

## INFORMATION SHEET

ORDER NO. \_\_\_\_  
MAXWELL PUBLIC UTILITIES DISTRICT  
MAXWELL WWTF  
COLUSA COUNTY

### **Background**

The Maxwell WWTF serves approximately 1,056 residents. The community is small and has a financial hardship.

The WWTF is currently regulated by WDRs Order No. R5-2009-0009 (NPDES No. CA0079987). The treatment plant currently provides secondary treatment and chlorine disinfection, and treated effluent is currently discharged to an unnamed tributary of Lurline Creek.

The previous NPDES Permit, WDRs Order No. R5-2002-0022, was adopted with a companion Cease and Desist Order (CDO) No. R5-2002-0023 because the Discharger could not consistently comply with the permit's Effluent Limitations for ammonia. The CDO required that the Discharger comply with the effluent limitations by 1 February 2007.

On 5 August 2003, the Executive Officer issued Administrative Civil Liability Complaint (ACLC) No. R5-2003-0505 for \$588,000 in mandatory minimum penalties to the Discharger for violations of Waste Discharge Requirements Order No. 96-071 and Order No. R5-2002-0022. Because the Discharger is a small community with a financial hardship, the ACLC allowed the Discharger to complete a compliance project in lieu of paying the penalty. On 22 October 2003, the Discharger entered into a Stipulated Settlement Agreement with the Executive Officer, which allowed the Discharger to complete a compliance project in lieu of paying the penalty. The Discharger proposed land disposal as its compliance project and agreed to complete the project by 1 February 2007.

In February 2006, the Discharger requested that the time schedule set forth in the CDO be extended to 31 December 2009 because of difficulties acquiring the land needed for the compliance project. In February 2007, the Discharger again requested the deadline be moved to 18 May 2010, which coincides with the full compliance deadline in the California Toxics Rule. On 22 June 2007, the Central Valley Water Board adopted Time Schedule Order (TSO) No. R5-2007-0073, which required that the Discharger complete certain milestones and complete the compliance project by 18 May 2010.

In order to comply with the TSO, the Discharger completed a Wastewater Facilities Plan, completed an environmental review pursuant to the California Environmental Quality Act (CEQA), submitted a Report of Waste Discharge, and made substantial progress toward acquiring land for the compliance project. The Discharger proposes to upgrade the WWTF to include effluent storage and a water recycling site, and will eliminate the discharge to surface waters after the project is completed. The improvements project will consist of:

- Increasing the depth of the existing aerated pond;
- Converting Oxidation Pond #1 to a second aerated pond with a deeper fermentation pit;
- Deepening the Oxidation Ponds #2 and #3 to convert them to facultative lagoons ;

- Constructing an effluent pumping station and pipeline to convey treated effluent to an effluent storage pond at the water recycling site; and
- Improving the new water recycling site to provide irrigation and tailwater systems.

Subsequently, on 18 September 2008, the Executive Officer issued Administrative Civil Liability Order (ACLO) No. R5-2008-0561 for \$1,617,000 in mandatory minimum penalties for additional violations of Waste Discharge Requirements Order No. R5-2002-0022. The 2008 ACLO replaces the Stipulated Settlement Agreement, incorporates the recent violations, extends the Record of Violations through 30 April 2008, and allows the Discharger until 18 May 2010 to complete the compliance project in lieu of paying the penalties.

According to the RWD, the improved WWTF and water recycling site will provide a firm treatment, storage and disposal capacity of 0.332 mgd as an average annual flow, and should accommodate projected growth for 20 years, assuming a 3.6 percent annual population growth rate.

### **Groundwater Conditions**

Surface soils in Maxwell area are predominantly fine-grained soils (silts and clay) deposited by flooding of major streams during the Holocene period. Shallow soils at the wastewater treatment plant consist of clay and sandy clay to a depth of 8 to 10 feet below ground surface (bgs).

The Discharger has been monitoring groundwater monthly at the wastewater treatment plant using five shallow monitoring wells since December 2002. Groundwater is typically found at depths ranging from one to six feet bgs at the wastewater treatment plant, and the groundwater flow direction is predominantly to the northeast. Historical groundwater analytical data for the wastewater treatment plant wells indicate that the existing WWTF may have degraded groundwater quality with respect to coliform organisms, EC, nitrogen, chloride, sodium, and boron. However, a statistical analysis of the data is required to determine background concentrations and whether the degradation has caused exceedance of applicable water quality limits.

Soils at the planned effluent recycling site are primarily clay and sandy clay interbedded with layers or lenses of silty and clayey sand. Five monitoring wells were installed at the water recycling site in April 2008. These wells were sampled in April and December 2008. Static groundwater levels prior to sampling ranged from 4.5 to 9.0 feet below the top of the well casing in April 2008, and from 8.0 to 10.0 feet in December 2008. However, the groundwater elevation and gradient cannot be determined because the Discharger has not surveyed the wells. Based on regional groundwater maps prepared by the Department of Water Resources, it appears that there is no well directly downgradient of the planned effluent storage pond.

The groundwater analytical data for the effluent recycling site data show high spatial and temporal variability despite the fact that the discharge has not yet begun. The primary purpose

of the data is to provide an understanding of pre-discharge groundwater quality, which will serve as a baseline to assess post-discharge data.

The Discharger has not evaluated the existing groundwater monitoring data to determine whether the wastewater treatment plant has unreasonably degraded the underlying groundwater. It is appropriate to require that the Discharger install additional monitoring wells as needed at the effluent recycling site. 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. This Order requires that the Discharger continue monitoring groundwater at the treatment plant and complete a formal determination of background groundwater quality and the degree to which degradation has occurred.

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

Surface water drainage is to Lurline Creek, which is tributary to the Colusa Basin Drain. 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.

The Basin Plan encourages water recycling where practicable. Upon completion of the planned improvements, the Discharger will recycle all effluent for beneficial uses.

### **Antidegradation Analysis**

State Water Resources Control Board Resolution No. 68-16 ("Policy with Respect to Maintaining High Quality Waters of the State") (hereafter Resolution 68-16) prohibits degradation of groundwater unless it has been shown that:

1. The degradation is consistent with the maximum benefit to the people of the State;
2. The degradation will not unreasonably affect present and anticipated future beneficial uses;
3. The degradation does not result in water quality less than that prescribed in state and regional policies, including violation of one or more water quality objectives; and
4. The discharger employs best practicable treatment or control (BPTC) to minimize degradation.

Resolution 68-16 prohibits degradation of groundwater quality as it existed in 1968, or at any time thereafter that groundwater quality was better than in 1968, other than degradation that was previously authorized. An antidegradation analysis is required for a new discharge location, and/or an increased volume of waste and/or an increased concentration of waste constituents.

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. 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, and the impact on water quality will be substantially less. Economic prosperity of valley communities and associated industry is of maximum benefit to the people of the State, and therefore sufficient reason to accommodate growth and groundwater degradation provided terms of the Basin Plan are met.

There has been a wastewater treatment facility at the current site since before 1958, when the first WDRs were issued. Although the Discharger has been monitoring groundwater quality at the current WWTF site since 2002, the data have not been evaluated to statistically determine background groundwater quality. The Discharger has also performed some pre-discharge groundwater monitoring at the proposed effluent recycling site. However, the data for that site are not sufficient to determine background groundwater quality.

The Discharger currently provides 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; and
3. Disinfection.

When the improvements project is complete, the facility will provide the following additional treatment and control measures:

1. Improved treatment reliability; and
2. Recycling of all treated effluent for beneficial uses.

However, the Discharger has not implemented any source control and the wastewater treatment plant and effluent storage ponds do not incorporate any specific measures to reduce the potential for groundwater degradation. The RWD states that the effluent storage pond will be constructed from native clay soils compacted to achieve an estimated saturated permeability rate of  $10^{-6}$  cm/sec. However, the RWD did not specify the thickness of the bottom liner or construction quality assurance procedures to ensure consistent and proper liner placement/compaction or verify the as-built permeability rate. Therefore, the degree of water quality protection provided by this liner cannot be determined. This Order requires the Discharger to submit a Background Groundwater Quality Study Report and continue groundwater monitoring at the wastewater treatment facility sites to demonstrate whether the clay liners are adequate to protect groundwater from unreasonable degradation due to leakage from the ponds. If groundwater monitoring data shows that the discharge to the ponds has violated the groundwater limitations of this Order, this Order may be reopened to add additional requirements that address the violations.

Additionally, although a certified operator is designated to operate the plant, the operator does not provide adequate supervision of the Operators in Training OITs that perform most operations. Therefore, this Order requires that the Discharger provide the correct grades of certified operators and appropriate supervision for any OITs to ensure proper operation and maintenance of the WWTF.

Surrounding land uses are primarily irrigated agriculture, and these land uses predate the existing WWTF. Based on the limited data available and historic land uses, it is reasonable to expect that agricultural practices have degraded groundwater quality at both sites, and that it will not be 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.

The Discharger cannot fully evaluate existing and potential future impacts to groundwater quality until completion of the WWTF improvements and additional hydrogeologic studies. The limited antidegradation analysis below indicates that the proposed discharge may comply with the Basin Plan. However, this Order includes interim groundwater limitations that are effective immediately and do not allow exceedance of Basin Plan water quality objectives. Final Groundwater Limitations, which will become effective on 30 December 2014, are the Basin Plan water quality objectives or existing background groundwater concentrations, whichever is greater.

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 has averaged approximately 1,800 umhos/cm over the last five years. The maximum annual average EC during that period was 1,942 umhos/cm, whereas the EC of the water supply ranged from 920 to 1,200 umhos/cm. Based on Finding No. 50, this is not consistent with the Tulare Lake Basin Plan's established effluent limit of 500 umhos/cm over the source water. This limit was established after a full evaluation of BPTC for discharges in the Tulare Lake Basin. Circumstances and conditions with respect to treatment and control of salinity in the Sacramento-San Joaquin River Basin are similar to those of the Tulare Lake Basin. Therefore, the discharge has the potential to cause violation of water quality objectives for salinity.
2. 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 storage/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. Groundwater monitoring data for the wastewater treatment plant site do not indicate unreasonable degradation due to nitrate, and the crops grown at the water recycling site should remove most of the nitrogen in the applied wastewater. However, groundwater is quite shallow at the wastewater treatment plant and the planned effluent recycling site, so there is some threat that the discharge could cause a violation of the Maximum Contaminant Level for nitrate in shallow groundwater.
3. For coliform organisms, the potential for exceedance of the Basin Plan's numeric water quality objective depends on the level of disinfection provided and the ability of vadose zone soils below the treatment plant and effluent storage ponds and saturated soils within the shallow water bearing zone to provide adequate filtration. Groundwater monitoring data for the wastewater treatment plant indicates that the shallow soils beneath the treatment ponds (which are unlined and contain undisinfected wastewater)

may not provide sufficient filtration. Groundwater conditions at the effluent storage pond site are similar and the effluent storage pond is designed to contain up to 14 feet of effluent. The higher hydraulic head in the effluent storage pond will increase the risk of degradation. However, as noted above, statistical analysis of the data is required to make that determination. This Order requires that the Discharger continue to disinfect treated effluent unless and until it is demonstrated that disinfection is not required to protect public health and groundwater quality. Disinfection would reduce the potential threat, but the use of sodium hypochlorite will also increase the salinity of the effluent and create trihalomethanes, neither of which is desirable. Additionally, disinfection will not prevent coliform impacts at the treatment plant site because treatment will take place in clay-lined ponds prior to disinfection. Depending on the outcome of the groundwater data analysis, it may be necessary to provide less permeable liners for the treatment ponds and/or change the method of disinfection.

Although this Order allows expansion of the WWTF, the growth rate used for the design is moderate and the primary purpose of the project is to eliminate a long-standing permitted discharge to surface waters rather than to accommodate growth. Sufficient reason exists to accommodate this growth as long as the discharger completes an antidegradation analysis and selects and implements appropriate salinity reduction and BPTC measures within a reasonable timeframe. It is also appropriate to allow some groundwater degradation as long as it is consistent with the Basin Plan and Resolution No. 68-16 because economic prosperity of local communities and associated industry is of benefit to the people of California. This Order establishes terms and conditions of discharge to ensure that the discharge does not unreasonably affect present and anticipated uses of groundwater and includes groundwater limitations that apply water quality objectives established in the Basin Plan to protect beneficial uses. This Order establishes effluent limitations that are protective of the beneficial uses of the underlying groundwater, requires a groundwater quality evaluation and determination of the need for salinity reduction, and requires groundwater monitoring to quantify any water quality impacts. Following completion of the work required by the time schedule contained in the Provisions, this Order will be reopened, if necessary, to reconsider effluent limitations and other requirements to comply with Resolution 68-16. Based on the existing record, the discharge is consistent with the antidegradation provisions of Resolution 68-16.

### **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>Capacity</u>
Average daily flow	0.332 mgd
Average daily dry weather flow <sup>1</sup>	0.224 mgd
<u>Peak wet weather flow</u>	1.50 mgd

<sup>1</sup> June through September, inclusive.

However, the model shows that I/I is critical to the WWTF's effluent disposal capacity. Therefore, it is appropriate to require that the Discharger continue its I/I reduction efforts, including requiring property owners to correct I/I associated with property laterals not owned by the Discharger.

The effluent limits for BOD of 30 mg/L monthly average and 90 mg/L daily maximum are based on reasonable expectations of performance of the secondary treatment system.

As noted above, the EC of the treated effluent is not currently within the generally accepted range of 500 umhos/cm over the EC of the water supply. This Order imposes an effluent limit of 1,950 umhos/cm as an annual average, 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.

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The Provisions require submittal of certain technical reports to verify completion of the improvements project and compliance with requirements to install monitoring wells, evaluate groundwater quality, 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:9/24/09