling techniques. As a result, detection of coliform organisms in the monitoring wells has decreased.

Groundwater Conditions

Eleven groundwater monitoring wells monitor first-encountered groundwater at the WWTF. Shallow groundwater in the vicinity flows northwest toward the Tuolumne River, which is typically a gaining stream. Groundwater underlying the site is approximately 60 feet below the bottom of Ponds 1 through 3, 1W, and 2W. Groundwater mounding associated with discharges to Ponds 1 through 3 is apparent in groundwater elevation maps submitted by the Discharger.

Because of the distinct groundwater mound created by the ponds, the background monitoring well MW-10 is not completely upgradient of the WWTF. However, the monitoring data from MW-10 and its location relative to the WWTF indicate that it is representative of shallow background groundwater quality and is unaffected by the discharge. Additionally, THMs have not been detected in MW-10 as they have in downgradient monitoring wells closer to the disposal ponds. Therefore, MW-10 is considered to be representative of background groundwater quality. In general, background groundwater quality, as indicated by MW-10, is not as good as downgradient groundwater quality. Therefore, it appears that no degradation of groundwater quality is occurring.

In the second quarter of 2008, the groundwater elevation dropped below the screened depth of MW-10. Consequently, MW-10 was dry and could not be sampled until the first quarter of 2011, possibly due to the drought from 2007 through 2009 and/or increased groundwater use in the area. If MW-10 goes dry for an extended period, the Order requires the Discharger to either replace MW-10 or justify why replacement is not needed.

Basin Plan, Beneficial Uses, and Regulatory Considerations

The beneficial uses of the Tuolumne River, as stated in the Basin Plan, are municipal and domestic supply; agricultural supply; 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 Tuolumne River, but the Discharger collects all storm water generated at the WWTP and disposes of it in rapid infiltration Pond 4.

Antidegradation Analysis

The Discharger has implemented best practicable treatment and control by constructing the new wastewater treatment plant, which incorporates: alarms to prevent system bypass or overflow; collection system improvements to reduce the potential for SSOs and to control inflow and infiltration; a concrete oxidation ditch, two concrete secondary clarifiers, and an indoor filter press sludge dewatering system; certified operators to ensure proper operation and maintenance; and a

supervisory Control and Data Acquisition (SCADA) system for early detection of potential wastewater treatment disruptions. The Discharger also has an industrial pretreatment program that sets biological oxygen demand, oil and grease, and salinity effluent limits for the dairy owned by DFA.

Constituents of concern that have the potential to degrade groundwater include salts (primarily TDS, sodium, and chloride), nutrients, and coliform organisms. Compared to the source water TDS concentration, the effluent TDS concentration is elevated approximately 160 mg/L, which is low for a typical domestic wastewater treatment facility, and indicates that the Discharger's current best practicable treatment and control practices are effective. The effluent TDS concentration currently averages 469 mg/L and the background groundwater concentration averages 1,180 mg/L. The TDS effluent quality of the newly-constructed WWTF is expected to remain the same or to potentially improve. Therefore, the discharge is not likely to degrade groundwater quality due to increased salinity, and a TDS effluent limit is not required to protect groundwater quality.

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. The effluent nitrate (as nitrogen) concentration currently averages 5.7 mg/L and the background groundwater concentration averages 40 mg/L. The nitrate effluent quality of the newly constructed WWTF is expected to remain the same. Therefore, the discharge is not likely to degrade groundwater quality due to increased nitrate, and a nitrate effluent limit is not required to protect groundwater quality.

For coliform organisms, the potential for exceedance of the Basin Plan's numeric water quality objective depends on the ability of 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. Waste Discharge Requirements Order 5-00-024 set an effluent limit that indirectly required disinfection. In 2003, the Discharger began disinfecting the effluent with sodium hypochlorite. As a result, trihalomethanes and an increase in TDS have been detected in the downgradient groundwater monitoring wells. In 2006, the Discharger rehabilitated and replaced groundwater monitoring wells and initiated new sampling techniques, which have reduced the TCO detections. This implies that previous TCO detections were a result of contaminated or compromised wells or poor sampling techniques. The approximate 60-foot unsaturated zone consisting of fine grained sand, silty sand, and clayey silt below Ponds 1 through 3, 1W and 2W is expected to be sufficient to filter out coliform organisms and prevent groundwater degradation. Additionally, an analysis of surface water monitoring data upstream and downstream of the facility shows that the Tuolumne River has not been impacted by the discharge in regards to the monitored constituents. Therefore, current data indicate that a TCO effluent limit is not required to protect groundwater quality and disinfection is not required.

Other Regulatory Considerations

The Discharger ceased discharging to Ponds 5 through 10 in 2006, and permanently sealed the pipeline leading to the ponds in 2011. Based on an inspection in September 2011, there is no visible evidence of sludge in Ponds 5 through 10. Therefore, this Order does not regulate Ponds 5 through 10. The Discharger may develop the land or maintain it as open space without authorization by the Central Valley Water Board.

Discharge Prohibitions, Specifications and Provisions

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

Influent Flow Measurement	Maximum Rate
Total Annual Flow ¹	700 MG
Average Dry Weather Flow ²	1.8 MGD
Peak Month Average Daily Flow ³	2.1 MGD

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

² As determined by the total influent flow for the dry months August through October, inclusive, divided by 92 days and expressed in million gallons per day (MGD).

³ As determined by the total influent wastewater flow during a calendar month, divided by the number of days in that month and expressed in million gallons per day (MGD).

Discharge of wastewater to former Ponds 5 through 10 is prohibited.

This Order contains an effluent limit for BOD and prescribes groundwater limitations that implement water quality objectives for groundwater from the Basin Plan. The limitations require that the discharge not cause groundwater to exceed a total coliform organism level of 2.2 MPN/100mL or contain waste constituents in concentrations statistically greater than background groundwater quality. Compliance with this limitation will be determined annually based on comparison of background groundwater quality using historical MW-10 monitoring data and downgradient monitoring well data, using approved statistical methods.

The Provisions require the submittal of technical reports that describe the statistical methods used to propose groundwater concentration limits based on background groundwater monitoring data. The Discharger is also required to construct a new background groundwater monitoring well if MW-10 goes dry for a certain period of time or justify why replacement is not needed.

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