STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

ORDER WQ 2010-0001

In the Matter of Own Motion Review of

WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2008-0162 [NPDES NO. CA 0084727] FOR THE TUOLUMNE UTILITIES DISTRICT, SONORA REGIONAL WASTEWATER TREATMENT PLANT, AND JAMESTOWN SANITARY DISTRICT JAMESTOWN WASTEWATER TREATMENT PLANT, TUOLUMNE COUNTY

Issued by the
California Regional Water Quality Control Board,
Central Valley Region

SWRCB/OCC FILE A-1967

BY THE BOARD:

Under the applicable regulations, the State Water Resources Control Board (State Water Board) ordinarily must take final action on petitions that challenge a regional board's action or failure to act within 270 days of the date that the petition is complete.[1] The last date for action on petitions may be extended for up to 60 days by written agreement with the petitioner.[2] On November 23, 2008, California Sportfishing Protection Alliance (CALSPA) filed a timely petition requesting the State Water Board to review and vacate Waste Discharge Requirements Order No. R5-2008-0162 (NPDES No. CA0084727] (the 2008 Permit). The time for formal disposition of the petition was October 2, 2009. CALSPA agreed to a 60-day extension of time. However, the State Water Board is not taking final action on the issues raised in the petition until January 5, 2010. Accordingly, the State Water Board is reviewing the 2008 Permit on its own motion.[3]

In this Order, the State Water Board remands the 2008 Permit, which the Central Valley Regional Water Quality Control Board (Central Valley Water Board) adopted on October 24, 2008. The 2008 Permit regulates seasonal surface water discharges from wastewater treatment plants owned and operated by the Tuolumne Utilities District (TUD) and

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[1] Cal. Code Regs., tit. 23, § 2050.5.

[2] *Ibid.*

[3] Wat. Code, § 13320, subd. (a).

the Jamestown Sanitary District (JSD). It is a renewal of previous WDRs that the Central Valley Water Board issued on March 15, 2001, Order No. R5-01-043 (the 2001 Permit). This Order addresses a single issue raised in the petition: whether the effluent limitations for the discharge of chlorine residual are less stringent in the 2008 Permit than in the 2001 Permit.[4] Based upon the record before the Central Valley Water Board and a technical review conducted by the Division of Water Quality (DWQ), we conclude that the 2008 Permit should be remanded to the Central Valley Water Board for reconsideration and revisions consistent with this Order.

I. BACKGROUND

The TUD owns and operates the Sonora Regional Wastewater Treatment Plant (SRWTP) and associated wastewater collection and disposal system, which provides sewer services to approximately 25,000 people. The SRWTP has a design capacity of 2.6 million gallons per day and produces secondary treated and disinfected effluent that is discharged to Quartz Reservoir, a 1,200 acre-foot constructed storage lagoon.[5] The JSD owns and operates the JSD Wastewater Treatment Plant (JWTP), which provides sewer services to approximately 3,000 people. JWTP has a design capacity of 0.2 million gallons per day and JSD has contracted with TUD to discharge its secondary treated and disinfected effluent to Quartz Reservoir.

Both TUD and JSD use chlorine to disinfect their effluent. Most wastewater treatment plants dechlorinate the chlorinated wastewater, a process that removes any remaining free or total combined chlorine residual. Neither of these plants, however, dechlorinates its disinfected effluent. Instead, the chlorine is expected to dissipate naturally or be consumed as it further oxidizes while the wastewater is stored in Quartz Reservoir. From May 16 through November 30 of each year, stored wastewater is used for irrigation of agricultural lands.[6] When storage capacity is inadequate to handle inflows, wastewater is released from the reservoir and discharged into Woods Creek, a water of the United States.

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[4] To the extent CALSPA raised issues not discussed in this Order, such issues are hereby dismissed as not substantial or appropriate for review by the State Water Board. (See *People v. Barry* (1987) 194 Cal.App.3d 158, 175-177, *Johnson v. State Water Resources Control Bd.* (2004) 123 Cal.App.4th 1107, Cal. Code Regs., tit. 23, § 2052, subd. (a)(1).)

[5] The Central Valley Water Board concluded that Quartz Reservoir is not a water of the United States. The Central Valley Water Board explains that Quartz Reservoir "is a constructed effluent storage lagoon, not a drinking water reservoir or an impoundment of a natural waterbody." (Central Valley Water Board Response to Petition, Feb. 9, 2009, at p. 2 n. 1; see also 40 C.F.R. § 122.2 ["Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA . . . are not waters of the United States."].)

[6] The discharges to agricultural lands and reclamation system are regulated under separate WDRs, Central Valley Water Board Order Nos. R5-94-192 and R5-2002-0202, respectively.

The 2008 Permit authorizes wet weather discharges into Woods Creek from December 1 through May 15, when flows in Woods Creek provide at least a 20:1 dilution ratio. Beneficial uses of Woods Creek downstream of the discharge point include commercial and sport fishing, aquaculture, warm freshwater habitat, cold freshwater habitat, and wildlife habitat.

The 2001 Permit contained one-hour and four-day average effluent limitations for chlorine residual of 0.019 mg/L and 0.011 mg/L, respectively. These effluent limitations were identical to the U.S. EPA's National Recommended Ambient Water Quality Criteria for protection of freshwater aquatic life,[7] and they implemented the narrative toxicity objective in the Basin Plan. The 2008 Permit replaces the one-hour and four-day average criteria with the following limitations: a 0.02 mg/L maximum daily effluent limitation (MDEL) and a 0.01 mg/L average monthly effluent limitation (AMEL).[8] To justify the change in effluent limitations, the Central Valley Water Board states that the effluent is stored in a 1,200 acre-foot reservoir for a minimum of four months, and any residual chlorine is therefore likely to dissipate or be consumed as it further oxidizes before the effluent is discharged into Woods Creek.[9] It explains that because it is so unlikely for the discharge to contain chlorine residual, TUD and JSD will no longer be required to conduct continuous monitoring. It avers, "continuous monitoring is not appropriate for this discharge, because *the threat of a chlorine release has not been shown based on monitoring data in the record, and, therefore, the threat of such a discharge is negligible.*"[10]

Upon review of the administrative record, however, DWQ noticed that discharge monitoring reports revealed actual discharges of chlorine residual into Woods Creek from 2004 through 2007. In January 2004, for example, there were sixteen consecutive days during which chlorine residual was discharged at concentrations ranging from 0.010 mg/L to 0.030 mg/L. For the entire month of March 2004, there were discharges of chlorine residual ranging from 0.010 mg/L, to as high as 0.05 mg/L. From 2005 through 2007, the monitoring results reported

[7] See http://www.epa.gov/waterscience/criteria/wqctable (last visited November 2, 2009).

[8] A maximum daily effluent limitation is the highest allowable daily discharge of a pollutant, over a calendar day (or 24-hour period). An average monthly effluent limitation is the highest allowable average of daily discharges over a calendar month.

[9] Central Valley Water Board Response to Petition, Feb. 9, 2009, p.14.

[10] *Ibid*. (emphasis added). The Permit's Fact Sheet also notes that chlorine has never been detected in the effluent. (See Order No. R5-2008-0162, pp. F21-22.)

consistent detections of chlorine residual at concentrations greater than zero mg/L. Based upon data available in the record, it appeared that chlorine does not completely dissipate or become fully consumed through oxidation while the effluent is stored in the Quartz Reservoir.

On September 15, 2009, CALSPA, the Central Valley Water Board, and representatives from TUD appeared at a State Water Board workshop to discuss CALSPA's petition and the effluent limitations for chlorine residual. At the workshop, the Central Valley Water Board and TUD requested to supplement the administrative record with three letters written in 2004 on behalf of TUD and addressed to the Central Valley Water Board.[11] TUD and the Central Valley Water maintain that the three letters explain why, from January through March 2004, detections of chlorine residual in amounts that exceeded the effluent limitation were not considered in adopting the effluent limitations. The letters articulate that (1) there were personnel problems in using a spectrophotometer and colorimeter; and (2) the presence of manganese in the effluent gave false positive test results for chlorine residual. In addition, the letters mention that an outside laboratory confirmed that the presence of manganese interfered with the test results.

Because the letters raised various questions about whether the 2008 Permit's chlorine residual effluent limitations were protective of aquatic life, we requested that TUD and the Central Valley Water Board provide additional evidence to justify that there were no actual discharges of chlorine residual. We sent a letter on September 23, 2009 requesting, among other things, the laboratory results for manganese and chlorine, chain of custody sheets, in-house sampling results for manganese, the procedures used to eliminate the interference of manganese, and various physical and operational descriptions of the facility. Both TUD and the Central Valley Water Board submitted their available information by October 14, 2009.[12]

II. ISSUE AND FINDINGS

Issue: The 2008 Permit contains effluent limitations for chlorine residual that are less stringent than the 2001 Permit, in violation of the anti-backsliding requirements of the Clean Water Act.

Findings: We conclude that Order No. R5-2008-0162 must be remanded to the Central Valley Water Board. New sampling data needs to be collected to justify manganese interference and, consequently, to justify whether the 2008 Permit's effluent limitations for

[11] The three letters were not before the Central Valley Water Board at the time it adopted the 2008 Permit.

[12] The three letters as well as the additional information submitted by October 14, 2009, are admitted into the State Water Board's record.

chlorine residual were correctly calculated. In the interim, the effluent limitations for chlorine residual in the 2001 Permit shall be restored. We will address these issues below.

A. Anti-backsliding

The Clean Water Act prevents a permitting agency from relaxing water quality-based effluent limitations in renewed or reissued NPDES permits, except under very limited circumstances. This federal rule is known as anti-backsliding and is set forth in Clean Water Act section 402(o)(1): "[A] permit may not be renewed, reissued, or modified to contain effluent limits which are less stringent than the comparable effluent limitations in the previous permit . . . ."[13] Section 402(o)(2) provides the following exceptions to anti-backsliding:

> A. Material and substantial alterations or additions to the permitted facility occurred after permit issuance which justify the application of a less stringent effluent limitation;
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> B. Information is available which was not available at the time of permit issuance . . . and which would have justified the application of a less stringent effluent limitation at the time of permit issuance . . . .;
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> C. A less stringent effluent limitation is necessary because of events over which the permittee has no control and for which there is no reasonably available remedy; . . . or
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> D. The permittee has installed the treatment facilities required to meet the effluent limitations in the previous permit and has properly operated and maintained the facilities but has nevertheless been unable to achieve the previous effluent limitations . . . .[14]

Even if one of the exceptions does apply, however, backsliding of an effluent limitation is still prohibited if the less stringent effluent limitation either (1) violates applicable effluent limitation guidelines, or (2) violates water quality standards.[15]

B. The 2008 Permit

CALSPA contends that the 0.02 mg/L MDEL and 0.01 mg/L AMEL are less stringent than the 2001 Permit's one-hour and four-day average limitations.[16] The Central

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[13] 33 U.S.C. § 1342(o)(1).

[14] *Id*., § 1342(o)(2). The federal rule also allows relaxation of water quality-based limitations if the requirements of Clean Water Act section 303(d)(4) are met. This section establishes different criteria for relaxation, depending on whether the receiving waters are in attainment with the applicable water quality standards. (*Id*., § 1313(d)(4).)

[15] 33 U.S.C. § 1342(o)(3).

[16] Petition, p. 24.

Valley Water Board responds that the change in chlorine residual effluent limits and averaging periods does not constitute backsliding.[17] It states that it followed the U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (TSD) procedures to convert the National Recommended Ambient Water Quality Criteria for chlorine of 0.019 mg/L one-hour average and 0.011 mg/L four-day average (the 2001 Permit limitations) into 0.02 mg/L as an MDEL and 0.01 mg/L as an AMEL.[18] However, State Water Board staff in DWQ employed the same TSD procedures, using daily monitoring results from April 2003 through March 2007, and calculated more stringent limitations. DWQ determined that the correct conversion of the U.S. EPA's recommended criteria is 0.019 mg/L MDEL and 0.0057 mg/L AMEL, which is more stringent than 0.02 mg/L MDEL and 0.01 mg/L AMEL.[19] At the September 15 workshop, we learned that the Central Valley Water Board did not include the documented exceedances of chlorine residual from January through March 2004 when it calculated the effluent limitations for the 2008 Permit. Had the Central Valley Water Board included this data, the effluent limitations would likely be more stringent than what is set forth in the 2008 Permit.

TUD and the Central Valley Water Board maintain that the board appropriately disregarded the documented exceedances of chlorine residual effluent limitations based on the three letters from early 2004. We are not sure when, the Central Valley Water Board received TUD's letters that claim that these exceedances were false positives due to interferences by manganese, but the letters were not before the Central Valley Water Board at the time it issued the 2008 Permit. On that basis alone, the letters would not provide appropriate grounds for excluding the monitoring data from the reasonable potential analysis. We are also concerned that the regional board staff appears to have relied upon TUD's conclusory letters without receiving underlying documentation.[20] Pursuant to the Porter-Cologne Water Quality Control Act, an exceedance of an effluent limitation is a serious violation and a regional water board has

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[17] Central Valley Water Board Response to Petition, Feb. 9, 2009, p.14.

[18] Order No. R5-2008-0162, pp. F37-38.

[19] The Central Valley Water Board does not explain how it arrived at its calculations, in either the fact sheet or elsewhere in the record.

[20] In its response to our September 23 request for information, the Central Valley Water Board stated that "[t]he files for [TUD] are incomplete for a large period of time, including around 2003-2006. We are currently investigating the reason for the incomplete record. We have recreated some of the files by requesting the TUD resubmit information. . . . We believe TUD submitted [sampling results for manganese from December 2003 through December 2005] as required by their permit, and therefore the original documents were at one time contained in the case files for this facility. We are investigating why these key original documents were absent from the files. *We are not certain the documents were in the files at the time Order No. R5-2008-0162 was adopted by the Central Valley Water Board*." (Central Valley Water Board Response to State Water Board request, Oct. 12, 2009, pp.1-2 (emphasis added.).)

the nondiscretionary duty to asses a mandatory minimum penalty of $3,000 for each serious violation.[21] Exceedances of an effluent limitation that are subject to mandatory minimum penalties should put both the discharger and the Central Valley Water Board on high alert. It is also well documented that chlorine is toxic to aquatic life, even at low concentrations. Fish can be killed if exposed (for one hour) to as little as 0.019 mg/L of chlorine;[22] brown trout experience total mortality if exposed to 0.04 mg/L of chlorine residual for two minutes;[23] and fifty percent of rainbow trout will die within ninety-six hours at residual chlorine concentrations of 0.014 to 0.029 mg/L.[24] It appears that only cursory attention was given to monitoring data showing actual discharges of chlorine into Woods Creek, and a decision was made, without adequate basis, to exclude that data from its calculations.

Based upon our review of the additional documentation submitted, the issue remains whether the Central Valley Water Board properly calculated the effluent limitations for chlorine residual without including monitoring data from 2004. Otherwise stated, is it true that the documented exceedances of chlorine residual were simply interferences by manganese? We find that neither TUD nor the Central Valley Water Board provided enough data or documentation to justify concluding that the results for chlorine exceedances were false positives. For example, TUD did not provide evidence that it followed procedures used to remove oxidized manganese from a sample in order to test for interference,[25] nor could it locate the chain of custody sheets or laboratory reports to prove that chlorine residual was absent in

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[21] Wat. Code, §§ 13385, subds. (h)(1), (h)(2)(A).

[22] See U.S. EPA, Ambient Water Quality Criteria for Chlorine, 1984, pp. 17-18, *available at* http://www.epa.gov/waterscience/criteria/library/ambientwqc/chlorine1984.pdf; see also State Water Board Order WQ 75-6 (*Department of Fish and Game*), p. 3 (finding that chlorine residual of 0.5 mg/L is harmful to aquatic life).

[23] William A. Brungs, *Effects of Residual Chlorine on Aquatic Life* (1973) 45 J. Wat. Pollution Control Federation 2180, 2183 Table II.

[24] *Ibid*. at 2184. Studies have also observed that after exposure to 0.01 mg/L over a seven-day period, fish species diversity can be reduced by fifty percent. (*Ibid.* at 2183 Table I.) Rainbow trout will even avoid concentrations as low as 0.001 mg/L. (*Ibid*. Table II.)

[25] These procedures are set forth by the Hach Company:

a. Adjust sample pH to 6-7.

b. Add 3 drops Potassium Iodide (30-g/L) (Cat. No. 343-32) to a 10-mL sample.

c. Mix and wait one minute.

d. Add 3 drops Sodium Arsenite (5-g/L) (Cat. No. 1047-32) and mix.

e. Analyze 10 mL of the treated sample as described in the procedure.

f. Subtract the result of this test from the original analysis result to obtain the correct chlorine concentration.

In essence, these procedures call for analyzing an original sample, then treating the sample and reanalyzing it, and then finding the difference between these two analyses to actually determine the true concentration of chlorine residual.

discharges in January, February, and March 2004. Chain of custody sheets and laboratory reports were provided for two samples taken in April 2004 and December 2005, but TUD does not show the results for every step of the test; the results only show the concentration of manganese present in the sample, which does not prove that manganese was a source of interference. In addition, an outside laboratory reportedly conducted a chlorine residual test and found "0" residual. TUD relies on this test result to claim that all of the chlorine exceedances in 2004 were erroneous. However, TUD did not provide any supporting documentation from this laboratory.

We are also concerned about the possibility that chlorine in Quartz Reservoir would not have a chance to completely dissipate or be consumed through oxidation before it reaches Woods Creek. It is a general principle that warm water floats and cold water sinks. During the winter when discharges to Woods Creek are permitted, the flow of effluent in Quartz Reservoir from intake to outtake has the potential to "short circuit," provided that TUD uses a surface-level gate in the outlet structure.[26] Because the stored effluent in Quartz Reservoir has had at least four months to cool, new effluent released into the reservoir is presumably much warmer. Therefore, the ongoing release of new, warmer effluent would float on top of the colder water as it travels approximately 800 feet[27] to the outlet gate. If the chlorine residual is not completely consumed through oxidation before it reaches the outlet, and if TUD uses a gate from the outlet structure that draws water from the surface of the reservoir, chlorine residual could very well be discharged into Woods Creek. In essence, if "short circuiting" were to occur in the reservoir, the reservoir's volume would not be available to increase the mean cell residence time and, therefore, not provide the necessary time needed for the chlorine residual to dissipate or oxidize.

III. CONCLUSIONS

Based on the above discussion, the Board concludes that:

1. Manganese is present in the effluent, but evidence in the record is insufficient to determine how much interference exists;

2. Evidence in the record is insufficient to determine how much chlorine residual is actually present in the effluent;

3. Evidence in the record is insufficient to determine whether the Central Valley Water Board properly calculated the effluent limitations for chlorine residual in the 2008 Permit;

[26] It is unknown which gate from the Quartz Reservoir outlet structure is used.

[27] DWQ measured the distance between the intake and outtakes using Google Earth software.

4. To eliminate the potential for short circuiting in Quartz Reservoir, a submerged outlet gate should be used when effluent is released to Woods Creek, because a submerged gate will draw cooler, more well-mixed water from Quartz Reservoir that has spent a sufficient time in the reservoir to have the chlorine levels reduced. Alternately, the release of new effluent into the reservoir could be done in such a way as to facilitate complete mixing and to eliminate the possibility that warm effluent will remain floating on top of the reservoir;

5. Order No. R5-2008-0162 must be revised to include the effluent limitations and monitoring requirements for chlorine residual that are contained in the 2001 Permit, Order No. R5-01-043, until there is sufficient evidence to support an alternative effluent limitation, and any subsequent effluent limitations must be developed consistent with anti-backsliding requirements and exceptions;

6. Order No. R5-2008-0162 must be revised to require new sampling data for chlorine residual using the effluent limitations and frequency of monitoring prescribed above in paragraph 5, where these samples must be collected for a period of one year;

7. Order No. R5-2008-0162 must be revised to require that, based on the data obtained above in paragraph 6, new Hach tests be performed to show interference by oxidized manganese, and that the test results must include all three results from the Hach test: the result showing the original analysis prior to treatment of the samples, the result showing the analysis of the treated samples, and then the difference between these two analyses to show the true chlorine residual concentration;

8. Order No. R5-2008-0162 must be revised to include a new reopener clause: This Order may be reopened for modification of the effluent limitations for chlorine residual if, after a period of one year, Hach test results demonstrate that there are no detections of chlorine residual in Woods Creek; and

9. Order No. R5-2008-0162 must be revised to require the development of operating requirements to eliminate the potential for short circuiting in Quartz Reservoir from December 1 through May 15 of each year.

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IV. ORDER

IT IS HEREBY ORDERED THAT, for the reasons discussed above, Order No. R5-2008-0162 is remanded to the Central Valley Water Board for reconsideration and revision, consistent with the conclusions of this order.

CERTIFICATION

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of the State Water Resources Control Board held on January 5, 2010.

AYE:	Chairman Charles R. Hoppin Vice Chair Frances Spivy-Weber Board Member Arthur G. Baggett, Jr. Board Member Walter G. Pettit
NAY:	None
ABSENT:	Board Member Tam M. Doduc
ABSTAIN:	None

Jeanine Townsend
Clerk to the Board