

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER R5-2014-0102

AMENDING WASTE DISCHARGE REQUIREMENTS
ORDER R5-2010-0114-02 (NPDES PERMIT NO. CA0077682)

SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT
SACRAMENTO REGIONAL WASTEWATER TREATMENT PLANT
SACRAMENTO COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Central Valley Water Board) finds that:

1. On 9 December 2010, the Central Valley Water Board adopted Waste Discharge Requirements Order R5-2010-0114, prescribing waste discharge requirements for the Sacramento Regional Wastewater Treatment Plant. For the purposes of this Order, the Sacramento Regional County Sanitation District is hereafter referred to as “Discharger” and the Sacramento Regional Wastewater Treatment Plant is hereafter referred to as “Facility.”
2. On 1 December 2011, the Central Valley Water Board adopted Order R5-2011-0083, amending Order R5-2010-0114 and Time Schedule Order R5-2010-0115 making changes to the Monitoring and Reporting Program, recycled water use, manganese effluent limitations, and interim effluent limitations for chlorpyrifos and diazinon.
3. On 4 October, 2013, the Central Valley Water Board adopted Order R5-2013-0124, amending Order R5-2010-0114 by: conforming ammonia and nitrate effluent limitations to State Water Resources Control Board (State Water Board) Order WQ 2012-0013; incorporating the effect of the stays of certain time deadlines and schedules issued by the Sacramento County Superior Court; modifying final effluent limitations for chlorodibromomethane and dichlorobromomethane; and removing effluent limitations and revising monitoring requirements for N-nitrosodimethylamine (NDMA).
4. On 8 August 2014, the Central Valley Water Board adopted Order R5-2014-0103, amending Order R5-2010-0114-02 by revising total coliform requirements to seasonal total coliform requirements.
5. The Facility’s treatment system consists of mechanical bar screens, aerated grit removal, primary sedimentation, pure oxygen activated sludge, secondary clarification, chlorine disinfection with dechlorination and a diffuser for river discharge. Solids handling consists of dissolved air flotation thickeners, gravity belt thickeners, anaerobic digesters and sludge stabilization basins with disposal on-site through land application or biosolids recycling facility. Wastewater is discharged to the Sacramento River at Freeport, a water of the United States.
6. Order R5-2010-0114-02 established new effluent limitations for ammonia and nitrate. The Discharger has identified biological nutrient removal (BNR) secondary treatment as the selected technology for nitrification and denitrification to comply with the new effluent limitations for ammonia and nitrate. The Discharger is on schedule to complete construction of the BNR facilities and comply with the final ammonia and nitrate effluent limits by 11 May 2021.

7. Order R5-2010-0114-02 includes a compliance schedule and interim maximum daily, average weekly, and average monthly effluent limitations for ammonia as shown in Table 1 below. The interim effluent limitations were calculated based on Facility performance and are effective until 11 May 2021.

Table 1 –Existing Interim Ammonia Limitations

Parameter	Units	Interim Effluent Limitations		
		Average Monthly	Average Weekly	Maximum Daily
Ammonia Nitrogen, Total (as N)	mg/L	33	35	45
	lbs/day	49,400	52,920	67,929

8. Pursuant to Water Code section 10608, the Governor has called for a 20 percent reduction in urban water use statewide by 2020 and urban water agencies are required to meet their urban water use target by 2020. In addition, pursuant to Water Code section 10608.16, subdivision (a), the State shall achieve a 20 percent reduction in urban per capita water use in California on or before December 31, 2020. Installation of water meters and calls for water conservation have resulted in decreasing influent wastewater flows to the Facility. With decreasing influent wastewater flows, influent ammonia concentrations have been observed to steadily increase. The current Facility is not designed to remove ammonia, so increased influent ammonia concentrations have resulted in increased effluent concentrations. The Discharger has implemented all feasible controls to limit the discharge of ammonia, but has recently experienced violations of the interim ammonia effluent limitations. Since the ammonia concentration increases are outside the control of the Discharger, this Order revises the interim ammonia limitations based on a recalculation that takes into account the effects of decreasing influent flow due to water conservation. Despite the increase in ammonia concentrations, the effluent ammonia loading rate (total pounds of ammonia per day) remains relatively the same as when the permit was adopted. Thus, the mass loading discharged to the Sacramento River will not increase as a result of modifying the interim limits to deal with the decreasing flow. Therefore, the corresponding interim mass limits for ammonia have not been increased.

Table 2 – Proposed Interim Ammonia Limitations

Parameter	Units	Interim Effluent Limitations		
		Average Monthly	Average Weekly	Maximum Daily
Ammonia Nitrogen, Total (as N)	mg/L	39	43	47
	lbs/day	49,400	52,920	67,929

9. To the extent that anti-backsliding requirements may be applicable to the relaxation of interim effluent limits, the Central Valley Water Board finds that an applicable exception to anti-backsliding is pursuant to Clean Water Act Section 402(o)(2)(B)(i). In pertinent part, this exception applies when information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance. Here,

the new information available to support revised interim ammonia effluent limits is due to new information described in Finding 8, above.

10. Order R5-2010-0114-02 may be reopened and modified in accordance with the Code of Federal Regulations (CFR) at 40 CFR section 122.62(a)(2).
11. Issuance of modifications to the NPDES Permit is exempt from the California Environmental Quality Control Act (Public Resources Code section 21000, et seq.) in accordance with Water Code section 13389.
12. The Central Valley Water Board has notified the Discharger and interested agencies and persons of its intent to amend Waste Discharge Requirements for this discharge and has provided them with an opportunity to submit their written views and recommendations.

IT IS HEREBY ORDERED THAT:

Waste Discharge Requirements Order R5-2010-0114-02 (NPDES No. CA0077682) is amended to revise the interim effluent limitations for ammonia as shown in underline/strikeout format in Attachment 1. The amendment shall become effective immediately.

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Resource Control Board (State Water Board) to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday (including mandatory furlough days), the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 8 August 2014.

Original Signed By Kenneth D. Landau for
PAMELA C. CREEDON, Executive Officer

2. Interim Effluent Limitations – Discharge Point No. 001

The Discharger shall maintain compliance with the following interim effluent limitations at Discharge Point No. 001, with compliance measured at Monitoring Location EFF-001 as described in the Monitoring and Reporting Program.

- a. Effective immediately and ending on 10 May 2021 for ammonia and 8 May 2023 for BOD₅ and TSS**, the Discharger shall maintain compliance with the interim effluent limitations specified in Table 7. These interim effluent limitations shall apply in lieu of the corresponding final effluent limitations specified for the same parameters during the time period indicated in this provision:

Table 7. Interim Effluent Limitations

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Conventional Pollutants						
Biochemical Oxygen Demand, 5-day @ 20°C	mg/L	30	45	60	--	--
	lbs/day ¹	45,286	67,929	90,572	--	--
Total Suspended Solids	mg/L	30	45	60	--	--
	lbs/day ¹	45,286	67,929	90,572	--	--
Non-Conventional Pollutant						
Ammonia Nitrogen, Total (as N)	mg/L	3933	3543	4547	--	--
	lbs/day ¹	49,400	52,920	67,929	--	--
1. Based on a design flow of 181 MGD.						

- b. Total Residual Chlorine¹. Effective immediately and ending on 30 November 2020**, the effluent total residual chlorine shall not exceed:
- 0.011 mg/L, as a monthly average; and
 - 0.018 mg/L, as a daily average.
- c. Total Coliform Organisms². Effective immediately and ending on 8 May 2023**, the total coliform organisms shall not exceed:
- 23 most probable number (MPN) per 100 mL, as a weekly median; and
 - 500 MPN/100 mL, in any two consecutive days as a daily maximum.

¹ The final effluent limitations for total residual chlorine become effective 1 December 2020.

² The final effluent limitations for total coliform organisms become effective when the Discharger complies with Special Provisions section VI.C.7. or 9 May 2023, whichever is sooner.

This Order contains pollutant restrictions that are more stringent than applicable federal requirements and standards. Specifically, this Order includes effluent limitations for BOD₅ and TSS that are more stringent than applicable federal standards, but that are nonetheless necessary to meet numeric objectives or protect beneficial uses. The rationale for including these limitations is explained in section IV.C.3 of this Fact Sheet.

6. Performance-based Effluent Limitations.

Performance-based effluent limitations have been used in this Order to establish interim effluent limitations and final effluent limitations where the calculated WQBEL (w/dilution credit) results in effluent limitations that exceed facility performance. Table F-19, below, displays the information used in developing the performance-based effluent limitations and the procedures for calculating performance-based effluent limitations are discussed below.

In developing the performance-based effluent limitation, where there are 10 sampling data points or more, sampling and laboratory variability is accounted for by establishing interim limits that are based on normally distributed data where 99.9% of the data points will lie within 3.3 standard deviations of the mean (Basic Statistical Methods for Engineers and Scientists, Kennedy and Neville, Harper and Row). Therefore, the interim limitations in this Order are established as the mean plus 3.3 standard deviations of the available data. However, if the maximum effluent concentration (MEC) exceeds the mean plus 3.3 standard deviation, then the MEC is the used for the interim limitation. When there are less than 10 sampling data points available, the EPA *Technical Support Document for Water Quality-based Toxics Control* ((EPA/505/2-90-001), TSD) recommends a coefficient of variation of 0.6 be utilized as representative of wastewater effluent sampling. The TSD recognizes that a minimum of 10 data points is necessary to conduct a valid statistical analysis. The multipliers contained in Table 5-2 of the TSD are used to determine a maximum daily limitation based on a long-term average objective. In this case, the long-term average objective is to maintain, at a minimum, the current plant performance level. Therefore, when there are less than 10 sampling points for a constituent, interim limitations are based on 3.11 times the maximum observed effluent concentration to obtain the daily maximum interim limitation (TSD, Table 5-2).

At the time this Order was originally adopted in December 2010, the interim ammonia limitations were calculated based on Facility performance using effluent ammonia data from June 2005 – April 2010. However, effluent ammonia concentrations have been steadily increasing. In December 2013, the Discharger violated the average monthly interim limit and investigated the reason for the excursion. It was determined that influent flows had been steadily decreasing due to water conservation, which was resulting in increasing influent ammonia concentrations. The current Facility does not remove ammonia, so increased influent concentrations will result in increased effluent concentrations. The Discharger has implemented all feasible controls to limit the discharge of ammonia.

Pursuant to Water Code section 10608, the Governor has called for a 20 percent reduction in urban water use statewide by 2020 and urban water agencies are required to meet their urban water use target by 2020. In addition, pursuant to Water Code section 10608.16, subdivision (a), the State shall achieve a 20 percent reduction in urban per capita water use in California on or before December 31, 2020. Therefore, the interim ammonia limitations have been recalculated to take into account the effects of decreasing influent flow due to water conservation. Taking this water conservation into consideration, along with current trends for ammonia concentration increases as a function of lower influent flows, a future annual average ammonia concentration of 30.3 mg/L (as N) was predicted. For ammonia, average monthly, average weekly, and maximum daily performance-based interim limits have been established. The maximum daily limit was projected using the 99.91 percentile as discussed above. Based on a daily monitoring frequency, the average monthly and average weekly interim limits have been projected using the 97.22 percentile and 99.36 percentile, respectively, representing once-in-three-years frequency consistent with the maximum daily projection. Using the statistics from an effluent ammonia dataset from January 2005 – January 2014, and the future predicted annual average ammonia concentration of 30.3 mg/L (as N), the interim ammonia limits were established as 39 mg/L (as N) for the monthly average, 43 mg/L (as N) for the weekly average, and 47 mg/L (as N) for maximum daily limit. Since, the increasing ammonia concentrations were due to water conservation, the influent mass loading of ammonia did not increase. Therefore, the corresponding interim mass limits for ammonia were not increased.

Where a dataset includes data reported below the laboratory detection limits (non-detects) the statistics, described above, becomes uncertain. In these situations, the regression on order statistics (ROS) technique was used to develop summary statistics and probability distribution functions. The ROS method was chosen because numerous studies have found that substituting one-half the reporting limit “results in substantial bias unless the proportion of missing data is small, 10 percent or less”¹. This technique is often used with water quality data and is a useful tool for evaluating data sets with at least 40% detected data². Furthermore, the ROS method was chosen because imputation methods, such as ROS, depend less on assumptions of distributional shape than the maximum likelihood estimation (MLE) method³. The ROS technique develops probability plotting positions for each detected and non-detect data point based on the ordering of all data. A least squares line is fit by regressing the log transformed concentrations to the detected probability plotting positions. Fill-in concentrations are assigned to the non-detect data points for calculation of summary statistics based on the detected data probability plotting positions and the ordered statistics regression line equation. The

¹ Dennis R. Helsel, “More Than Obvious: Better Methods for Interpreting Nondetect Data,” *Environmental Science and Technology* (15 October 2005): 419A

² Robert H. Shumway, Rahman S. Azari, and Masoud Kayhanian, “Statistical Approaches to Estimating Mean Water Quality Concentrations with Detection Limits,” *Environmental Science and Technology* 36, no. 15 (2002): 3345-3353.

³ Dennis R. Helsel, “More Than Obvious: Better Methods for Interpreting Nondetect Data,” *Environmental Science and Technology* (15 October 2005): 420A

summary statistics are calculated from the detected data points and the fill-in values for non-detect data. An estimated mean and standard deviation are used to calculate the 99.9th percentile performance-based effluent limitation, as described above.

Table F-19. Performance-based Effluent Limitations Statistics

Parameter	Units	MEC	# of Samples	% Detected	Mean	Std. Dev.	Performance-based Effluent Limitation
Ammonia ^{1,2}	mg/L	45	1124513	100	27.224-2	4.113-70	39, 43, 4745
Copper	µg/L	6.34	114	100	4.16	0.803	6.8
Cyanide ³	µg/L	10	176	58.5	4.85	1.89	11.1
Aluminum ³	µg/L	35.2	61	93.4	17.6	5.39	35.4
Carbon Tetrachloride ⁴	µg/L	1.7	101	5.9	--	--	5.3
Chlorodibromomethane ⁴	µg/L	0.7	101	16.8	--	--	2.2
Chlorodibromomethane (after nitrification)	µg/L	8.3	12	100	2.9	1.9	12 ⁸
Dichlorobromomethane	µg/L	3.4	101	91.1	1.10	0.583	3.4
Dichlorobromomethane (after nitrification)	µg/L	25	12	100	14.6	5.3	35 ⁸
Bis(2-ethylhexyl) phthalate ⁵	µg/L	8.1	115	99.1	0.854	0.506	12.5
Methylene Chloride ^{1,3}	µg/L	5.4	101	91.1	1.18	0.901	5.4
Tetrachloroethylene ⁴	µg/L	1.4	101	13.9	--	--	4.4
Pentachlorophenol ⁴	µg/L	5.7	115	0.9	--	--	17.7
Dibenzo(ah)anthracene ⁴	µg/L	0.51	145	0.7	--	--	1.6
Manganese ^{1,5,6}	µg/L	270	51	100	4.28	0.25	270
Methyl Tertiary Butyl Ether ⁴ (MTBE)	µg/L	5.8	128	2.3	--	--	18.0

Note: Data set are based on data collected between 12 June 2005 and 10 October 2009 unless noted.

¹ ~~Performance-based effluent limitation set to MEC. Average monthly, average weekly, and maximum daily interim limits established for ammonia and calculated as described in Technical Memorandum from Airy Krich-Brinton to Robert Seyfried dated 9 May 2014 "Ammonia Interim Limits Re-Calculation for Regional San".~~

² Data set ranges from ~~15 June January~~ 2005 to ~~28 April 2010 January~~ 2014.

³ Regression on order statistics (ROS) method used.

⁴ Performance-based effluent limit estimated as 3.11 times the MEC because the amount of detected data is less than 20%

⁵ Mean and standard deviation are expressed as natural logarithms because the log-normal distribution is the best fit for the dataset.

⁶ Data set ranges from 19 April 2009 to 8 June 2011.

⁷ Data set ranges from 5 June 2005 to 6 October 2009.

⁸ For chlorodibromomethane and dichlorobromomethane the performance-based effluent limitations increase after nitrification facilities are operating. The performance-based effluent limitations were calculated based on estimated maximum effluent concentrations from pilot study data results plus a process scale-up factor of 40% to take into consideration uncertainties and variability. The potential need for further adjustment based on full scale implementation is not known at this time,

E. Interim Effluent Limitations

1. Compliance Schedules for ammonia and Title 22 (or Equivalent)

Requirements. The permit limitations for ammonia, BOD₅, TSS, and total coliform