

## INFORMATION SHEET

INFORMATION SHEET – ORDER NO. R5-2010-\_\_\_\_  
CITY OF REEDLEY  
WASTEWATER TREATMENT FACILITY  
FRESNO COUNTY

### **Background**

Waste Discharge Requirements (WDRs) Order No. 5-01-257, adopted by the Central Valley Water Board on 7 December 2001, for the City of Reedley (City or Discharger), regulates the City's wastewater treatment facility (WWTF) located in sections 33 and 34, Township 15 South, Range 23 East, MDB&M, in Fresno County.

WDRs Order No. 5-01-257 authorizes a discharge of 3.5 million gallons per day (mgd) of wastewater to percolation ponds (Ponds 1 through 7) with a surface area of approximately 39 acres. The Order, as National Pollutant Discharge Elimination System (NPDES) Permit No. CA0081230, also authorizes a monthly average discharge flow of 1.75 mgd of wastewater to the Kings River.

On 17 October 2003, the Central Valley Water Board adopted Special Order No. R5-2003-0156 amending Order No. 5-01-257 and delaying the compliance dates for Provisions J.13 and J.14 of the Order.

Provision J.13 of Order No. 5-01-257 requires the Discharger to submit, by the schedule approved by the Executive Officer pursuant to Provision J.12, but no later than 15 December 2004, the written comprehensive technical evaluation and written recommendations for WWTF modifications (i.e., component upgrade, retrofit, and disposal method).

Provision J.14 of Order No. 5-01-257 requires the Discharger to submit, by 15 December 2004, a technical report that proposes specific numeric groundwater limitations that reflect full implementation of Best Practicable Treatment or Control (BPTC) practices, and specific supporting data, for Regional Water Board consideration.

Provision J.12 of Order No. 5-01-257 required the Discharger to submit a written Work Plan that sets forth a schedule for a systematic and comprehensive technical evaluation of each major component of the WWTF's waste treatment and disposal systems. The Work Plan was submitted by the Discharger and approved by the Executive Officer on 1 July 2003.

Given the approval date of 1 July 2003, and tasks involved in the Work Plan, the deadline of 15 December 2004 for Provisions J.13 and J.14 in Order No. 5-01-257 was no longer reasonable. Therefore, the due date of 15 December 2004 in Order No. 5-01-257 was extended to 1 March 2006 and 1 February 2006 for Provisions J.13 and J.14, respectively, with the adoption of Order No. R5-2003-0156.

In September 2006, Carollo Engineers submitted a Final Wastewater Treatment Plant Master Plan (Master Plan) with details for a proposed WWTF expansion in compliance with Provision J.13 of Order No. 5-01-257. In May 2007, a *Short List of Constituents of Concern for Best Practicable Treatment and Control* was submitted in compliance with Provision J.14 of Order No. 5-01-257. Central Valley Water Board staff has reviewed the Master Plan and the BPTC report; both reports appeared to be complete.

Since July 1998, the City has not discharged to the Kings River. At the City's request the Central Valley Water Board adopted Special Order No. R5-2006-0105 on 22 September 2006 to rescind the NPDES Permit No. CA0081230 portion of the Order.

On September 2007, the City submitted a Report of Waste Discharge (RWD) for a proposed expansion from 3.5 mgd to 5.0 mgd and discharge of its wastewater to land only.

The 2007 RWD water balance concludes the 36 acres of percolation ponds available at the time provided enough storage/disposal capacity for a discharge flow of 4.69 mgd. The City reconfigured its ponds and submitted a revised water balance in April 2009 showing that the capacity of its now existing 37.46 acres of ponds is 5.0 mgd. The revised water balance does not account for instances when percolation ponds are out of service for maintenance or, as discussed in more detail below, when Ponds 4 and 5 are out of service due to high river flows. The disposal capacity of the WWTF may be somewhat lower than 5.0 mgd so the Order limits the discharge flow to 4.69 mgd and includes a provision requiring the Discharger to demonstrate the WWTF has sufficient treatment, storage, and disposal capacity before the discharge flow limit can be increased to 5.0 mgd.

The construction of the expanded WWTF was completed in November 2009. The expanded WWTF includes a headworks, two oxidation ditches, one anoxic basin, four secondary clarifiers, three return sludge holding tanks, and three centrifuges.

Undisinfected secondary effluent is discharged to six percolation ponds (Ponds 1 through 5, and 7) with a surface area of approximately 36 acres. The new oxidation ditch was constructed on the location where Pond six was located.

### **Solids Management and Disposal**

Historically sludge handling practices included discharging sludge to unlined sludge drying beds; a practice that was conducted for over twenty years and has impacted shallow groundwater. In 1996, the City changed its sludge handling practices by installing two centrifuge units and hauling its biosolids off-site.

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In late 1997, the City excavated and then spread high nitrogen soils over the area where the sludge storage area and sludge drying beds were. In March 1998, the City planted the area with Eucalyptus trees in an effort to phytoremediate site soils and groundwater.

Currently, one older centrifuge unit is in use, along with two new centrifuge units that were installed as part of the WWTF expansion. Sludge generated at the WWTF will continue to be hauled off-site and discharged to McCarthy Family Farms Inc., near Corcoran, California, for composting under appropriate WDRs.

The WWTF has approximately 1.5 acres of asphalt lined sludge drying beds that are only used in case of emergency.

### **Groundwater Conditions**

According to information in *Lines of Equal Elevation in Well in Unconfined Aquifer*, published by the Department of Water Resources in Spring 2004 regional groundwater flow southwesterly and is found at approximately 70 feet below ground surface (bgs).

A Water-Level Elevation and Direction of Groundwater Flow Map included in the September 2007 RWD indicates that groundwater flows in a northwest direction based on groundwater monitoring data from the 2007 third quarter groundwater monitoring report. Groundwater flow maps from the 2005 fourth quarter and the 1999 first quarter groundwater monitoring reports show water flowing to the southeast towards the Kings River.

Mounding and seasonal fluctuations in the groundwater table depicted by groundwater flow maps in the September 2007 RWD make it clear that groundwater flow direction varies.

Groundwater elevation data and staff observations made during inspections indicate that high Kings River flows during the irrigation season (generally April through September) can result in groundwater mounding that eliminates the separation between the invert of Ponds 4 and 5 and groundwater. This may reduce the effectiveness of pathogen removal as effluent migrates through the soil to groundwater. It is appropriate to limit the use of Ponds 4 and 5 to the non-irrigation season and to times when the separation of the Ponds' inverts and underlying groundwater is less than five feet. This Order includes a Discharge Specification that limits the use of Ponds 4 and 5 to times when the separation is more than five feet to ensure adequate pathogen removal.

The WWTF has 14 groundwater monitoring wells (MW-1 to MW-6, MW-14 to MW-16, MW-18 to MW-22). The quality of groundwater in the vicinity of the percolation ponds is depicted by groundwater monitoring wells MW-4, MW-5, MW-6, and MW-16. Based on groundwater monitoring data from February 1997 through 2010, the average EC (in  $\mu\text{mhos/cm}$ ), nitrate (as  $\text{NO}_3$ , in mg/L) and chloride (in mg/L) concentrations for these monitoring wells is as follows MW-4 (658, 26, 62), MW-5 (691, 25, 55), MW-6 (649, 24, 61), and MW-16 (645, 28, 57), respectively.

EC in MW-4 fluctuated with a slight downward trend. EC in MW-5 is fairly stable through out the years until 2008 when EC decreased. EC in MW-6 and MW-16 is stable with no increase or decrease. EC in monitoring wells MW-4, MW-5, MW-6, and MW-16 are all below 1,000  $\mu\text{mhos/cm}$ .

Nitrate (as  $\text{NO}_3$ ) concentrations for MW-4, MW-5, and MW-6 fluctuate with no apparent pattern. Nitrate (as  $\text{NO}_3$ ) concentrations are below the MCL of 45 mg/L. Nitrate (as  $\text{NO}_3$ ) concentrations in MW-16 fluctuate generally above the MCL of 45 mg/L.

Chloride in MW-4, MW-5, MW-6, and MW-16 are stable with no increase or decrease in concentration.

The Discharger submitted a technical report, *Groundwater Assessment Wastewater Treatment Facility* (GWA) in August 2001. The GWA report evaluated existing groundwater

data and identified monitoring wells MW-4, MW-5, MW-6, and MW-16 as being effluent dominated since their location is adjacent to the percolation ponds. The GWA report further stated that wells MW-1, MW-2, MW-3, and MW-21 are impacted from the historical use of unlined sludge drying beds and that the northern extent of nitrate pollution had not been defined.

Based on groundwater monitoring data from February 1997 through March 2010, the average EC (in  $\mu\text{mhos/cm}$ ), nitrate (as  $\text{NO}_3$ , in mg/L) and chloride (in mg/L) concentrations for monitoring wells in the vicinity of the abandoned sludge drying beds (MW-1, MW-2, MW-3, MW-15, MW-21, and MW-22) are as follows, MW-1 (1047, 92, 83), MW-2 (729, 86, 58), MW-3 (966, 134, 51), MW-15 (807, 44, 70), MW-21 (1045, 74, 62), and MW-22 (796, 49, 76), respectively.

EC in MW-1 fluctuated, and then decreased slowly from December 2008 through May 2010. EC in MW-2 and MW-15 has gradually been decreasing. EC in MW-3 has generally not changed over a 13-year period. EC in MW-21 also fluctuated, and then decreased from 2007 through 2009. EC in MW-22 has been increasing since 2001.

Nitrate (as  $\text{NO}_3$ ) concentrations for MW-1, MW-2, MW-3, MW-21, and MW-22 continue to exceed the nitrate (as  $\text{NO}_3$ ) MCL of 45 mg/L. MW-15 has had nitrate (as  $\text{NO}_3$ ) concentrations below the MCL since 2004.

Chloride concentrations in MW-1 fluctuated and in MW-2 the concentrations have been stable since 1997. Chloride concentrations in MW-3 and MW-15 have slightly decreased in mid-2004 and have been stable since then. Chloride concentrations in MW-21 fluctuated but show an overall decreasing trend and in MW-22 concentrations have increased.

Impacted soils that were spread over the abandoned sludge drying beds have been tested for nitrate (as N) concentrations twice yearly since 2002 (Sites 1 through 6) and at three depth intervals (4, 6, and 8 ft bgs). The ranges in nitrate (as N), TKN, and TN for these Sites are as follows:

	Nitrate (as N in mg/kg)	TKN (in mg/kg)	TN (in mg/kg)
Site 1 at 4ft	1-4	52-1400	52-1400
Site 1 at 6ft	1-3	88-500	88-500
Site 1 at 8ft	1-4	45-400	47-400
Site 2 at 4ft	6-130	58-1400	129-1400
Site 2 at 6ft	1-75	52-550	57-625
Site 2 at 8ft	1-61	22-300	59-307
Site 3 at 4ft	2-56	140-1100	162-1156
Site 3 at 6ft	1-11	10-500	10-511
Site 3 at 8ft	2-38	75-400	75-409
Site 4 at 4ft	3-59	99-1000	111-1006
Site 4 at 6ft	3-103	60-1400	89-1503
Site 4 at 8ft	1-38	98-900	111-938

	Nitrate (as N in mg/kg)	TKN (in mg/kg)	TN (in mg/kg)
Site 5 at 4ft	2-84	160-1400	169-1484
Site 5 at 6ft	1-15	56-400	64-401
Site 5 at 8ft	1-12	43-500	46-501
Site 6 at 4ft	5-63	100-1200	110-1207
Site 6 at 6ft	1-93	100-1300	142-1301
Site 6 at 8ft	4-92	140-2200	200-2228

The City needs to evaluate the effectiveness of its phytoremediation project and groundwater cleanup strategy. A provision requiring the submittal of a technical report is included in this Order.

The City gets its source water from a network of six water supply wells. Based on the 2008 SMRs, the flow-weighted average for source water EC was reported as 221 µmhos/cm.

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

The *Water Quality Control Plan for the Tulare Lake Basin, Second Edition, revised January 2004* (hereafter Basin Plan) designates beneficial uses, establishes narrative and numerical water quality objectives, contains implementation plans and policies for protecting all water of the Basin, and incorporates, by reference, plans and policies of the State Water Board. Pursuant to section 12363(a) of the California Water Code (CWC), these requirements implement the Basin Plan.

The Basin Plan specifies that municipal and domestic wastewater dischargers will be required to reclaim and reuse wastewater whenever reclamation is feasible.

The Basin Plan identifies the greatest long-term water quality problem facing the entire Tulare Lake Basin is increasing salinity in groundwater, a process accelerated due to the intensive use of soil and water resources by irrigated agriculture. The Basin Plan recognizes that degradation is unavoidable until there is a long-term solution to the salt imbalance. Until then, the Basin Plan establishes several salt management requirements, including:

- a. The incremental increase in salts from use and treatment must be controlled to the extent possible. The maximum EC of effluent discharged to land shall not exceed the EC of the source water plus 500 µmhos/cm. When the source water is from more than one source, the EC shall be a weighted average of all sources.
- b. Discharges to areas that may recharge to good quality groundwater shall not exceed an EC of 1,000 µmhos/cm, a chloride content of 175 mg/L, and boron content of 1.0 mg/L. WWTF monitoring data indicates effluent levels are significantly below these limits, thus this Order does not include numerical effluent limits for these constituents. This Order does require monitoring for these constituents.

The Basin Plan requires municipal WWTFs that discharge to land to comply with treatment performance standards for BOD and TSS. WWTFs that preclude public access and are

greater than 1 mgd must provide removal of 80 percent or reduction to 40 mg/L, whichever is more restrictive, for both BOD and TSS.

### **Antidegradation**

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

- a. The degradation is consistent with the maximum benefits to the people of the State;
- b. The degradation will not unreasonable affect present and anticipated future beneficial uses;
- c. 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
- d. The Discharger employs BPTC to minimize degradation.

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, 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 impacts 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.

Constituents of concern in the discharge that have the potential to degrade groundwater include salts and nutrients. This Order establishes terms and conditions of discharge to ensure that the discharge does not unreasonably affect present and anticipated uses of groundwater.

The Order includes Basin Plan effluent limits for EC that represent BPTC with respect to salinity. It also contains groundwater limitations that apply water quality objectives established in the Basin Plan to protect beneficial uses. With respect to EC, the quality of the discharge is better than the most sensitive water quality objective for EC.

The WWTF provides nitrogen removal and the Order includes limits that require the effluent total nitrogen to be 10 mg/L or less. Nitrate (as N) represents only a portion of the total nitrogen in effluent. Other nitrogen species can include organic nitrogen, ammonia, and nitrite. Additional nitrogen losses will occur in the ponds and during the migration of effluent through the soil profile to groundwater. The total nitrogen limit of 10 mg/L will ensure that the nitrate (as N) concentration of this percolate will be less than the MCL of 10 mg/L. Groundwater Limitations in the Order also proscribe the discharge from causing the groundwater nitrate (as N) concentration from exceeding the MCL. Therefore, any

degradation that may result from the discharge will not exceed water quality objectives or impair beneficial uses.

### **Treatment Technology and Control**

The expanded WWTF provides treatment and control of the discharge that incorporates:

- a. Secondary treatment of wastewater;
- b. Wastewater treatment for nitrogen removal;
- c. Mechanical sludge dewatering;
- d. Sludge hauled off-site;
- e. Pretreatment permits for significant industrial users;
- f. An operation and maintenance manual;
- g. Certified operators to ensure proper operation and maintenance; and
- h. Source water, discharge, and groundwater monitoring.

Implementation of the above treatment, operation, maintenance, and monitoring measures, as required by this Order, represents the implementation of BPTC of the discharge.

Given the above, the discharge meets the requirements of Resolution 68-16.

### **CEQA**

The City of Reedley adopted an Environmental Impact Report (EIR) (SCH # 2006021132) in accordance with the California Environmental Quality Act (CEQA) and filed a Notice of Determination on 24 May 2007 for an increase in capacity from 3.0 mgd to 5.0 mgd for Phase I and then up to 7.0 mgd for Phase II.

Central Valley Water Board staff reviewed the Final EIR and concurs with the conclusion that the project would be an improvement over the existing discharge and that the discharge would not have a significant impact on water quality, particularly because the effluent quality will improve. This Order includes effluent limits for BOD, TSS, EC and nitrogen. Compliance with these will mitigate any significant impacts to water quality.

### **Title 27**

CWC section 13173 defines designated waste as either:

- a. Hazardous waste that has been granted a variance from hazardous waste management requirements pursuant to section 25143 of the Health and Safety Code.
- b. Non-hazardous waste that consists of, or contains, pollutants that, under ambient environmental conditions at a waste management unit, could be released in concentrations exceeding applicable water quality objectives or could reasonably be expected to affect beneficial uses of the water of the State contained in the appropriate water quality control plan.

Pursuant to section 20090(a) of Title 27 California Code of Regulations, the discharge of domestic sewage or treated effluent associated with municipal wastewater treatment plants is

exempt from Title 27, provided any resulting degradation of groundwater is in accordance with the Basin Plan and the waste need not be managed as a hazardous waste.

None of the wastes regulated by the proposed Order are hazardous wastes or required to be treated as hazardous wastes. As described under the Antidegradation Analysis section above, the authorized discharge of treated wastewater to land will not cause exceedances of Basin Plan requirements or applicable water quality objectives, and are thus exempt from Title 27 pursuant to section 20090(a).

Historically, sludge handling practices included discharging sludge to unlined sludge drying beds. Sludge drying and storage practices impacted shallow groundwater at the north end of the WWTF with salts and nitrates. The Discharger discontinued these practices and is continuing a project to assess and remediate the groundwater plume. Additional assessment of remediation options is necessary to optimize the management of groundwater degradation caused by historic sludge handling practices.

The Discharger now mechanically dewater its sludge and hauls it off-site to McCarthy Family Farm Inc. for composting under appropriate WDRs. Sludge is only stored onsite for short periods in a lined drying bed during emergencies. Short term storage in a lined drying bed is not expected to result in discharges causing exceedances of water quality objectives.

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

#### **Discharge Prohibitions, Specifications and Provisions**

The proposed Order prohibits discharge to surface waters and surface water drainage courses.

The proposed Order sets a monthly average daily flow limit of 4.69 mgd. The Discharger must submit an engineering report showing the WWTF has sufficient treatment, storage and disposal capacity to comply with a monthly average discharge flow limit of 5.0 mgd before discharge above 4.69 mgd will be authorized.

The Order includes effluent limits for BOD<sub>5</sub> and TSS of 40 mg/L as monthly average and 80 mg/L as daily maximum. These limitations are based on Basin Plan minimum performance standards for municipal facilities.

The proposed Order's provisions regarding percolation pond dissolved oxygen and freeboard are consistent with Central Valley Water Board policy for the prevention of nuisance conditions, and are applied to all such facilities.

The proposed Order prescribes groundwater limitations that implement water quality objectives for groundwater from the Basin Plan.

The proposed Order includes provisions that require the Discharger to conduct a salinity evaluation and submit a salinity minimization plan. A provision requiring the Discharger to evaluate the effectiveness of the phytoremediation project in remediating impacted

groundwater. The Order would also require the Discharger to periodically evaluate wastewater recycling options.

### **Monitoring Requirements**

The proposed Order includes influent and effluent monitoring requirements, percolation pond monitoring, source water monitoring, sludge monitoring, and groundwater monitoring. This monitoring is necessary to characterize the discharge, evaluate compliance with effluent limitations prescribed by the Order, and evaluate groundwater quality and the extent of the degradation caused by the discharge.

### **Reopener**

The conditions of discharge in the proposed Order were developed based on currently available technical information and applicable water quality laws, regulations, policies, and plans, and are intended to assure conformance with them. It may be appropriate to reopen the Order if applicable laws and regulations change.

DMS/wdh: 11/4/2010