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For Petitioner California Sportfishing Protection Alliance

**BEFORE THE STATE WATER RESOURCES CONTROL BOARD**

**In the Matter of Waste Discharge Requirements )  
for the Sacramento Regional County Sanitation )  
District's Regional Wastewater Treatment Plant; )     **PETITION FOR REVIEW**  
California Regional Water Quality Control Board )  
- Central Valley Region Order No. R5-2010-0114; )  
- NPDES NO. CA0077682 )  
\_\_\_\_\_ )**

Pursuant to Section 13320 of California Water Code and Section 2050 of Title 23 of the California Code of Regulations (CCR), California Sportfishing Protection Alliance ("CSPA" or "petitioner") petitions the State Water Resources Control Board (State Board) to review and vacate the final decision of the California Regional Water Quality Control Board for the Central

Valley Region (“Regional Board”) in adopting Waste Discharge Requirements (NPDES NO. CA0077682) for the Sacramento Regional County Sanitation District’s Wastewater Treatment Plant, on 9 December 2010. See Order No. R5-2010-0114. The issues raised in this petition were raised in timely written comments.

**1. NAME AND ADDRESS OF THE PETITIONERS:**

California Sportfishing Protection Alliance  
3536 Rainier Avenue  
Stockton, California 95204  
Attention: Bill Jennings, Executive Director

**2. THE SPECIFIC ACTION OR INACTION OF THE REGIONAL BOARD WHICH THE STATE BOARD IS REQUESTED TO REVIEW AND A COPY OF ANY ORDER OR RESOLUTION OF THE REGIONAL BOARD WHICH IS REFERRED TO IN THE PETITION:**

Petitioner seeks review of Order No. R5-2010-0114, Waste Discharge Requirements (NPDES NO. CA0077682), for the Sacramento Regional County Sanitation District’s Wastewater Treatment Plant. A copy of the adopted Order is attached as Attachment No. 1.

**3. THE DATE ON WHICH THE REGIONAL BOARD ACTED OR REFUSED TO ACT OR ON WHICH THE REGIONAL BOARD WAS REQUESTED TO ACT:**

9 December 2010

**4. A FULL AND COMPLETE STATEMENT OF THE REASONS THE ACTION OR FAILURE TO ACT WAS INAPPROPRIATE OR IMPROPER:**

CSPA submitted a detailed comment letter on 8 October 2010. That letter, CSPA’s oral testimony presented at the Regional Board’s hearing on the matter and the following comments set forth in detail the reasons and points and authorities why CSPA believes the Order fails to comport with statutory and regulatory requirements. Presented first, below, are CSPA’s comments on revisions made to the permit following close of the comment period for which the Regional Board refused to accept written comments. The specific reasons the adopted Orders are improper are:

- A. Federal Regulation, 40 CFR 124.7 (e), requires that all draft permits shall be accompanied by a statement of basis, shall be based on the administrative record, shall be publically noticed and made available for public comment. Federal Regulations 40 CFR 124.10 requires notification that a draft permit has been**

**prepared and that at least 30 days are allowed for public comment. Federal Regulations 40 CFR 124.14 contains requirements for reopening the public comment period including reissuance of a draft permit. Significant changes were made to the Permit after closure of the public comment period. Those changes were not made available for public comment and a new draft permit has not been reissued. Late Revisions of the permit were also made and presented shortly before the Regional Board's public hearing on the matter. CSPA's utilized our allotted time before the Regional Board at the public hearing to orally discuss these several significant issues.**

1. The Permit, page 5 Finding No. B and Discharge Prohibition No. B, allows for extracted groundwater, estimated at approximately 1.0 MGD, to be discharged into the effluent channel downstream of the secondary clarifiers and upstream of the plant chlorination station. This discharge bypasses the wastewater treatment plant bar screens, grit removal, primary sedimentation and activated sludge processes.

Federal Regulation, 40 CFR 122.41m, defines bypass as any intentional diversion of waste streams from any portion of a treatment facility. 40 CFR 122.41 m2 allows for bypasses to occur only if it is for essential maintenance to assure efficient operation. Obviously, routinely allowing the discharge to bypass the most essential treatment processes cannot be considered essential maintenance and the discharge at the prescribed location is contrary to federal regulation.

2. The Effluent Limitation for electrical conductivity (EC) was increased from 840 to 900 umhos/cm (Permit page 15). The rationale for the limitation was not modified in the permit or the Fact Sheet. The basis for the original performance based EC limitation, as presented in the Fact Sheet, was calculated as the 99.9th percentile of the running annual average effluent EC based on effluent data from June 2006 through April 2010 (page F-52).

In the Regional Board's undated Response to Comments (pages 61 through 63) staff agreed to modify the EC limitation upward from 840 to 900 umhos/cm. There was however no discussion of the basis for modifying the limitation. There is no discussion that the original average EC limitation was calculated in error. It can only be concluded that the modification to the permit results in the limitation no longer being based on the annual average 99.9 percentile as is detailed in the Fact Sheet and that the Fact Sheet is therefore incorrect.

3. The permit was revised to add a Receiving Water Limitation for temperature stating that: “The discharge shall not cause the receiving water temperature to increase more than 4°F above the ambient temperature of the receiving water at any time (sp) or place outside the initial dilution.” The limitations for temperature are based on the Thermal Plan (Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California) and Resolution No. 89-094 granting an exception to objectives 5A(l)(a) (from 1 October to 30 April) and 5A(l)(b) of the Thermal Plan. However the thermal plan states that: “No discharge shall cause a surface water temperature rise greater than 4°F above the natural temperature of the receiving waters at any time or place.” There is no exception for the zone of initial dilution. The State Water Board Resolution (90-103) does not mention any exemption within the zone of initial dilution. The exact language of Resolution 89-094 is not included in the permit however the thermal plan is explicit in stating the limit shall be met at all times and places. The exclusion of the zone of initial dilution from temperature requirements is a significant relaxation of the thermal plan requirements.
  
4. The permit, Receiving Water Limitations, Surface Water Limitations (page 17), was modified to allow a minimum pH of 6.0. The Basin Plan Water Quality of Objective for pH requires that wastewater discharges not cause the pH to be depressed below 6.5. The permit, on page F-78 states that the instantaneous Effluent Limitation is more stringent than the Basin Plan objective which allows for averaging. The staff’s position is apparently based on the Dischargers mixing zone analysis. This position could certainly be debated, however the permit only discusses the Effluent Limitation and provides no discussion or defense for altering the Receiving Water Limitation. The Basin Plan allows that the Water Quality Objective for pH may be based on an averaging period but does not allow that the pH be depressed below 6.5. Federal regulation 40 CFR 122 44 requires that limitations be developed when a discharge has a reasonable potential to exceed a water quality standard or objective. US EPA’s ambient criteria for pH shows that low pH levels are critical for the protection of freshwater aquatic life especially with regard to the release of toxic constituents from sediments and conversion of other chemicals to a toxic form. It is doubtful that the Discharger’s mixing zone analysis discusses these impacts of pH. The receiving water limitation for pH allows for an exceedance of the water quality objective and does not constitute an averaging period. Regional Board staff acknowledged at the public hearing that this change to the permit was in error.

5. The permit, at page 37, was modified to state that compliance with the Turbidity Receiving Water Limitation shall be determined using data samples from receiving water monitoring station location RSWD-003 and analyzed with data samples for natural turbidity at receiving water monitoring station location RSWU-001. Sampling point 003 is located 4,200 feet downstream of sampling point 001 according to the Monitoring and Reporting Program. The water quality objective for turbidity is contained in the Basin Plan which requires that waters shall be maintained free of changes that cause nuisance or adversely affects beneficial uses. The language added to the permit excludes 4,200 feet of the receiving stream from compliance with the turbidity limitation by stating that compliance shall be determined by comparing point 001 with point 003. The Basin Plan allows for an averaging period to be applied to the turbidity objective provided that beneficial uses are protected. Turbid waters can have a significant impact on aquatic life with regard to foraging for food and predation. There is nothing in the permit showing the beneficial use is protected within the 4,200 feet between points 001 and 003. There is a reasonable potential for turbidity from the discharge to exceed the water quality objective within the area between points 001 and 003 and the limitation developed under 40 CFR 122.44 must be applicable throughout the waterbody.
6. The Monitoring and Reporting Program has been modified to change effluent hardness sampling from grab samples to 24-hour composites. Hardness issues have been a significant point of contention in many of the Board's permits as the Board routinely utilizes the effluent hardness to determine the toxicity of hardness dependant metals. The hardness can vary significantly throughout a day at a wastewater treatment plant especially due to industrial and food processing discharges. The toxicity of metals should appropriately be based on the worst case hardness. The use of a 24-hour composite will average the hardness collected throughout the day and does not represent the worst case hardness. The effluent sampling for hardness should be retained as a grab sample.
7. The Monitoring and Reporting Program, page E-10, has been significantly relaxed by removing the requirement to re-sample and re-test if an acute toxicity test failure occurs. The Regional Board states that limitations and sampling are not necessary for constituents of emerging concern that acute toxicity would be prevented in mixing zones all based on the fact that toxicity testing is being required. Now the Regional Board proposed to significantly relax the toxicity testing requirements. The Discharger is already failing toxicity tests and yet the monitoring is being relaxed. The Permit, Compliance Summary, page F-8, shows the effluent discharge to the Sacramento River failed acute toxicity tests 6 times

in 2008 and 9 times in 2009. Based on the existing monitoring and the dismal record of compliance; the discharger should be required to conduct a toxicity reduction evaluation and the monitoring should be increased, certainly not relaxed.

8. The permit on pages F-35 through 37 was significantly revised to include a discussion of mixing zone conditions. CSPA's comments with regard to the additional mixing zone language are as follows:
  - a. The permit has been modified to state that the mixing zone does not compromise the integrity of the entire water body concluding the Sacramento River is a very large water body. Based on the permit, the mixing zones are between 350 and 400 feet wide in the River which is estimated to be 400 feet wide at the bottom and 600 feet wide at the surface. A zone of passage for fish is cited as existing on the sides of the river along the banks. However, Tetra Tech submitted a final review of the mixing zones in a memorandum to the Regional Board dated 30 June 2008 stating that: "Some phenomena were observed in the field that were not reproduced in the model, most notably a region of high dye concentration near the eastern river bank just downstream from the diffuser in the October 2005 dye release." This information indicates that the area designated as a zone of passage for fish may not exist at all. The discharge is apparently well documented as encompassing the center of the river. Tetra Tech as a consultant to the Regional Board has confirmed that a dye test of the wastewater discharge confirmed wastewater along the bank. There is therefore sufficient information to conclude that the discharge may extend across most of the river width.
  - b. Language was added to the permit to state that: "The SIP requires that the acute mixing zone be appropriately sized to prevent lethality to organisms passing through the mixing zone.

USEPA recommends that float times through a mixing zone less than 15 minutes ensures that there will not be lethality to passing organisms. The acute mixing zone proposed by the Discharger extends 60 feet downstream from the outfall. Based on a minimum river velocity of 0.35 feet/sec, the minimum float time is 2.8 minutes." The permit assumes that fish travel at the speed of the river. There is no technical justification in mixing zone analyses procedures to use the river velocity as the speed at which fish migrate through a river. The TDS contains several methods for

calculating the speed of fish migration all of which have been ignored. This assumption must also conclude that fish only travel downstream since swimming against the river flow would not be at the same speed as downstream flow. This conclusion also ignores comments by the fishery experts at the US Fish and Wildlife Service who commented that: "We are also concerned about potential aquatic life attraction impacts from the discharge plume. Various species can be drawn to discharge plumes for various reasons, including feeding and temperature and flow refuge. This attraction can result in impacts from related effluent toxicity and predation. The discharge area's identity as a popular fishing location also suggests an association between the discharge plume and possible predator attraction." In a 15 June 2010 letter to Kenneth Landau at the Regional Board the Director of the California Department of Fish and Game stated with regard to the thermal plume from the Sacramento Regional WWTP: "Department Fisheries Biologists have stated in previous comments to the Regional Board that manmade flows such as effluent discharge attract fish." It is easy to conclude that if a fish is attracted to the wastewater discharge; it is not going to simply bypass it at the velocity of the river. It is also unlikely that fish will maintain their passage to the banks of the river if they are attracted to the wastewater discharge in the center as the fishery experts suggest. The mixing zone analysis also ignores the fact the endangered green sturgeon are bottom dwelling fish where there is minimal if any allowed zone of passage. The Regional Board and the Discharger have relied entirely on models. There has been more than a decade to conduct actual instream studies and analysis, which would have provided definitive answers regarding the impacts of allowing dilution mixing rather than providing treatment.

- c. The permit further attempts to justify a mixing zone based on the fact that "an acute toxicity effluent limitation that requires compliance to be determined based on acute bioassays using 100% effluent." This completely ignores the fact that the acute toxicity testing shows the discharge is toxic. The Permit, Compliance Summary, page F-8, shows the effluent discharge to the Sacramento River failed acute toxicity tests 6 times in 2008 and 9 times in 2009. If the use of toxicity testing is used to justify a mixing zone; continued failure of those test should also be used to deny dilution credits and adequate treatment should be required.

There is sufficient information available to conclude that the mixing zone proposed by the discharger would cause acute toxicity, compromise the

integrity of the Sacramento River, adversely impact biologically sensitive or critical habitats and restrict the passage of aquatic life.

Late Revision change:

*1. NPDES Permit. Modify section V.A.15.c. of the Limitations and Discharge Requirements as shown in underline/strikeout format below:*

- c. The discharge shall not cause the receiving water surface temperature to increase more than 4°F above the ambient temperature of the receiving water at any ~~time~~ time or place outside the initial zone of dilution.

The cited Receiving Water Limitation is based on the Thermal Plan. The thermal plan requires that the surface water temperature not be increased more than 4 degrees. There is a significant difference between the surface water and the water surface. The modification to apply the thermal plan only at the water's surface does not comply with the thermal plan.

**B. The Permit, Finding P, page 11, regarding endangered species protection should be modified to state that the discharge of toxic constituents in toxic concentrations will continue for 10 years, which may result in the “taking” of endangered species.**

The Central Valley Regional Water Quality Control Board's Permit shows that the Sacramento Regional County Sanitation District discharges toxic levels of ammonia (45 mg/l)—almost 20 times above the acutely toxic level (2.2 mg/l)—to the Sacramento River, then requires the toxic discharges be eliminated within ten years, and concludes there will be no impact to endangered species.

The Permit, pages F-53 through 56, contains the following information regarding ammonia:

**“(a) WQO.** The NAWQC for the protection of freshwater aquatic life for total ammonia, recommends acute (1-hour average; criteria maximum concentration or CMC) standards based on pH and chronic (30-day average; criteria continuous concentration or CCC) standards based on pH and temperature. USEPA also recommends that no 4-day average concentration should exceed 2.5 times the 30-day CCC. USEPA found that as pH increased, both the acute and chronic toxicity of ammonia increased. Salmonids were more sensitive to acute toxicity effects than other species. However, while the acute toxicity of ammonia was not influenced by temperature, it was found that invertebrates and young fish experienced increasing chronic toxicity effects with increasing temperature. Because the Sacramento-San Joaquin Delta has a beneficial use of cold freshwater habitat and the presence of salmonids and early fish life stages in the



Sacramento-San Joaquin Delta is well documented, the recommended criteria for waters where salmonids and early life stages are present were used.

The maximum permitted effluent pH is 8.5, as the Basin Plan objective for pH in the receiving stream is the range of 6.5 to 8.5. In order to protect against the worst-case short-term exposure of an organism, a pH value of 8.5 was used to derive the acute criterion. The resulting acute criterion is 2.14 mg/L. The maximum observed 30-day rolling average temperature and the maximum observed pH of the Sacramento River were used to calculate the 30-day CCC. The maximum observed 30-day average Sacramento River temperature was 72.5°F (22.5°C), for the rolling 30-day period ending 4 September 2001. The maximum observed Sacramento River pH value was 8.0 on 9 September 2000. Using a pH value of 8.0 and the worst-case temperature value of 72.5°F (22.5°C) on a rolling 30-day basis, the resulting 30-day CCC is 1.8 mg/L (as N). The 4-day average concentration is derived in accordance with the USEPA criterion as 2.5 times the 30-day CCC. Based on the 30-day CCC of 1.8 mg/L (as N), the 4-day average concentration that should not be exceeded is 4.5 mg/L (as N).

**(b) RPA Results.** Untreated domestic wastewater contains ammonia. Nitrification is a biological process that converts ammonia to nitrite and nitrite to nitrate. Denitrification is a process that converts nitrate to nitrite or nitric oxide and then to nitrous oxide or nitrogen gas, which is then released to the atmosphere. The Discharger does not currently use nitrification to remove ammonia from the waste stream. Ammonia is known to cause acute and/or chronic toxicity to aquatic organisms. Therefore, the discharge has reasonable potential to cause or contribute to an exceedance of the Basin Plan's narrative toxicity objective in the receiving water.

**(c) Dilution Considerations.** As discussed in Section IV.C.2.d of the Fact Sheet, an allowance for chronic aquatic life dilution may be granted. However, based on the considerations below and discussed in more detail in Attachment K, no dilution has been allowed for ammonia. The Central Valley Water Board determines that Discharger must fully nitrify and denitrify its wastewater to reduce ammonia and nitrogen for the following reasons:

- (1) Recent studies suggest that ammonia at ambient concentrations in the Sacramento River, Delta and Suisun Bay may be acutely toxic to native *Pseudodiaptomus forbesi* (copepod).
- (2) A consensus of scientific experts concluded the SRWTP is a major source of ammonia to the Delta<sup>1</sup>.

- (3) Recent studies provide evidence that ammonia from the SRWTP discharge is contributing to the inhibition nitrogen uptake by diatoms in Suisun Bay.
  - (4) Ammonia along with the clam, *Corbula* and high turbidity are attributed to reducing diatom production and standing biomass in the Suisun Bay.
  - (5) Downstream of the discharge point, ammonia may be a cause in the shift of the aquatic community from diatoms to smaller phytoplankton species that are less desirable as food species.
  - (6) Regardless of whether ammonia is directly or indirectly contributing to the POD, ammonia is shown to affect adult *Pseudodiatomus forbesi* reproduction at concentrations greater than or equal to 0.79 mg/L. And nauplii and juvenile *Pseudodiatomus forbesi* are affected at ammonia concentrations greater to or equal 0.36 mg/L. These ammonia concentrations can be found downstream of the discharge. The beneficial use protection extends to all aquatic life and not limited to pelagic organisms.
  - (7) USEPA expects to publish the 2009 Ammonia Criteria Update which includes more stringent ammonia criteria for freshwater mussels compared with criteria for salmonids in early 2011. Freshwater mussels reside in the Upper Sacramento River above and likely below the SRWTP discharge.
  - (8) The Discharger's effluent contains ammonia and BOD at levels that use all the assimilative capacity for oxygen demanding substances in the Sacramento-San Joaquin Delta. This results in no assimilative capacity for other cities and communities to discharge oxygen demanding constituents, which is needed for them to grow despite the fact that most of these cities and communities are already implementing Best Practical Treatment and Control (BPTC) at their own facilities and SRWTP is not.
  - (9) The Discharger's effluent contains nitrosoamines at levels that are greater than 100 times the primary MCL. Nitrosamines are disinfection byproducts that are created when wastewater effluent contains ammonia and is then disinfected with chlorine, which is the case at the SRWTP.
  - (10) The Discharger must fully comply with Resolution No. 68-16 that requires Best Practical Treatment and Control, which for this discharge includes nitrification and denitrification of their wastewater.
- (d) WQBELs.** The Central Valley Water Board calculates WQBELs in accordance with SIP procedures for non-CTR constituents, and ammonia is a non-CTR constituent. The SIP procedure assumes a 4-day averaging period for calculating the long-term average discharge condition (LTA). However, USEPA recommends modifying the procedure for

calculating permit limits for ammonia using a 30-day averaging period for the calculation of the LTA corresponding to the 30-day CCC. Therefore, while the LTAs corresponding to the acute and 4-day chronic criteria were calculated according to SIP procedures, the LTA corresponding to the 30-day CCC was calculated assuming a 30-day averaging period. The lowest LTA representing the acute, 4-day CCC, and 30-day CCC is then selected for deriving the average monthly effluent limitation (AMEL) and the maximum daily effluent limitation (MDEL). The remainder of the WQBEL calculation for ammonia was performed according to the SIP procedures. This Order contains a final average monthly effluent limitation (AMEL) and maximum daily effluent limitation (MDEL) for ammonia of 1.8  $\mu\text{g/L}$  and 2.2  $\mu\text{g/L}$ , respectively, based on the NAWQC ammonia criteria for aquatic toxicity with no dilution credit.

**(e) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 45 mg/L is greater than the applicable WQBELs. See Table F-20. Performance-based Effluent Limitations Statistics. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is not feasible and appears to put the Discharger in immediate non-compliance with the ammonia final effluent limitations. New or modified control measures may be necessary in order to comply with the effluent limitations, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. The Discharger submitted an infeasibility analysis dated August 2010. As discussed in section IV.E of this Fact Sheet, a compliance schedule has been included in this Order for ammonia.”

With regard to the endangered species act, the Permit contains the following Finding:

**P. Endangered Species Act.** This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the Federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). This Order requires compliance with effluent limits, receiving water limits, and other requirements to protect the beneficial uses of waters of the state. The discharger is responsible for meeting all requirements of the applicable Endangered Species Act.

The Permit also allows that:

“V. Whole Effluent Toxicity Testing Requirements; Acute and chronic Toxicity Testing  
*Ammonia Toxicity* – The acute toxicity testing may be modified to eliminate ammonia-related toxicity until 30 November 2020, at which time the Discharger shall be required to implement the test without modifications to eliminate ammonia toxicity.

The wastewater treatment plant discharges ammonia at levels measured as high as 45 mg/l (page F-56). The Permit contains a final average monthly effluent limitation (AMEL) and maximum daily effluent limitation (MDEL) for ammonia of 1.8  $\mu\text{g/L}$  mg/l and 2.2  $\mu\text{g/L}$  mg/l, respectively, based on the NAWQC ammonia criteria for aquatic toxicity with no dilution credit. Clearly the current discharge is toxic and compliance with the proposed limitation for ammonia is not required until the end of 2020, ten additional years of toxic discharges.

In addition to toxic levels of ammonia the Permit limits other toxic constituents such as copper. The Permit, Compliance Summary, page F-8, shows the effluent discharge to the Sacramento River failed acute toxicity tests 6 times in 2008 and 9 times in 2009. The compliance summary did not state whether ammonia removal was done prior to the acute toxicity testing.

The Permit clearly shows that the wastewater discharge from the Sacramento Regional Wastewater Treatment plant is toxic to aquatic life. The Sacramento River, within the Sacramento River delta is home to numerous endangered and threatened species. Within the 10 years the Regional Board is proposing to allow Sacramento Regional County Sanitation District to eliminate the toxic discharges, the impact to threatened and endangered species will be devastating to a waterbody already in significant decline. The Permit should acknowledge the impacts to endangered and threatened species during the 10-years the Regional Board is allowing for Sacramento County to eliminate their toxic discharges to the Sacramento River.

The Order has been developed with federal funds and is issued pursuant to U.S. Environmental Protection Agency (EPA) authorization. Consequently, the Regional Board and/or EPA must enter into formal consultation with both the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) pursuant to Section 7 of the ESA. The discharge of toxicity and toxic pollutants by the Discharger is a violation of Section 9 of the ESA and requires an incidental take permit pursuant to Section 10 of the ESA. The Regional Board's issuance of an Order that authorizes and/or "causes" an illegal "take" is also a violation of Section 9 of the ESA. The discharge contains toxic levels of ammonia and consistently fails bioassays; the permit allows these toxic discharges to continue for at least the next ten years. Significant toxic impacts to endangered species can occur from the discharge over the next decade as is allowed under the terms of the permit. Consequently, both the Discharger and the Regional Board must secure incidental take permits from NMFS and USFWS.

The Regional Board's Response to Comments states in part that: *"Furthermore, the Central Valley Water Board has no jurisdiction to authorize a take or regulate endangered species; only the Department of Fish and Game may do so. (CA. Fish & Game Code, §§ 37, 39, 2080.1(c), 2081, 2081.1.) Second, the tentative Order, Finding P, states, in part, "the Discharger is responsible for meeting all requirements of the applicable Endangered Species Act." Thus, the Order explicitly provides that it does not authorize a take. Any obligation to acquire a take permit is the Discharger's obligation; engaging in any take without obtaining necessary permits*

*would go beyond the permitted operations of the facility.*” It is clear that the Regional Board’s permit allows ten years for the Discharger to comply with waste discharge requirements, including requirements to remove toxic levels of ammonia. Ammonia is discharged at concentrations as high as 45 mg/l. The permit establishes an ammonia limitation at approximately 2 mg/l as necessary to protect aquatic life from acute toxicity. It is also well established that numerous species of endangered fish are present in the Sacramento River at the point of discharge. The discharge routinely fails biotoxicity monitoring. The permit failed to address additive toxicity as required by the Basin Plan. It is at best naïve to believe that an allowance to continue toxic discharges for another decade will not result in the death of endangered fish in the area of the discharge. The rationale provided by the Regional Board regarding endangered species protection is simply bureaucratic gobbledygook that results in a complete lack of protection of endangered species.

**C. The Permit fails to list bis (2-ethylhexyl) phthalate in the Emergency Planning and Community Right to Know Act assessment.**

Section 13263.6(a) of the CWC, requires that *“the Regional Water Board shall prescribe effluent limitations as part of the waste discharge requirements of a POTW for all substances that the most recent toxic chemical release data reported to the state emergency response commission pursuant to Section 313 of the Emergency Planning and Community Right to Know Act of 1986 (42 U.S.C. Sec. 11023) (EPCRA) indicate as discharged into the POTW, for which the State Water Board or the Regional Water Board has established numeric water quality objectives, and has determined that the discharge is or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to, an excursion above any numeric water quality objective”*.

The Permit cites chromium and chromium compounds, copper and copper compounds, lead and lead compounds, styrene and zinc compounds but fails to cite bis(2-ethylhexyl)phthalate. Bis(2-ethylhexyl)phthalate (DEHP) is reportable to the Toxic Release Inventory (TRI) under section 313 of the Emergency Planning and Community Right-to-know Act (EPCRA). A discussion in the Regional Board permits with regard to bis(2-ethylhexyl)phthalate and EPCRA could not be located.

**D. Effluent Limitations for aluminum and specific conductivity (EC) are improperly regulated as an annual average contrary to Federal Regulations 40 CFR 122.45 (d)(2).**

Federal Regulation 40 CFR 122.45 (d)(2) requires that permit for POTWs establish Effluent Limitations as average weekly and average monthly unless impracticable. ((d) *Continuous discharges*. For continuous discharges all permit effluent limitations, standards, and prohibitions, including those necessary to achieve water quality standards, shall unless impracticable be stated

as: (1) Maximum daily and average monthly discharge limitations for all dischargers other than publicly owned treatment works; and (2) Average weekly and average monthly discharge limitations for POTWs.). The Permit establishes Effluent Limitations for aluminum and EC as an annual average contrary to the cited Federal Regulation.

The common dictionary meaning of impracticable is: incapable of being performed or accomplished. The Regional Board has converted applicable water quality standards in Table 6 to monthly, weekly and daily limitations. It is mathematically possible to convert the limitations for aluminum and EC to weekly and monthly limitations. Establishing the Effluent Limitations for aluminum and EC in accordance with the Federal Regulation is not impracticable, it can be accomplished.

Pages F-88 and 89 of the Permit explain that: *“For effluent limitations based on Secondary MCLs, this Order includes annual average effluent limitations. The Secondary MCLs are drinking water standards contained in Title 22 of the California Code of Regulations. Title 22 requires compliance with these standards on an annual average basis, when sampling at least quarterly. Since it is necessary to determine compliance on an annual average basis, it is impracticable to calculate average weekly and average monthly effluent limitations.”* The Permit discussion has nothing to do with the practicability or impracticability of converting the limitations to weekly and monthly limits.

Title 22 requirements are not binding on the Regional Board; the Regional Board does not regulate domestic drinking water supplies. The Regional Board is however required to protect the instream municipal and domestic beneficial uses. Limiting these constituents to be regulated on an annual, average will allow for shorter term peaks well above the secondary MCLs directly impacting the numerous documented downstream domestic water users. While the Department of Public Health (DPH) may be required to develop longer term limitations; the Regional Board is obligated to protect the instream beneficial uses continuously. The Regional Board has no authority to allow concentration peaks of pollutants above the drinking water MCLs. It is not unusual for receiving water criteria based on protecting the municipal use to be more protective than the drinking water MCLs; look to the case of trihalomethanes. Trihalomethanes are regulated in drinking water at 80 ug/l while the California Toxics Rule (CTR) contains limitations for individual trihalomethanes (chlorodibromomethane and dibromochloromethane) at a fraction of that value. With respect to aluminum and EC and the Secondary MCL; the Permit contains a Receiving Water Limitation, No 14 for Taste and Odors which requires that the discharge not cause taste- or odor-producing substances to be present in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses. There is no time frame associated with the Receiving Water Limitation and short term exceedences of the MCLs based on taste and odor could cause violation. In any case, the discussion of Title 22 requirements does not relieve

the Regional Board from implementing 40 CFR 122.45 and converting the limitations to weekly and monthly which is possible, practicable and is required.

Even if Title 22 were applicable here, the state regulation does not override federal law. As the Regional Board states in their permit – the state can be more stringent than required by federal regulation but there is no such citation or allowance to be less stringent. Annual average limitations are less stringent than allowed under the 40 CFR 122.45. The permit must be amended to limit aluminum and EC in accordance with the cited Federal Regulation.

It is also noted that the Permit, pages F-44 and 67, discusses annual average limitations for MTBE although limited in Table 6 as a daily maximum. The above discussion would also apply to MTBE should the currently proposed limitation be modified.

**E. The Permit fails to contain mass-based effluent limits as required by Federal Regulations 40 CFR 122.45(b).**

Federal Regulation, 40 CFR 122.45 (b) requires that in the case of POTWs, permit Effluent Limitations, standards, or prohibitions shall be based on design flow. Concentration is not a basis for design flow. Mass limitations are concentration multiplied by the design flow and therefore meet the regulatory requirement. Each of the constituents regulated in the Permit, Table 6, with the exception of BOD, TSS and ammonia do not have mass based limitations.

Section 5.7.1 of U.S. EPA's *Technical Support Document for Water Quality Based Toxics Control* (TSD, EPA/505/2-90-001) states with regard to mass-based Effluent Limits:

“Mass-based effluent limits are required by NPDES regulations at 40 CFR 122.45(f). The regulation requires that all pollutants limited in NPDES permits have limits, standards, or prohibitions expressed in terms of mass with three exceptions, including one for pollutants that cannot be expressed appropriately by mass. Examples of such pollutants are pH, temperature, radiation, and whole effluent toxicity. Mass limitations in terms of pounds per day or kilograms per day can be calculated for all chemical-specific toxics such as chlorine or chromium. Mass-based limits should be calculated using concentration limits at critical flows. For example, a permit limit of 10 mg/l of cadmium discharged at an average rate of 1 million gallons per day also would contain a limit of 38 kilograms/day of cadmium.

Mass based limits are particularly important for control of bioconcentratable pollutants. Concentration based limits will not adequately control discharges of these pollutants if the effluent concentrations are below detection levels. For these pollutants, controlling mass loadings to the receiving water is critical for preventing adverse environmental impacts.

However, mass-based effluent limits alone may not assure attainment of water quality standards in waters with low dilution. In these waters, the quantity of effluent discharged has a strong effect on the instream dilution and therefore upon the RWC. At the extreme case of a stream that is 100 percent effluent, it is the effluent concentration rather than the mass discharge that dictates the instream concentration. Therefore, EPA recommends that permit limits on both mass and concentration be specified for effluents discharging into waters with less than 100 fold dilution to ensure attainment of water quality standards.”

Federal Regulations, 40 CFR 122.45 (f), states the following with regard to mass limitations:

- “(1) all pollutants limited in permits shall have limitations, standards, or prohibitions expressed in terms of mass except:
  - (i) For pH, temperature, radiation or other pollutants which cannot be expressed by mass;
  - (ii) When applicable standards and limitations are expressed in terms of other units of measurement; or
  - (iii) If in establishing permit limitations on a case-by-case basis under 125.3, limitations expressed in terms of mass are infeasible because the mass of the pollutant discharged cannot be related to a measure of operation (for example, discharges of TSS from certain mining operations), and permit conditions ensure that dilution will not be used as a substitute for treatment.
  
- (2) Pollutants limited in terms of mass additionally may be limited in terms of other units of measurement, and the permit shall require the permittee to comply with both limitations.”

Federal Regulations, 40 CFR 122.45 (B)(1), states the following: “In the case of POTWs, permit effluent limitations, standards, or prohibitions shall be calculated based on design flow.” For POTWs priority pollutants, such as metals, have traditionally been reduced by the reduction of solids from the wastestream, incidental to treatment for organic material. Following adoption of the CTR, compliance with priority pollutants is of critical importance and systems need to begin utilizing loading rates of individual constituents in the WWTP design process. It is highly likely that the principal design parameters for individual priority pollutant removal are based on mass, making mass based Effluent Limitations critically important to compliance. The inclusion of mass limitations is of critical importance to achieving compliance with requirements for individual pollutants. The Permit contains a long list of priority pollutants, Table 6, for which there is no identified design flow. The Permit does not comply with the requirements of 40 CFR 122.45.



In addition to the above citations, on June 26<sup>th</sup> 2006 U.S. EPA, Mr. Douglas Eberhardt, Chief of the CWA Standards and Permits Office, sent a letter to Dave Carlson at the Central Valley Regional Water Quality Control Board strongly recommending that NPDES permit effluent limitations be expressed in terms of mass as well as concentration.

One of the most significant arguments presented above is Federal Regulation, 40 CFR 122.45 (b) requires that in the case of POTWs, permit Effluent Limitations, standards, or prohibitions shall be based on design flow. The Regional Board's Response to Comments failed to discuss the fact that concentration based limitations are not based on design flow. The design flow is critically important for priority pollutant removal from wastewater systems. CFR 124.17(a)(2) requires the Response to Comments briefly describe and respond to all significant comments. The Regional Board failed to describe this comment or to provide any response.

**F. The Permit fails to contain an Effluent Limitation for aluminum in accordance with Federal Regulations 40 CFR 122.44, US EPA's interpretation of the regulation, and California Water Code, Section 13377.**

Federal Regulations, 40 CFR 122.44 (d)(i), requires that; "Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality." The Basin Plan contains a narrative water quality objective for toxicity that states in part that "[a]ll waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life" (narrative toxicity objective). Where numeric water quality objectives have not been established, 40 CFR §122.44(d) specifies that WQBELs may be established using USEPA criteria guidance under CWA section 304(a), proposed State criteria or a State policy interpreting narrative criteria supplemented with other relevant information, or an indicator parameter. U.S. EPA developed National Recommended Ambient Water Quality Criteria for protection of freshwater aquatic life for aluminum to prevent toxicity to freshwater aquatic life. The recommended ambient criteria four-day average (chronic) and one-hour average (acute) criteria for aluminum are 87 µg/l and 750 µg/l, respectively.

US EPA's 87 ug/l chronic criterion was developed using low pH and hardness testing. California Central Valley waters, the Sacramento River, at the Valley floor, have been sampled to have hardnesses as low as 26 mg/l CaCO<sub>3</sub> as reported in the Permit. US EPA recognized in their ambient criteria development document, (Ambient Water Quality Criteria for Aluminum, EPA 440/5-86-008) that the pH was in the range 6.5 to 6.6 and that the hardness was below 20 mg/l. Typical values for pH and hardness in the Central Valley alone warrant use of the chronic ambient criteria for aluminum. Despite the hardness and pH values used in the development of

the criteria; U.S. EPA's conclusions in their *Ambient Criteria for the Protection of Freshwater Aquatic Life* recommends that application of the ambient criteria as necessary to be protective of the aquatic beneficial uses of receiving waters in lieu of site-specific criteria. Regional Board NPDES permitting staff has not presented any scientific or legal defense for their position that EPA's chronic criteria are overly protective. The Regional Board does not have the legal authority or the technical knowledge to pick and choose through a criteria document and use parts and discard others. US EPA recommends ambient criteria documents in their entirety as necessary to protect aquatic life beneficial uses of receiving waters; using only part is a modification of the criteria. The modification of criteria must go through the water quality standards development regulatory process.

Supporting the use and applicability of the ambient criteria for aluminum US EPA recently wrote the following letter to the Regional Board:



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

75 Hawthorne Street  
San Francisco, CA 94105-3901

Certified Mail No. 7008 3230 0000 3862 9328  
Return Receipt Requested

JUN 24 2010

Patricia Croccon  
Executive Officer  
Central Valley Regional Water Quality Control Board  
11000 Sun Center Drive, Suite 200  
Rancho Cordova, CA 95670

Re: Water Quality Criteria for Aluminum and the Placer County Sewer Maintenance  
District 1 WWTP (NPDES Permit No. CA0079216)

Dear Ms. Croccon:

We have reviewed Placer County Department of Facility Services' request, dated June 14, 2010, to relax the aluminum effluent limitations in the proposed NPDES permit. Relaxing the effluent limitations may degrade water quality, adversely affect beneficial uses, and conflict with federal anti-backsliding and/or anti-degradation requirements. These concerns need to be addressed to ensure the permit effectively protects water quality and complies with NPDES permitting requirements.

At its May 27, 2010 meeting, the Central Valley Regional Water Quality Control Board considered a proposed renewal of the NPDES permit for the Placer County Sewer Maintenance District 1 wastewater treatment plant. During the meeting, the discharger contested the applicability of EPA's National Recommended Water Quality Criteria for aluminum in determining reasonable potential for the discharge to exceed water quality standards and establishing effluent limitations. The discharger contested the use of the chronic aluminum criterion for protection of aquatic life since the criterion is based on a lower hardness than observed in the receiving waters. The 87 µg/l chronic aluminum criterion is based on a toxicity test with striped bass in water at pH between 6.5 and 6.6 standard units and hardness less than 10 mg/l.

The aluminum effluent limitations in the proposed permit were calculated by applying EPA recommended aluminum criteria as an interpretation of the narrative toxicity standard in the Basin Plan. The effluent limitations were calculated in accordance with procedures described in the State Implementation Policy. The EPA criteria for aluminum were also applied to the existing permit for this facility to establish the average monthly and maximum daily effluent limitations.

We understand that the existing maximum daily effluent limitation has been met (with one exception) and the 30-day average effluent limitation has been met approximately 16 months out of 25 from 2006 to 2009. The discharger currently manipulates hardness in the effluent by adding magnesium hydroxide to provide

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alkalinity for the nitrification process. Based on data the discharger provided, the upstream receiving water hardness in Rock Creek ranges from 20 to 98 mg/l, but the lowest observed effluent hardness is 141 mg/l. We understand that the reported lowest ambient hardness values (20 mg/l) may actually be a detection limit as that specific value was reported in six consecutive samples taken in 2007. If future modification to the treatment process discontinues or reduces the use of magnesium hydroxide, the effluent hardness may be significantly reduced.

EPA has not formally changed its recommended aluminum criteria; the appropriate aluminum criteria values for higher hardness situations remain uncertain. The existing EPA-recommended chronic aluminum criterion of 87  $\mu\text{g/l}$  is clearly protective of aquatic life and is appropriate for use in evaluating reasonable potential and establishing effluent limitations. As EPA's Charles Delos notes in his 2002 and 2010 letters, it may be reasonable to apply a higher criterion value if the ambient hardness levels are substantially and consistently higher than the values used in deriving the existing chronic criterion value. When considering whether to apply a higher criterion value, the Regional Board should carefully consider whether the high ambient and effluent hardness values asserted by the discharger are accurate and likely to continue in the future.

The Regional Board has discretion in interpreting the Basin Plan narrative toxicity standard and it may be possible to make a different reasonable potential conclusion or derive less stringent effluent limitations than provided in the existing permit. However, a decision to apply a higher criterion and relax or eliminate the effluent limitations imposed by the previous permit would have to be supported by thorough anti-degradation and anti-backsliding analyses. Recent data show that effluent concentrations of aluminum ranged between 12 and 162  $\mu\text{g/l}$ . A decision to eliminate or raise the aluminum effluent limitations above current performance levels would trigger serious anti-degradation and anti-backsliding concerns as that action would, in effect, authorize aluminum discharges above current discharge and ambient levels. The information from Mr. Delos provided by the discharger does not constitute "new information" that provides a basis for backsliding from existing permit limitations as we understand that information was initially provided to Regional Board staff in 2002, prior to issuance of the existing permit.

Given the uncertainty about appropriate aluminum criteria levels for this situation and the need to carefully evaluate anti-degradation and anti-backsliding implications of removing or relaxing the aluminum limitations, EPA Region IX recommends the conservative approach of retaining the existing effluent limitations in the new permit.

If you wish to discuss our recommendations, please contact Elizabeth Sablad of my staff at (415) 972-3044.

Sincerely,

  
Alexis Strauss, Director 24 June 2010  
Water Division

The Regional Board and their Permit cites US EPA's *Ambient Criteria for the Protection of Freshwater Aquatic Life for Aluminum* (criteria) as not being representative or necessary because the chronic criteria were based on a low hardness and low pH. The Regional Board cites one section of the criteria development document but ignores the final recommendation to use the recommended criteria absent a site-specific objective for aluminum. The Regional Board then defaults to the US EPA recommended acute criteria of 750 ug/l. The Regional Board's citation of the criteria development document is incomplete its review, for example the *criteria* development document (EPA 440/5-86-008) also cites that:

169 ug/l of aluminum caused a 24% reduction in the growth of young brook trout.

174 ug/l of aluminum killed 58% of the exposed striped bass.

Bioaccumulation factors ranged from 50 to 231 for young brook trout exposed to aluminum for 15 days.

Aluminum at 169 ug/l caused a 24% reduction in the weight of young brook trout.

US EPA recommends that understanding the Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses is necessary in order to understand the text, tables and calculations of a criteria document. The Regional Board's assessment of the use of low hardness and low pH clearly shows they did not heed EPA's advice in reviewing the criteria development procedures for water quality criteria or the final recommendations. The Regional Board occasionally cites individual aluminum toxicity testing at Yuba City; again individual testing is not a valid replacement for developing fully protective criteria. A prime example of a state utilizing good water quality standards development techniques for developing a site specific standard for aluminum is the state of Indiana where a final chronic criterion of 174 ug/l was established in 1997. In 2003, Canada adopted pH dependant freshwater aquatic life criteria for aluminum that ranges from 84 ug/l to 252 ug/l. Ignoring the final recommendation of the criteria misses the protective intermediate measures to protect against mortality and reductions to growth and reproduction. According to the New Mexico water quality standards (20.6.4.900.M NMAC), the dissolved aluminum chronic criterion is 87 µg/L and the dissolved aluminum acute criterion is 750 µg/L for aquatic life uses. High chronic levels of dissolved aluminum can be toxic to fish, benthic invertebrates, and some single-celled plants. Aluminum concentrations from 100 to 300 µg/L increase mortality, retard growth, gonadal development and egg production of fish (<http://h2osparc.wq.ncsu.edu>). The Regional Board's single use of the acute criteria for aluminum is not protective of the aquatic life beneficial uses of the receiving stream.

Federal Regulations, 40 CFR 122.44 (d)(i), requires that; "Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including

State narrative criteria for water quality.” US EPA has interpreted 40 CFR 122.44(d) in *Central Tenets of the National Pollutant Discharge Elimination System (NPDES) Permitting Program* (Factsheets and Outreach Materials, 08/16/2002) that although States will likely have unique implementation policies there are certain tenets that may not be waived by State procedures. These tenets include that “where valid, reliable, and representative effluent data or instream background data are available they MUST be used in applicable reasonable potential and limits derivation calculations. Data may not be arbitrarily discarded or ignored.” The California Water Code (CWC), Section 13377 states in part that: “...the state board or the regional boards shall...issue waste discharge requirements... which apply and ensure compliance with ...water quality control plans, or for the protection of beneficial uses...” Section 122.44(d) of 40 CFR requires that permits include water quality-based effluent limitations (WQBELs) to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water. A water quality standard for Failure to include an effluent limitation for aluminum in the Permit violates 40 CFR 122.44 and CWC 13377.

The Permit with regard to aluminum and failing to implement the chronic criteria specifically states on pages F-52 and 53 that:

**“i. Aluminum, (a) WQO.** The Secondary MCL for aluminum for the protection of the MUN beneficial use is 200 µg/L. In addition, USEPA developed National Recommended Ambient Water Quality Criteria (NAWQC) for protection of freshwater aquatic life for aluminum. The recommended 4-day average (chronic) and 1-hour average (acute) criteria for aluminum are 87 µg/L and 750 µg/L, respectively, for waters with a pH of 6.5 to 9.0. USEPA recommends that the ambient criteria are protective of the aquatic beneficial uses of receiving waters in lieu of site-specific criteria. However, information contained in the footnotes to the NAWQC indicate that the development of the chronic criterion was based on specific receiving water conditions where there is low pH (below 6.5) and low hardness levels (below 50 mg/L as CaCO<sub>3</sub>). The Sacramento River (SR) has been measured to have hardness values—typically between 26 and 100 mg/L as CaCO<sub>3</sub>. The SR has been measured above the discharge to have a pH between 6.4 to 8.8. Thus, it is unlikely that application of the chronic criterion of 87 µg/L is necessary to protect aquatic life in the Sacramento River in the vicinity of the discharge. For similar reasons, the Utah Department of Environmental Quality (Department) only applies the 87 µg/L chronic criterion for aluminum where the pH is less than 7.0 and the hardness is less than 50 mg/L as CaCO<sub>3</sub> the receiving water after mixing. For conditions where the pH equals or exceeds 7.0 and the hardness is equal to or exceeds 50 mg/L as CaCO<sub>3</sub>, the Department regulates aluminum based on the 750 µg/L acute criterion. In this site specific case it is likely that application of the stringent chronic criteria (87µg/L) is overly protective.”

The legally adopted site-specific aluminum criteria in Utah found in the Utah Administrative Code <http://www.rules.utah.gov/publicat/code/r317/r317-002.htm#T16>. Actually states that the criteria for aluminum is

Aluminum, 4 Day Average (6) 87, 1 Hour Average 750

(6) The criterion for aluminum will be implemented as follows: Where the pH is equal to or greater than 7.0 and the hardness is equal to or greater than 50 ppm as CaCO<sub>3</sub> in the receiving water after mixing, the 87 ug/l chronic criterion (expressed as total recoverable) will not apply, and aluminum will be regulated based on compliance with the 750 ug/l acute aluminum criterion (expressed as total recoverable).

Even if one were to properly apply the Utah objective; since the hardness in the Sacramento River is below 50 mg/l (measured at 26mg/l), the 87 ug/l chronic criteria would be applicable. Perhaps the Regional Board staff has misread their cited Utah footnote; if the hardness is greater than 50 mg/l – the 87 ug/l will not apply. Here the hardness has been shown to be less than 50 so the 87 ug/l criteria would apply. Of course the Utah objective is not applicable in California.

More importantly with regard to Utah is that they legally adopted a state specific criterion. The Regional Board in this case is attempting to utilize the Utah objective and fails to pursue a technically and legally sound site specific objective for aluminum.

40 CFR 122.44 (d)(vi):

“Where a State has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits using one or more of the following options:

(A) Establish effluent limits using a calculated numeric water quality criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and will fully protect the designated use. Such a criterion may be derived using a proposed State criterion, or an explicit State policy or regulation interpreting its narrative water quality criterion, supplemented with other relevant information which may include: EPA's Water Quality Standards Handbook, October 1983, risk assessment data, exposure data, information about the pollutant from the Food and Drug Administration, and current EPA criteria documents; or

(B) Establish effluent limits on a case-by-case basis, using EPA's water quality criteria, published under section 304(a) of the CWA, supplemented where necessary by other relevant information; or

(C) Establish effluent limitations on an indicator parameter for the pollutant of concern, provided:

(1) The permit identifies which pollutants are intended to be controlled by the use of the effluent limitation;

(2) The fact sheet required by Sec. 124.56 sets forth the basis for the limit, including a finding that compliance with the effluent limit on the indicator parameter will result in controls on the pollutant of concern which are sufficient to attain and maintain applicable water quality standards;

(3) The permit requires all effluent and ambient monitoring necessary to show that during the term of the permit the limit on the indicator parameter continues to attain and maintain applicable water quality standards; and

(4) The permit contains a reopener clause allowing the permitting authority to modify or revoke and reissue the permit if the limits on the indicator parameter no longer attain and maintain applicable water quality standards.”

California has not established water quality criteria for aluminum.

Federal Regulations allow a state to be more stringent than federal regulations, but there are no provisions for a state to be less stringent than applicable regulations. The Regional Board’s failure to include effluent limitations for aluminum, based on EPA’s chronic water quality criteria, is less stringent than the limitations required under 122.44(d)(vi). The Regional Board could adopt site-specific criteria or ask the State Board to adopt a water quality criterion.

The Regional Board’s use of the “Utah” criteria for developing limitations, or for failing to develop limitation, utilizes the criteria to justify less restrictive site specific water quality objectives. The Regional Board has utilized the “Utah” criteria as a replacement for legally adopted aluminum water quality criteria.

40 CFR 131.2 - A water quality standard defines the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses. States adopt water quality standards to protect public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act (the Act).

40 CFR 131.3 (c) *Section 304(a) criteria* are developed by EPA under authority of section 304(a) of the Act based on the latest scientific information on the relationship that the effect of a constituent concentration has on particular aquatic species and/or human health. This information is issued periodically to the States as guidance for use in developing criteria.



The establishment of state wide or site specific water quality criteria must be done in accordance with 40 CFR 131. Such criteria must be submitted to EPA for review and approval:

“The following elements must be included in each State’s water quality standards submitted to EPA for review:

- (a) Use designations consistent with the provisions of sections 101(a)(2) and 303(c)(2) of the Act.
- (b) Methods used and analyses conducted to support water quality standards revisions.
- (c) Water quality criteria sufficient to protect the designated uses.
- (d) An antidegradation policy consistent with § 131.12.
- (e) Certification by the State Attorney General or other appropriate legal authority within the State that the water quality standards were duly adopted pursuant to State law.
- (f) General information which will aid the Agency in determining the adequacy of the scientific basis of the standards which do not include the uses specified in section 101(a)(2) of the Act as well as information on general policies applicable to State standards which may affect their application and implementation.”

The Regional Board has not however recalculated the criteria and begun the legally required process of modifying the water quality criteria. The Regional Board has circumvented the legal water quality standards development process and applied the recommended water quality levels for Utah in NPDES permits. This conflicts with federal and state requirements for developing water quality standards, including site-specific standards. The Regional Board has failed to follow the legally required procedures for developing water quality standards, 40 CFR Part 131. In utilizing the Utah criteria in place of legally adopted criteria the Regional Board has failed to comply with the California Water Code, Porter Cologne Section 13241. In applying a new water quality standard for aluminum from the State of Utah and failing to abide by US EPA’s ambient criteria for aluminum the Regional Board failed to consider the factors from Porter Cologne § 13241. Each regional board shall establish such water quality objectives in water quality control plans as in its judgment will ensure the reasonable protection of beneficial uses and the prevention of nuisance; however, it is recognized that it may be possible for the quality of water to be changed to some degree without unreasonably affecting beneficial uses. Factors to be considered by a regional board in establishing water quality objectives shall include, but not necessarily be limited to, all of the following:

- (a) Past, present, and probable future beneficial uses of water.
- (b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.

- (c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.
- (d) Economic considerations.
- (e) The need for developing housing within the region.
- (f) The need to develop and use recycled water.

CFR 124.17(a)(2) requires the Response to Comments briefly describe and respond to all significant comments. The Regional Board failed to describe US EPA's letter, 169 ug/l of aluminum caused a 24% reduction in the growth of young brook trout, 174 ug/l of aluminum killed 58% of the exposed striped bass and numerous individual parts of CSPA's comment regarding aluminum or to provide any response.

**G. The Central Valley Regional Water Board (Region 5) NPDES Permits establish Effluent Limitations for metals based on the hardness of the effluent and/or the downstream water and rarely use the ambient upstream receiving water hardness as required by Federal Regulations, the California Toxics Rule (CTR, 40 CFR 131.38(c)(4)).**

For the Sac Regional discharge the upstream receiving water always at the lowest observed upstream receiving water hardness (i.e., 26 mg/L as CaCO<sub>3</sub>). The Water-Quality Assessment of the Sacramento River Basin, California Water-Quality, Sediment and Tissue Chemistry, and Biological Data, 1995-1998 (Open-File Report 2000- 91) by the United States Geological Survey found the total hardness of the Sacramento River at Freeport to be 19 mg/l as CaCO<sub>3</sub> on 6 January 1997 ([http://ca.water.usgs.gov/sac\\_nawqa/Publications/ofr\\_2000-391/data\\_sw/Freeport/freefld.html](http://ca.water.usgs.gov/sac_nawqa/Publications/ofr_2000-391/data_sw/Freeport/freefld.html)). The USGS is a reliable source of information and there is no reason not to use the lowest reported hardness of 19 mg/l. The data is at least as reliable as that reported by the Discharger and utilized by the Regional Board. However, for ease of calculation and for demonstration purposes the following uses the 26 mg/l hardness low data point reported in the Permit. For any modification of the Permit; low ambient instream hardness should be established at 19 mg/l.

The Regional Board used a hardness of 80 mg/L (as CaCO<sub>3</sub>) for to calculate the effluent concentration allowance (ECA) for Concave Down Metals (chronic cadmium, chromium III, copper, nickel, and zinc) rationalizing that an ECA based on a lower hardness (e.g. lowest upstream receiving water hardness) would also be protective, but would result in unreasonably stringent effluent limits considering the known conditions. Therefore, in this Order the ECA for all Concave Down Metals has been calculated using Equation 1 with a hardness of 80 mg/L (as CaCO<sub>3</sub>). (Permit pages F-23 and 24)

The Regional Board used the minimum upstream receiving water hardness and the minimum effluent hardness to calculate the ECA for all Concave Up Metals (acute cadmium, lead, and

acute silver) rationalizing that the use of a lower ECA (e.g., calculated based solely on the lowest upstream receiving water hardness) is also protective, but would lead to unreasonably stringent effluent limits considering the known conditions.

Metals	Regional Board's Effluent Concentration Allowances, ECAs (ug/L) as total recoverable metals		Using a hardness of 26 mg/l*	
	acute	chronic	acute	chronic
Copper	11	7.7	3.9	3.0
Chromium III	1500	72	565	68
Cadmium	3.3	2.1	0.96	0.85
Lead	54	2.1	15	0.55
Nickel	390	43	155	17
Silver	1.8	--	0.37 (daily max)	
Zinc	99	99	38	38

\*19 mg/l total hardness was reported by USGS for the Sacramento River at Freeport.

It is obvious from the table above that using the ambient upstream hardness results in significantly more restrictive effluent limitations and that more constituents are likely to present a reasonable potential to exceed the criteria.

The Permit cites in Findings F and G that federal regulations require the application of limitations more stringent than technological standards where necessary to meet water quality standards. The Regional Board has failed to cite any regulatory authority that allows limitations that are less stringent than those required by federal regulation.

Federal Regulation 40 CFR 131.38(c)(4) states that: "For purposes of calculating freshwater aquatic life criteria for metals from the equations in paragraph (b)(2) of this section, for waters with a hardness of 400 mg/l or less as calcium carbonate, the actual ambient hardness of the surface water shall be used in those equations." (Emphasis added). The definition of *ambient* is "in the surrounding area", "encompassing on all sides". It has been the Region 5, Sacramento, NPDES Section, in referring to Basin Plan objectives for temperature, to define *ambient* as meaning upstream. It is reasonable to assume, after considering the definition of ambient, that EPA is referring to the hardness of the receiving stream before it is potentially impacted by an effluent discharge. It is also reasonable to make this assumption based on past interpretations and since EPA, in permit writers' guidance and other reference documents, generally assumes receiving streams have dilution, which would ultimately "encompass" the discharge. Ambient conditions are in-stream conditions unimpacted by the discharge. Confirming this definition, the SIP Sections 1.4.3.1 *Ambient Background Concentration as an Observed Maximum* and 1.4.3.2 state in part that: "If possible, preference should be given to ambient water column concentrations measured immediately upstream or near the discharge, but not within an allowed

mixing zone for the discharge. The RWQCB shall have discretion to consider if any samples are invalid for use as applicable data due to evidence that the sample has been erroneously reported or the sample is not representative of the ambient receiving water column that will mix with the discharge.”

The Regional Board has used the effluent hardness and the instream effluent hardness measured immediately downstream of the point of discharge, calling such “ambient”. Ambient is defined as “surrounding”; not “in the middle of”. Regional Board staff have begun to define any hardness used (effluent, upstream and downstream) as being “ambient”. The result of using a higher effluent or downstream hardness value is that metals are toxic at higher concentrations, discharges have less reasonable potential to exceed water quality standards and the resulting Permits have fewer Effluent Limitations.

The most typical wastewater discharge situation is where the receiving water hardness is lower than the effluent hardness. Metals are more toxic in lower hardness water. For example; if the receiving water hardness is 25 mg/l and the effluent hardness is 50 mg/l a corresponding chronic discharge limitation for copper based on the different hardness’s would be 2.9 ug/l and 5.2 ug/l, respectively. Obviously, the limitation based on the true ambient (upstream) receiving water hardness is more restrictive.

The Regional Board’s use of hardness other than the upstream is based on an approach developed by Dr. Robert Emerick, of Eco:Logic Engineers. Dr. Emerick developed a different approach for evaluating hardness-dependent metals that used effluent and downstream hardness values in assessing reasonable potential and developing effluent limits. He subsequently presented his approach at the Water Board’s Training Academy and the Regional Board has adopted this methodology as a defacto policy in developing and issuing wastewater discharge permits. Dr. Emerick’s approach has never been evaluated or adopted through the legally mandated rule-making procedures. Use of the policy has resulted in fewer and less stringent and less protective limits in numerous permits.

The Federal Register, Volume 65, No. 97/Thursday, May 18<sup>th</sup> 2000 (31692), adopting the California Toxics Rule in confirming that the ambient hardness is the upstream hardness, absent the wastewater discharge, states that: “A hardness equation is most accurate when the relationship between hardness and the other important inorganic constituents, notably alkalinity and pH, are nearly identical in all of the dilution waters used in the toxicity tests and in the surface waters to which the equation is to be applied. If an effluent raises hardness but not alkalinity and/or pH, using the lower hardness of the downstream hardness might provide a lower level of protection than intended by the 1985 guidelines. If it appears that an effluent causes hardness to be inconsistent with alkalinity and/or pH the intended level of protection will usually be maintained or exceeded if either (1) data are available to demonstrate that alkalinity

and/or pH do not affect the toxicity of the metal, or (2) the hardness used in the hardness equation is the hardness of upstream water that does not include the effluent. The level of protection intended by the 1985 guidelines can also be provided by using the WER procedure.”

On March 24, 2000 the US Fish and Wildlife Service (Service) and the National Marine Fisheries Service (NMFS) issued a biological opinion on the effects of the final promulgation of the CTR on listed species and critical habitats in California in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.; Act). The biological opinion was issued to the U.S. Environmental Protection Agency, Region 9, with regard to the “Final Rule for the Promulgation of Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California” (CTR)”. The document represented the Services’ final biological opinion on the effects of the final promulgation of the CTR on listed species and critical habitats in California in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.; Act).

The biological opinion contains the following discussion, beginning on page 205, regarding the use of hardness in developing limitations for toxic metals:

“The CTR should more clearly identify what is actually to be measured in a site water to determine a site-specific hardness value. Is the measure of hardness referred to in the CTR equations a measure of the water hardness due to calcium and magnesium ions only? If hardness computations were specified to be derived from data obtained in site water calcium and magnesium determinations alone, confusion could be avoided and more accurate results obtained (APHA 1985). Site hardness values would thus not include contributions from other multivalent cations (e.g., iron, aluminum, manganese), would not rise above calcium + magnesium hardness values, or result in greater-than-intended site criteria when used in formulas. In this Biological opinion, what the Services refer to as hardness is the water hardness due to calcium + magnesium ions only.

The CTR should clearly state that to obtain a site hardness value, samples should be collected upstream of the effluent source(s). Clearly stating this requirement in the CTR would avoid the computation of greater-than-intended site criteria in cases where samples were collected downstream of effluents that raise ambient hardness, but not other important water qualities that affect metal toxicity (e.g., pH, alkalinity, dissolved organic carbon, calcium, sodium, chloride, etc.). Clearly, it is inappropriate to use downstream site water quality variables for input into criteria formulas because they may be greatly altered by the effluent under regulation. Alterations in receiving water chemistry by a discharger (e.g., abrupt elevation of hardness, changes in pH, exhaustion of alkalinity, abrupt increases in organic matter etc.) should not result, through application of hardness in criteria formulas, in increased allowable discharges of toxic metals. If the use of

downstream site water quality variables were allowed, discharges that alter the existing, naturally-occurring water composition would be encouraged rather than discouraged. Discharges should not change water chemistry even if the alterations do not result in toxicity, because the aquatic communities present in a water body may prefer the unaltered environment over the discharge-affected environment. Biological criteria may be necessary to detect adverse ecological effects downstream of discharges, whether or not toxicity is expressed.

The CTR proposes criteria formulas that use site water hardness as the only input variable. In contrast, over twenty years ago Howarth and Sprague (1978) cautioned against a broad use of water hardness as “shorthand” for water qualities that affect copper toxicity. In that study, they observed a clear effect of pH in addition to hardness. Since that time, several studies of the toxicity of metals in test waters of various compositions have been performed and the results do not confer a singular role to hardness in ameliorating metals toxicity. In recognition of this fact, most current studies carefully vary test water characteristics like pH, calcium, alkalinity, dissolved organic carbon, chloride, sodium, suspended solids, and others while observing the responses of test organisms. It is likely that understanding metal toxicity in waters of various chemical makeups is not possible without the use of a geochemical model that is more elaborate than a regression formula. It may also be that simple toxicity tests (using mortality, growth, or reproductive endpoints) are not capable of discriminating the role of hardness or other water chemistry characteristics in modulating metals toxicity (Erickson *et al.* 1996). Gill surface interaction models have provided a useful framework for the study of acute metals toxicity in fish (Pagenkopf 1983; Playle *et al.* 1992; Playle *et al.* 1993a; Playle *et al.* 1993b; Janes and Playle 1995; Playle 1998), as have studies that observe physiological (e.g. ion fluxes) or biochemical (e.g. enzyme inhibition) responses (Lauren and McDonald 1986; Lauren and McDonald 1987a; Lauren and McDonald 1987b; Reid and McDonald 1988; Verbost *et al.* 1989; Bury *et al.* 1999a; Bury *et al.* 1999b). Even the earliest gill models accounted for the effects of pH on metal speciation and the effects of alkalinity on inorganic complexation, in addition to the competitive effects due to hardness ions (Pagenkopf 1983). Current gill models make use of sophisticated, computer-based, geochemical programs to more accurately account for modulating effects in waters of different chemical makeup (Playle 1998). These programs have aided in the interpretation of physiological or biochemical responses in fish and in investigations that combine their measurement with gill metal burdens and traditional toxicity endpoints.

The Services recognize and acknowledge that hardness of water and the hardness acclimation status of a fish will modify toxicity and toxic response. However the use of hardness alone as a universal surrogate for all water quality parameters that may modify

toxicity, while perhaps convenient, will clearly leave gaps in protection when hardness does not correlate with other water quality parameters such as DOC, pH, Cl- or alkalinity and will not provide the combination of comprehensive protection and site specificity that a multivariate water quality model could provide. In our review of the best available scientific literature the Services have found no conclusive evidence that water hardness, by itself, in either laboratory or natural water, is a consistent, accurate predictor of the aquatic toxicity of all metals in all conditions.

SWRCB presidential Order No. WQ 2008-0008 (Corrected) regarding a petition for consideration of the City of Davis' NPDES Permit states and concludes that:

“Based on the current record, it would be more appropriate to use the lowest reliable upstream receiving water hardness values of 78 mg/l for Willows Slough Bypass and 85 mg/l for Conaway Ranch Toe Drain for protection from acute toxicity impacts, regardless of when the samples were taken or whether they were influenced by storm events. Because high flow conditions may deviate from the design flow conditions for selection of hardness as specified in the CTR, it may not be necessary, in some circumstances, to select the lowest hardness values from high flow or storm event conditions. Regardless of the hardness used, the resulting limits must always be protective of water quality criteria under all flow conditions.”

“**Conclusion:** The Central Valley Water Board was justified in using upstream receiving water hardness values rather than effluent hardness values. However, for protection from acute toxicity impacts in the receiving waters, which can occur in short durations even during storm events, in this case, based on the existing record, the Central Valley Water Board should have used the lowest valid upstream receiving water hardness values of 78 mg/l for Willow Slough Bypass and 85 mg/l for Conaway Ranch Toe Drain. Effluent limitations must protect beneficial uses considering reasonable, worst-case conditions. We recognize that this approach does not necessarily agree with conclusions in other guidance stating that low flow conditions are the “worst-case” conditions. However, nothing in this Order is intended to suggest that low flows are inappropriate for determining the reasonable, worst-case conditions in other contexts.” (Emphasis added)

The Regional Board has cited the State Board's Water Quality Order (WQO)(No. 2008 0008) for the City of Davis as allowing complete discretion in utilizing the downstream hardness in deriving limits for toxic metals. WQO 2008 0008 in requiring the Regional Board to modify their permit states: “Revise the Fact Sheet to include a discussion of the appropriate hardness to use to protect from acute toxicity impacts (which can occur in short-term periods including storm events) in the receiving waters. The Fact Sheet should also state that the lowest valid upstream receiving water hardness values of 78 mg/l for Willow Slough Bypass and 85 mg/l for Conaway

Ranch Toe Drain should be used to determine reasonable potential for the effluent to exceed the hardness-dependent metal CTR criteria, unless additional evidence and analysis, consistent with this Order, demonstrates that different hardness values are appropriate to use and are fully protective of water quality.” The Regional Board did not use the lowest observed upstream hardness as required in WQO 2008 0008. The Regional Board has not provided additional evidence and analysis demonstrating that different hardness is fully protective of beneficial uses. To the contrary, the Regional Board does not address the March 24, 2000 the US Fish and Wildlife Service (Service) and the National Marine Fisheries Service (NMFS) CTR Biological Opinion cited above stating that the use of hardness alone is not protective of beneficial uses and recommending the sole use of the ambient upstream hardness in developing limits for toxic metals.

State Water Board Order WQO 2004 – 0013 for the City of Yuba City is also clear that the lowest observed hardness must be used in determining reasonable potential and developing Effluent Limitations for hardness dependant metals. The Yuba City Order states that: Conclusions No. 5; “In calculating the hardness value of the receiving water for purposes of determining the need for effluent limitations for metals, i.e., the reasonable potential, it is appropriate to use the “worst-case” historical data, but use of ICP data is more reliable than the titration method.”

The Regional Board’s arguments with regard to effluent and/or downstream receiving water hardness can only be made if in-stream mixing is considered. Mixing zones may be granted in accordance with extensive requirements contained in the SIP and the Basin Plan to establish Effluent Limitations. Mixing zones cannot be considered in conducting a reasonable potential analysis to determine whether a constituent will exceed a water quality standard or objective. The Regional Board’s approach in using the effluent or downstream hardness to conduct a reasonable potential analysis and consequently establish effluent limitations can only be utilized if mixing is considered; otherwise the ambient (upstream) hardness results in significantly more restrictive limitations. A mixing zone allowance has not been discussed with regard to this issue and therefore does not comply with the SIP. To the contrary, the Regional Board states that mixing zones are not being allowed for acute metals toxicity.

The issue is that the Regional Board fails to comply with the regulatory requirement to use the ambient instream hardness for limiting hardness dependant metals under the CTR. Failure to utilize the upstream ambient hardness for determining reasonable potential and developing limitations results in fewer and less restrictive Effluent Limitations.

The Regional Board is intentionally deceptive in their Response to Comments in stating that they used the downstream ambient hardness to calculate the reasonable potential and effluent Limitations for hardness dependant metals. Reading the permit Fact Sheet, pages F-20 through F-28, the Regional Board cites the “Emerick” report and methodology as being their source for



determining that metals limitations would be overly protective based on the ambient upstream ambient hardness. The “Emerick” report and method does not utilize the downstream hardness and therefore cannot be used for any such justification. Without the “Emerick” report as their basis, the Regional Board cites no authority or technical basis for concluding that using a lower ambient upstream instream hardness results in overly protective effluent limitations. Further, the permit clearly states that a hardness of 80 mg/l was used to conduct the reasonable potential analysis and to establish limitations for hardness dependant metals. The permit Fact Sheet clearly cites that the worst case effluent hardness is 80 mg/l. The Fact Sheet, Tables F-6, F-7 and F-8, all clearly show that the “Mixed Downstream Ambient Concentration” hardness is only 80 mg/l when measuring 100% effluent (Effluent Fraction). Any mixture of the effluent and the downstream hardness results in a lower hardness than 80 mg/l. In December 2010, Judge Timothy M. Frawley of the California Superior Court in Sacramento (CSPA vs. the Regional Board, El Dorado Irrigation District) clearly decided that the effluent hardness cannot be used in calculating limitations for hardness dependant metals. The Regional Board’s permit does not comply with the Superior Court ruling with regard to hardness.

**H. The Regional Board failed to use the most current criteria for copper resulting in the Permit containing an inadequate effluent limitation in accordance with 40 CFR 122.44.**

In accordance with Federal Regulations, 40 CFR 122.44, the Regional Board is required to establish an effluent limitation if a pollutant is measured in the effluent which presents a reasonable potential to exceed a water quality standard or objective. In 2007 US EPA updated the Ambient Water Quality Criteria for Copper, (February 2007; EPA-822-F-07-001). Since EPA published the hardness-based recommendation for copper criteria in 1984, new data have become available on copper toxicity and its effects on aquatic life.

The Biotic Ligand Model (BLM) – a metal bioavailability model that uses receiving water body characteristics to develop site-specific water quality criteria – utilizes the best available science and serves as the basis for the new national recommended criteria. The BLM requires ten input parameters to calculate a freshwater copper criterion (a saltwater BLM is not yet available): temperature, pH, dissolved organic carbon (DOC), calcium, magnesium, sodium, potassium, sulfate, chloride, and alkalinity. The BLM is used to derive the criteria rather than as a post-derivation adjustment as was the case with the hardness-based criteria. This allows the BLM-based criteria to be customized to the particular water under consideration.

BLM-based criteria can be more stringent than the current hardness-based copper criteria and in certain cases the current hardness-based copper criteria may be overly stringent for particular water bodies. We expect that application of this model will result in more appropriate criteria and eliminate the need for costly, time-consuming site-specific modifications using the water effect ratio. The Regional Board, in the Permit, laments that the hardness based effluent limitation

based solely on the ambient upstream hardness would be overly restrictive. Use of the new criteria resolves any issue about overly or under restrictive limitations and stands as a test of the Regional Board's sincerity to derive a limitation based on the latest available science. As is stated above, the BLM is based on ten input parameters and can be more or less restrictive than an effluent limitation based solely on hardness. Since the new criteria has the potential to be more restrictive than that which was developed on use of hardness alone, the Regional Board has not conducted an adequate reasonable potential analysis and has not used the latest criteria which may be more restrictive than that presented in the Permit. The Permit should be revised based on the use of the BLM and the latest EPA ambient criteria for copper.

**I. The Permit fails to contain a protective Effluent Limitation for copper in violation of the California Toxics Rule, Federal Regulations (40 CFR 122.44), the California Water Code (CWC), Section 13377 and the State's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP).**

The maximum observed effluent (MEC) concentration for copper was 6.34 µg/l, Table F-20, which exceeds the most stringent California Toxics Rule (CTR) water quality standard of 3.0 µg/l. In accordance with Federal Regulations, 40 CFR 122.44, the Regional Board is required to establish an effluent limitation if a pollutant is measured in the effluent which presents a reasonable potential to exceed a water quality standard of objective. In accordance with the SIP, Section 1.3, since the maximum effluent concentration exceeded a water quality standard, an effluent limitation is required. California Water Code, section 13377, requires that: "Notwithstanding any other provision of this division, the state board and the regional boards shall, as required or authorized by the Federal Water Pollution Control Act, as amended, issue waste discharge and dredged or fill material permits which apply and ensure compliance with all applicable provisions of the act and acts amendatory thereof or supplementary, thereto, together with any more stringent effluent standards or limitations necessary to implement water quality control plans, or for the protection of beneficial uses, or to prevent nuisance."

The measured concentrations of copper at 6.34 µg/l clearly exceed the CTR water quality standard of 3.0 µg/l and in accordance with Federal and State Regulations and the SIP, effluent limitations are required.

The Regional Board however did not utilize the lowest observed ambient surface water hardness (26 mg/l) in developing an effluent limitation for copper. The Permit includes an effluent limitation for copper based on the hardness of the effluent, which is 80 mg/l. Use of the effluent hardness in developing the effluent limitation for copper has resulted in an effluent limitation, which does not comply with the regulatory requirement to use the instream ambient hardness, and is not protective of the receiving stream aquatic life beneficial use. The Regional Board's

use of the effluent hardness resulted in a chronic based effluent concentration allowance (ECA) of 7.7 ug/l rather than 3.0 ug/l (26 mg/l hardness) and an acute ECA of 11 ug/l rather than 3.9 ug/l (26 mg/l hardness). Use of the 19 mg/l total hardness value reported by the USGS would yield an even greater difference between the effluent hardness results utilized by the Regional Board.

Federal Regulation, 40 CFR 122.4 (a), (d) and (g) require that no permit may be issued when the conditions of the permit do not provide for compliance with the applicable requirements of the CWA, or regulations promulgated under the CWA, when imposition of conditions cannot ensure compliance with applicable water quality requirements and for any discharge inconsistent with a plan or plan amendment approved under Section 208(b) of the CWA. The copper effluent limitations in the Permit are not protective of the aquatic life beneficial use of the receiving stream.

**J. The Permit fails to contain an Effluent Limitation for lead in violation of the California Toxics Rule, Federal Regulations (40 CFR 122.44), the California Water Code (CWC), Section 13377 and the State's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP).**

The maximum observed effluent (MEC) concentration for lead was 1.19 µg/l, Table F-2, which exceeds the most stringent California Toxics Rule (CTR) water quality standard of 0.55 µg/l. In accordance with Federal Regulations, 40 CFR 122.44, the Regional Board is required to establish an effluent limitation if a pollutant is measured in the effluent which presents a reasonable potential to exceed a water quality standard of objective. In accordance with the SIP, Section 1.3, since the maximum effluent concentration exceeded a water quality standard, an effluent limitation is required. California Water Code, section 13377, requires that: "Notwithstanding any other provision of this division, the state board and the regional boards shall, as required or authorized by the Federal Water Pollution Control Act, as amended, issue waste discharge and dredged or fill material permits which apply and ensure compliance with all applicable provisions of the act and acts amendatory thereof or supplementary, thereto, together with any more stringent effluent standards or limitations necessary to implement water quality control plans, or for the protection of beneficial uses, or to prevent nuisance."

The measured concentrations of lead at 1.19 µg/l clearly exceed the CTR water quality standard of 0.55 µg/l and in accordance with Federal and State Regulations and the SIP, effluent limitations are required.

The Regional Board did not utilize the lowest observed ambient surface water hardness (26 mg/l) in conducting the reasonable potential. The Permit fails to include an effluent limitation for lead since the reasonable potential analysis was conducted based on the hardness of the effluent, which is 80 mg/l, rather than utilizing the lowest observed hardness of 26 mg/l. Use of the

effluent hardness in developing the reasonable potential for lead has resulted a failure to include an effluent limitation in the Permit. Use of the effluent hardness and failure to include an effluent limitation for lead does not comply with the regulatory requirement to use the instream ambient hardness and is not protective of the receiving stream aquatic life beneficial use. Use of the 19 mg/l total hardness value reported by the USGS would yield an even greater difference between the effluent hardness results utilized by the Regional Board.

The requirements to use the instream ambient hardness are discussed in greater detail above. State Water Board Order WQO 2004 – 0013 for the City of Yuba City is also clear that the lowest observed hardness must be used in determining reasonable potential and developing Effluent Limitations for hardness dependant metals. The Yuba City Order states that: Conclusions No. 5; “In calculating the hardness value of the receiving water for purposes of determining the need for effluent limitations for metals, i.e., the reasonable potential, it is appropriate to use the “worst-case” historical data, but use of ICP data is more reliable than the titration method.”

Federal Regulation, 40 CFR 122.4 (a), (d) and (g) require that no permit may be issued when the conditions of the permit do not provide for compliance with the applicable requirements of the CWA, or regulations promulgated under the CWA, when imposition of conditions cannot ensure compliance with applicable water quality requirements and for any discharge inconsistent with a plan or plan amendment approved under Section 208(b) of the CWA. The absence of an effluent limitation for lead in the Permit is not protective of the aquatic life beneficial use of the receiving stream.

**K. The Permit fails to contain an Effluent Limitation for zinc in violation of the California Toxics Rule, Federal Regulations (40 CFR 122.44), the California Water Code (CWC), Section 13377 and the State’s Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP).**

The maximum observed effluent (MEC) concentration for zinc was 33.5 µg/l, Table F-2, which exceeds the most stringent California Toxics Rule (CTR) water quality standard of 17.0 µg/l. In accordance with Federal Regulations, 40 CFR 122.44, the Regional Board is required to establish an effluent limitation if a pollutant is measures in the effluent which presents a reasonable potential to exceed a water quality standard of objective. In accordance with the SIP, Section 1.3, since the maximum effluent concentration exceeded a water quality standard, an effluent limitation is required. California Water Code, section 13377, requires that: “Notwithstanding any other provision of this division, the state board and the regional boards shall, as required or authorized by the Federal Water Pollution Control Act, as amended, issue waste discharge and dredged or fill material permits which apply and ensure compliance with all applicable provisions of the act and acts amendatory thereof or supplementary, thereto, together with any

more stringent effluent standards or limitations necessary to implement water quality control plans, or for the protection of beneficial uses, or to prevent nuisance.”

The measured concentrations of zinc at 33.5 µg/l clearly exceed the CTR water quality standard of 17.0 µg/l and in accordance with Federal and State Regulations and the SIP, effluent limitations are required.

The Regional Board did not utilize the lowest observed ambient surface water hardness (19 mg/l) in conducting the reasonable potential. The Permit fails to include an effluent limitation for zinc since the reasonable potential analysis was conducted based on the hardness of the effluent, which is 80 mg/l, rather than utilizing the lowest observed hardness of 19 mg/l. Use of the effluent hardness in developing the reasonable potential for zinc has resulted in a failure to include an effluent limitation in the Permit. Use of the effluent hardness and failure to include an effluent limitation for zinc does not comply with the regulatory requirement to use the instream ambient hardness and is not protective of the receiving stream aquatic life beneficial use. Use of the 19 mg/l total hardness value reported by the USGS would yield an even greater difference between the effluent hardness results utilized by the Regional Board.

The requirement to use the instream ambient hardness is discussed in greater detail above. State Water Board Order WQO 2004 – 0013 for the City of Yuba City is also clear that the lowest observed hardness must be used in determining reasonable potential and developing Effluent Limitations for hardness dependant metals. The Yuba City Order states that: Conclusions No. 5; “In calculating the hardness value of the receiving water for purposes of determining the need for effluent limitations for metals, i.e., the reasonable potential, it is appropriate to use the “worst-case” historical data, but use of ICP data is more reliable than the titration method.”

Federal Regulation, 40 CFR 122.4 (a), (d) and (g) require that no permit may be issued when the conditions of the permit do not provide for compliance with the applicable requirements of the CWA, or regulations promulgated under the CWA, when imposition of conditions cannot ensure compliance with applicable water quality requirements and for any discharge inconsistent with a plan or plan amendment approved under Section 208(b) of the CWA. The absence of an effluent limitation for zinc in the Permit is not protective of the aquatic life beneficial use of the receiving stream.

**L. The Permit fails to implement the requirements of the Basin Plan, *Implementation, Policy for Application of Water Quality Objectives* with regard to additive toxicity.**

The Permit shows based on the instream ambient hardness, that copper, lead and zinc are present in the discharge at elevated concentrations. The combination of copper, lead and zinc has a potential for exhibiting additive toxic effects. The Basin Plan, *Implementation, Policy for Application of Water Quality Objectives* requires that: “Where multiple toxic pollutants exist

*together in water, the potential for toxicologic interactions exists. On a case by case basis, the Regional Water Board will evaluate available receiving water and effluent data to determine whether there is a reasonable potential for interactive toxicity. Pollutants which are carcinogens or which manifest their toxic effects on the same organ systems or through similar mechanisms will generally be considered to have potentially additive toxicity.”*

The Basin Plan is a policy of the Regional Board. California Water Code § 13146. State Agency Compliance requires that state offices, departments and boards, in carrying out activities which affect water quality, shall comply with state policy for water quality control unless otherwise directed or authorized by statute, in which case they shall indicate to the state board in writing their authority for not complying with such policy.

The Regional Board has failed to follow policy by not assessing the additive toxic effects of copper, lead and zinc ignoring the requirements of CWC Section 13146.

The Regional Board in their Response to Comments cites that the permit is protective based on two facts; the permit contains limits for individual constituents and the permit requires toxicity testing that would discover any additive affects. Both points are wrong, the permit fails to include limits for all the cited metals. The Regional Board fails to recognize that the discharge currently routinely fails the bioassay testing. Perhaps the toxicity failures are due to additive toxicity. However, even if both answers were correct, such does not relieve the Regional Board from complying with their own Basin Plan, which clearly requires that additive toxicity be evaluated by the methodology prescribed. The Basin Plan does not provide staff the option to utilize other methodologies for evaluating additive toxicity. California Water Code § 13146. State agency compliance; State offices, departments and boards, in carrying out activities which affect water quality, shall comply with state policy for water quality control unless otherwise directed or authorized by statute, in which case they shall indicate to the state board in writing their authority for not complying with such policy.

**M. The Permit contains an inadequate reasonable potential by using incorrect statistical multipliers as required by Federal regulations, 40 CFR § 122.44(d)(1)(ii).**

Federal regulations, 40 CFR § 122.44(d)(1)(ii), state “when determining whether a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative or numeric criteria within a State water quality standard, the permitting authority shall use procedures which account for existing controls on point and nonpoint sources of pollution, **the variability of the pollutant or pollutant parameter in the effluent**, the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity), and where appropriate, the dilution of the effluent in the receiving water.” Emphasis added. The reasonable potential analysis fails to consider the statistical variability of data and laboratory analyses as explicitly required by the federal regulations. The procedures for computing variability are detailed in

Chapter 3, pages 52-55, of USEPA's *Technical Support Document For Water Quality-based Toxics Control*. The Regional Water Board conducted the RPA in accordance with Section 1.3 of the SIP. The Permit fails to discuss compliance with 40 CFR § 122.44(d)(1)(ii). The State and Regional Boards do not have the authority to override and ignore federal regulation. A statistical analysis results in a projected maximum effluent concentration (MEC) based on laboratory variability and the resulting MEC is greater than was obtained from the actual sampling data. The result of using statistical variability is that a greater number of constituents will have a reasonable potential to exceed water quality standards and therefore a permit will have a greater number of effluent limitations. The intentional act of ignoring the Federal regulation has a clear intent of limiting the number of regulated constituents in an NPDES permit. The fact that the SIP illegally ignores this fundamental requirement does not exempt the Regional Board from its obligation to consider statistical variability in compliance with federal regulations. The failure to utilize statistical variability results in significantly fewer Effluent Limitations that are necessary to protect the beneficial uses of receiving waters. The reasonable potential analyses are flawed and must be recalculated.

The Regional Board in their Response to Comments admits: "Consistent with the RPA procedure from the SIP, the RPA for the tentative Order was not performed using statistical multipliers to determine if effluent limitations are needed." The Regional Board is incorrect in their Response to Comments that "neither protocol is necessarily better or worse in every case"; the use of statistical multipliers results in a projected maximum effluent concentration that is higher than the measured effluent concentration which will lead to more and more stringent limitations. The SIP procedures do not utilize a statistical analysis; one simply determines whether the maximum effluent concentration exceeds the water quality objective; if so a limitation is established. A state policy, in this case the SIP, does not override a Federal regulation.

**N. The Permit contains a compliance time schedule "effective immediately and ending on 30 November 2020" to meet the discharge limitations for BOD, TSS, ammonia, coliform organisms, chlorine and chlorpyrifos that exceeds the requirements of the Basin Plan.**

The Permit allows 10 years for the Discharger to comply with discharge limitations for BOD, TSS, ammonia, coliform organisms, chlorine and chlorpyrifos. The Basin Plan, Implementation, requires that where it is infeasible immediately achieve compliance a schedule of compliance may be granted based on the shortest practicable time but no longer than ten years.

The Permit contains numerous limitations based on the California Toxic Rule, which was adopted in 2000 with a final date for compliance with water quality standards by 18 May 2010. That date has passed.

The existing NPDES permit for this facility was adopted in 2000. NPDES permits have a five year lifespan. Based on our routine review of NPDES permits from the Central Valley Region it is typical that a 5-year compliance schedule is granted for planning, design and construction of tertiary wastewater treatment systems. It is also typical that Dischargers generally comply with these time schedules.

40 C.F.R. section 131.38(e)(3) formerly authorized compliance schedules delaying the effective date of WQBELs being set based on the NTR and CTR. Pursuant to 40 C.F.R. section 131.38(e)(8), however, this compliance schedule authorization *expressly expired* on May 18, 2005, depriving the State and Regional Boards with any authority to issue compliance schedules delaying the effective date of such WQBELs. Indeed, the EPA Federal Register Preamble accompanying the CTR stated as much, noting, “EPA has chosen to promulgate the rule with a sunset provision which states that the authorizing compliance schedule provision will cease or sunset on May 18, 2005.”

The Regional Board may contend that the EPA Federal Register Preamble has effectively extended this compliance schedule authority when the Preamble observed, “[I]f the State Board adopts, and EPA approves, a statewide authorizing compliance schedule provision significantly prior to May 18, 2005, EPA will act to stay the authorizing compliance schedule provision in today’s rule.” It is true that the State Board subsequently adopted its Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, enacted by State Board Resolution No. 2000-015 (March 2, 2000) (“State Implementation Plan” or “SIP”) and that the SIP provides for compliance schedules without imposing a May 18, 2005 cutoff. EPA, however, *has not* acted to stay 40 C.F.R. section 131.38(e)(8) by the only means it can lawfully do so: notice and comment rulemaking that amends 40 C.F.R. section 131.38(e)(8). Without such a rulemaking, 40 C.F.R. section 131.38(e)(8) remains the law and it unequivocally ends authorization to issue compliance schedules after May 18, 2000. *See Friends of the Earth, Inc. v. Environmental Protection Agency*, 446 F.3d 140 (D.C. Cir. 2006).

Even if 40 C.F.R. section 131.38(e)(8) did not preclude issuing compliance schedules which delay the effective date of WQBELs set under the NTR and CTR, the CWA itself precludes such compliance schedules—and any compliance schedule which delays the effective date of WQBELs past 1977.

Numerous courts have held that neither the EPA nor the States have the authority to extend the deadlines for compliance established by Congress in CWA section 301(b)(1). 33 U.S.C. §1311(b)(1); *See State Water Control Board v. Train*, 559 F.2d 921, 924-25 (4th Cir. 1977) (“Section 301(b)(1)’s effluent limitations are, on their face, unconditional”); *Bethlehem Steel Corp. v. Train*, 544 F.2d 657, 661 (3d Cir. 1976), *cert. denied sub nom. Bethlehem Steel Corp. v. Quarles*, 430 U.S. 975 (1977) (“Although we are sympathetic to the plight of Bethlehem and similarly situated dischargers, examination of the terms of the statute, the legislative history of



[the Clean Water Act] and the case law has convinced us that July 1, 1977 was intended by Congress to be a rigid guidepost”).

This deadline applies equally to technology-based effluent limitations and WQBELs. *See Dioxin/Organochlorine Ctr. v. Rasmussen*, 1993 WL 484888 at \*3 (W.D. Wash. 1993), *aff'd sub nom. Dioxin/Organochlorine Ctr. v. Clarke*, 57 F.3d 1517 (9th Cir. 1995) (“The Act required the adoption by the EPA of ‘any more stringent limitation, including those necessary to meet water quality standards,’ by July 1, 1977”) (citation omitted); *Longview Fibre Co. v. Rasmussen*, 980 F.2d 1307, 1312 (9th Cir. 1992) (“[Section 1311(b)(1)(C)] requires achievement of the described limitations ‘not later than July 1, 1977.’”) (citation omitted). Any discharger not in compliance with a WQBEL after July 1, 1977, violates this clear congressional mandate. *See Save Our Bays and Beaches v. City & County of Honolulu*, 904 F. Supp. 1098, 1122-23 (D. Haw. 1994).

Congress provided no blanket authority in the Clean Water Act for extensions of the July 1, 1977, deadline, but it did provide authority for the States to foreshorten the deadline. CWA section 303(f) (33 U.S.C. § 1313(f)) provides that: “[n]othing in this section [1313] shall be construed to affect any effluent limitations or schedule of compliance required by any State to be implemented prior to the dates set forth in section 1311(b)(1) and 1311(b)(2) of this title nor to preclude any State from requiring compliance with any effluent limitation or schedule of compliance at dates earlier than such dates.”

Because the statute contains explicit authority to expedite the compliance deadline but not to extend it, the Regional Board may not authorize extensions beyond this deadline in discharge permits.

The July 1, 1977, deadline for achieving WQBELs applies equally even if the applicable WQS are established after the compliance deadline. 33 U.S.C. section 1311(b)(1)(C) requires the achievement of “more stringent limitations necessary to meet water quality standards . . . established pursuant to any State law . . . or required to implement any applicable water quality standard established pursuant to this chapter.” Congress understood that new WQS would be established after the July 1, 1977, statutory deadline; indeed, Congress mandated this by requiring states to review and revise their WQS every three years. *See* 33 U.S.C. § 1313(c). Yet, Congress did not draw a distinction between achievement of WQS established before the deadline and those established after the deadline.

Prior to July 1, 1977, therefore, a discharger could be allowed some time to comply with an otherwise applicable water quality-based effluent limitation. Beginning on July 1, 1977, however, dischargers were required to comply as of the date of permit issuance with WQBELs, including those necessary to meet standards established subsequent to the compliance deadline.

In the Clean Water Act Amendments of 1977, Congress provided limited extensions of the July 1, 1977, deadline for achieving WQBELs. In CWA section 301(i), Congress provided that “publicly-owned treatment works” (“POTWs”) that must undertake new construction in order to achieve the effluent limitations, and need Federal funding to complete the construction, may be eligible for a compliance schedule that may be “in no event later than July 1, 1988.” 33 U.S.C. § 1311(i)(1) (emphasis added). Congress provided for the same limited extension for industrial dischargers that discharge into a POTW that received an extension under section 1311(i)(1). *See* 33 U.S.C. § 1311(i)(2). In addition, dischargers that are not eligible for the time extensions provided by section 1311(i) but that do discharge into a POTW, may be eligible for a compliance schedule of no later than July 1, 1983. *See* 33 U.S.C. § 1319(a)(6).

The fact that Congress explicitly authorized certain extensions indicates that it did not intend to allow others, which it did not explicitly authorize. In *Homestake Mining*, the Eighth Circuit held that an enforcement extension authorized by section 1319(a)(2)(B) for technology-based effluent limitations did not also extend the deadline for achievement of WQBELs. 595 F.2d at 427-28. The court pointed to Congress' decision to extend only specified deadlines: “[h]aving specifically referred to water quality-based limitations in the contemporaneously enacted and similar subsection [1319](a)(6), the inference is inescapable that Congress intended to exclude extensions for water quality-based permits under subsection [1319](a)(5) by referring therein only to Section [1311](b)(1)(A). *Id.* at 428 (citation omitted). By the same reasoning, where Congress extended the deadline for achieving effluent limitations for specific categories of discharges and otherwise left the July 1, 1977, deadline intact, there is no statutory basis for otherwise extending the deadline.

The Clean Water Act defines the term effluent limitation as: “any restriction established . . . on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters, the waters of the contiguous zone, or the ocean, including schedules of compliance.” 33 U.S.C. § 1362(11).

The term schedule of compliance is defined, in turn, as “a schedule of remedial measures including an enforceable sequence of actions or operations leading to compliance with an effluent limitation, other limitation, prohibition, or standard.” 33 U.S.C. § 1362(17). The purpose of a compliance schedule is to facilitate compliance with an effluent limitation by the applicable deadline by inserting interim goals along the way: “[a] definition of effluent limitations has been included so that control requirements are not met by narrative statements of obligation, but rather are specific requirements of specificity as to the quantities, rates, and concentration of physical, chemical, biological and other constituents discharged from point sources. It is also made clear that the term effluent limitation includes schedules and time tables of compliance. The Committee has added a definition of schedules and time-tables of compliance so that it is clear that enforcement of effluent limitations is not withheld until the final date required for achievement.” S. Rep. No. 92-414, at 77, *reprinted in* 1972 U.S.C.C.A.N.

3668 (Oct. 28, 1971) (emphasis added). Thus, Congress authorized compliance schedules, not to extend its deadlines for achievement of effluent limitations, but to facilitate achievement by the prescribed deadlines.

In *United States Steel Corp.*, the industry plaintiff argued that 33 U.S.C. § 1311(b)(1)(C) allows the July 1, 1977, deadline to be met simply by beginning action on a schedule of compliance that eventually would result in achieving the technology- and water quality-based limitations. 556 F.2d at 855. The Court of Appeals disagreed: “[w]e reject this contorted reading of the statute. We recognize that the definition of ‘effluent limitation’ includes ‘schedules of compliance,’ section [1362(11)], which are themselves defined as ‘schedules . . . of actions or operations leading to compliance’ with limitations imposed under the Act. Section [1362(17)]. It is clear to us, however, that section [1311(b)(1)] requires point sources to achieve the effluent limitations based on BPT or state law, not merely to be in the process of achieving them, by July 1, 1977.” *Id.* Thus, compliance schedule may not be used as a means of evading, rather than meeting, the deadline for achieving WQBELs.

Finally, a compliance schedule that extends beyond the statutory deadline would amount to a less stringent effluent limit than required by the CWA. States are explicitly prohibited from establishing or enforcing effluent limitations less stringent than are required by the CWA. *See* 33 U.S.C. § 1370; Water Code §§ 13372, 13377. The clear language of the statute, bolstered by the legislative history and case law, establishes unambiguously that compliance schedules extending beyond the July 1, 1977, deadline may not be issued in discharge permits. The Permit, however, purports to do just that. By authorizing the issuance of permits that delay achievement of effluent limitations for over thirty years beyond Congress’ deadline, the Permit makes a mockery of the CWA section 301(b)(1)(C) deadline and exceeds the scope of the Regional Board’s authority under the Clean Water Act and the Porter-Cologne Act. 33 U.S.C. § 1311(b)(1)(C).

The Permit allows twice the time that is typically allowed for Dischargers to comply with similar limitations to those contained in the Permit. This is also 5 years beyond the life of the permit and 10 years after full compliance with the CTR was to have been achieved. The Permit details that the beneficial uses and water quality suffers significantly from existing quality of the discharge. Another ten years of degraded recreational, aquatic life and drinking water beneficial uses is unacceptable. The aquatic life within the Delta has suffered dramatic decline which most agree is at least in part to degraded water quality. The Regional Board has not presented any reasonable defense that the allotted compliance schedule is “based on the shortest practicable time”.

**O. The Permit fails to contain an adequate effluent limitation for electrical conductivity (EC) in violation of federal regulation 40 CFR 122.44.**

Federal Regulations, 40 CFR 122.44 (d)(i), requires that; “Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.” The Water Quality Control Plan (Basin Plan) for the Central Valley Region, Water Quality Objectives, page III-3.00, contains a Chemical Constituents Objective that includes Title 22 Drinking Water Maximum Contaminant Levels (MCLs) by reference. The Title 22 MCLs for EC are 900 µmhos/cm (recommended level), 1,600 µmhos/cm (upper level) and 2,200 µmhos/cm (short term maximum).

The Basin Plan states, on Page III-3.00 Chemical Constituents, that “Waters shall not contain constituents in concentrations that adversely affect beneficial uses.” The Basin Plan’s “Policy for Application of Water Quality Objectives” provides that in implementing narrative water quality objectives, the Regional Board will consider numerical criteria and guidelines developed by other agencies and organizations. This application of the Basin Plan is consistent with Federal Regulations, 40CFR 122.44(d).

For EC, *Ayers R.S. and D.W. Westcott, Water Quality for Agriculture, Food and Agriculture Organization of the United Nations – Irrigation and Drainage Paper No. 29, Rev. 1, Rome (1985)*, levels above 700 µmhos/cm will reduce crop yield for sensitive plants. The University of California, Davis Campus, Agricultural Extension Service, published a paper, dated 7 January 1974, stating that there will not be problems to crops associated with salt if the EC remains below 750 µmhos/cm.

The discharge of EC or TDS may exceed water quality objectives for each designated beneficial use:

MUN: The Drinking Water maximum contaminant levels (MCLs) are water quality objectives incorporated into the Basin Plan Chemical Constituents by reference. The MCL for TDS is 500 mg/l as the recommended level, 1,000 mg/l as an upper level and 1,500 mg/l as a short term maximum. *McKee and Wolf* (1971 Water Quality Criteria) cites that waters above 4,000 mg/l TDS are generally unfit for human use.

AGR: The Basin Plan states, on Page III-3.00 Chemical Constituents, that “Waters shall not contain constituents in concentrations that adversely affect beneficial uses.” The Basin Plan’s “Policy for Application of Water Quality Objectives” provides that in implementing narrative water quality objectives, the Regional Board will consider numerical criteria and guidelines developed by other agencies and organizations. This application

of the Basin Plan is consistent with Federal Regulations, 40CFR 122.44(d). For EC, *Ayers R.S. and D.W. Westcott, Water Quality for Agriculture, Food and Agriculture Organization of the United Nations – Irrigation and Drainage Paper No. 29, Rev. 1, Rome (1985)*, levels above 700  $\mu\text{mhos/cm}$  will reduce crop yield for sensitive plants. The State Water Resources Control Board's *Irrigation with Reclaimed Municipal Waste (July 1984)* and *McKee and Wolf (1971 Water Quality Criteria)*, state that waters with TDS above 2,100 mg/l are unsuitable for any irrigation under most conditions.

IND: *McKee and Wolf (1971 Water Quality Criteria)* lists the limiting TDS concentrations for numerous industrial uses in mg/l; boiler feed water 50-3000, brewing 500-1000, canning 850, general food processing 850 and paper manufacturing 80-500.

COLD/MIGR/SPWN: In a *Biological Significance* document sent to the Regional Board regarding the Musco Olive facility, dated November 1<sup>st</sup> 2006, James M. Harrington, Staff Water Quality Biologist with the California Department of Fish and Game, citing *McKee and Wolf (1971 Water Quality Criteria)* wrote that: "Surveys of inland fresh waters indicates that good mixes of fish fauna are found where conductivity values range between 150 and 500  $\mu\text{mhos/cm}$ . Even in the most alkaline waters, the upper tolerance limit for aquatic life is approximately 2000  $\mu\text{mhos/cm}$ ."

The beneficial uses of receiving streams may be degraded by salt concentrations in wastewater discharges and Federal Regulation, 40 CFR 122.4 (a), (d) and (g) require that no permit may be issued when the conditions of the permit do not provide for compliance with the applicable requirements of the CWA, or regulations promulgated under the CWA, when imposition of conditions cannot ensure compliance with applicable water quality requirements and for any discharge inconsistent with a plan or plan amendment approved under Section 208(b) of the CWA. California Water Code, section 13377, requires that: "Notwithstanding any other provision of this division, the state board and the regional boards shall, as required or authorized by the Federal Water Pollution Control Act, as amended, issue waste discharge and dredged or fill material permits which apply and ensure compliance with all applicable provisions of the act and acts amendatory thereof or supplementary, thereto, together with any more stringent effluent standards or limitations necessary to implement water quality control plans, or for the protection of beneficial uses, or to prevent nuisance." The Region 5 Permit does not protect the beneficial uses of the receiving stream, the Sacramento River, and therefore does not comply with the requirements of Federal Regulations and the California Water Code.

The wastewater discharge average EC level is 764  $\mu\text{mhos/cm}$  and the maximum observed EC was 960  $\mu\text{mhos/cm}$ . Clearly the discharge exceeds the MCLs for EC presenting a reasonable potential to exceed the water quality objective. The Permit contains a performance based annual average effluent limitation for EC of 840  $\mu\text{mhos/cm}$ . The proposed EC limitation clearly exceeds the agricultural water quality goal and the MCL for EC. The proposed Order fails to establish an effluent limitation for EC that are protective of the Chemical Constituents water quality objective.

The Permit, page F-48, states that: *“Due to the site-specific conditions of the discharge, the Central Valley Water Board has used best professional judgment in determining the appropriate method for conducting the RPA for these non-priority pollutant salinity constituents. For conducting the RPA, the USEPA recommends using a mass-balance approach to determine the expected critical downstream receiving water concentration using a steady-state approach. This downstream receiving water concentration is then compared to the applicable water quality objectives to determine if the discharge has reasonable potential to cause or contribute to an in-stream excursion. This approach allows assimilative capacity and dilution to be factored into the RPA.”*

The Regional Board’s unique approach for determining reasonable potential can only be undertaken if a mixing zone is considered. The Regional Board cites “site-specific conditions” that would warrant such an approach but fails to define any unique conditions here. Basically this is a wastewater discharge into a river – nothing exotic except for the politics. The Regional Board’s cited approach for determining reasonable potential is contrary to the regulations. Mixing can only be considered after the reasonable potential has been conducted and an effluent limitation established.

The Permit, Page F-73, states that: “...in addition, there are at least 20 agricultural diversions within 1 mile upstream and 2 miles downstream of the discharge.” The mixing zone has not been defined for salinity. The size of the mixing zone has not been defined. It is reasonable to assume that since there are numerous irrigation intakes within 1 to 2 miles of the discharge that the intakes would be impacted by inadequately diluted wastewater containing EC above the agricultural goal. The proposed mixing zone for salinity has not met any of the requirements in the SIP or the Basin Plan.

The Regional Board’s Response to Comments states the following with regard to statistical multipliers:

*“**Response:** Until adoption of the State Water Board’s Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP), USEPA’s Technical Support Document for Water Quality-based Toxics Control,*

*EPA/505/2-90-001, March 1991 (TSD) was the normal protocol followed for permit development for all constituents. The SIP is required only for California Toxics Rule (CTR) and National Toxics Rule (NTR) constituents and prescribes a different protocol when conducting an RPA, but is identical when developing water quality based effluent limitations (WQBELs). For some time after SIP adoption, SIP protocols were used for CTR/NTR constituents, and TSD protocols were used for non-CTR/NTR constituents. While neither protocol is necessarily better or worse in every case, using both protocols in the same permit has led to confusion by Dischargers and the public, and to greater complexity in writing permits. Currently there is no State Water Board or Central Valley Water Board policy that establishes a recommended or required approach to conduct an RPA or establish WQBELs for non-CTR/NTR constituents. However, the State Water Board has held that the Central Valley Water Board may use the SIP as guidance for water quality-based toxics control. The SIP states in the introduction "The goal of this Policy is to establish a standardized approach for permitting discharges of toxic pollutants to nonocean surface waters in a manner that promotes statewide consistency." Therefore, for consistency in the development of NPDES permits, the Central Valley Water Board has begun to use the RPA procedures from the SIP to evaluate reasonable potential for both CTR/NTR and non- CTR/NTR constituents. Consistent with the RPA procedure from the SIP, the RPA for the tentative Order was not performed using statistical multipliers to determine if effluent limitations are needed."*

The Regional Board's arguments with regard to statistical multipliers directly conflicts with their discussion of reasonable potential for EC. The use of statistical multipliers generally results in more and more stringent limitations than the SIP procedure. The SIP procedure would have also resulted in an Effluent Limitation for EC based on protecting the irrigated agriculture and drinking water. The Regional Board's logic can only lead one to conclude that they will undertake any means of avoiding the establishment of Effluent Limitations in permits.

A mixing zone, by definition, is an area where water quality standards are allowed to be exceeded. If water quality standards are known to be exceeded – there is obviously beyond a reasonable potential for the discharge to exceed the water quality standard. If the water quality standard is exceeded there is reasonable potential under 40 CFR 122.44 (d)(i). 40 CFR 122.44 (d)(i) requires that; "Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality." Clearly at the point of discharge the discharge of 960 umhos/cm exceeds the agricultural goal of 700 umhos/cm, the drinking water MCL of 900 umhos/cm and the salinity standards for the Delta contained in the Basin Plan. There is beyond a reasonable potential for the discharge to exceed water quality standards for EC, they are exceeded by the discharge. An EC effluent limitation is mandated by federal regulation and the Permit must be amended accordingly.

**P. The Permit fails to contain an effluent limitation for total dissolved solids (TDS) in violation of federal regulation 40 CFR 122.44.**

Federal Regulations, 40 CFR 122.44 (d)(i), requires that; “Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.” The Water Quality Control Plan (Basin Plan) for the Central Valley Region, Water Quality Objectives, page III-3.00, contains a Chemical Constituents Objective that includes Title 22 Drinking Water Maximum Contaminant Levels (MCLs) by reference. The Title 22 MCLs for TDS are 500 mg/l (recommended level), 1,000 mg/l (upper level) and 1,500 mg/l (short term maximum).

The Permit, Table F-14, shows the maximum effluent concentration of TDS was 540 mg/l. There is a reasonable potential for the discharge of TDS at 540 mg/l to exceed the drinking water MCL of 500 mg/l. EC and TDS are related and in most discharges one can generally be translated to the other by a simple multiplier; this discharge has industrial dischargers that would impact the EC to TDS relationship and the relationship has not been defined. There is no evidence in the Permit regarding the consistency of an EC to TDS relationship; therefore regulating EC may not adequately control TDS.

*The Permit, page F-48, states that: “Due to the site-specific conditions of the discharge, the Central Valley Water Board has used best professional judgment in determining the appropriate method for conducting the RPA for these non-priority pollutant salinity constituents. For conducting the RPA, the USEPA recommends using a mass-balance approach to determine the expected critical downstream receiving water concentration using a steady-state approach. This downstream receiving water concentration is then compared to the applicable water quality objectives to determine if the discharge has reasonable potential to cause or contribute to an in-stream excursion. This approach allows assimilative capacity and dilution to be factored into the RPA.”*

The Regional Board’s unique approach for determining reasonable potential can only be undertaken if a mixing zone is considered. The Regional Board cites “site-specific conditions” that would warrant such an approach but fails to define any unique conditions. Basically this is a wastewater discharge into a river – nothing exotic except for the politics. The Regional Board’s cited approach for determining reasonable potential is contrary to the regulations. Mixing can only be considered after the reasonable potential has been conducted and an effluent limitation established. A mixing zone, by definition, is an area where water quality standards are allowed to be exceeded. If water quality standards are known to be exceeded – there is obviously beyond a reasonable potential for the discharge to exceed the water quality standard. If the water quality standard is exceeded there is reasonable potential under 40 CFR 122.44 (d)(i). 40 CFR 122.44



(d)(i) requires that; “Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.” Clearly at the point of discharge the discharge of 540 mg/l exceeds the drinking water MCL of 500 mg/l. There is beyond a reasonable potential for the discharge to exceed water quality standards for TDS, they are exceeded by the discharge. A TDS effluent limitation is mandated by federal regulation and the Permit must be amended accordingly.

**Q. The Permit fails to meet the preconditions necessary to exempt waste storage, treatment and disposal ponds from California Code of Regulations Title 27 and fails to implement the requirements of CCR Title 27.**

CCR Title 27 §20090. SWRCB - Exemptions. (C15: §2511):

“The following activities shall be exempt from the SWRCB-promulgated provisions of this subdivision, so long as the activity meets, and continues to meet, all preconditions listed: (a) **Sewage**—Discharges of domestic sewage or treated effluent which are regulated by WDRs issued pursuant to Chapter 9, Division 3, Title 23 of this code, or for which WDRs have been waived, and which are consistent with applicable water quality objectives, and treatment or storage facilities associated with municipal wastewater treatment plants, provided that residual sludges or solid waste from wastewater treatment facilities shall be discharged only in accordance with the applicable SWRCB-promulgated provisions of this division. (b) **Wastewater**—Discharges of wastewater to land, including but not limited to evaporation ponds, percolation ponds, or subsurface leachfields if the following conditions are met: (1) the applicable RWQCB has issued WDRs, reclamation requirements, or waived such issuance; (2) the discharge is in compliance with the applicable water quality control plan; and (3) the wastewater does not need to be managed according to Chapter 11, Division 4.5, Title 22 of this code as a hazardous waste.” (Emphasis added)

Region 5’s Basin Plan, Water Quality Objectives for Ground Waters:

The following objectives apply to all ground waters of the Sacramento and San Joaquin River Basins, as the objectives are relevant to the protection of designated beneficial uses. These objectives do not require improvement over naturally occurring background concentrations. The ground water objectives contained in this plan are not required by the federal Clean Water Act.

**Bacteria**

In ground waters used for domestic or municipal supply (MUN) the most probable number of coliform organisms over any seven-day period shall be less than 2.2/100 ml.

### **Chemical Constituents**

Ground waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. At a minimum, ground waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs) specified in the following provisions of Title 22 of the California Code of Regulations, which are incorporated by reference into this plan: Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of Section 64431, Table 64444-A (Organic Chemicals) of Section 64444, and Tables 64449-A (Secondary Maximum Contaminant Levels- Consumer Acceptance Limits) and 64449-B (Secondary Maximum Contaminant Levels-Ranges) of Section 64449. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. At a minimum, water designated for use as domestic or municipal supply (MUN) shall not contain lead in excess of 0.015 mg/l. To protect all beneficial uses, the Regional Water Board may apply limits more stringent than MCLs.

### **Tastes and Odors**

Ground waters shall not contain taste- or odor producing substances in concentrations that cause nuisance or adversely affect beneficial uses.

### **Toxicity**

Ground waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life associated with designated beneficial use(s). This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances.

The Permit, pages F-13 and 14, states the following:

4. Emergency Storage Basins (ESBs). The Facility includes five Emergency Storage Basins (ESBs), ESB-A through E with a total capacity of 302 million gallons (MG). ESB-A is lined with concrete and has 15.5 MG of capacity. The purpose of ESB-A is to store diverted influent flows above the SRWTP hydraulic capacity (peak wet weather flows) and store diverted effluent flows to meet various conditions to comply with the NPDES permit. Reasons to divert final effluent to ESB-A and not discharge to the Sacramento River include maintaining the minimum 14:1 river to effluent ratio, maintaining effluent temperature requirements, and maintaining chlorine limits. Flow stored in ESB-A is returned to the SRWTP headworks for treatment.

Overflow from ESB-A discharges to unlined ESB-B that can if necessary overflow to unlined ESBC. The combined capacity of ESB-B and C is 206 MG. Since construction of ESBD, ESB-A is typically only used to store excess influent flows. ESB-A, B and C are exempt from Title 27, § 20090(a) since these basins are integral to protecting the SRWTP treatment processes from washing out due to peak wet weather flows or for storage of diverted flow to comply NPDES permit conditions.

ESB-D is lined with 60-mil reinforced polypropylene liner and has a capacity of 60-75 MG. The primary use of ESB-D is to stored diverted chlorinated effluent to comply with flow dilution, potential chlorine excursions and thermal requirements. Chlorinated effluent from ESB-D is returned to the SRWTP for dechlorination prior to discharge to the Sacramento River. Since ESB-D is lined there is minimal threat to groundwater and is consistent with water quality objectives and therefore is exempt from Title 27 § 20090(a).

ESB-E is part of the surge relief mechanism and designed to relief waterhammer effects in the influent conduit. ESB-E stores raw influent in an unlined earthen 20 MG basin and is exempt from Title 27 § 20090(a).

The preconditions to grant an exemption for municipal WWTPs from regulation under CCR Title 27 are that; the discharge is regulated by WDRs; the discharge is consistent with applicable water quality objectives; the treatment and storage facilities are associated with a municipal WWTP, and sludge is properly regulated in accordance with CCR Title 27. The discharge is regulated by WDRs. The treatment and storage facilities are associated with a municipal WWTP. Sludge is regulated in accordance with CCR Title 27. An exemption from CCR Title cannot be granted as the precondition that the discharge complies with applicable water quality objectives has not been established. Specifically:

- ESB-B and ESB-C are unlined, groundwater in the area is shallow, the groundwater has been degraded by similar wastewater discharges and there is no monitoring showing the pond has not caused the exceedance of the Basin Plan water quality objectives for groundwater. The preconditions for an exemption from CCR Title 27 have not been established.
- ESB-E stores raw sewage influent in an unlined earthen 20 MG basin, groundwater in the area is shallow, the groundwater has been degraded by similar wastewater discharges and there is no monitoring showing the pond has not caused the exceedance of the Basin Plan water quality objectives for groundwater. The preconditions for an exemption from CCR Title 27 have not been established.

Contrary to the Permit findings, the preconditions for exemption from CCR Title 27 have not been established and the Permit must be revised to properly regulate the ponds under CCR Title 27.

The Regional Board's Response to Comments appears to state that any part of a wastewater treatment system need not meet the "precondition" of Title 27 that water quality standards cannot be exceeded. There is no defense for this position. A waiver from Title 27 requirements cannot be granted if the wastewater treatment system, or any of its individual parts, cannot be shown to maintain compliance with water quality standards. The use of wastewater ponds over permeable soils and an elevated groundwater table certainly presents the potential to exceed water quality standards as wastewater percolates to and mixes with groundwater. There is no information that would allow the ponds and therefore the wastewater treatment system to be exempted from CCR Title 27.

**R. The Permit contains an allowance for a mixing zone that does not comply with the requirements of Federal Regulation 40 CFR Section 131.12 (a)(1) and the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP) or the Basin Plan.***

"A mixing zone is an area where an effluent discharge undergoes initial dilution and is extended to cover the secondary mixing in the ambient waterbody. A mixing zone is an allocated impact zone where water quality criteria can be exceeded as long as acutely toxic conditions are prevented" according to EPA's *Technical Support Document for Water Quality-based Toxics Control (TSD)* (USEPA, 1991), (Water quality criteria must be met at the edge of a mixing zone.) Mixing zones are regions within public waters adjacent to point source discharges where pollutants are diluted and dispersed at concentrations that routinely exceed human health and aquatic life water quality standards (the maximum levels of pollutants that can be tolerated without endangering people, aquatic life, and wildlife.) Mixing zone policies allow a discharger's point of compliance with state and federal water quality standards to be moved from the "end of the pipe" to the outer boundaries of a dilution zone. The CWA was adopted to minimize and eventually eliminate the release of pollutants into public waters because fish were dying and people were getting sick. The CWA requires water quality standards (WQS) be met in all waters to prohibit concentrations of pollutants at levels assumed to cause harm. Since WQS criteria are routinely exceeded in mixing zones it is likely that in some locations harm is occurring. The general public is rarely aware that local waters are being degraded within these mixing zones, the location of mixing zones within a waterbody, the nature and quantities of pollutants being diluted, the effects the pollutants might be having on human health or aquatic life, or the uses that may be harmed or eliminated by the discharge. Standing waist deep at a favorite fishing hole, a fisherman has no idea that he is in the middle of a mixing zone for a sewage discharger that has not been required to adequately treat their waste.

In 1972, backed by overwhelming public support, Congress overrode President Nixon's veto and passed the Clean Water Act. Under the CWA, states are required to classify surface waters by uses – the beneficial purposes provided by the waterbody. For example, a waterbody may be designated as a drinking water source, or for supporting the growth and propagation of aquatic life, or for allowing contact recreation, or as a water source for industrial activities, or all of the above. States must then adopt criteria – numeric and narrative limits on pollution, sufficient to protect the uses assigned to the waterbody. Uses + Criteria = Water Quality Standards (WQS). WQS are regulations adopted by each state to protect the waters under their jurisdiction. If a waterbody is classified for more than one use, the applicable WQS are the criteria that would protect the most sensitive use.

All wastewater dischargers to surface waters must apply for and receive a permit to discharge pollutants under the National Pollutant Discharge Elimination System (NPDES.) Every NPDES permit is required to list every pollutant the discharger anticipates will be released, and establish effluent limits for these pollutants to ensure the discharger will achieve WQS. NPDES permits also delineate relevant control measures, waste management procedures, and monitoring and reporting schedules.

It is during the process of assigning effluent limits in NPDES permits that variances such as mixing zones alter the permit limits for pollutants by multiplying the scientifically derived water quality criteria by dilution factors. The question of whether mixing zones are legal has never been argued in federal court.

Mixing zones are never mentioned or sanctioned in the CWA. To the contrary, the CWA appears to speak against such a notion:

“whenever...the discharges of pollutants from a point source...would interfere with the attainment or maintenance of that water quality...which shall assure protection of public health, public water supplies, agricultural and industrial uses, and the protection and propagation of a balanced population of shellfish, fish and wildlife, and allow recreational activities in and on the water, effluent limitations...shall be established which can reasonably be expected to contribute to the attainment or maintenance of such water quality.”

A plain reading of the above paragraph calls for the application of effluent limitations whenever necessary to assure that *WQS will be met in all waters*. Despite the language of the Clean Water Act; US EPA adopted 40 CFR 131.13, General policies, that allows States to, at their discretion, include in their State standards, policies generally affecting their application and implementation, such as mixing zones, low flows and variances. According to EPA; (EPA, Policy and Guidance on Mixing Zones, 63 Fed Reg. 36,788 (July 7, 1998)) as long as mixing zones do not eliminate

beneficial uses in the whole waterbody, they do not violate federal regulation or law. California has mixing zone policies included in individual Water Quality Control Plans (Basin Plans) and the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (2005) permitting pollutants to be diluted before being measured for compliance with the state's WQS.

Federal Antidegradation regulations at 40 CFR 131.12 require that states protect waters at their present level of quality and that all beneficial uses remain protected. The corresponding State Antidegradation Policy, Resolution 68-16, requires that any degradation of water quality not unreasonably affect present and anticipated beneficial uses. Resolution 68-16 further requires that: "Any activity which produces or may produce or increase volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with the maximum benefit to the people of the State will be maintained."

- Pollution is defined in the California Water Code as an alteration of water quality to a degree, which unreasonably affects beneficial uses. In California, Water Quality Control Plans (Basin Plans) contain water quality standards and objectives, which are necessary to protect beneficial uses. The Basin Plan for California's Central Valley Regional Water Board states that: "According to Section 13050 of the California Water Code, Basin Plans consist of a designation or establishment for the waters within a specified area of beneficial uses to be protected, water quality objectives to protect those uses, and a program of implementation needed for achieving the objectives. State law also requires that Basin Plans conform to the policies set forth in the Water Code beginning with Section 13000 and any state policy for water quality control. Since beneficial uses, together with their corresponding water quality objectives, can be defined per federal regulations as water quality standards, the Basin Plans are regulatory references for meeting the state and federal requirements for water quality control (40 CFR 131.20)."
- Nuisance is defined in the California Water Code as anything, which is injurious to health, indecent, offensive or an obstruction of the free use of property, which affects an entire community and occurs as a result of the treatment or disposal of waste.

The Antidegradation Policy (Resolution 68-16) allows water quality to be lowered as long as beneficial uses are protected (pollution or nuisance will not occur), best practicable treatment and control (BPTC) of the discharge is provided, and the degradation is in the best interest of the people of California. Water quality objectives were developed as the maximum concentration of a pollutant necessary to protect beneficial uses and levels above this concentration would be

considered pollution. The Antidegradation Policy does not allow water quality standards and objectives to be exceeded. Mixing zones are regions within public waters adjacent to point source discharges where pollutants are diluted and dispersed at concentrations that routinely exceed water quality standards.

The Antidegradation Policy (Resolution 68-16) requires that best practicable treatment or control (BPTC) of the discharge be provided. Mixing zones have been allowed in lieu of treatment to meet water quality standards at the end-of-the-pipe prior to discharge. To comply with the Antidegradation Policy, the trade of receiving water beneficial uses for lower utility rates must be in the best interest of the people of the state and must also pass the test that the Discharger is providing BPTC. By routinely permitting excessive levels of pollutants to be legally discharged, mixing zones act as an economic disincentive to Dischargers who might otherwise have to design and implement better treatment mechanisms. Although the use of mixing zones may lead to individual, short-term cost savings for the discharger, significant long-term health and economic costs may be placed on the rest of society. An assessment of BPTC, and therefore compliance with the Antidegradation Policy, must assess whether treatment of the wastestream can be accomplished, is feasible, and not simply the additional costs of compliance with water quality standards. A BPTC case can be made for the benefits of prohibiting mixing zones and requiring technologies that provide superior waste treatment and reuse of the wastestream.

EPA's Water Quality Standards Handbook states that: "It is not always necessary to meet all water quality criteria within the discharge pipe to protect the integrity of the waterbody as a whole." The primary mixing area is commonly referred to as the zone of initial dilution, or ZID. Within the ZID acute aquatic life criteria are exceeded. To satisfy the CWA prohibition against the discharge of toxic pollutants in toxic amounts, regulators assume that if the ZID is small, significant numbers of aquatic organisms will not be present in the ZID long enough to encounter acutely toxic conditions. EPA recommends that a ZID not be located in an area populated by non-motile or sessile organisms, which presumably would be unable to leave the primary mixing area in time to avoid serious contamination.

Determining the impacts and risks to an ecosystem from mixing pollutants with receiving waters at levels that exceed WQS is extremely complex. The range of effects pollutants have on different organisms and the influence those organisms have on each other further compromises the ability of regulators to assess or ensure "acceptable" short and long-term impacts from the use of mixing zones. Few if any mixing zones are examined prior to the onset of discharging for the potential effects on impacted biota (as opposed to the physical and chemical fate of pollutants in the water column). Biological modeling is especially challenging – while severely toxic discharges may produce immediately observable effects, long-term impacts to the ecosystem can be far more difficult to ascertain. The effects of a mixing zone can be insidious; impacts to

species diversity and abundance may be impossible to detect until it is too late for reversal or mitigation.

The CALIFORNIA CONSTITUTION, ARTICLE 10, WATER, SEC. 2 states that: “It is hereby declared that because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare. The right to water or to the use or flow of water in or from any natural stream or water course in this State is and shall be limited to such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use or unreasonable method of use or unreasonable method of diversion of water. Riparian rights in a stream or water course attach to, but to no more than so much of the flow thereof as may be required or used consistently with this section, for the purposes for which such lands are, or may be made adaptable, in view of such reasonable and beneficial uses; provided, however, that nothing herein contained shall be construed as depriving any riparian owner of the reasonable use of water of the stream to which the owner's land is riparian under reasonable methods of diversion and use, or as depriving any appropriator of water to which the appropriator is lawfully entitled. This section shall be self-executing, and the Legislature may also enact laws in the furtherance of the policy in this section contained.” The granting of a mixing zone is an unreasonable use of water when proper treatment of the wastestream can be accomplished to meet end-of-pipe limitations. Also contrary to the California Constitution, a mixing zone does not serve the beneficial use; to the contrary, beneficial uses are degraded within the mixing zone.

The Central Valley Regional Water Quality Control Board’s Basin Plan, page IV-16.00, requires the Regional Board use EPA’s *Technical Support Document for Water Quality Based Toxics Control (TSD)* in assessing mixing zones. The TSD, page 70, defines a first stage of mixing, close to the point of discharge, where complete mixing is determined by the momentum and buoyancy of the discharge. The second stage is defined by the TSD where the initial momentum and buoyancy of the discharge are diminished and waste is mixed by ambient turbulence. The TSD goes on to state that in large rivers this second stage mixing may extend for miles. The TSD, Section 4.4, requires that if complete mix does not occur in a short distance mixing zone monitoring and modeling must be undertaken.

The State’s *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California* (SIP), Section 1.4.2.2, contains requirements for a mixing zone study which must be analyzed before a mixing zone is allowed for a wastewater discharge. Properly adopted state Policy requirements are not optional. The proposed Effluent Limitations in the Permit are not supported by the scientific investigation that is required by the SIP and the Basin Plan.



SIP Section 1.4.2.2 requires that a mixing zone shall not:

1. Compromise the integrity of the entire waterbody.
2. Cause acutely toxic conditions to aquatic life.
3. Restrict the passage of aquatic life.
4. Adversely impact biologically sensitive habitats.
5. Produce undesirable aquatic life.
6. Result in floating debris.
7. Produce objectionable color, odor, taste or turbidity.
8. Cause objectionable bottom deposits.
9. Cause Nuisance.
10. Dominate the receiving water body or overlap a different mixing zone.
11. Be allowed at or near any drinking water intake.

Federal regulation 40 CFR Section 131.12 (a)(1) the Antidegradation Policy requires that: “Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.” The Central Valley Regional Board routinely grants mixing zones above the drinking water maximum contaminant level (MCL) for human health criteria despite that municipal and domestic supply is a designated beneficial use of the receiving stream. The designated beneficial use of drinking water is not protected within the reach of the stream, which is often established as some unknown length, contrary to 40 CFR 131.12.

Few mixing zones are adequately evaluated to determine whether the modeling exercise was in fact relevant or accurate, or monitored over time to assess the impacts of the mixing zone on the aquatic environment. The sampling of receiving waters often consists of analyzing one or two points where the mixing zone boundary is supposed to be – finding no pollution at the mixing zone boundary is often considered proof that mixing has been “successful” when in fact the sampling protocol might have missed the plume altogether.

The Permit allows a mixing zone for constituents based on human health (Drinking water) rather than requiring treatment to meet end-of-pipe limitations. The Delta serves to convey the drinking water supply for over 25 million Californians via the State Water Project (SWP), Central Valley Project (CVP) and local projects and intakes. Through the SWP and CVP, the channels in the Delta are also used to supply the agricultural water supply for roughly 2 million acres of prime farmland. It is important to stress that the Delta is not the source per se for all SWP and CVP water, but that the Delta and the Sacramento River serve as a critical conduit for water supplies that are physically developed upstream. To comply with the Antidegradation Policy, the trade of receiving water beneficial uses for lower utility rates must be in the best interest of the people of the state and must also pass the test that the Discharger is providing BPTC. Although the use of mixing zones may lead to individual, short-term cost savings for the

discharger, significant long-term health and economic costs may be placed on the rest of society. The required antidegradation finding, that allowing a mixing zone rather than requiring treatment to remove pollutants to levels that protect beneficial uses at the point of discharge, is in the best interest of the people of California can be made in good faith. It is doubtful that put to a vote that Californians would vote to allow drinking water to be incrementally degraded in favor of maintenance of Sacramento's low sewer rates. Californians have routinely voted for clean water and clean water bonds. An assessment of BPTC, and therefore compliance with the Antidegradation Policy, must assess whether treatment of the wastestream can be accomplished, is feasible, and not simply the additional costs of compliance with water quality standards. A BPTC case can be made for the benefits of prohibiting a mixing zone and requiring technologies that provide superior waste treatment and reuse of the wastestream. It is more likely that the allowance for a human health mixing zone may be considered a violation of the State Constitution which requires the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the mixing zone is a waste and unreasonable use of water which is not in the interest of the people and for the public welfare.

The 303(d) listing for the Sacramento-San Joaquin Delta includes: Chlorpyrifos, DDT, Diazinon, Exotic Species, Group A Pesticides, Mercury, Polychlorinated biphenyls (PCBs) and unknown toxicity. The Permit allows for a chronic toxicity mixing zone. Obviously, an allowance for a mixing zone for toxic pollutants will add to the unknown toxicity in the Sacramento River. The Basin Plan states, "*Additional treatment beyond minimum federal standards will be imposed on dischargers to [WQLSs]. Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment.*" By definition, an allowance for chronic mixing means that chronic water quality objectives will be exceeded within the mixing zone. An allowance for a chronic mixing zone within the Sacramento River, which is 303(d) listed for unknown toxicity, does not meet the Basin Plan requirements for additional treatment to meet water quality objectives in the limited segment of the river.

Phthalates were detected in greater than 75% of approximately 2,540 urinary samples collected from participants of the National Health and Nutrition Examination Survey (NHANES). Exposure in the United States to diethyl phthalate, dibutyl phthalate or diisobutylphthalate, benzyl butyl phthalate, and di-(2-ethylhexyl) phthalate is widespread.<sup>1</sup>

Bis(2-ethylhexyl)phthalate, commonly abbreviated DEHP, is an organic compound. The chemical formula for DEHP is C<sub>24</sub>H<sub>38</sub>O<sub>4</sub>. It possesses good plasticizing properties. Being produced on a massive scale by many companies, it has acquired many names and acronyms,

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<sup>1</sup> Environmental Health Perspectives Volume 112, Number 3, March 2004, Urinary Levels of Seven Phthalate Metabolites in the U.S. Population from the National Health and Nutrition Examination Survey (NHANES) 1999-2000, Manori J. Silva, Dana B. Barr, John A. Reidy, Nicole A. Malek, Carolyn C. Hodge, Samuel P. Caudill, John W. Brock, Larry L. Needham, and Antonia M. Calafat, Division of Laboratory Sciences, National Center for Environmental Health, Centers for Disease Control and Prevention, Atlanta, Georgia, USA

including BEHP and di-2-ethylhexyl phthalate. Due to its suitable properties and the low cost, DEHP is widely used as a plasticizer in manufacturing of articles made of PVC. Plastics may contain 1% to 40% of DEHP. DEHP is also used as a hydraulic fluid and as a dielectric fluid in capacitors. DEHP is a colorless liquid with almost no odor.

Because of bis(2-ethylhexyl)phthalate's prevalence in the environment and the documented threats to human and aquatic life; on 30 December 2009 US Environmental Protection Agency (US EPA) issued an *Action Plan* to address the manufacturing, processing, distribution, and use of this phthalate.

Water quality standards for bis(2-ethylhexyl)phthalate were established in December 1992 in the National Toxics Rule (NTR), which was amended in 1999. On 18 May 2000, US EPA adopted the California Toxics Rule<sup>2</sup> (CTR). The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the state. The water quality standards for bis(2-ethylhexyl)phthalate are 1.8 ug/l for waters from which both water and aquatic organisms are consumed and 5.9 ug/l for non-drinking water sources as a thirty-day average. US EPA has revised their recommended Ambient Criteria<sup>3</sup> for bis(2-ethylhexyl)phthalate to 1.2 ug/l for waters from which both water and aquatic organisms are consumed and 2.2 ug/l for non-drinking water sources as a thirty day average. The Permit allows a mixing zone for bis(2-ethylhexyl)phthalate and would establish a limitations at 13 ug/l as a daily maximum.

## **Overview from US EPA's Phthalates Action Plan**

### ***I. Overview***

*U.S. Environmental Protection Agency's (EPA's) current management plan includes the following eight phthalates: dibutyl phthalate (DBP), diisobutyl phthalate (DIBP), butyl benzyl phthalate (BBP), di-n-pentyl phthalate (DnPP), di(2-ethylhexyl) phthalate (DEHP), di-n-octyl phthalate (DnOP), diisononyl phthalate (DINP), and diisodecyl phthalate (DIDP). In developing this plan, EPA considered the toxicity of phthalates, their prevalence in the environment and their widespread use and human exposure.*

*Phthalates are produced in high volume, over 470 million pounds per year (EPA 2006). Manufacturers use them in numerous industrial and consumer products, primarily as plasticizers in poly(vinyl chloride) (PVC) products. Many phthalates can potentially lead to high exposure, both individually and together with other phthalates. They can often substitute for each other in products. They are used in*

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<sup>2</sup> <http://www.epa.gov/region09/water/ctr/index.html>

<sup>3</sup> <http://www.epa.gov/waterscience/criteria/wqctable/index.html>

*medical applications and have been detected in food. A number of phthalates appear in biomonitoring surveys of human tissues, evidencing widespread human exposure (CDC 2009). Although exposure to phthalates can produce a variety of effects in laboratory animals, for certain phthalates the adverse health effects on the development of the male reproductive system are the most serious. Several studies have shown associations between phthalate exposures and human health (although no causal link has been established). Recent scientific attention is focusing on evaluating the cumulative effects of mixtures of phthalates in an exposed organism.*

*EPA is concerned about phthalates because of their toxicity and the evidence of pervasive human and environmental exposure to them. Thus, EPA intends to initiate action to address the manufacturing, processing, distribution in commerce, and/or use of these eight phthalates. EPA intends to take action as part of a coordinated approach with the Consumer Product Safety Commission (CPSC) and the Food and Drug Administration (FDA).*

#### **Excerpts from US EPA's Phthalates Action Plan**

- *In response to a European ban on the use of some phthalates in toys and personal care products for children, plasticizers based on isosorbide esters were developed (Roquett, 2009). These plasticizers can cover a broad range of phthalate applications, such as adhesive, sealants, sinks, floor coverings, wall paper, and medical disposables. It is worth noting that isosorbide esters could be prepared under solvent-free conditions (Chalecki, 1997), providing an environmentally friendly approach to manufacturing.*
- *The reproductive developmental effects observed in humans include shortened anogenital distance observed in newborn boys; and shortened pregnancy, lower sex and thyroid hormones, and reduced sperm quality observed in adults.*
- *Of the 8 phthalates, BBP, DEHP, and DBP elicit the most toxicity to terrestrial organisms, fish, and aquatic invertebrates (EC, 2008a,; Staples et al. 1997). Ecotoxicity studies with these phthalates showed adverse effects to aquatic organisms with a broad range of endpoints and at concentrations that coincide with measured environmental concentrations. Toxic effects were observed at environmentally relevant exposures in the low ng/L to µg/L range (Oehlmann et al. 2008).*
- *Some phthalates studied have been shown to affect reproduction and impair development in all studied animal groups. Most phthalates appear to act by interfering with the functioning of various hormone systems, but some phthalates have wider pathways of*

*effects (Jobling et al. 1995). Effect concentrations of phthalates in laboratory experiments are consistent with measured environmental concentrations (Oehlmann, et al., 2008).*

- *Phthalates are released to the environment from multiple sources including industrial releases, the disposal of manufacturing, processing and industrial wastes, municipal solid waste, land application of sewage sludge, and release from products containing phthalates. Only two (DBP and DEHP) of the 8 phthalates are listed on EPA's Toxics Release Inventory (TRI).list of toxic chemicals. The available release data for these two phthalates indicate that releases of phthalates can be expected to all primary environmental media.*
- *Due to their pervasive use and release, as well as its propensity for global transport, phthalates are found in most environmental media, for example ambient air, surface water, soil, sediment, etc (EC, 2003a-b; 2008a-b; NTP-CERHR, 2003 a-e; 2006). Aquatic organisms, fish and terrestrial animals have evident exposure to DEHP (EC 2008a; Staples et al. 1997).*
- *Phthalate exposures can produce a variety of adverse effects in laboratory animals; especially on the development of the male reproductive system, and therefore there are implications for human health. Animal data on the cumulative effect of mixtures of several phthalates showed an increase in the reproductive effects in the organism exposed. Phthalates are produced in high volume and they are used in numerous industrial and consumer products. Phthalates appear in biomonitoring surveys, such as NHANES, that provide evidence of widespread human exposure. Phthalates are also found in the environment and wildlife species. EPA is concerned with phthalates based on toxicity, particularly to the development of the male reproductive system, prevalence in the environment, widespread use and human exposure and recent work focusing on the potential cumulative effect of mixtures of phthalates.*
- *EPA intends to initiate rulemaking to add the 8 phthalates to the list under TSCA section 5(b)(4). Section 5(b)(4) authorizes the EPA to compile and keep current a list of chemicals it finds present or may present an unreasonable risk of injury to health or the environment. EPA intends to publish a notice of proposed rulemaking in autumn, 2010.*

The Permit allows a mixing zone for bis(2-ethylhexyl)phthalate simply stating that:

“Assimilative capacity is available for bis(2-ethylhexyl)phthalate in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for bis(2-ethylhexyl)phthalate have been developed considering the allowance of human carcinogen dilution credits.” The Delta serves to convey the drinking

water supply for over 25 million Californians via the State Water Project (SWP), Central Valley Project (CVP) and local projects and intakes. The antidegradation policy requires a finding, that allowing a mixing zone rather than requiring treatment to remove pollutants to levels that protect beneficial uses at the point of discharge, is in the best interest of the people of California, this seems to be a steep slope with regard to bis(2-ethylhexyl)phthalate. The allowance for a mixing zone for bis(2-ethylhexyl)phthalate appears to compromise the integrity of the entire waterbody contrary to the requirements of the SIP.

The mixing zone analysis does not discuss fish ingestion with regard to bis(2-ethylhexyl)phthalate despite that the Permit cites that the point of discharge is heavily fished. Recall that the water quality standard for bis(2-ethylhexyl)phthalate is partially based on the ingestion of fish.

Pages F-39 through F-44 list the constituents for which the Regional Board is proposing to allow a mixing zone. Electrical conductivity is not listed as being granted a mixing zone. The wastewater discharge average EC level is 764  $\mu\text{mhos/cm}$  and the maximum observed EC was 960  $\mu\text{mhos/cm}$ . Clearly the discharge exceeds the MCLs for EC presenting a reasonable potential to exceed the water quality objective. The Permit contains a performance based annual average effluent limitation for EC of 840  $\mu\text{mhos/cm}$ . The proposed EC limitation clearly exceeds the agricultural water quality goal and the MCL for EC. The proposed Order fails to establish an effluent limitation for EC that are protective of the Chemical Constituents water quality objective.

The Permit, page F-48, states that: *“Due to the site-specific conditions of the discharge, the Central Valley Water Board has used best professional judgment in determining the appropriate method for conducting the RPA for these non-priority pollutant salinity constituents. For conducting the RPA, the USEPA recommends using a mass-balance approach to determine the expected critical downstream receiving water concentration using a steady-state approach. This downstream receiving water concentration is then compared to the applicable water quality objectives to determine if the discharge has reasonable potential to cause or contribute to an in-stream excursion. This approach allows assimilative capacity and dilution to be factored into the RPA.”*

The Regional Board's unique approach for determining reasonable potential can only be undertaken if a mixing zone is considered. The Regional Board cites “site-specific conditions” that would warrant such an approach but fails to define any unique conditions here. Basically this is a wastewater discharge into a river – nothing exotic except for the politics. The Regional Board's cited approach for determining reasonable potential is contrary to the regulations. Mixing can only be considered after the reasonable potential has been conducted and an effluent limitation established.

A mixing zone, by definition, is an area where water quality standards are allowed to be exceeded. If water quality standards are known to be exceeded – there is obviously beyond a reasonable potential for the discharge to exceed the water quality standard. If the water quality standard is exceeded there is reasonable potential under 40 CFR 122.44 (d)(i). 40 CFR 122.44 (d)(i) requires that; “Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.” Clearly at the point of discharge the discharge of 960 umhos/cm exceeds the agricultural goal of 700 umhos/cm, the drinking water MCL of 900 umhos/cm and the salinity standards for the Delta contained in the Basin Plan. There is beyond a reasonable potential for the discharge to exceed water quality standards for EC, they are exceeded by the discharge. An EC effluent limitation is mandated by federal regulation and the Permit must be amended accordingly.

The Permit, Page F-73, states that: “...in addition, there are at least 20 agricultural diversions within 1 mile upstream and 2 miles downstream of the discharge.” The mixing zone has not been defined for salinity. The size of the mixing zone has not been defined. It is reasonable to assume that since there are numerous irrigation intakes within 1 to 2 miles of the discharge that the intakes would be impacted by inadequately diluted wastewater containing EC above the agricultural goal. The proposed mixing zone for salinity has not met any of the requirements in the SIP or the Basin Plan.

“The Sacramento River near the diffuser is a popular sport fishing area. In addition, there are at least 20 agricultural diversions within 1 mile upstream and 2 miles downstream of the discharge. Based upon information submitted by SRCSD, the typical construction of the agricultural irrigation water intakes in the vicinity of the outfall would draw water from near the bank of the river, below the water surface (deep enough to not go dry during low river levels, but far enough from the river bottom to not be impacted by bottom sediments). It appears that undiluted effluent will not be drawn into the agricultural intakes, but varying mixtures of effluent and river water will be diverted from the partially mixed discharge plume.” (Permit, Page F-73) The SRCSD requested acute and chronic aquatic life dilution credits for ammonia, copper, cyanide, and chlorpyrifos. Human carcinogen dilution credits were requested for carbon tetrachloride, chlorodibromomethane, dichlorobromomethane, methylene chloride, tetrachloroethylene, pentachlorophenol, bis(2-ethylhexyl)phthalate, dibenzo(ah)anthracene, 1,2-diphenyl-hydrazine, and N-nitrosodimethylamine. Additionally, human health dilution credits were requested for manganese, nitrate, and MTBE. Mixing zone analyses have generally been limited to whether a constituent causes harm to crop yield or produces toxic effects to plants. Recently there has been significant discussion of food safety and the health effects from plant uptake of pollutants in irrigation water. Although much of the discussion revolves around reclamation with treated sewage, the irrigation intakes in the Sacramento River may provide an equal level of exposure.

The Permit discusses consultation with the Department of Public Health (DPH), but that discussion appears to have been limited to pathogens; food safety was not assessed. Again, it does not appear that the interests of the people of California are best served by allowing a mixing zone for the discharge of chemicals known to cause harm to human health to nearby farmland. The Permit does not discuss plant uptake and associated human health impacts from irrigation of crops with water extracted from within the mixing zone. The Permit also fails to cite whether the impacted farmers using this irrigation water were notified of the mixing zone allowance and the associated chemicals may be in their irrigation water. Nuisance is defined in the California Water Code as anything, which is injurious to health, indecent, offensive or an obstruction of the free use of property, which affects an entire community and occurs as a result of the treatment or disposal of waste. The allowance for a mixing zone three miles long in which there are at least 20 agricultural intakes could impact the entire local agricultural community based on the potential health impacts from crop uptake of pollutants and the free use of the farmers property. Using irrigation water exceeding water quality objectives, which is allow in the mixing zone, could directly impact farmers growing organic crops.

Many pharmaceuticals and personal care products (PPCPs) are commonly found in biosolids and effluents from wastewater treatment plants. Land application of these biosolids and the reclamation of treated wastewater can transfer those PPCPs into the terrestrial and aquatic environments, giving rise to potential accumulation in plants. (Uptake of Pharmaceutical and Personal Care Products by Soybean Plants from Soils Applied with Biosolids and Irrigated with Contaminated Water Chenxiwu, Alison Sponberg, Jason Witter, Minfang and Kevin Czajkowski; *Department of Environmental Sciences, and Department of Geography and Planning, University of Toledo, Toledo, Ohio 43606 Received April 8, 2010. Revised manuscript received June 25, 2010. Accepted July 12, 2010.*) The impacts to irrigated agriculture have not been adequately assessed with regard to the proposed mixing zone.

Water quality criteria for the protection of freshwater aquatic life are generally established on a 1-hour and a 4-day basis for acute and chronic toxic effects, respectively. It is a requirement in the TSD that it be shown that aquatic life does not remain resident within the mixing zone for 1-hour to prevent acute toxicity and 4-days for chronic impacts. There is nothing in the Permit addressing the amount of time and the methods for assessment for aquatic life to migrate through the mixing zone. The primary mixing area is commonly referred to as the zone of initial dilution, or ZID. Within the ZID acute aquatic life criteria are exceeded. To satisfy the CWA prohibition against the discharge of toxic pollutants in toxic amounts, regulators assume that if the ZID is small, significant numbers of aquatic organisms will not be present in the ZID long enough to encounter acutely toxic conditions. EPA recommends that a ZID not be located in an area populated by non-motile or sessile organisms, which presumably would be unable to leave the primary mixing area in time to avoid serious contamination. The Permit does not address populations of non-motile or sessile organisms within the mixing zone. The US Fish and Wildlife Service commented that: "We are also concerned about potential aquatic life attraction



impacts from the discharge plume. Various species can be drawn to discharge plumes for various reasons, including feeding and temperature and flow refuge. This attraction can result in impacts from related effluent toxicity and predation. The discharge area's identity as a popular fishing location also suggests an association between the discharge plume and possible predator attraction.” The Permit does not show that aquatic life passes through the mixing zone in a time to prevent toxicity, such is required by the TSD, which in turn is required by the Basin Plan.

The SIP requires a mixing zone not restrict the passage of aquatic life. The Permit contains the following statements regarding the accommodations for the passage of fish:

- The chronic aquatic life mixing zone is 400 feet wide and extends 350 feet downstream of the diffuser.
- The Sacramento River is approximately 600 feet wide at the surface. The chronic mixing zone is approximately 400 ft x 350 ft.
- The size of the zone of passage varies on either side of the river depending on the river geometry.
- The surface of the river is approximately 600 feet across and the bottom of the river is approximately 400 feet across.
- Based on the model the zone of passage at the surface of the river is generally at least 100 feet on both sides of the river, while the zone of passage at the bottom of the river is greater than 40 feet from both sides of the river.

It is stated in the mixing zone analysis discussion in the Permit that the mixing zone is 400 feet across, the same width as the river bottom, with the water surface being 600 feet across. Since the width of the mixing zone is the same as the width of the river bottom, we are to assume that the pollutant stream is not heavier than water and floats somewhere between the bottom and top of the river. In reality, some pollutants are heavier than water and sink while other pollutants are lighter and tend to float. The temperature of the waste will also impact the location of the mixing zone; warmer water tending to be more buoyant. The dye used to confirm that there is a passage for fish would tend to have the same characteristics throughout and tend to stay together. It makes no sense that the mixing zone is 400 feet wide and the river bottom is 400 feet wide and that there is a zone of passage at the bottom of at least 40 feet unless the plume is always buoyant, there are no pollutants that are heavier than water, such as saline water. The Sacramento River at Freeport is within the designated critical habitat for 5 federally-listed fish species including winter- and spring-run Chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*O. mykiss*), delta smelt (*Hypomesus transpacificus*) and green sturgeon (*Acipenser medirostris*). The zone of passage for critical habitat is unacceptably small and the proposal for an allowance for a chronic mixing zone should be prohibited.

Tetra Tech was tasked to review the Sacramento Regional County Sanitation District's dynamic modeling study for the Sacramento Regional Wastewater Treatment Plant. Tetra Tech submitted

a final review memorandum to the Regional Board dated 30 June 2008. “Some phenomena were observed in the field that were not reproduced in the model, most notably a region of high dye concentration near the eastern river bank just downstream from the diffuser in the October 2005 dye release. The subsequent November 2006 dye release was conducted in an effort to further resolve this observed behavior, however the model failed in all cases to reproduce this high concentration region.” (pages 9 and 10) It was not discussed that the area close to the river banks are defined as providing a bypass for fish – obviously, the dye shows the effluent plume at the bank. This is simply discussed as an anomaly, fish bypass was not addressed. This would confirm that there is no area of bypass for fish.

In justifying that the mixing zone *shall not cause acutely toxic conditions to aquatic life passing through the mixing zone*, the Permit states that: “The chronic mixing zone does not allow acute aquatic life criteria to be exceeded and this Order requires acute bioassays to be conducted using 100% effluent. Compliance with these requirements ensures that acutely toxic conditions to aquatic life passing through the chronic mixing zone do not occur.” The bioassays, according to the US Fish and Wildlife Service (15 June 2010) are not using the most sensitive species. The Discharger has routinely failed bioassays without apparent penalty or any requirement for corrective action. Bioassays are also not run continuously. Requiring bioassay sampling is not an assurance that toxic conditions are prohibited or prevented.

Copper and lead act on aquatic organisms in the same fashion. Therefore, additive toxicity for these constituents must be considered. The Basin Plan, at (IV-17.00), states the following:

*“Where multiple toxic pollutants exist together in water, the potential for toxicological interactions exists. On a case by case basis, the Regional Water Board will evaluate available receiving water and effluent data to determine whether there is reasonable potential for interactive toxicity. Pollutants which are carcinogens or which manifest their toxic effects on the same organ systems or through similar mechanisms will generally be considered to have potentially additive toxicity. The following formula will be used to assist the Regional Water Board in making determinations:*

$$\sum_{i=1}^n \frac{[\text{Concentration of Toxic Substance}]}{[\text{Toxicologic Limit for Substance in Water}]} < 1.0$$

*The concentration of each toxic substance is divided by its toxicologic limit. The resulting ratios are added for substances having similar toxicologic effects and, separately, for carcinogens. If such a sum of ratios is less than one, an additive toxicity problem is assumed not to exist. If the summation is equal to or greater than one, the combination of chemicals is assumed to present an unacceptable level of*

*toxicological risk. For example, monitoring shows that ground water beneath a site has been degraded by three volatile organic chemicals, A, B, and C, in concentrations of 0.3, 0.4, and 0.04 µg/l, respectively. Toxicologic limits for these chemicals are 0.7, 3, and 0.06 µg/l, respectively. Individually, no chemical exceeds its toxicologic limit. However, an additive toxicity calculation shows:*

$$\frac{0.3}{0.7} + \frac{0.4}{3} + \frac{0.04}{0.06} = 1.2$$

*The sum of the ratios is greater than unity (>1.0); therefore the additive toxicity criterion has been violated. The concentrations of chemicals A, B, and C together present a potentially unacceptable level of toxicity.”*

Additive toxicity has not been considered in the Permit but has the potential to result in the take of endangered species within the mixing zone and potentially beyond.

The City of Rio Vista NPDES permit states that: “The Sacramento River in the vicinity of the discharge is tidally influenced, resulting in flow reversals. With flow reversals, some volume of river water is multiple dosed with the effluent as the river flows downstream past the discharge, reverses moving upstream past the discharge a second time, then again reverses direction and passes the discharge point a third time as it moves down the river. A particular volume of river water may move back and forth, past the discharge point many times due to tidal action, each time receiving an additional load of wastewater.” Rio Vista is downstream from the subject wastewater treatment plant. Flow reversals and multi-dosing of pollutants are not discussed in the Permit’s mixing zones.

The Permit, page F-34 states that: “The SRWTP discharge is considered an incompletely-mixed discharge, so the Discharger conducted a mixing zone study. A mathematical dynamic model was developed by Flow Sciences Inc. and consists of five models linked in series, with the output from previous models used as part of the inputs to subsequent models.” The Permit then states that infield verification of the model was conducted; but fails to discuss the verification sampling results or the percentage error. The Permit further states that the model is proprietary and transmittal for verification to the Regional Board was not allowed. Each model would be assessed with an acceptable error. There is no discussion of whether the acceptable errors are additive from each of the models. It has been ten years since this NPDES permit has been renewed which should have allowed for a significant sampling database to be assembled supporting the model, no such discussion is presented in the Permit. We know of no models that are capable of assessing tidal flow reversals in rivers and tidal reversals are not discussed in the Permit. Unfortunately, the Permit fails to provide any information that provides any documentation of the accuracy of the model and the modeled results.

**S. The Permit contains Effluent Limitations less stringent than the existing permit, contrary to the Antibacksliding requirements of the Clean Water Act and Federal Regulations, 40 CFR 122.44 (l)(1).**

Under the Clean Water Act (CWA), point source dischargers are required to obtain federal discharge (NPDES) permits and to comply with water quality based effluent limits (WQBELs) in NPDES permits sufficient to make progress toward the achievement of water quality standards or goals. The antibacksliding and antidegradation rules clearly spell out the interest of Congress in achieving the CWA's goal of continued progress toward eliminating all pollutant discharges. Congress clearly chose an overriding environmental interest in clean water through discharge reduction, imposition of technological controls, and adoption of a rule against relaxation of limitations once they are established.

Upon permit reissuance, modification, or renewal, a discharger may seek a relaxation of permit limitations. However, according to the CWA, relaxation of a WQBEL is permissible only if the requirements of the antibacksliding rule are met. The antibacksliding regulations prohibit EPA from reissuing NPDES permits containing interim effluent limitations, standards or conditions less stringent than the final limits contained in the previous permit, with limited exceptions. These regulations also prohibit, with some exceptions, the reissuance of permits originally based on best professional judgment (BPJ) to incorporate the effluent guidelines promulgated under CWA §304(b), which would result in limits less stringent than those in the previous BPJ-based permit. Congress statutorily ratified the general prohibition against backsliding by enacting §§402(o) and 303(d)(4) under the 1987 Amendments to the CWA. The amendments preserve present pollution control levels achieved by dischargers by prohibiting the adoption of less stringent effluent limitations than those already contained in their discharge permits, except in certain narrowly defined circumstances.

When attempting to backslide from WQBELs under either the antidegradation rule or an exception to the antibacksliding rule, relaxed permit limits must not result in a violation of applicable water quality standards. The general prohibition against backsliding found in §402(o)(1) of the Act contains several exceptions. Specifically, under §402(o)(2), a permit may be renewed, reissued, or modified to contain a less stringent effluent limitation applicable to a pollutant *if*: (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; (B)(i) 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; or (ii) the Administrator determines that technical mistakes or mistaken interpretations of law were made in issuing the permit under subsection (a)(1)(B) of this section; (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 [(e.g., Acts of God)]; (D) the permittee has received a permit modification under section 1311(c), 1311(g), 1311(h), 1311(i), 1311(k), 1311(n), or 1326(a) of this title; or (E) 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, in which case the limitations in the reviewed, reissued, or modified permit may reflect the level of pollutant control actually achieved (but shall not be less stringent than required by effluent guidelines in effect at the time of permit renewal, reissuance, or modification).

Even if a discharger can meet either the requirements of the antidegradation rule under §303(d)(4) or one of the statutory exceptions listed in §402(o)(2), there are still limitations as to how far a permit may be allowed to backslide. Section 402(o)(3) acts as a floor to restrict the extent to which BPJ and water quality-based permit limitations may be relaxed under the antibacksliding rule. Under this subsection, even if EPA allows a permit to backslide from its previous permit requirements, EPA may never allow the reissued permit to contain effluent limitations which are less stringent than the current effluent limitation guidelines for that pollutant, or which would cause the receiving waters to violate the applicable state water quality standard adopted under the authority of §303.49.

Federal regulations 40 CFR 122.44 (l)(1) have been adopted to implement the antibacksliding requirements of the CWA:

- (1) Reissued permits. (1) Except as provided in paragraph (1)(2) of this section when a permit is renewed or reissued, interim effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit (unless the circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued and would constitute cause for permit modification or revocation and reissuance under Sec. 122.62.)
- (2) In the case of effluent limitations established on the basis of Section 402(a)(1)(B) of the CWA, a permit may not be renewed, reissued, or modified on the basis of effluent guidelines promulgated under section 304(b) subsequent to the original issuance of such permit, to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit.
  - (i) Exceptions--A permit with respect to which paragraph (1)(2) of this section applies may be renewed, reissued, or modified to contain a less stringent effluent limitation applicable to a pollutant, if:

- (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;
  - (B)(1) 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; or (2) The Administrator determines that technical mistakes or mistaken interpretations of law were made in issuing the permit under section 402(a)(1)(b);
  - (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;
  - (D) The permittee has received a permit modification under section 301(c), 301(g), 301(h), 301(i), 301(k), 301(n), or 316(a); or
  - (E) 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, in which case the limitations in the reviewed, reissued, or modified permit may reflect the level of pollutant control actually achieved (but shall not be less stringent than required by effluent guidelines in effect at the time of permit renewal, reissuance, or modification).
- (ii) Limitations. In no event may a permit with respect to which paragraph (1)(2) of this section applies be renewed, reissued, or modified to contain an effluent limitation which is less stringent than required by effluent guidelines in effect at the time the permit is renewed, reissued, or modified. In no event may such a permit to discharge into waters be renewed, issued, or modified to contain a less stringent effluent limitation if the implementation of such limitation would result in a violation of a water quality standard under section 303 applicable to such waters.

The Permit, page states that:

“3. Satisfaction of Anti-Backsliding Requirements

The effluent limitations in this Order are at least as stringent as the effluent limitations in the existing Order, with the exception of effluent limitations for chloroform, lindane, silver, lead, zinc and cyanide. The effluent limitations for these pollutants are less stringent than those in Order No. 5-00-188. This relaxation of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations.

Order No. 5-00-188 included effluent limitations for chloroform, lindane, silver, lead, zinc and cyanide. Based on monitoring data collected from June 2005 – July 2008, the discharge does not indicate reasonable potential to exceed water quality objectives for chloroform, lindane, silver, lead and zinc. Therefore, effluent limitations for these parameters were not included in this Order. The lack of effluent limitations in this Order does not constitute backsliding.

Order No. 5-00-188 established effluent limitations for cyanide of 10.8 µg/L as a daily average with a trigger of 6.1 µg/L. The cyanide limitation of 10.8 µg/L was based on the MEC of 9.0 µg/L times a safety factor of 1.2 (which was proposed by the Discharger and accepted by the Central Valley Water Board). A trigger concentration exceedance results in an investigation and Central Valley Water Board notification with the Central Valley Water Board may require an action plan to address the cause of the exceedance. The Central Valley Water Board found that the trigger concentration would be protective and appropriate if established as the 95th percentile value assuming that historical data follows a lognormal probability distribution which was 6.1 mg/L. The Discharger performed a dynamic model for cyanide which resulted in a chronic LTA of 13.9 mg/L. The calculated limit is 11.0 mg/L as an AMEL with a MDEL of 22.0 mg/L. As discussed in Section IV.C.2.d, the dynamic model represents a more accurate picture of the mixing zone concentrations. This Order relaxes the effluent limitation for cyanide from Order No. 5-00-188. The dynamic model data submitted by the Discharger is considered new information by the Central Valley Water Board.

Order No. 5-00-188 established effluent limitations for oil and grease. As discussed further in section IV.C.3, monitoring data over the term of Order No. 5-00-188 indicated that the discharge no longer exhibits reasonable potential to exceed water quality objectives for oil and grease. Therefore, the effluent limitation is not retained in this Order. The monitoring data submitted by the Discharger is considered new information by the Central Valley Water Board.

The revision of the cyanide limitation and the removal of effluent limitations for oil and grease, chloroform, lindane, silver, lead and zinc are consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Board Resolution No. 68-16. Any impact on existing water quality will be insignificant.”

The Permit fails to cite any of the exceptions to Federal regulations 40 CFR 122.44 (l)(1) in relaxing the permit and removing limitations. The removal of limitations rests solely on continued monitoring, not new information as defined in the regulation. There was no substantial modification to the treatment system or the character of the wastestream that justifies removal of the limitations. With regard to silver, lead and zinc, contrary to the statements regarding “new” information, the removal of limitations was based on the use of the effluent, rather than the ambient instream hardness, in determining reasonable potential that resulted in the Regional Board’s removal of the limitations. The statement that “any impact on existing water quality will be insignificant” is incorrect if the removal of metal limitations results in toxicity during periods of low ambient hardness. The Regional Board fails to cite a proper exemption to the Antiretroviral regulation and fails to provide any substance to support their claim that the impact on water quality will be insignificant.

**T. The Permit carries forth a Thermal Plan exemption that degrades the aquatic life beneficial use of the receiving stream, the Sacramento River.**

The Permit contains the following Effluent Limitation:

“e. Temperature. The maximum temperature of the discharge shall not exceed the natural receiving water temperature by more than 20°F from 1 May through 30 September and more than 25°F from 1 October through 30 April.”

The Permit contains the following Receiving Water Limitations:

“15. Temperature.

a. If the natural receiving water temperature is less than 65°F, the discharge shall not create a zone, defined by water temperature of more than 2°F above natural temperature, which exceeds 25 percent of the cross sectional area of the River at any point outside the zone of initial dilution.

b. If the natural receiving water temperature is 65° F or greater, the discharge shall not create a zone, defined by a water temperature of 1° F or more above natural receiving water temperature which exceeds 25 percent of the cross sectional area of the River at any point outside the zone of initial dilution for more than one hour per day as an average in any month.

The following is a reproduction of the Permit Table F-16.

<b>Thermal Plan Requirements (Section 5.A.(1)a-c)</b>	<b>Existing NPDES Permit Requirements (181 mgd discharge)</b>	<b>SRCS D Proposed NPDES Requirements (181 mgd)</b>
5.A.(1)a The maximum effluent	The maximum temperature of the discharge shall not exceed the	The daily average temperature of the effluent shall not exceed the daily



<p>temperature shall not exceed the natural receiving water temperature by more than 20 ° F</p>	<p>natural receiving water temperature by more than: 25 ° F from 1 October through 30 April; -or- 20° F from 1 May through 30 September  <i>(meets Thermal Plan requirements)</i></p>	<p>average natural receiving water temperature by more the 20° F 1 April through 30 September, or by more the 25° F 1 October through 31 March</p>
<p><b>5.A.(1)b</b>                  Elevated temperature waste discharges either individually or combined with other discharges shall not create a zone, defined by water temperatures of more than 1° F above natural receiving water temperature, which exceeds 25 percent of the cross-sectional area of a main river channel at any point.</p>	<p>If the natural receiving water temperature is less than 65° F: The discharge shall not create a zone, defined by water temperature of more than 2° F above the natural receiving water temperature, which exceeds 25 percent of the cross sectional area of the River at any point outside the zone of initial dilution. If the natural receiving water temperature is 65° F or greater: Meets Thermal Plan requirements at any point outside the zone of initial dilution.</p>	<p>The discharge shall not create a zone, defined by water temperatures of more than 2.5° F above natural receiving water temperature, which exceeds 50 percent of the cross-sectional area of the river at any point, evaluated as a daily average.</p>
<p><b>5.A.(1)c</b>                  No discharge shall cause a surface water temperature rise greater than 4° F above the natural temperature of the receiving waters at any time or place.</p>	<p>No Exception <i>(Meets Thermal Plan Requirements)</i></p>	<p>The discharge shall not cause a surface water temperature rise greater than 4° F above the natural temperature of the river at any time or place.</p>

Thermal Plan compliance:

Page F-92 of the Permit states that:

“Based on the dynamic model results for the effluent, the limitations appear to put the Discharger in immediate non-compliance. New or modified control measures may be necessary in order to comply with the effluent limitations, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. Furthermore, the effluent limitations for temperature are a new regulatory requirement within this permit, which becomes applicable to the waste discharge with the adoption of this Order, which was adopted after 1 July 2000. Therefore, a compliance time schedule for compliance with the temperature effluent limitations is established in TSO No. R5-2010-XXXX in accordance with CWC section 13300, that requires preparation and implementation of a pollution prevention plan in compliance with CWC section 13263.3.”

Page F-79 of the Permit states that:

“As a condition of Waste Discharge Order No. 5-00-188, the Discharger completed and submitted a study assessing the thermal impacts of its discharge in the Sacramento River to the National Marine Fisheries Services (NMFS), titled “Thermal Effects of Sacramento Regional Wastewater Treatment Plant Discharges on Migrating Fishes of the Sacramento River, February 2005.” This thermal impact assessment recommended continuation of the existing thermal plan exemptions. The 2005 Thermal Study was previously reviewed by NMFS staff and they did not indicate any concerns with the proposed Thermal Plan exception. Since this time, however, conditions under which the evaluation was made have changed. There has been a significant pelagic organism decline in the Delta, new species are threatened and there has been a change in the diffuser configuration. In December 2009, the Discharger requested revised changes to their Thermal Plan exemption. In June 2010, the Discharger in a letter to the Central Valley Water Board withdrew its request for an expanded wastewater treatment plant. Due to these changes the Discharger prepared a new study, “Thermal Plan Exception Justification for the Sacramento Regional Wastewater Treatment Plant”, July 2010. With this revised July 2010 study, new thermal plan exemptions were requested.”

It is somehow amazing that it takes a model to determine that the Discharger is in non-compliance with the discharge limitations for temperature. The proposed Limitation for temperature in the Permit is the same as the existing NPDES permit, Order No. 5-00-188. This is not a “new” effluent limitation. Has the Discharger not conducted temperature sampling? Have the data not been reviewed? Is the Discharger not required to assess compliance and report, to the Regional Board, instances of non-compliance? Is the Effluent Limitation for temperature not subject to mandatory minimum penalties under the California Water Code for Effluent Limitation violations?

The California Department of Fish and Game has stated that manmade flows such as effluent discharges attract fish. The Fish and Wildlife Services have stated that some fish larvae could be expected in the vicinity of the city of Sacramento during February-June and during the larval stage delta smelt are the most vulnerable to zones of poor water quality or high water temperature due to their reduced mobility. There has been a significant pelagic organism decline in the Delta and new species are threatened. And, with all this said, the Regional Board is recommending in the Permit to continue the thermal plan exemption for the Sacramento Regional wastewater treatment plant. The Regional Board’s required study sounds like the numerous studies that have already been completed in the decade since the last permit was adopted. Instead, the Regional Board should be investigating whether the thermal discharges from the Sacramento Regional wastewater treatment plant are, at a minimum, contributing to toxicity within the receiving stream.

It's somewhat amazing that following more than a decade of studies that even the most basic of information regarding the impacts of Sacramento County's thermal waste discharge is unknown. Each of the studies is contrary to comments and recommendations by the agencies with expertise in fisheries. As follows, another model says there is a zone of passage for fish yet the experts say that wastewater discharges are attractive to fish and that young fish do not have the mobility to avoid dangers. The agency comments are not new information, but all the Regional Board gets is more modeling and no real life data or information. A continued lack of information after a decade of studies, and the Permit requires more studies.

Page F-80 of the Permit states the following with regard to a thermal zone of passage for fish:

“The July 2010 thermal plan exception justification study is based on the dynamic model for temperature performed by Flow Science. The modeled temperature plumes show a zone of passage at the surface of the Sacramento River approximately 75-100 feet wide on the west bank and 175-200 feet wide on the east bank. The surface width of the river at the diffuser is 600 feet. The zone of passage at the bottom of the river is smaller due to the configuration of the west bank. The study concluded that both surface water swimming fish and bottom water swimming fish would avoid the heated plume by swimming around or on top of it.”

In a 15 June 2010 letter to Kenneth Landau at the Regional Board the Director of the California Department of Fish and Game stated with regard to the thermal plume from the Sacramento Regional WWTP:

“Department Fisheries Biologists have stated in previous comments to the Regional Board that manmade flows such as effluent discharge attract fish. The Department supports USEPA findings and recommends that acute and/or chronic mixing zones not be allowed and that conditions be set to meet Basin Plan Objectives allowing for no toxicity in the discharge.”

In a 15 June 2010 letter to the Regional Board the US Fish and Wildlife Service stated:

“Delta smelt enter the Sacramento River and Deep Water Ship Channel from late December to June to spawning in temperatures between 12-18 C. spawning on the mainstem of the Sacramento River may occur particularly during years of low freshwater discharge. Delta smelt critical habitat in the Sacramento River extends north to the confluence with the American River. Pre-spawning adults could be expected in the vicinity of the city of Sacramento from the latter part of December through June. Some larvae could be expected in the vicinity of the city of Sacramento during February-June. During the larval stage delta smelt are the most vulnerable to zones of poor water quality or high water temperature due to their reduced mobility.”

The Thermal Plan exception has resulted in a situation where the aquatic life beneficial use in the Delta is degraded to the point that recovery is questionable. Increased thermal discharges are another stress. Clearly the evidence submitted by the fishery agencies is contrary to the models submitted by consultants hired by the Discharger. With the Delta in significant decline and more aquatic life failures the Permit should implement a new approach and error on the side of water quality and implement the Thermal Plan without exception.

**U. The Permit fails to assess compliance and require compliance with and the Receiving Water Limitation for Toxicity, which is based on the Basin Plan narrative toxicity water quality objective.**

The Permit contains Receiving Water Limitation No. 16 which requires that the wastewater discharge not cause: “Toxic substances to be present, individually or in combination, in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.” An identical Receiving Water Limitation is contained in the existing NPDES permit for the Sacramento Regional County Sanitation District.

Threatened violation:

The increasing production and use of pharmaceuticals and personal care products (PPCPs) – some of which may be endocrine disrupting compounds (EDCs) – have led to a growing concern about the occurrence of these compounds in the environment. Recent studies have reported the occurrence worldwide of EDCs, PPCPs, and other organic wastewater contaminants (OWCs) – collectively referred to as “constituents of emerging concern” (CECs) or “emerging constituents” (ECs) – in wastewater treatment plant (WWTP) effluents, surface waters used as drinking water supplies, and in some cases, finished drinking waters. Of the 126 samples analyzed for the project, one sample (American River at Fairbairn drinking water treatment plant [DWTP] intake collected in April 2008) had no detectable levels of any EDCs, PPCPs, or OWCs. All other samples had one or more analytes detected at or above the corresponding MRLs. The five most frequently detected PPCPs were caffeine, carbamazepine, primidone, sulfamethoxazole, and tris(2-chloroethyl) phosphate (TCEP). At the sample sites upstream of WWTP discharges in all three watersheds, the concentrations of selected PPCPs, except for caffeine, were low (i.e.,  $\leq 13$  ng/L), pointing to WWTP discharges as the main source of most PPCPs and OWCs in the environment. (Source, Fate, and Transport of Endocrine disruptors, Pharmaceuticals, and Personal Care Products in Drinking Water Sources in California, National Water Research Institute Fountain Valley, California, May 2010)

Over the last 10 years, reports of feminized wildlife have fueled chilling headlines. Most of these reports have focused on the many ways that estrogen in sewage effluent can distort normal male development. Now a new study reveals one way that the hormone

pollutant can affect females: Too much estrogen causes subtle changes in female fish's courting behavior, which could alter a population's genetic makeup (Environ. Sci. Technol., DOI: 10.1021/es101185b).

Increase in intersex fish downstream from WWTP possibly associated with endocrine-active contaminants. (Boulder Colorado, Colorado University, 2008)

Skewed sex ratio downstream from WWTP possibly associated with endocrine-active contaminants. (Boulder Colorado, Colorado University, 2006)

Fluoxetine (FLX), Sertraline (SER) and their degradates NFLX, and NSER were the primary antidepressants in brain tissue samples. Little or no venlafaxine (VEN), the dominant antidepressant in both water and bed sediment, was present. Degradates were measured at higher concentrations in brain samples than parent compounds. (Boulder Creek, Colorado & Fourmile Creek, Iowa, the College of Wooster, 2010)

SAR sites (with WWTP or urban runoff influent) males had significantly lower Testosterone (T) than the reference site males. Males from SAR sites had significantly higher  $17\beta$ -estradiol (E2) than reference site. Females from SAR sites had significantly lower E2 than the reference site females. (USGS, Santa Ana River (SAR) SAR sites, 2009)

“Several recent studies have documented endocrine disruption in Delta fish. One of the biomarkers of EDCs is intersex fish, fish with both male and female reproductive organs. A recent histopathological evaluation of delta smelt for the Pelagic Organism Decline found 9 of 144 maturing delta smelt (6%) collected in the fall were intersex males. This study provides evidence that delta smelt are being exposed to EDCs. Brander and Cherr (2008) observed choriogenin induction in male silversides from Suisun Marsh. Riordan and Adam (2008) reported endocrine disruption in male fathead minnows following in-situ exposures below the Sacramento Regional Treatment Plant. Lavado, et al. (in press) conducted studies in 2006 and 2007 to evaluate the occurrence and potential sources of EDCs in Central Valley waterways. In their study, estrogenic activity was repeatedly observed at 6 of 16 locations in the Bay-Delta watershed, including in water from the Lower Napa River and Lower Sacramento River in the Delta. Further studies are needed to identify the compounds responsible for the observed estrogenic activity and their sources.” (Alameda County Water District, Alameda County Flood Control and Water Conservation District, Zone 7, Metropolitan Water District of Southern California, San Luis & Delta-Mendota Water Authority, Santa Clara Valley Water District, State Water Contractors, June 1, 2010)

A recent study by the Toxic Substances Hydrology Program of the U.S. Geological Survey (USGS) shows that a broad range of chemicals found in residential, industrial,

and agricultural wastewaters commonly occurs in mixtures at low concentrations downstream from areas of intense urbanization and animal production. The chemicals include human and veterinary drugs (including antibiotics), natural and synthetic hormones, detergent metabolites, plasticizers, insecticides, and fire retardants. One or more of these chemicals were found in 80 percent of the streams sampled. Half of the streams contained 7 or more of these chemicals, and about one-third of the streams contained 10 or more of these chemicals. This study is the first national-scale examination of these organic wastewater contaminants in streams and supports the USGS mission to assess the quantity and quality of the Nation's water resources. A more complete analysis of these and other emerging water-quality issues is ongoing. Knowledge of the potential human and environmental health effects of these 95 chemicals is highly varied; drinking-water standards or other human or ecological health criteria have been established for 14. Measured concentrations rarely exceeded any of the standards or criteria. Thirty-three are known or suspected to be hormonally active; 46 are pharmaceutically active. Little is known about the potential health effects to humans or aquatic organisms exposed to the low levels of most of these chemicals or the mixtures commonly found in this study. ("Pharmaceuticals, hormones, and other organic wastewater contaminants in U.S. streams, 1999-2000: A national reconnaissance," an article published in the March 15, 2002 issue of *Environmental Science & Technology*, v. 36, no. 6, pages 1202-1211. Data are presented in a companion USGS report, "Water-quality data for pharmaceuticals, hormones, and other organic wastewater contaminants in U.S. streams, 1999-2000" (USGS Open-File Report 02-94). These and other reports, data, and maps can be accessed on the Internet at <http://toxics.usgs.gov>.)

PPCPs are found where people or animals are treated with drugs and people use personal care products. PPCPs are found in any water body influenced by raw or treated sewage, including rivers, streams, ground water, coastal marine environments, and many drinking water sources. PPCPs have been identified in most places sampled. The U.S. Geological Survey (USGS) implemented a national reconnaissance to provide baseline information on the environmental occurrence of PPCPs in water resources. You can find more information about this project from the USGS's [What's in Our Wastewaters and Where Does it Go?](#) site. PPCPs in the environment are frequently found in aquatic environments because PPCPs dissolve easily and don't evaporate at normal temperature and pressures. Practices such as the use of sewage sludge ("biosolids") and reclaimed water for irrigation brings PPCPs into contact with the soil.  
(<http://www.epa.gov/ppcp/faq.html#ifthereareindeed>)

From the recent scientific investigations and literature it is reasonable to conclude that "constituents of emerging concern" (CECs) are present in the wastewater discharge from the Sacramento Regional wastewater treatment plant. It is also reasonable to conclude that the wastewater discharge contains CECs in concentrations that at a minimum threaten to violate the

Receiving Water Limitation for toxicity which prohibits toxic substances to be present in concentrations that produce detrimental physiological responses in human or aquatic life. The Permit is silent with regard to CECs except to state that requiring filtration may reduce their quantity in the wastewater discharge. Monitoring for CECs in the wastewater discharge, in the receiving stream (the Sacramento River) or in agricultural diversions taken from within the proposed mixing zones is not required in the Permit. It is undoubted that the Regional Board's response will be that the individual chemical pollutants do not have promulgated water quality standards and monitoring for CECs would therefore be unproductive. However, the Regional Board has an obligation to require an investigation of the potential violation of the Receiving Water Limitation for Toxicity. The Discharger is also required to assess compliance with all limitations and report any instances of non-compliance with limitations, including Receiving Water Limitations. The Regional Board is also, by 40 CFR 122.44, required to develop Effluent Limitations if the discharge presents a reasonable potential to exceed a water quality standard, including the narrative toxicity objective.

US EPA has compiled a database; *Treating Contaminants of Emerging Concern A Literature Review Database* (August 2010). Local wastewater treatment system design Engineers, such as Dr. Robert Emerick, have also been testing treatment system capabilities for removing CECs. There appear to be treatment technologies that are capable of removing significant levels of CECs.

At a minimum, the Permit should include a requirement for a study of the presence of CECs in the wastewater discharge, the receiving stream and in agricultural intakes within the proposed 3 mile mixing zone and the effectiveness of different treatment technologies to remove CECs. The report should be made available to the public. At a time when the Permit will likely require advanced treatment systems to be designed and constructed; investigating the technologies that are capable of removing CECs would make sense economically and environmentally.

The Regional Board's Response to Comments fails to address the above comment in accordance with 40 CFR 124.17(a)(2). The Regional Board cites bioassays, which the Discharger routinely fails as a means of protection against toxic discharges. Besides the bioassay failures, the Regional Board fails to recognize that bioassays do not measure any of the cited threats against the Receiving Water beneficial use. Specifically, bioassays do not measure impacts to human health. Bioassays only measure mortality to fish and are not capable of determining things like changes of sex due to chemical pollutants. The Discharger admitted during cross examination by a representative of the Water Agencies during the public hearing that they had never sampled their discharge for pollutants of emerging concern. The Regional Board failed to require any sampling for CECs and does not address such in the Response to Comments. There is adequate information to show that CECs in wastewater discharges threaten the Receiving Water Limitation for toxicity. There are treatability analyses available showing which technologies are best at removing CECs; the Regional Board did not require the Discharger to investigate these

treatment technologies in constructing their new treatment system and did not address such in the Response to Comments. The Regional Board's Response to Comments on this issue fails to describe and fails to provide a response to every cited significant point. The Responses that were presented, such as bioassays are provided are incorrect and a dismal attempt to disguise the fact that absolutely nothing is being done by the Regional Board to address this issue.

**V. The Permit contains an inadequate antidegradation analysis that does not comply with the requirements of Section 101(a) of the Clean Water Act, Federal Regulations 40 CFR § 131.12, the State Board's Antidegradation Policy (Resolution 68-16) and California Water Code (CWC) Sections 13146 and 13247.**

CWC Sections 13146 and 13247 require that the Board in carrying out activities which affect water quality shall comply with state policy for water quality control unless otherwise directed by statute, in which case they shall indicate to the State Board in writing their authority for not complying with such policy. The State Board has adopted the Antidegradation Policy (Resolution 68-16), which the Regional Board has incorporated into its Basin Plan. The Regional Board is required by the CWC to comply with the Antidegradation Policy.

Section 101(a) of the Clean Water Act (CWA), the basis for the antidegradation policy, states that the objective of the Act is to "restore and maintain the chemical, biological and physical integrity of the nation's waters." Section 303(d)(4) of the CWA carries this further, referring explicitly to the need for states to satisfy the antidegradation regulations at 40 CFR § 131.12 before taking action to lower water quality. These regulations (40 CFR § 131.12(a)) describe the federal antidegradation policy and dictate that states must adopt both a policy at least as stringent as the federal policy as well as implementing procedures.

California's antidegradation policy is composed of both the federal antidegradation policy and the State Board's Resolution 68-16 (State Water Resources Control Board, Water Quality Order 86-17, p. 20 (1986) ("Order 86-17"); Memorandum from Chief Counsel William Attwater, SWRCB to Regional Board Executive Officers, "federal Antidegradation Policy," pp. 2, 18 (Oct. 7, 1987) ("State Antidegradation Guidance")). As a state policy, with inclusion in the Water Quality Control Plan (Basin Plan), the antidegradation policy is binding on all of the Regional Boards (Water Quality Order 86-17, pp. 17-18).

Implementation of the state's antidegradation policy is guided by the State Antidegradation Guidance, SWRCB Administrative Procedures Update 90-004, 2 July 1990 ("APU 90-004") and USEPA Region IX, "Guidance on Implementing the Antidegradation Provisions of 40 CFR 131.12" (3 June 1987) ("Region IX Guidance"), as well as Water Quality Order 86-17.

The Regional Board must apply the antidegradation policy whenever it takes an action that will lower water quality (State Antidegradation Guidance, pp. 3, 5, 18, and Region IX Guidance, p.



1). Application of the policy does not depend on whether the action will actually impair beneficial uses (State Antidegradation Guidance, p. 6). Actions that trigger use of the antidegradation policy include issuance, re-issuance, and modification of NPDES and Section 404 permits and waste discharge requirements, waiver of waste discharge requirements, issuance of variances, relocation of discharges, issuance of cleanup and abatement orders, increases in discharges due to industrial production and/or municipal growth and/or other sources, exceptions from otherwise applicable water quality objectives, etc. (State Antidegradation Guidance, pp. 7-10, Region IX Guidance, pp. 2-3). Both the state and federal policies apply to point and nonpoint source pollution (State Antidegradation Guidance p. 6, Region IX Guidance, p. 4).

The federal antidegradation regulations delineate three tiers of protection for waterbodies. Tier 1, described in 40 CFR § 131.12(a)(1), is the floor for protection of all waters of the United States (48 Fed. Reg. 51400, 51403 (8 Nov. 1983); Region IX Guidance, pp. 1-2; APU 90-004, pp. 11-12). It states that “[e]xisting instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.” Uses are “existing” if they were actually attained in the water body on or after November 28, 1975, or if the water quality is suitable to allow the use to occur, regardless of whether the use was actually designated (40 CFR § 131.3(e)). Tier 1 protections apply even to those waters already impacted by pollution and identified as impaired. In other words, already impaired waters cannot be further impaired.

Tier 2 waters are provided additional protections against unnecessary degradation in places where the levels of water quality are better than necessary to support existing uses. Tier 2 protections strictly prohibit degradation unless the state finds that a degrading activity is: 1) necessary to accommodate important economic or social development in the area, 2) water quality is adequate to protect and maintain existing beneficial uses and 3) the highest statutory and regulatory requirements and best management practices for pollution control are achieved (40 CFR § 131.12(a) (2)). Cost savings to a discharger alone, absent a demonstration by the project proponent as to how these savings are “necessary to accommodate important economic or social development in the area,” are not adequate justification for allowing reductions in water quality (Water Quality Order 86-17, p. 22; State Antidegradation Guidance, p. 13). If the waterbody passes this test and the degradation is allowed, degradation must not impair existing uses of the waterbody (48 Fed. Reg. 51403). Virtually all waterbodies in California may be Tier 2 waters since the state, like most states, applies the antidegradation policy on a parameter-by-parameter basis, rather than on a waterbody basis (APU 90-004, p. 4). Consequently, a request to discharge a particular chemical to a river, whose level of that chemical was better than the state standards, would trigger a Tier 2 antidegradation review even if the river was already impaired by other chemicals.

Tier 3 of the federal antidegradation policy states “[w]here high quality waters constitute an outstanding national resource, such as waters of national and State parks and wildlife refuges and

waters of exceptional recreational or ecological significance, that water shall be maintained and protected (40 CFR § 131.12(a)(3)). These Outstanding National Resource Waters (ONRW) are designated either because of their high quality or because they are important for another reason (48 Fed. Reg. 51403; State Antidegradation Guidance, p. 15). No degradation of water quality is allowed in these waters other than short-term, temporary changes (Id.). Accordingly, no new or increased discharges are allowed in either ONRW or tributaries to ONRW that would result in lower water quality in the ONRW (EPA Handbook, p. 4-10; State Antidegradation Guidance, p. 15). Existing antidegradation policy already dictates that if a waterbody “should be” an ONRW, or “if it can be argued that the waterbody in question deserves the same treatment [as a formally designated ONRW],” then it must be treated as such, regardless of formal designation (State Antidegradation Guidance, pp. 15-16; APU 90-004, p. 4). Thus the Regional Board is required in each antidegradation analysis to consider whether the waterbody at issue should be treated as an ONRW. It should be reiterated that waters cannot be excluded from consideration as an ONRW simply because they are already “impaired” by some constituents. By definition, waters may be “outstanding” not only because of pristine quality, but also because of recreational significance, ecological significance or other reasons (40 CFR §131.12(a)(3)). Waters need not be “high quality” for every parameter to be an ONRW (APU 90-004, p. 4). For example, Lake Tahoe is on the 303(d) list due to sediments/siltation and nutrients, and Mono Lake is listed for salinity/TDC/chlorides but both are listed as ONRW.

Even a minimal antidegradation analysis requires an examination of: 1) existing applicable water quality standards; 2) ambient conditions in receiving waters compared to standards; 3) incremental changes in constituent loading, both concentration and mass; 4) treatability; 5) best practicable treatment and control (BPTC); 6) comparison of the proposed increased loadings relative to other sources; 7) an assessment of the significance of changes in ambient water quality and 8) whether the waterbody was a ONRW. A minimal antidegradation analysis must also analyze whether: 1) such degradation is consistent with the maximum benefit to the people of the state; 2) the activity is necessary to accommodate important economic or social development in the area; 3) the highest statutory and regulatory requirements and best management practices for pollution control are achieved; and 4) resulting water quality is adequate to protect and maintain existing beneficial uses. A BPTC technology analysis must be done on an individual constituent basis; while tertiary treatment may provide BPTC for pathogens, dissolved metals may simply pass through.

Any antidegradation analysis must comport with implementation requirements in State Board Water Quality Order 86-17, State Antidegradation Guidance, APU 90-004 and Region IX Guidance.

The antidegradation review process is especially important in the context of waters protected by Tier 2. See EPA, Office of Water Quality Regulations and Standards, *Water Quality Standards*

*Handbook*, 2nd ed. Chapter 4 (2nd ed. Aug. 1994). Whenever a person proposes an activity that may degrade a water protected by Tier 2, the antidegradation regulation requires a state to: (1) determine whether the degradation is “necessary to accommodate important economic or social development in the area in which the waters are located”; (2) consider less-degrading alternatives; (3) ensure that the best available pollution control measures are used to limit degradation; and (4) guarantee that, if water quality is lowered, existing uses will be fully protected. 40 CFR § 131.12(a)(2); EPA, Office of Water Quality Regulations and Standards, *Water Quality Standards Handbook*, 2nd ed. 4-1, 4-7 (2nd ed. Aug. 1994). These activity-specific determinations necessarily require that each activity be considered individually.

For example, the APU 90-004 states:

“Factors that should be considered when determining whether the discharge is necessary to accommodate social or economic development and is consistent with maximum public benefit include: a) past, present, and probably beneficial uses of the water, b) economic and social costs, tangible and intangible, of the proposed discharge compared to benefits. The economic impacts to be considered are those incurred in order to maintain existing water quality. The financial impact analysis should focus on the ability of the facility to pay for the necessary treatment. The ability to pay depends on the facility’s source of funds. In addition to demonstrating a financial impact on the publicly – or privately – owned facility, the analysis must show a significant adverse impact on the community. The long-term and short-term socioeconomic impacts of maintaining existing water quality must be considered. Examples of social and economic parameters that could be affected are employment, housing, community services, income, tax revenues and land value. To accurately assess the impact of the proposed project, the projected baseline socioeconomic profile of the affected community without the project should be compared to the projected profile with the project...EPA’s *Water Quality Standards Handbook* (Chapter 5) provides additional guidance in assessing financial and socioeconomic impacts”

As a rule-of-thumb, USEPA recommends that the cost of compliance should not be considered excessive until it consumes more than 2% of disposable household income in the region. This threshold is meant to suggest more of a floor than a ceiling when evaluating economic impact. In the *Water Quality Standards Handbook*, USEPA interprets the phrase “necessary to accommodate important economic or social development” with the phrase “substantial and widespread economic and social impact.”

The antidegradation analysis must discuss the relative economic burden as an aggregate impact across the entire region using macroeconomics. Considering the intrinsic value of the Delta to the entire state and the potential effects upon those who rely and use Delta waters, it must also evaluate the economic and social impacts to water supply, recreation, fisheries, etc. from the

Discharger's degradation of water quality in the Delta. Nor has the case been made that there is no alternative for necessary housing other than placing it where its wastewater must discharge directly into sensitive but seriously degraded waters. It is unfortunate that the agency charged with implementing the Clean Water Act has apparently decided it is more important to protect the polluter than the environment.

There is nothing resembling an analysis buttressing the unsupported claim that BPTC is being provided. An increasing number of wastewater treatment plants around the country and state are employing reverse-osmosis (RO), or even RO-plus. Clearly, micro or nano filtration can be considered BPTC for wastewater discharges of impairing pollutants into critically sensitive ecological areas containing listed species that are already suffering serious degradation. If this is not the case, the antidegradation analysis must explicitly detail how and why a run-of-the-mill secondary or tertiary system can be considered BPTC.

Any reasonably adequate antidegradation analysis must discuss the affected beneficial uses (i.e., numbers and health of the aquatic ecosystem; extent, composition and viability of agricultural production; people depending upon these waters for water supply; extent of recreational activity; etc.) and the probable effect the discharge will have on these uses.

Alternatively, Tier 1 requires that existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. By definition, any increase in the discharge of impairing pollutants to impaired waterways unreasonably degrades beneficial uses and exceeds applicable water quality standards. Prohibition of additional mass loading of impairing pollutants is a necessary stabilization precursor to any successful effort in bringing an impaired waterbody into compliance.

The Permit allows a mixing zone for constituents based on human health (Drinking water) rather than requiring treatment to meet end-of-pipe limitations. The Delta serves to convey the drinking water supply for over 25 million Californians via the State Water Project (SWP), Central Valley Project (CVP) and local projects and intakes. Through the SWP and CVP, the channels in the Delta are also used to supply the agricultural water supply for roughly 2 million acres of prime farmland. It is important to stress that the Delta is not the source per se for all SWP and CVP water, but that the Delta and the Sacramento River serve as a critical conduit for water supplies that are physically developed upstream. To comply with the Antidegradation Policy, the trade of receiving water beneficial uses for lower utility rates must be in the best interest of the people of the state and must also pass the test that the Discharger is providing BPTC. Although the use of mixing zones may lead to individual, short-term cost savings for the discharger, significant long-term health and economic costs may be placed on the rest of society. The required antidegradation finding, that allowing a mixing zone rather than requiring treatment to remove pollutants to levels that protect beneficial uses at the point of discharge, is in the best interest of the people of California can be made in good faith. It is doubtful that put to a vote

that Californians would vote to allow drinking water to be incrementally degraded in favor of maintenance of Sacramento's low sewer rates. Californians have routinely voted for clean water and clean water bonds. An assessment of BPTC, and therefore compliance with the Antidegradation Policy, must assess whether treatment of the wastestream can be accomplished, is feasible, and not simply the additional costs of compliance with water quality standards. A BPTC case can be made for the benefits of prohibiting a mixing zone and requiring technologies that provide superior waste treatment and reuse of the wastestream. It is more likely that the allowance for a human health mixing zone may be considered a violation of the State Constitution which requires the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the mixing zone is a waste and unreasonable use of water which is not in the interest of the people and for the public welfare.

The Sacramento River is impaired and 303(d) listed for unknown toxicity. The Permit allows a mixing zone for chronic toxicity. Already impaired waters cannot be further impaired. The Antidegradation Policy discussion in the Permit or as prepared by the Discharger, does not discuss the impacts of allowing further degradation of the Sacramento River and the impacts of allowing a toxic mixing zone in an already impaired waterbody.

The Permit, Page F-73, states that: "...in addition, there are at least 20 agricultural diversions within 1 mile upstream and 2 miles downstream of the discharge." The mixing zone has not been defined for salinity. The size of the mixing zone has not been defined. It is reasonable to assume that since there are numerous irrigation intakes within 1 to 2 miles of the discharge that the intakes would be impacted by inadequately diluted wastewater containing EC above the agricultural goal. The proposed mixing zone for salinity has not met any of the requirements in the SIP or the Basin Plan. The allowance for a mixing zone for salinity and the impacts to the agricultural beneficial use is not discussed in the Antidegradation Policy analysis.

The Permit shows based on the instream ambient hardness, that copper, lead and zinc are present in the discharge at elevated concentrations. The combinations of copper, lead and zinc have a potential for exhibiting additive toxic effects. The Basin Plan, *Implementation, Policy for Application of Water Quality Objectives* requires that: "*Where multiple toxic pollutants exist together in water, the potential for toxicologic interactions exists. On a case by case basis, the Regional Water Board will evaluate available receiving water and effluent data to determine whether there is a reasonable potential for interactive toxicity. Pollutants which are carcinogens or which manifest their toxic effects on the same organ systems or through similar mechanisms will generally be considered to have potentially additive toxicity.*" The Antidegradation Policy assessment does not address additive toxicity.

Table 3-2 of the Discharger's Antidegradation Analysis lists "applicable Water Quality Objectives and/or Criteria for the Sacramento-San Joaquin Delta.

Table 3-2 fails to cite that

- BOS and total suspended solids (TSS) limitations are based on the Federal Secondary Treatment Rule.
- Chlorine residual levels are based on the narrative toxicity objective.
- The EC objective: The designated beneficial uses of irrigated agriculture and industrial supply are not protected by the sole application of the secondary MCL.
- The TDS objective: The designated beneficial uses of irrigated agriculture and industrial supply are not protected by the sole application of the secondary MCL.
- The aluminum objective: chronic aquatic life beneficial uses are not listed as being more stringent than the cited secondary MCL
- The metals criteria for copper, lead, nickel, silver and zinc are: based on “A range of receiving water criteria was calculated using downstream 5th percentile (39.9 mg/L) and 95th percentile (84.2 mg/L) hardness values for the Sacramento River at River Mile 44 collected during the period 1/22/1998 – 6/12/2008.” ((table 3-2) footnote No. 4) Federal Regulation 40 CFR 131.38(c)(4) states that: “For purposes of calculating freshwater aquatic life criteria for metals from the equations in paragraph (b)(2) of this section, for waters with a hardness of 400 mg/l or less as calcium carbonate, the actual ambient hardness of the surface water shall be used in those equations.” Ambient conditions are in-stream conditions unimpacted by the discharge. Confirming this definition, the SIP Sections 1.4.3.1 *Ambient Background Concentration as an Observed Maximum* and 1.4.3.2 state in part that: “If possible, preference should be given to ambient water column concentrations measured immediately upstream or near the discharge, but not within an allowed mixing zone for the discharge. The “antidegradation analysis fails to cite the lowest recorded upstream hardness value which should have been utilized in determining the water quality standards for metals. On January 6th 2007 the total hardness (CaCO<sub>3</sub>) was measured in the Sacramento River at Freeport at 19 mg/l. (USGS Water-Quality Assessment of the Sacramento River Basin, California: Water-Quality, Sediment and Tissue Chemistry, and Biological Data, 1995-1998 (Open-File Report) 2000-391, [http://ca.water.usgs.gov/sac\\_nawqa/Publications/ofr\\_2000-391/data\\_sw\\_int.html](http://ca.water.usgs.gov/sac_nawqa/Publications/ofr_2000-391/data_sw_int.html))
- Chloroform: a citation of the Cal EPA Cancer Potency Factor as a Drinking Water Level of 1.1 ug/l is absent. Only the total trihalomethane MCL of 80 ug/l is cited.

Page 3-2 (60) “The range of hardness-based acute and chronic freshwater aquatic life CTR objectives for dissolved copper, lead, silver and zinc included in Table 3-2 were calculated using 5th and 95th percentile downstream hardness values calculated for the Sacramento River at River Mile 44” not the lowest observed ambient receiving water of 19 mg/l.

Section 3.3 303(D) listings (page 3-6 (64) The Sacramento-San Joaquin Delta is impaired for chlorpyrifos, DDT, diazinon, exotic species, group A pesticides, mercury and unknown toxicity. Portions of the Delta are also 303(D) listed for electrical conductivity (EC). The analysis (page 3-8, 66) acknowledges that the sources of unknown toxicity are unknown and that any proposed TMDL completion is not scheduled to be completed until 2019.

Although the Permit is based on no expanded flow rate, under the Clean Water Act and the NPDES permit regulations (40 CFR 122.4(i)), when a new source seeks to obtain a permit for a discharge of pollutants to a stream segment already exceeding its water quality standards for that pollutant, no permit may be issued. An exception to this prohibition is where the new source demonstrates, before the close of the public comment period for the Permit, that: (1) there are sufficient remaining pollutant load allocations for the discharge, and (2) existing dischargers in the stream segment are subject to compliance schedules designed to bring the stream segment into compliance with applicable water quality standards. The Ninth Circuit Court of Appeals has ruled in *Friends of Pinto Creek v. United States Environmental Protection Agency* that a new or expanded wastewater discharge may not be allowed into an impaired waterway unless all existing discharges have been identified and are subject to compliance schedules.

The Discharger's Antidegradation Analysis, Section 4 Environmental Setting (page 4-1, 72), Section 4.4 on pages 4-6 and 4-7, compares the Sacramento Regional wastewater discharge to "similarly situated discharges".

The discussion of "similarly situated dischargers" states that: "...advanced treatment is often driven by low dilution of treated effluent that occurs in the receiving water, such as is typically the case for many Central Valley dischargers. The SRWTP discharge situation is rare among wastewater treatment plants within the region in that its receiving water – the Sacramento River at Freeport – currently provides a daily average dilution ratio of 20:1 or more at all times, and is expected to do so greater than 99.5% of the time under the proposed 218 mgd discharge scenario. Additionally, modeling performed for the 70-year (1922-1991) hydrologic period of record shows that the mean percentage of flow contributed by SRWTP discharge to the twelve Delta locations modeled for percent SRWTP effluent contribution as a result of the proposed project, would range from 0.01% at in the San Joaquin River near Stockton to 2.2% at in the Sacramento River Greene's Landing/Hood, indicating typical dilution ratios ranging from approximately 50:1 to 1000:1.

All of the communities in the Central Valley with existing discharges that have constructed or are constructing advanced treatment facilities have done so in reaction to water quality-based considerations influenced by the location and physical conditions that exist at their point of discharge to receiving waters. For communities that have established new discharges to receiving waters, applicable NPDES discharge requirements have resulted in the need to construct

advanced treatment facilities to be able to achieve permit requirements upon commencement of the discharge. Examples of such new discharges include Iron House Sanitary District and the City of Rio Vista. In such cases, the dilution characteristics in the receiving water have not been a controlling factor in the decision to construct advanced treatment facilities. Because the dilution situation for the SRWTP discharge is distinctly different from most other municipal discharges within the region, many of which occur in effluent dominated water bodies, so too are the water quality-based factors that relate to the level of treatment required to comply with applicable standards and to protect downstream beneficial uses. This important factor of dilution was accounted for in the water quality modeling performed in support of the District's Master Plan EIR, and was considered in this assessment. The water quality analysis provided in this antidegradation analysis, together with the assessment performed as part of the NPDES permit renewal, will be used to reach decisions regarding the future level of treatment required at the SRWTP, in accordance with the rules and policies existing under the Clean Water Act and California Water Code."

The discussion of "similarly situated dischargers" fails to consider or discuss that:

1. Dilution in a receiving stream may be granted only if assimilative capacity exists within a receiving stream. The use of assimilative capacity is based on a mixing zone analysis. Mixing zones are limited areas where water quality standards are allowed to be exceeded within a receiving stream. The granting of a mixing zone allows a wastewater Discharger to utilize the receiving stream to dilute wastewater constituents within the receiving stream rather than provide the treatment necessary to remove pollutants. Dilution is not based solely on hydraulic flow rates as is presented, but is also dependant on individual constituent concentrations. There is no discussion of pollutant concentrations, assimilative capacity of individual pollutants or the impacts of a mixing zone analysis on the beneficial uses of the receiving stream, the Sacramento River.
2. The significance of a twenty-to-one dilution ratio is not discussed but is based on recommendations from the California Department of Public Health (DPH) to protect the beneficial uses of contact recreation and food crop irrigation. The DPH recommendation is presented in their Wastewater Disinfection for Public Health Protection, February 1987, and the Uniform Guidelines for the Disinfection of Wastewater, August 1992. The science utilized by DPH in developing these documents was also utilized to develop Reclamation Criteria contained in California Code of Regulations Title 22. The DPH documents recommend that a tertiary level of treatment is necessary to protect contact recreational uses in an unrestricted impoundment and to directly irrigate food crops. DPH recommends that secondary treatment plus a minimum in stream dilution ratio of twenty-to-one offers an



equivalent level of protection as tertiary treatment. Contact recreation and irrigated agriculture are beneficial uses of the Sacramento River at the point of discharge. These beneficial uses would not be protected within a granted mixing zone.

3. The DPH recommended twenty-to-one dilution were not based on surface waters receiving significant upstream wastewater discharges. The Sacramento River and the Delta, upstream of the Sacramento Regional Wastewater Treatment Plant, receive significant flows from other wastewater discharges. The quantity and quality of the upstream wastewater discharges is not discussed, particularly from Placer and Nevada County and the City of Sacramento combined sewer overflows. DPH has not made any recommendations with regard to surface water and an acceptable level of treatment or dilution when the receiving stream already contains significant treated sewage.
4. The State and Regional Board's Antidegradation Policy, Resolution 68-16, requires the application of best practicable treatment and control (BPTC) of wastewater discharges. The large number of wastewater treatment plants providing advanced (tertiary treatment and nitrification/denitrification) surrounding the Sacramento Regional wastewater treatment plant establishes a standard of BPTC. The establishment of BPTC has not been discussed with regard to the large number of wastewater treatment plants providing advanced treatment.

The Discharger's Antidegradation Policy analysis, Section 4.5.1 Pelagic Organisms Decline (page 4-8, 79). This Section states in part that: "Since 2000, the population levels of several pelagic fish species in the Delta have experienced a precipitous decline to historic low levels that continues to persist. The species in question include Delta smelt (*Hypomesus transpacificus*), longfin smelt (*Spirinchus thaleichthys*), threadfin shad (*Dorosoma petenense*), and juvenile striped bass (*Morone saxatilis*). The potential causes or contributors of the above described Pelagic Organism Decline (POD) which are under investigation include: (1) hydrologic modifications associated with Delta water supply projects, (2) entrainment of fish species and prey species in Delta pumps and pump intake facilities, (3) food web disruption caused by invasive clam and aquatic plant species, (4) predation by native and non-native species, (5) adverse impacts of contaminants, including pesticides, ammonia, trace metals, and other constituents of concern, (6) habitat quality decline, (7) stock-recruitment effects and (8) other factors. The impact valuations contained in Section 5 identify the magnitude of change in water quality associated with the proposed increase in discharge. Additionally, potential impacts related to the toxicity of the most sensitive aquatic species in national data sets are assessed through the use of U.S. EPA criteria and adopted water quality standards contained in the California Toxics Rule and National Toxics Rule. Additional pertinent information is also considered in the impact evaluations, where available."

The water quality evaluation contained in the Antidegradation Analysis, including Section 5, do not include an evaluation of additive toxicity as is required by the Basin Plan. The Basin Plan, *Implementation, Policy for Application of Water Quality Objectives* requires that: “Where multiple toxic pollutants exist together in water, the potential for toxicologic interactions exists. On a case by case basis, the Regional Water Board will evaluate available receiving water and effluent data to determine whether there is a reasonable potential for interactive toxicity. Pollutants which are carcinogens or which manifest their toxic effects on the same organ systems or through similar mechanisms will generally be considered to have potentially additive toxicity.”

The water quality evaluation contained in the Antidegradation Analysis, including Section 5, do not include an evaluation of “emerging constituents of concern”. There are thousands of chemicals and chemical compounds in use throughout modern communities. Only approximately two hundred have had water quality standards developed. Scientific studies are revealing that these emerging constituents are responsible for the feminization of fish and numerous other impacts which could result in their decline in surface waters. Studies have revealed that these constituents pass through current wastewater treatment systems, *Source, Fate, and Transport of Endocrine Disruptors, Pharmaceuticals, and Personal Care Products in Drinking Water Sources in California National Water Research Institute Fountain Valley, California, May 2010*. Expansion of the Sacramento Regional Wastewater Treatment Plant will result in the discharge of “emerging constituents” at increased levels. If these studies are true; the wastewater discharge would violate the Receiving Water Limitation for toxicity which requires that a wastewater discharge shall not cause “toxic substances to be present, individually or in combination, in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.” While this section of the Antidegradation Analysis discusses aquatic life, the impacts to drinking water and human health must also be considered with regard to emerging constituents.

The Permit, page F-75, states that: “*Given the very high level of public contact with the receiving water, the use of the receiving water for irrigation which can result in human contact with pathogens, and extensive use of Delta waters as private and public water supplies, any increased risk of illness and infection from exposure to the wastewater is not protective of the municipal, agricultural or recreational beneficial use. This permit requires an essentially pathogen free wastewater, which will incidentally implement DPH’s recommendation to improve the level of disinfection to remove protozoa in addition to bacteria, enteric virus and other pathogens. Several technologies are available to achieve this, all essentially involving filtration to produce a very low-solids effluent, which is then dosed with a disinfectant (usually chlorine or UV light). The combination of filtration and disinfectant effectively removes all pathogens. Requirements of Title 22 will be adequate to meet the 1 in 10,000 risk and 1 log removal recommended by the DPH.*” The Permit acknowledges that 1986 USEPA’s Ambient Criteria for

bacteria is based on risk criteria of 8 illnesses in 1,000 exposures. EPA's ambient criteria for bacteria is the basis for the current and past Receiving Water Limitation for coliform organisms and is the level argued by the Discharger as being protective of water quality. The Permit acknowledges that the receiving stream at the point of discharge is heavily used for contact recreation. The Antidegradation Analysis does not assess how many illness have occurred during the existing life of the wastewater discharge and how many will occur in the recommended compliance period (another 10-years) until "tertiary" treatment will be established. The Antidegradation Analysis does not discuss the costs associated with the past, existing and future illnesses cause from recreational activity within the wastewater plume.

The Permit contains Effluent Limitations for ammonia based on preventing toxicity to aquatic life based on EPA's ambient criteria. The Permit clearly shows that the wastewater discharge from the Sacramento Regional Wastewater Treatment plant is toxic to aquatic life. The Sacramento River, within the Sacramento River delta is home to numerous endangered and threatened species. Within the 10 years the Regional Board is proposing to allow Sacramento Regional County Sanitation District to eliminate the toxic discharges, the impact to threatened and endangered species will be devastating to a waterbody already in significant decline. The Antidegradation Analysis should acknowledge the impacts to endangered and threatened species during the 10-years the Regional Board is allowing for Sacramento County to eliminate their toxic discharges to the Sacramento River.

The Permit fails to cite any of the exceptions to Federal regulations 40 CFR 122.44 (l)(1) in relaxing the permit and removing limitations. The removal of limitations rests solely on continued monitoring, not new information as defined in the regulation. There was no substantial modification to the treatment system or the character of the wastestream that justifies removal of the limitations. With regard to silver, lead and zinc, contrary to the statements regarding "new" information, the removal of limitations was based on the use of the effluent, rather than the ambient instream hardness, in determining reasonable potential that resulted in the Regional Board's removal of the limitations. The statement that "any impact on existing water quality will be insignificant" is incorrect if the removal of metal limitations results in toxicity during periods of low ambient hardness. Removal of the Effluent Limitations for silver, lead and zinc and use of the effluent hardness rather than the lowest observed ambient hardness is not discussed in the Antidegradation Analysis.

**W. The Permit does not contain enforceable Effluent Limitations for chronic toxicity and therefore does not comply with the Basin Plan, Federal Regulations, at 40 CFR 122.44 (d)(1)(i) and the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP).**

Permit, State Implementation Policy states that on March 2, 2000, the State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays,*

*and Estuaries of California* (State Implementation Policy or SIP). The SIP, Section 4, Toxicity Control Provisions, Water Quality-Based Toxicity Control, states that: “A chronic toxicity effluent limitation is required in permits for all dischargers that will cause, have a reasonable potential to cause, or contribute to chronic toxicity in receiving waters.” The SIP is a state *Policy* and CWC Sections 13146 and 13247 require that the Board in carrying out activities which affect water quality shall comply with state policy for water quality control unless otherwise directed by statute, in which case they shall indicate to the State Board in writing their authority for not complying with such policy.

Federal regulations, at 40 CFR 122.44 (d)(1)(i), require that limitations must control all pollutants or pollutant parameters which the Director determines are or may be discharged at a level which will cause, or contribute to an excursion above any State water quality standard, including state narrative criteria for water quality. There has been no argument that domestic sewage contains toxic substances and presents a reasonable potential to cause toxicity if not properly treated and discharged. The Water Quality Control Plan for the Sacramento/ San Joaquin River Basins (Basin Plan), Water Quality Objectives (Page III-8.00) for Toxicity is a narrative criteria which states that all waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life. The Permit contains a narrative Effluent Limitation prohibiting the discharge of chronically toxic substances: however a *Compliance Determination* has been added to the Permit that sampling and TRE/TIE provisions of Provision shall constitute compliance with effluent limitation. The *Compliance Determination* nullifies the Effluent Limitation and makes toxic discharges unenforceable.

The Basin Plan narrative Toxicity Objective states that: “All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, or aquatic life. This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances. Compliance with this objective will be determined by analyses of indicator organisms, species diversity, population density, growth anomalies, and biotoxicity tests of appropriate duration or other methods as specified by the Regional Board.”

According to the Basin Plan toxicity sampling is required to determine compliance with the requirement that all waters be maintained free of toxic substances. Sampling does not equate with or ensure that waters are free of toxic substances. The Tentative Permit requires the Discharger to conduct an investigation of the possible sources of toxicity if a threshold is exceeded. This language is not a limitation and essentially eviscerates the Regional Board’s authority, and the authority granted to third parties under the Clean Water Act, to find the Discharger in violation for discharging chronically toxic constituents. An enforceable effluent limitation for chronic toxicity must be included in the Order.

**5. THE MANNER IN WHICH THE PETITIONERS ARE AGGRIEVED.**

CSPA is a non-profit, environmental organization that has a direct interest in reducing pollution to the waters of the Central Valley. CSPA's members benefit directly from the waters in the form of recreational hiking, photography, fishing, swimming, hunting, bird watching, boating, consumption of drinking water and scientific investigation. Additionally, these waters are an important resource for recreational and commercial fisheries. Central Valley waterways also provide significant wildlife values important to the mission and purpose of the Petitioners. This wildlife value includes critical nesting and feeding grounds for resident water birds, essential habitat for endangered species and other plants and animals, nursery areas for fish and shellfish and their aquatic food organisms, and numerous city and county parks and open space areas. CSPA's members reside in communities whose economic prosperity depends, in part, upon the quality of water. CSPA has actively promoted the protection of fisheries and water quality throughout California before state and federal agencies, the State Legislature and Congress and regularly participates in administrative and judicial proceedings on behalf of its members to protect, enhance, and restore declining aquatic resources. CSPA member's health, interests and pocketbooks are directly harmed by the failure of the Regional Board to develop an effective and legally defensible program addressing discharges to waters of the state and nation.

**6. THE SPECIFIC ACTION BY THE STATE OR REGIONAL BOARD WHICH PETITIONER REQUESTS.**

Petitioners seek an Order by the State Board to:

- A. Vacate Order No. R5-2010-0114 (NPDES NO. CA0077682) and remand to the Regional Board with instructions prepare and circulate a new tentative order that comports with regulatory requirements.
- B. Alternatively; prepare, circulate and issue a new order that is protective of identified beneficial uses and comports with regulatory requirements.

**7. A STATEMENT OF POINTS AND AUTHORITIES IN SUPPORT OF LEGAL ISSUES RAISED IN THE PETITION.**

CSPA's arguments and points of authority are adequately detailed in the above comments, our 8 October 2010 comment letter and in oral testimony presented at the Regional Board's hearing on the matter. Should the State Board have additional questions regarding the issues raised in this petition, CSPA will provide additional briefing on any such questions. The petitioners believe that an evidentiary hearing before the State Board will not be necessary to resolve the issues raised in this petition. However, CSPA welcomes the opportunity to present oral argument and

respond to any questions the State Board may have regarding this petition.

**8. A STATEMENT THAT THE PETITION HAS BEEN SENT TO THE APPROPRIATE REGIONAL BOARD AND TO THE DISCHARGERS, IF NOT THE PETITIONER.**

A true and correct copy of this petition, without attachment, was sent electronically and by First Class Mail to Ms. Pamela Creedon, Executive Officer, Regional Water Quality Control Board, Central Valley Region, 11020 Sun Center Drive #200, Rancho Cordova, CA 95670-6114. A true and correct copy of this petition, without attachment, was sent to the Discharger in care of: Mr. Stanley R. Dean, District Engineer, Sacramento Regional County Sanitation District, 10060 Goethe Road, Sacramento, CA 95827.

**9. A STATEMENT THAT THE ISSUES RAISED IN THE PETITION WERE PRESENTED TO THE REGIONAL BOARD BEFORE THE REGIONAL BOARD ACTED, OR AN EXPLANATION OF WHY THE PETITIONER COULD NOT RAISE THOSE OBJECTIONS BEFORE THE REGIONAL BOARD.**

CSPA presented the issues addressed in this petition to the Regional Board in an 8 October 2010 comment letters that was accepted into the record and in oral testimony at the Regional Board's hearing of the matter.

If you have any questions regarding this petition, please contact Bill Jennings at (209) 464-5067 or Michael Jackson at (530) 283-1007.

Dated: 5 January 2011

Respectfully submitted,



Bill Jennings, Executive Director  
California Sportfishing Protection Alliance

Attachment No. 1: Order No. R5-2010-0114

# CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

## CENTRAL VALLEY REGION

11020 Sun Center Drive, #200 Rancho Cordova, California 95670-6114  
Phone (916) 464-3291 • Fax (916) 464-4645  
<http://www.waterboards.ca.gov/centralvalley>

**ORDER NO. R5-2010-0114**  
**NPDES NO. CA0077682**

### WASTE DISCHARGE REQUIREMENTS FOR THE SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT SACRAMENTO REGIONAL WASTEWATER TREATMENT PLANT SACRAMENTO COUNTY

The following Discharger is subject to waste discharge requirements as set forth in this Order:

**Table 1. Discharger Information**

<b>Discharger</b>	Sacramento Regional County Sanitation District
<b>Name of Facility</b>	Sacramento Regional Wastewater Treatment Plant
<b>Facility Address</b>	8521 Laguna Station Road
	Elk Grove, CA 95758
	Sacramento County
The U.S. Environmental Protection Agency (USEPA) and the Regional Water Quality Control Board have classified this discharge as a major discharge.	

The discharge by the **Sacramento Regional County Sanitation District** from the discharge points identified below is subject to waste discharge requirements as set forth in this Order:

**Table 2. Discharge Location**

<b>Discharge Point</b>	<b>Effluent Description</b>	<b>Discharge Point Latitude</b>	<b>Discharge Point Longitude</b>	<b>Receiving Water</b>
001	Disinfected Secondary Treated Wastewater	38° 27' 15" N	121° 30' 00" W	Sacramento River

**Table 3. Administrative Information**

This Order was adopted by the Regional Water Quality Control Board on:	<b>9 December 2010</b>
This Order shall become effective on:	<b>50 days after the Adoption Date of this Order</b>
This Order shall expire on:	<b>1 December 2015</b>
The Discharger shall file a Report of Waste Discharge in accordance with title 23, California Code of Regulations, as application for issuance of new waste discharge requirements no later than:	<b>180 days prior to the Order expiration date</b>

I, **Pamela C. Creedon**, Executive Officer, do hereby certify that this Order with all attachments is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on **9 December 2010**.

*Original Signed By*

\_\_\_\_\_  
**Pamela C. Creedon**, Executive Officer

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**I. FACILITY INFORMATION**

The following Discharger is subject to waste discharge requirements as set forth in this Order:

**Table 4. Facility Information**

<b>Discharger</b>	Sacramento Regional County Sanitation District
<b>Name of Facility</b>	Sacramento Regional Wastewater Treatment Plant, Elk Grove
<b>Facility Address</b>	8521 Laguna Station Road
	Elk Grove, CA 95758
	Sacramento
<b>Facility Contact, Title, and Phone</b>	Stanley R. Dean, District Engineer, (916) 875-9101
<b>Mailing Address</b>	10060 Goethe Road, Sacramento, CA 95827
<b>Type of Facility</b>	Publicly Owned Treatment Works
<b>Facility Design Flow</b>	181 Million Gallons per Day (MGD) (Permitted Average Dry Weather Flow)

**II. FINDINGS**

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

**A. Background.** Sacramento Regional County Sanitation District (hereinafter Discharger) is currently discharging pursuant to Order No. 5-00-188 and National Pollutant Discharge Elimination System (NPDES) Permit No. CA0077682. The Discharger submitted a Report of Waste Discharge, dated 1 February 2005, and applied for a NPDES permit renewal to discharge up to 218 mgd of treated wastewater from Sacramento Regional Wastewater Treatment Plant, hereinafter Facility. In June 2010, the Discharger withdrew its request to increase the treatment plant capacity from 181 mgd to 218 mgd.

For the purposes of this Order, references to the “discharger” or “permittee” in applicable federal and state laws, regulations, plans, or policy are held to be equivalent to references to the Discharger herein.

The Discharger provides sewerage service to the Cities of Sacramento, Folsom, West Sacramento, and the Sacramento Area Sewer District service area. The Sacramento Area Sewer District service area includes the Cities of Elk Grove, Rancho Cordova, Citrus Heights, Courtland, and Walnut Grove, as well as, portions of the unincorporated areas of Sacramento County. The population served is approximately 1.3 million people. The Discharger owns and operates the main trunk lines/interceptors feeding the Facility. The smaller diameter collection systems are owned and operated by the various contributing agencies and not by the Discharger. This Order regulates the Facility only. The collection systems that feed the Facility are regulated under the State Water Resources Control Board’s Water Quality Order No. 2006-0003.

The Facility is contracted to accept 60 mgd of wastewater and storm runoff from the downtown Sacramento combined collection system. Combined collection flows are managed by the Combined Wastewater Collection and Treatment System (CWCTS) operated by the City of Sacramento. The CWCTS is governed by Waste Discharge Requirements Order No.R5-2010-0004 (NPDES No. CA0079111). Depending on treatment and conveyance capacity, flow in excess of 60 mgd maybe received at the Facility.

**B. Facility Description.** The Discharger owns and operates the Facility, a Publicly Owned Treatment Works (POTW). The treatment system consists of mechanical bar screens, aerated grit removal, primary sedimentation, pure oxygen activated sludge aeration, 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 from Discharge Point No. 001 (see table on cover page) to the Sacramento River at Freeport, a water of the United States, and within the legal boundaries of the Sacramento – San Joaquin Delta. Attachment B provides a map of the area around the Facility. Attachment C provides a flow schematic of the Facility.

The Discharger currently provides 5.0 MGD of treated wastewater to the Water Reclamation Facility (WRF) for unrestricted use, with a provision for Facility expansion to 10 MGD. The WRF is regulated under the Master Reclamation Permit No. 97-146 and provides recycled water for landscape irrigation and wastewater treatment plant process water.

As part of Waste Discharge Requirements (WDR) Order No. 98-087, a corrective action program (CAP) was initiated by the Discharger. The CAP is to address elevated constituent concentrations that were observed in samples from groundwater monitoring wells down gradient of the Dedication Land Disposal areas (DLDs) and the Class III landfill when compared to upgradient groundwater monitoring wells. Extraction wells are used for hydraulic control of the site. Characterization of the groundwater aquifer is documented in the reports submitted twice annually pursuant to WDR Order No. 98-087. The Discharger conveys the extracted groundwater from the CAP extraction wells, estimated at approximately 1.0 MGD, to the Facility effluent channel downstream of the secondary clarifiers and upstream of the plant chlorination station or onsite constructed wetlands. Discharging water from the CAP system downstream of the secondary clarifiers is acceptable and does not decrease the amount of treatment as the treatment processes upstream of this discharge point are not designed for removal of the CAP discharge constituents of concern. Furthermore, based on the extracted groundwater sampling, estimates of CAP discharge constituent concentrations are either below current Facility effluent concentrations or do not have a reasonable potential to violate water quality objectives in the receiving water. Based on these considerations, the Board finds disposal of CAP discharge as described above to be acceptable.

**C. Legal Authorities.** This Order is issued pursuant to section 402 of the Clean Water Act (CWA) and implementing regulations adopted by USEPA and chapter 5.5, division 7 of

the California Water Code (CWC; commencing with section 13370). It shall serve as a NPDES permit for point source discharges from this facility to surface waters. This Order also serves as Waste Discharge Requirements (WDRs) pursuant to Article 4, Chapter 4, Division 7 of the CWC (commencing with section 13260).

- D. Background and Rationale for Requirements.** The Central Valley Water Board developed the requirements in this Order based on information submitted as part of the application, through monitoring and reporting programs, and other available information. The Fact Sheet (Attachment F), which contains background information and rationale for Order requirements, is hereby incorporated into this Order and constitutes part of the Findings for this Order. Attachments A through K are also incorporated into this Order.
- E. California Environmental Quality Act (CEQA).** Under CWC section 13389, this action to adopt an NPDES permit is exempt from the provisions of CEQA, Public Resources Code sections 21100-21177.
- F. Technology-based Effluent Limitations.** Section 301(b) of the CWA and implementing USEPA permit regulations at section 122.44, title 40 of the Code of Federal Regulations (40 CFR 122.44), require that permits include conditions meeting applicable technology-based requirements at a minimum, and any more stringent effluent limitations necessary to meet applicable water quality standards. The discharge authorized by this Order must meet minimum federal technology-based requirements based on Secondary Treatment Standards at 40 CFR Part 133. A detailed discussion of the technology-based effluent limitations development is included in the Fact Sheet.
- G. Water Quality-Based Effluent Limitations (WQBELs).** Section 301(b) of the CWA and 40 CFR 122.44(d) require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards. This Order contains requirements, expressed as water quality-based requirements that are necessary to achieve water quality standards. The Regional Water Board considered the factors listed in CWC section 13241 in establishing these requirements. The rationale for these requirements, which consist of tertiary treatment or equivalent requirements, is discussed in the Fact Sheet.
- 40 CFR 122.44(d)(1)(i) mandates that permits include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, WQBELs must be established using: (1) USEPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in 40 CFR 122.44(d)(1)(vi).
- H. Water Quality Control Plans.** The Central Valley Water Board adopted a *Water Quality Control Plan, Fourth Edition (Revised September 2009)*, for the Sacramento and

San Joaquin River Basins (hereinafter Basin Plan) on 9 December 1994 that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. In addition, the Basin Plan implements State Water Resources Control Board (State Water Board) Resolution No. 88-63, which established state policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply. Discharge to 001 is within the legal boundaries of the Sacramento-San Joaquin Delta. Beneficial uses applicable to the Sacramento –San Joaquin Delta are as follows:

**Table 5. Basin Plan Beneficial Uses**

Discharge Point	Receiving Water Name	Beneficial Use(s)
001	<b>Sacramento – San Joaquin Delta</b>	<u>Existing:</u> Municipal and domestic supply (MUN); Agricultural supply, including irrigation and stock watering (AGR); Industrial process supply (PROC); Industrial service supply (IND); Water contact recreation, including canoeing and rafting (REC-1); Non-contact water recreation (REC-2); Warm freshwater habitat (WARM); Cold freshwater habitat (COLD); Migration of aquatic organisms, warm and cold (MIGR); Spawning, reproduction, and/or early development, warm (SPWN); Wildlife habitat (WILD); and Navigation (NAV).
NA	<b>Groundwater</b>	Municipal and domestic water supply (MUN); Agricultural supply (AGR); Industrial service supply (IND); and Industrial process supply (PRO).

The Basin Plan includes a list of Water Quality Limited Segments (WQLSs), which are defined as "...those sections of lakes, streams, rivers or other fresh water bodies where water quality does not meet (or is not expected to meet) water quality standards even after the application of appropriate limitations for point sources (40 CFR 130, et seq.)." The Basin Plan also states, "Additional treatment beyond minimum federal standards will be imposed on dischargers to WQLSs. Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment." The Delta is listed as a WQLS for Chlorpyrifos, DDT, Diazinon, Exotic Species, Group A Pesticides, Mercury, Polychlorinated byphenyls (PCBs) and unknown toxicity in the 303(d) list of impaired water bodies.

The State Water Board adopted the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Water and Enclosed Bays and Estuaries of California (Thermal Plan) on 18 May 1972, and amended this plan on 18 September 1975. This plan contains temperature objectives for surface waters. Requirements of this Order implement the Thermal Plan.

The Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan) was adopted on 13 December 2006 by the State Water Board superseding the May 1995 and the 1991 Bay-Delta Plan. The Bay-Delta Plan identifies the beneficial uses of the estuary and includes objectives for flow, salinity, and endangered species protection.

The Bay-Delta Plan attempts to create a management plan that is acceptable to the stakeholders while at the same time is protective of beneficial uses of the Sacramento – San Joaquin Delta. The State Water Board adopted Decision 1641 (D-1641) on 29 December 1999. D-1641 implements flow objectives for the Bay-Delta Estuary, approves a petition to change points of diversion of the Central Valley Project and the State Water Project in the Southern Delta, and approves a petition to change places of use and purposes of use of the Central Valley Project. The water quality objectives of the Bay-Delta Plan are implemented as part of this Order.

The Sacramento River at Freeport is within the designated critical habitat for five federally-listed fish species including winter- and spring-run Chinook salmon (*Oncorhynchus tshawytscha*), Steelhead (*O. mykiss*), Delta smelt (*Hypomesus transpacificus*) and Green sturgeon (*Acipenser medirostris*). Other listed wildlife species that feed on Central Valley fishes include the California Least Tern (*Stenula antillarum brownie*) and the Giant Garter snake (*Thamnopsis gigas*). In addition to the federally-listed species the California State Species of Special Concern include the Sacramento Splittail (*Pogonichthys macrolepidotus*) and the Central Valley Fall/Late-Fall Salmon (*Oncorhynchus tshawytscha*).

Requirements of this Order specifically implement the applicable Water Quality Control Plans.

The Central Valley Water Board adopted Resolution No. R5-2007-0161, Water Board's Actions to Protect Beneficial Uses of the San Francisco Bay/Sacramento- San Joaquin Delta Estuary on 6 December 2007. The purpose of the resolution is to identify and implement actions needed to protect the San Francisco/San Joaquin Delta beneficial uses. Some actions include exercising the State Water Board's water rights authority over water right decisions and exercising the San Francisco Bay Regional Water Quality Control Board's and Central Valley Water Board's authority over controlling water quality in the Delta.

- I. **National Toxics Rule (NTR) and California Toxics Rule (CTR).** USEPA adopted the NTR on 22 December 1992, and later amended it on 4 May 1995 and 9 November 1999. About 40 criteria in the NTR applied in California. On 18 May 2000, USEPA adopted the CTR. The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the state. The CTR was amended on 13 February 2001. These rules contain water quality criteria for priority pollutants.
- J. **State Implementation Policy.** On 2 March 2000, the State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed*

*Bays, and Estuaries of California* (State Implementation Policy or SIP). The SIP became effective on 28 April 2000 with respect to the priority pollutant criteria promulgated for California by USEPA through the NTR and to the priority pollutant objectives established by the Central Valley Water Board in the Basin Plan. The SIP became effective on 18 May 2000 with respect to the priority pollutant criteria promulgated by USEPA through the CTR. The State Water Board adopted amendments to the SIP on 24 February 2005 that became effective on 13 July 2005. The SIP establishes implementation provisions for priority pollutant criteria and objectives and provisions for chronic toxicity control. Requirements of this Order implement the SIP.

**K. Compliance Schedules and Interim Requirements.** In general, an NPDES permit must include final effluent limitations that are consistent with CWA section 301 and with 40 CFR 122.44(d). There are exceptions to this general rule. The State Water Board has concluded that where the Regional Water Board's Basin Plan allows for schedules of compliance and the Regional Water Board is newly interpreting a narrative standard, it may include schedules of compliance in the permit to meet effluent limits that implement a narrative standard. See *In the Matter of Waste Discharge Requirements for Avon Refinery* (State Water Board Order WQ 2001-06 at pp. 53-55). See also *Communities for a Better Environment (CBE) et al. v. State Water Resources Control Board*, 34 Cal.Rptr.3d 396, 410 (2005). The Basin Plan for the Sacramento and San Joaquin Rivers includes a provision that authorizes the use of compliance schedules in NPDES permits for water quality objectives that are adopted after the date of adoption of the Basin Plan, which was 25 September 1995 (see Basin Plan at page IV-16). Consistent with the State Water Board's Order in the CBE matter, the Regional Water Board has the discretion to include compliance schedules in NPDES permits when it is including an effluent limitation that is a "new interpretation" of a narrative water quality objective. This conclusion is also consistent with USEPA policies and administrative decisions. See, e.g., *Whole Effluent Toxicity (WET) Control Policy*. The State Water Board's *Policy for Compliance Schedules in National Pollutant Discharge Elimination System Permits* (Compliance Schedule Policy) allows compliance schedules for new, revised, or newly interpreted water quality objectives or criteria, or in accordance with a TMDL. All compliance schedules must be as short as possible, and may not exceed 10 years from the effective date of the adoption, revision, or new interpretation of the applicable water quality objective or criterion, unless a TMDL allows a longer schedule. The Regional Water Board, however, is not required to include a compliance schedule of compliance, but may issue a Time Schedule Order pursuant to CWC section 13300 or a Cease and Desist Order pursuant to CWC section 13301 where it finds that the discharger is violating or threatening to violate the permit. The Regional Water Board will consider the merits of each case in determining whether it is appropriate to include a compliance schedule in a permit, and, consistent with the Basin Plan Compliance Schedule Policy, should consider feasibility of achieving compliance, and must impose a schedule that is as short as practicable possible to achieve compliance with the objectives, criteria, or effluent limitation based on the objective or criteria.

Section 2.1 of the SIP provides that, based on a Discharger's request and demonstration that it is infeasible for an existing Discharger to achieve immediate

compliance with an effluent limitation derived from a CTR criterion, compliance schedules may be allowed in an NPDES permit. Unless an exception has been granted under section 5.3 of the SIP, a compliance schedule may not exceed 5 years from the date that the permit is issued or reissued, nor may it extend beyond 10 years from the effective date of the SIP (or 18 May 2010) to establish and comply with CTR criterion-based effluent limitations. The Compliance Schedule Policy and the SIP do not allow compliance schedules for priority pollutants beyond 18 May 2010, except for new or more stringent priority pollutant criteria adopted by USEPA after 17 December 2008.

Where a compliance schedule for a final effluent limitation exceeds 1 year, the Order must include interim numeric limitations for that constituent or parameter, interim milestones and compliance reporting within 14 days after each interim milestone. The permit may also include interim requirements to control the pollutant, such as pollutant minimization and source control measures. Where allowed by the Basin Plan, compliance schedules and interim effluent limitations or discharge specifications may also be granted to allow time to implement a new or revised water quality objective. This Order does include compliance schedules and interim effluent limitations. A detailed discussion of the basis for the compliance schedules and interim effluent limitations is included in the Fact Sheet (Attachment F).

- L. Alaska Rule.** On 30 March 2000, USEPA revised its regulation that specifies when new and revised state and tribal water quality standards become effective for CWA purposes. (40 CFR 131.21 and 65 FR 24641 (27 April 2000).) Under the revised regulation (also known as the Alaska rule), new and revised standards submitted to USEPA after 30 May 2000, must be approved by USEPA before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to USEPA by 30 May 2000 may be used for CWA purposes, whether or not approved by USEPA.
- M. Stringency of Requirements for Individual Pollutants.** This Order contains both technology-based effluent limitations and WQBELs for individual pollutants. The technology-based effluent limitations consist of restrictions on flow and percent removal requirements for 5-day biochemical oxygen demand (BOD<sub>5</sub>) and total suspended solids (TSS) and pH. The WQBELs consist of restrictions on ammonia, copper, cyanide, carbon tetrachloride, chlorodibromomethane, dichlorobromomethane, methylene chloride, tetrachloroethylene, pentachlorophenol, bis(2-ethylhexyl) phthalate, dibenzo(ah)anthracene, N-nitrosodimethylamine, aluminum, nitrate, manganese, methyl tertiary butyl ether, mercury, chlorine residual, diazinon, and chlorpyrifos. This Order's technology-based pollutant restrictions implement the minimum, applicable federal technology-based requirements. In addition, this Order includes water quality based effluent limitations for BOD<sub>5</sub>, total coliform organisms, and TSS to meet numeric objectives or protect beneficial uses.

WQBELs have been scientifically derived to implement water quality objectives that protect beneficial uses. Both the beneficial uses and the water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards. To the extent that toxic pollutant WQBELs were derived from the CTR, the



CTR is the applicable standard pursuant to 40 CFR 131.38. The scientific procedures for calculating the individual WQBELs for priority pollutants are based on the CTR-SIP, which was approved by USEPA on 18 May 2000. All beneficial uses and water quality objectives contained in the Basin Plan were approved under state law and submitted to and approved by USEPA prior to 30 May 2000. Any water quality objectives and beneficial uses submitted to USEPA prior to 30 May 2000, but not approved by USEPA before that date, are nonetheless “*applicable water quality standards for purposes of the [Clean Water] Act*” pursuant to 40 CFR 131.21(c)(1). Collectively, this Order’s restrictions on individual pollutants are no more stringent than required to implement the technology-based requirements of the CWA and the applicable water quality standards for purposes of the CWA.

- N. Antidegradation Policy.** 40 CFR 131.12 requires that the state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California’s antidegradation policy in State Water Board Resolution No. 68-16. Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Central Valley Water Board’s Basin Plan implements, and incorporates by reference, both the state and federal antidegradation policies. As discussed in detail in the Fact Sheet, the permitted discharge is consistent with the antidegradation provision of 40 CFR 131.12 and Resolution No. 68-16.
- O. Anti-Backsliding Requirements.** Sections 303(d)(4) and 402(o)(2) of the CWA and federal regulations at 40 CFR 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require effluent limitations in a reissued permit to be as stringent as those in the previous permit, with some exceptions. Some effluent limitations in this Order are less stringent than those in Order No. 5-00-188. As discussed in detail in the Fact Sheet, this relaxation of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations.
- P. Endangered Species Act.** This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the Federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). This Order requires compliance with effluent limits, receiving water limits, and other requirements to protect the beneficial uses of waters of the state. The discharger is responsible for meeting all requirements of the applicable Endangered Species Act.
- Q. Monitoring and Reporting.** 40 CFR 122.48 requires that all NPDES permits specify requirements for recording and reporting monitoring results. CWC sections 13267 and 13383 authorize the Central Valley Water Board to require technical and monitoring reports. The Monitoring and Reporting Program establishes monitoring and reporting requirements to implement federal and State requirements. The Monitoring and Reporting Program is provided in Attachment E.

- R. Standard and Special Provisions.** Standard Provisions, which apply to all NPDES permits in accordance with 40 CFR 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 CFR 122.42, are provided in Attachment D. The discharger must comply with all standard provisions and with those additional conditions that are applicable under 40 CFR 122.42. The Central Valley Water Board has also included in this Order special provisions applicable to the Discharger. A rationale for the special provisions contained in this Order is provided in the Fact Sheet.
- S. Provisions and Requirements Implementing State Law.** The provisions/requirements in sections V.B and VI.C.4.c of this Order are included to implement state law only. These provisions/requirements are not required or authorized under the federal CWA; consequently, violations of these provisions/requirements are not subject to the enforcement remedies that are available for NPDES violations.
- T. Notification of Interested Parties.** The Central Valley Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe WDRs for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Details of notification are provided in the Fact Sheet of this Order.
- U. Consideration of Public Comment.** The Central Valley Water Board, in a public meeting, heard and considered all comments pertaining to the discharge. Details of the Public Hearing are provided in the Fact Sheet.

**THEREFORE, IT IS HEREBY ORDERED**, that Order No. 5-00-188 is rescinded upon the effective date of this Order except for enforcement purposes, and, in order to meet the provisions contained in division 7 of the CWC (commencing with section 13000) and regulations adopted thereunder, and the provisions of the federal CWA and regulations and guidelines adopted thereunder, the Discharger shall comply with the requirements in this Order.

### **III. DISCHARGE PROHIBITIONS**

- A.** Discharge of wastewater at a location or in a manner different from that described in the Findings is prohibited.
- B.** The by-pass or overflow of wastes to surface waters is prohibited, except as allowed by Federal Standard Provisions I.G. and I.H. (Attachment D), and as described in Finding II.B, for the groundwater Corrective Action Program (CAP).
- C.** Neither the discharge nor its treatment shall create a nuisance as defined in section 13050 of the CWC.
- D.** The Discharger shall not allow pollutant-free wastewater to be discharged into the collection, treatment, and disposal system in amounts that significantly diminish the

system’s capability to comply with this Order. Pollutant-free wastewater means rainfall, groundwater, cooling waters, and condensates that are essentially free of pollutants.

- E. Discharge to the Sacramento River is prohibited when the Sacramento River instantaneous flow is less than 1300 cubic feet per second (cfs) at RSWU-001.
- F. Discharge to the Sacramento River is prohibited when there is less than a 14:1 (river:effluent) flow ratio over a rolling one-hour period available in the Sacramento River at RSWU-001.
- G. The discharge or storage of waste classified as ‘hazardous’ or ‘designated’, as defined in California Code of Regulations, title 23, section 2521, subdivision (a) and Water Code section 13173of Title 27, is prohibited.

**IV. EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS**

**A. Effluent Limitations – Discharge Point No. 001**

**Effective immediately unless otherwise specified**, the Discharger shall maintain compliance with the following final effluent limitations at Discharge Point No. 001, with compliance measured at Monitoring Location EFF-001 as described in the Monitoring and Reporting Program.

**1. Final Effluent Limitations – Discharge Point No. 001**

- a. The Discharger shall maintain compliance with the following effluent limitations specified in Table 6:

**Table 6. Effluent Limitations**

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
<b>Conventional Pollutants</b>						
Biochemical Oxygen Demand, 5-day @ 20°C <sup>2</sup>	mg/L	10	15	20	--	--
	lbs/day <sup>1</sup>	15,100	22,700	30,200	--	--
Total Suspended Solids <sup>2</sup>	mg/L	10	15	20	--	--
	lbs/day <sup>1</sup>	15,100	22,700	30,200	--	--
pH	standard units	--	--	--	6.0	8.0
<b>Priority Pollutants</b>						
Bis(2-ethylhexyl)phthalate	µg/L	--	--	13	--	--
Carbon Tetrachloride	µg/L	--	--	5.3	--	--
Chlorodibromomethane	µg/L	--	--	2.2	--	--
Copper, Total Recoverable	µg/L	7.3	--	9.3	--	--
Cyanide	µg/L	--	--	11	--	--
Dibenzo(ah)anthracene	µg/L	0.2	--	0.4	--	--
Dichlorobromomethane	µg/L	--	--	3.4	--	--

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Methylene Chloride	µg/L	4.7	--	11	--	--
N-nitrosodimethylamine	µg/L	0.00069	--	0.0014	--	--
Pentachlorophenol	µg/L	--	--	18	--	--
Tetrachloroethylene	µg/L	--	--	4.4	--	--
<b>Non-Conventional Pollutants</b>						
Settleable Solids	ml/L	0.1	--	0.2	--	--
Aluminum, Total Recoverable	µg/L	503	--	750	--	--
Ammonia Nitrogen, Total (as N) <sup>2</sup>	mg/L	1.8	--	2.2	--	--
	Lbs/day <sup>1</sup>	2720	--	3320	--	--
Nitrate, Total (as N)	mg/L	10	--	--	--	--
Manganese, Total Recoverable	µg/L	--	--	85	--	--
Methyl Tertiary Butyl Ether	µg/L	--	--	18	--	--

<sup>1</sup> Based on a design average dry weather flow of 181 MGD.

<sup>2</sup> This Order includes interim effluent limitations for BOD<sub>5</sub>, TSS, and Total Ammonia Nitrogen (section IV.A.2.). Effective immediately, the interim effluent limitations shall apply in lieu of final effluent limitations for these constituents. The final effluent limitations for BOD<sub>5</sub>, TSS, and Total Ammonia Nitrogen become effective when the Discharger complies with Special Provisions section VI.C.7. or 1 December 2020, whichever is sooner.

- b. Percent Removal.** The average monthly percent removal of 5-day biochemical oxygen demand (BOD<sub>5</sub>) and total suspended solids (TSS) shall not be less than 85 percent.
- c. Chronic Whole Effluent Toxicity.** There shall be no chronic whole effluent toxicity in the effluent discharge.
- d. Acute Whole Effluent Toxicity.** Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:
  - i. 70%, minimum for any one bioassay; and
  - ii. 90%, median for any three consecutive bioassays.
- e. Temperature.** The maximum temperature of the discharge shall not exceed the natural receiving water temperature at RSWU-001 by more than 20°F from 1 May through 30 September and more than 25°F from 1 October through 30 April.
- f. Total Residual Chlorine<sup>1</sup>.** Effluent total residual chlorine shall not exceed:

<sup>1</sup> This Order includes interim effluent limitations for total residual chlorine and total coliform organisms (section IV.A.2.). Effective immediately, the interim effluent limitations for these constituents shall apply in lieu of final effluent limitations. The final effluent limitations for total residual chlorine and total coliform organisms

- i. 0.011 mg/L, as a 4-day average; and
  - ii. 0.019 mg/L, as a 1-hour average.
- g. Total Coliform Organisms<sup>1</sup>.** Effluent total coliform organisms shall not exceed:
- i. 2.2 most probable number (MPN) per 100 mL, as a 7-day median;
  - ii. 23 MPN/100 mL, more than once in any 30-day period; and
  - iii. 240 MPN/100 mL, at any time.
- h. Average Dry Weather Flow.** The average dry weather discharge flow shall not exceed 181 mgd.
- i. Aluminum, Total Recoverable.** Effluent total recoverable aluminum concentrations shall not exceed 200 µg/L as a calendar annual average.
- j. Electrical Conductivity.** Effluent electrical conductivity shall not exceed 900 µmhos/cm as a calendar annual average.
- k. Mercury.** For a calendar year, the performance-based interim annual mass load of total mercury shall not exceed 2.2 lbs/year.
- l. Chlorpyrifos and Diazinon.** Effluent chlorpyrifos and diazinon concentrations shall not exceed the sum of one as defined below:

i. Average Monthly Effluent Limit

$$S_{AMEL} = \frac{C_{D-avg}}{0.08} + \frac{C_{C-avg}}{0.012} \leq 1.0$$

$C_{D-avg}$  = average monthly diazinon effluent concentration in µg/L

$C_{C-avg}$  = average monthly chlorpyrifos effluent concentration in µg/L

ii. Maximum Daily Effluent Limit

$$S_{MDEL} = \frac{C_{D-max}}{0.16} + \frac{C_{C-max}}{0.025} \leq 1.0$$

$C_{D-max}$  = maximum daily diazinon effluent concentration in µg/L

$C_{C-max}$  = maximum daily chlorpyrifos effluent concentration in µg/L

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become effective when the Discharger complies with Special Provisions section VI.C.7. or 1 December 2020, whichever is sooner.

**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 30 November 2020**, 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
<b>Conventional Pollutants</b>						
Biochemical Oxygen Demand, 5-day @ 20°C	mg/L	30	45	60	--	--
	lbs/day <sup>1</sup>	45,286	67,929	90,572	--	--
Total Suspended Solids	mg/L	30	45	60	--	--
	lbs/day <sup>1</sup>	45,286	67,929	90,572	--	--
<b>Non-Conventional Pollutant</b>						
Ammonia Nitrogen, Total (as N)	mg/L	33	35	45	--	--
	lbs/day <sup>1</sup>	49,400	52,920	67,929	--	--
1. Based on a design flow of 181 MGD.						

- b. **Total Residual Chlorine<sup>1</sup>. Effective immediately and ending on 30 November 2020**, the effluent total residual chlorine shall not exceed:

- i. 0.011 mg/L, as a monthly average; and
- ii. 0.018 mg/L, as a daily average.

- c. **Total Coliform Organisms<sup>2</sup>. Effective immediately and ending on 30 November 2020**, the total coliform organisms shall not exceed:

- i. 23 most probable number (MPN) per 100 mL, as a weekly median; and
- ii. 500 MPN/100 mL, in any two consecutive days as a daily maximum.

<sup>1</sup> The final effluent limitations for total residual chlorine become effective when the Discharger complies with Special Provisions section VI.C.7. or 1 December 2020, whichever is sooner.

<sup>2</sup> The final effluent limitations for total coliform organisms become effective when the Discharger complies with Special Provisions section VI.C.7. or 1 December 2020, whichever is sooner.

**B. Land Discharge Specifications – Not Applicable**

**C. Reclamation Specifications – Not Applicable**

**V. Receiving Water Limitations**

**A. Surface Water Limitations**

Receiving water limitations are based on water quality objectives contained in the Basin Plan and are a required part of this Order. The discharge shall not cause the following in the Sacramento River and Sacramento-San Joaquin Delta:

1. **Bacteria.** The fecal coliform concentration, based on a minimum of not less than five samples for any 30-day period, to exceed a geometric mean of 200 MPN/100 mL, nor more than 10 percent of the total number of fecal coliform samples taken during any 30-day period to exceed 400 MPN/100 mL.
2. **Biostimulatory Substances.** Water to contain biostimulatory substances which promote aquatic growths in concentrations that cause nuisance or adversely affect beneficial uses.
3. **Chemical Constituents.** Chemical constituents to be present in concentrations that adversely affect beneficial uses.
4. **Color.** Discoloration that causes nuisance or adversely affects beneficial uses.
5. **Dissolved Oxygen:** The dissolved oxygen concentration to be reduced below 7.0 mg/L at any time.
6. **Floating Material.** Floating material to be present in amounts that cause nuisance or adversely affect beneficial uses.
7. **Oil and Grease.** Oils, greases, waxes, or other materials to be present in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.
8. **pH.** The pH to be depressed below 6.5 nor raised above 8.5.
9. **Pesticides:**
  - a. Pesticides to be present, individually or in combination, in concentrations that adversely affect beneficial uses;
  - b. Pesticides to be present in bottom sediments or aquatic life in concentrations that adversely affect beneficial uses;

- c. Total identifiable persistent chlorinated hydrocarbon pesticides to be present in the water column at concentrations detectable within the accuracy of analytical methods approved by USEPA or the Executive Officer
- d. Pesticide concentrations to exceed those allowable by applicable antidegradation policies (see State Water Board Resolution No. 68-16 and 40 CFR 131.12,
- e. Pesticide concentrations to exceed the lowest levels technically and economically achievable;
- f. Pesticides to be present in concentration in excess of the maximum contaminant levels set forth in CCR, Title 22, division 4, chapter 15; nor
- g. Thiobencarb to be present in excess of 1.0 µg/L.

**10. Radioactivity:**

- a. Radionuclides to be present in concentrations that are harmful to human, plant, animal, or aquatic life nor that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.
- b. Radionuclides to be present in excess of the maximum contaminant levels specified in Table 4 (MCL Radioactivity) of section 64443 of Title 22 of the California Code of Regulations.

**11. Suspended Sediments.** The suspended sediment load and suspended sediment discharge rate of surface waters to be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

**12. Settleable Substances.** Substances to be present in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.

**13. Suspended Material.** Suspended material to be present in concentrations that cause nuisance or adversely affect beneficial uses.

**14. Taste and Odors.** Taste- or odor-producing substances to be present in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses.

**15. Temperature.**

- a. If the natural receiving water temperature is less than 65°F, the discharge shall not create a zone, defined by water temperature of more than 2°F above natural temperature, which exceeds 25 percent of the cross sectional area of the River at any point outside the zone of initial dilution.



- b. If the natural receiving water temperature is 65°F or greater, the discharge shall not create a zone, defined by a water temperature of 1°F or more above natural receiving water temperature which exceeds 25 percent of the cross sectional area of the River at any point outside the zone of initial dilution for more than one hour per day as an average in any month.
- c. The discharge shall not cause the receiving water surface temperature to increase more than 4°F above the ambient temperature of the receiving water at any time or place.

**16. Toxicity.** Toxic substances to be present, individually or in combination, in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.

**17. Turbidity.**

- a. Shall not exceed 2 Nephelometric Turbidity Units (NTU) where natural turbidity is less than 1 NTU;
- b. Shall not increase more than 1 NTU where natural turbidity is between 1 and 5 NTUs;
- c. Shall not increase more than 20 percent where natural turbidity is between 5 and 50 NTUs;
- d. Shall not increase more than 10 NTU where natural turbidity is between 50 and 100 NTUs; no
- e. Shall not increase more than 10 percent where natural turbidity is greater than 100 NTUs.

**B. Groundwater Limitations.**

The release of waste constituents from any transport, storage, treatment, or disposal component associated with the Facility shall not cause the underlying groundwater to be degraded.

**VI. Provisions**

**A. Standard Provisions**

1. The Discharger shall comply with all (federal NPDES standard conditions from 40 CFR Part 122) Standard Provisions included in Attachment D of this Order.
2. The Discharger shall comply with the following provisions:

- a. If the Discharger's wastewater treatment plant is publicly owned or subject to regulation by California Public Utilities Commission, it shall be supervised and operated by persons possessing certificates of appropriate grade according to Title 23, CCR, division 3, chapter 26.
- b. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to:
  - i. Violation of any term or condition contained in this Order;
  - ii. Obtaining this Order by misrepresentation or by failing to disclose fully all relevant facts;
  - iii. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge; and
  - iv. A material change in the character, location, or volume of discharge.

The causes for modification include:

- *New regulations.* New regulations have been promulgated under section 405(d) of the CWA, or the standards or regulations on which the permit was based have been changed by promulgation of amended standards or regulations or by judicial decision after the permit was issued.
- *Land application plans.* When required by a permit condition to incorporate a land application plan for beneficial reuse of sewage sludge, to revise an existing land application plan, or to add a land application plan.
- *Change in sludge use or disposal practice.* Under 40 CFR 122.62(a)(1), a change in the Discharger's sludge use or disposal practice is a cause for modification of the permit. It is cause for revocation and reissuance if the Discharger requests or agrees.

The Central Valley Water Board may review and revise this Order at any time upon application of any affected person or the Central Valley Water Board's own motion.

- c. If a toxic effluent standard or prohibition (including any scheduled compliance specified in such effluent standard or prohibition) is established under section 307(a) of the CWA, or amendments thereto, for a toxic pollutant that is present in the discharge authorized herein, and such standard or prohibition is more stringent than any limitation upon such pollutant in this Order, the Central Valley Water Board will revise or modify this Order in accordance with such toxic effluent standard or prohibition.

The Discharger shall comply with effluent standards and prohibitions within the time provided in the regulations that establish those standards or prohibitions, even if this Order has not yet been modified.

- d.** This Order shall be modified, or alternately revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a)(2) of the CWA, if the effluent standard or limitation so issued or approved:
  - i.** contains different conditions or is otherwise more stringent than any effluent limitation in the Order; or
  - ii.** controls any pollutant limited in the Order.

The Order, as modified or reissued under this paragraph, shall also contain any other requirements of the CWA then applicable.

- e.** The provisions of this Order are severable. If any provision of this Order is found invalid, the remainder of this Order shall not be affected.
- f.** The Discharger shall take all reasonable steps to minimize any adverse effects to waters of the State or users of those waters resulting from any discharge or sludge use or disposal in violation of this Order. Reasonable steps shall include such accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge or sludge use or disposal, and adequate public notification to downstream water agencies or others who might contact the non-complying discharge.
- g.** The Discharger shall ensure compliance with any existing or future pretreatment standard promulgated by USEPA under section 307 of the CWA, or amendment thereto, for any discharge to the municipal system.
- h.** The discharge of any radiological, chemical or biological warfare agent or high-level, radiological waste is prohibited.
- i.** A copy of this Order shall be maintained at the discharge facility and be available at all times to operating personnel. Key operating personnel shall be familiar with its content.
- j.** Safeguard to electric power failure:
  - i.** The Discharger shall provide safeguards to assure that, should there be reduction, loss, or failure of electric power, the discharge shall comply with the terms and conditions of this Order.
  - ii.** Upon written request by the Central Valley Water Board the Discharger shall submit a written description of safeguards. Such safeguards may include alternate power sources, standby generators, retention capacity, operating procedures, or other means. A description of the safeguards provided shall

include an analysis of the frequency, duration, and impact of power failures experienced over the past 5 years on effluent quality and on the capability of the Discharger to comply with the terms and conditions of the Order. The adequacy of the safeguards is subject to the approval of the Central Valley Water Board.

- iii. Should the treatment works not include safeguards against reduction, loss, or failure of electric power, or should the Central Valley Water Board not approve the existing safeguards, the Discharger shall, within 90 days of having been advised in writing by the Central Valley Water Board that the existing safeguards are inadequate, provide to the Central Valley Water Board and USEPA a schedule of compliance for providing safeguards such that in the event of reduction, loss, or failure of electric power, the Discharger shall comply with the terms and conditions of this Order. The schedule of compliance shall, upon approval of the Central Valley Water Board, become a condition of this Order.
- k. The Discharger, upon written request of the Central Valley Water Board, shall file with the Board a technical report on its preventive (failsafe) and contingency (cleanup) plans for controlling accidental discharges, and for minimizing the effect of such events. This report may be combined with that required under Central Valley Water Board Standard Provision contained in section VI.A.2.i. of this Order.

The technical report shall:

- i. Identify the possible sources of spills, leaks, untreated waste by-pass, and contaminated drainage. Loading and storage areas, power outage, waste treatment unit outage, and failure of process equipment, tanks and pipes should be considered.
- ii. Evaluate the effectiveness of present facilities and procedures and state when they became operational.
- iii. Predict the effectiveness of the proposed facilities and procedures and provide an implementation schedule containing interim and final dates when they will be constructed, implemented, or operational.

The Central Valley Water Board, after review of the technical report, may establish conditions which it deems necessary to control accidental discharges and to minimize the effects of such events. Such conditions shall be incorporated as part of this Order, upon notice to the Discharger.

- I. A publicly owned treatment works whose waste flow has been increasing, or is projected to increase, shall estimate when flows will reach hydraulic and treatment capacities of its treatment and disposal facilities. The projections shall be made in January, based on the last 3 years' average dry weather flows, peak wet weather flows and total annual flows, as appropriate. When any projection

- shows that capacity of any part of the facilities may be exceeded in 4 years, the Discharger shall notify the Central Valley Water Board by 31 January. A copy of the notification shall be sent to appropriate local elected officials, local permitting agencies and the press. Within 120 days of the notification, the Discharger shall submit a technical report showing how it will prevent flow volumes from exceeding capacity or how it will increase capacity to handle the larger flows. The Central Valley Water Board may extend the time for submitting the report.
- m.** The Discharger shall submit technical reports as directed by the Executive Officer. All technical reports required herein that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code, sections 6735, 7835, and 7835.1. To demonstrate compliance with Title 16, CCR, sections 415 and 3065, all technical reports must contain a statement of the qualifications of the responsible registered professional(s). As required by these laws, completed technical reports must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work.
  - n.** The Central Valley Water Board is authorized to enforce the terms of this permit under several provisions of the CWC, including, but not limited to, sections 13385, 13386, and 13387.
  - o.** For publicly owned treatment works, prior to making any change in the point of discharge, place of use, or purpose of use of treated wastewater that results in a decrease of flow in any portion of a watercourse, the Discharger must file a petition with the State Water Board, Division of Water Rights, and receive approval for such a change. (CWC section 1211).
  - p.** In the event the Discharger does not comply or will be unable to comply for any reason, with any prohibition, maximum daily effluent limitation, 1-hour average effluent limitation, or receiving water limitation contained in this Order, the Discharger shall notify the Central Valley Water Board by telephone (916) 464-3291 within 24 hours of having knowledge of such noncompliance, and shall confirm this notification in writing within 5 days, unless the Central Valley Water Board waives confirmation. The written notification shall include the information required by the Standard Provision contained in Attachment D section V.E.1. [40 CFR 122.41(l)(6)(i)].
  - q.** Failure to comply with provisions or requirements of this Order, or violation of other applicable laws or regulations governing discharges from this facility, may subject the Discharger to administrative or civil liabilities, criminal penalties, and/or other enforcement remedies to ensure compliance. Additionally, certain violations may subject the Discharger to civil or criminal enforcement from appropriate local, state, or federal law enforcement entities.

- r. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to the Central Valley Water Board.

To assume operation under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, address and telephone number of the persons responsible for contact with the Central Valley Water Board and a statement. The statement shall comply with the signatory and certification requirements in the federal Standard Provisions (Attachment D, section V.B) and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the CWC. Transfer shall be approved or disapproved in writing by the Executive Officer.

## **B. Monitoring and Reporting Program Requirements**

The Discharger shall comply with the Monitoring and Reporting Program, and future revisions thereto, in Attachment E of this Order.

## **C. Special Provisions**

### **1. Reopener Provisions**

- a. Conditions that necessitate a major modification of a permit are described in 40 CFR 122.62, including:
  - i. If new or amended applicable water quality standards are promulgated or approved pursuant to section 303 of the CWA, or amendments thereto, this permit may be reopened and modified in accordance with the new or amended standards.
  - ii. When new information, that was not available at the time of permit issuance, would have justified different permit conditions at the time of issuance.
- b. This Order may be reopened for modification, or revocation and reissuance, as a result of the detection of a reportable priority pollutant generated by special conditions included in this Order. These special conditions may be, but are not limited to, fish tissue sampling, whole effluent toxicity, monitoring requirements on internal waste streams, and monitoring for surrogate parameters. Additional requirements may be included in this Order as a result of the special condition monitoring data.
- c. **Pollution Prevention.** This Order requires the Discharger prepare pollution prevention plans following CWC section 13263.3(d)(3) for ammonia and mercury. Based on a review of the pollution prevention plans, this Order may be reopened

for addition and/or modification of effluent limitations and requirements for these constituents.

- d. Whole Effluent Toxicity.** As a result of a Toxicity Reduction Evaluation (TRE), this Order may be reopened to include a numeric chronic toxicity limitation, a new acute toxicity limitation, and/or a limitation for a specific toxicant identified in the TRE. Additionally, if the State Water Board revises the SIP's toxicity control provisions that would require the establishment of numeric chronic toxicity effluent limitations, this Order may be reopened to include a numeric chronic toxicity effluent limitation based on the new provisions.
- e. Water Effects Ratios (WER) and Metal Translators.** A default WER of 1.0 has been used in this Order for calculating CTR criteria for applicable priority pollutant inorganic constituents. In addition, default dissolved-to-total metal translators have been used to convert water quality objectives from dissolved to total recoverable when developing effluent limitations for copper. If the Discharger performs studies to determine site-specific WERs and/or site-specific dissolved-to-total metal translators, this Order may be reopened to modify the effluent limitations for the applicable inorganic constituents.
- f. Perchlorate and 1,2-diphenyl hydrazine Studies.** If after review of the study results it is determined that the discharge has reasonable potential to cause or contribute to an exceedance of a water quality objective this Order may be reopened and effluent limitations added for the subject constituents.
- g. Central Valley Drinking Water Policy.** If water quality objectives are adopted for organic carbon, nutrients, salinity, bromide, or pathogens to protect drinking water supplies in the Central Valley Region, this Order may be reopened for addition and/or modification of effluent limitations and requirements, as appropriate, to require compliance with the applicable water quality objectives.
- h. Ammonia Studies.** The ammonia effluent limitations in this Order are based on USEPA's recommended National Ambient Water Quality Criteria for protection of aquatic life. However, studies are ongoing to evaluate the effect of ammonia on the inhibition of growth of diatoms in the Bay-Delta, studies to evaluate the sensitivity of delta smelt to ammonia toxicity, and studies of the technological feasibility of ammonia removal processes. Based on the result of these studies, this Order may be reopened to modify the ammonia effluent limitations, as appropriate.
- i. Temperature Studies.** The temperature effluent limitations and receiving water prohibitions are based on the existing Thermal Plan exemption conditions. The United States Fish and Wildlife Service (USFWS) requested studies to characterize fish behavior in the affected river reach to determine how fish behave in response to the discharge field, and whether predator concentrations are elevated in the thermal discharge field. Based on the result of these studies,

this Order may be reopened to modify the temperature effluent limitations and receiving water prohibitions, as appropriate.

- j. Regional Monitoring Program.** The State and Regional Water Boards are committed to creation of a coordinated Regional Monitoring Program to address receiving water monitoring in the Delta for all Water Board regulatory and research programs. When a Regional Monitoring Program becomes functional, this permit may be reopened to make appropriate adjustments in permit-specific monitoring to coordinate with the Regional Monitoring Program.
- k. The Bay-Delta Plan.** The South Delta salinity standards are currently under review by the State Water Board in accordance with implementation provisions contained in the Bay-Delta Water Quality Control Plan. If applicable water quality objectives of the Bay-Delta Plan are adopted, this Order may be reopened for addition and/or modification of effluent limitations and requirements, as appropriate.
- l. Constituents of Emerging Concern (CECs).** The State Water Resources Control Board is conducting studies on CECs discharged from wastewater treatment plants. Upon completion of the studies and formulation of recommendations for CEC monitoring, this Order may be reopened for addition of monitoring or special studies of CECs in the treatment plant discharge.
- m. Interim Ammonia Effluent Limitations.** The Discharger is required in the Pollution Prevention Program to evaluate means of reducing effluent ammonia concentrations in the interim until compliance with final Ammonia effluent limitations can be attained. If the Discharger identifies and implements strategies that reduce effluent Ammonia concentrations, this Order may be reopened for modification of the interim Ammonia Effluent Limitations.
- n. Nitrogen Studies.** The nitrate effluent limitations in this Order are based on USEPA's primary maximum contaminant level for drinking water. However, studies are on-going to evaluate the effect of nitrogen in the Bay-Delta system and to users of Bay-Delta waters. Based on the result of these or other studies, this Order may be reopened to modify the nitrate effluent limitations, as appropriate.

## **2. Special Studies, Technical Reports and Additional Monitoring Requirements**

- a. Chronic Whole Effluent Toxicity.** For compliance with the Basin Plan's narrative toxicity objective, this Order requires the Discharger to conduct chronic whole effluent toxicity (WET) testing, as specified in the Monitoring and Reporting Program (Attachment E, section V). Furthermore, this Provision requires the Discharger to investigate the causes of, and identify corrective actions to reduce or eliminate effluent toxicity. If the discharge exhibits toxicity exceeding the numeric toxicity monitoring trigger during accelerated monitoring established in this Provision, the Discharger is required to initiate a TRE in accordance with an approved TRE Workplan, and take actions to mitigate the impact of the discharge



- i. Toxicity Reduction Evaluation (TRE) Workplan.** Within 90 days of the effective date of this Order, the Discharger shall submit to the Central Valley Water Board a TRE Workplan for approval by the Executive Officer. The TRE Workplan shall outline the procedures for identifying the source(s) of, and reducing or eliminating effluent toxicity. The TRE Workplan must be developed in accordance with USEPA guidance<sup>1</sup> and be of adequate detail to allow the Discharger to immediately initiate a TRE as required in this Provision.
- ii. Accelerated Monitoring and TRE Initiation.** When the numeric toxicity monitoring trigger is exceeded during regular chronic toxicity monitoring, and the testing meets all test acceptability criteria, the Discharger shall initiate accelerated monitoring as required in the Accelerated Monitoring Specifications. The Discharger shall initiate a TRE to address effluent toxicity if any WET testing results exceed the numeric toxicity monitoring trigger during accelerated monitoring.
- iii. Numeric Toxicity Monitoring Trigger.** The numeric toxicity monitoring trigger to initiate a TRE is  $8 TU_C$  (where  $TU_C = 100/NOEC$ ). The monitoring trigger is not an effluent limitation; it is the toxicity threshold at which the Discharger is required to begin accelerated monitoring and initiate a TRE when the effluent exhibits toxicity.
- iv. Accelerated Monitoring Specifications.** If the numeric toxicity monitoring trigger is exceeded during regular chronic toxicity testing, the Discharger shall initiate accelerated monitoring within 14 days of notification by the laboratory of the exceedance. Accelerated monitoring shall consist of four (4) chronic toxicity tests conducted once every 2 weeks using the species that exhibited toxicity. The following protocol shall be used for accelerated monitoring and TRE initiation:

  - (a)** If the results of four (4) consecutive accelerated monitoring tests do not exceed the monitoring trigger, the Discharger may cease accelerated monitoring and resume regular chronic toxicity monitoring. However, notwithstanding the accelerated monitoring results, if there is adequate

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<sup>1</sup> See the Fact Sheet (Attachment F, section VII.B.2.a. for a list of USEPA guidance documents that must be considered in the development of the TRE Workplan.)

evidence of effluent toxicity, the Executive Officer may require that the Discharger initiate a TRE.

- (b) If the source(s) of the toxicity is easily identified (e.g., temporary plant upset), the Discharger shall make necessary corrections to the facility and shall continue accelerated monitoring until four (4) consecutive accelerated tests do not exceed the monitoring trigger. Upon confirmation that the effluent toxicity has been removed, the Discharger may cease accelerated monitoring and resume regular chronic toxicity monitoring.
- (c) If the result of any accelerated toxicity test exceeds the monitoring trigger, the Discharger shall cease accelerated monitoring and begin a TRE to investigate the cause(s) of, and identify corrective actions to reduce or eliminate effluent toxicity. Within thirty (30) days of notification by the laboratory of any test result exceeding the monitoring trigger during accelerated monitoring, the Discharger shall submit a TRE Action Plan to the Central Valley Water Board including, at minimum:
  - (1) Specific actions the Discharger will take to investigate and identify the cause(s) of toxicity, including a TRE WET monitoring schedule;
  - (2) Specific actions the Discharger will take to mitigate the impact of the discharge and prevent the recurrence of toxicity; and
  - (3) A schedule for these actions.

**b. Perchlorate and 1,2-Diphenyl-hydrazine Study.** There are indications that the discharge may contain perchlorate and 1,2-Diphenyl-hydrazine at levels that may have a reasonable potential to cause or contribute to an exceedance of water quality objectives. The Discharger shall comply with the following time schedule to conduct a study to determine if the effluent has the reasonable potential to cause or contribute to an instream exceedance of the applicable water quality objective for perchlorate and 1,2-Diphenyl-hydrazine:

<u>Task</u>	<u>Compliance Date</u>
i. Submit Workplan and Time Schedule	90 days from Adoption Date of this Order
ii. Begin Study	To be determined in Task i.
iii. Complete Study	To be determined in Task i.
iv. Submit Study Report	To be determined in Task I, or by three years from the Adoption Date of this Order, whichever is sooner.

**c. *Hyalella azteca* Study.** The Discharger shall submit a workplan and time schedule for Executive Officer approval to conduct a study to determine if it is feasible to use existing laboratory procedures to evaluate both acute and chronic

toxicity of the discharge. The study should build upon existing research of whole effluent toxicity (WET) testing using *Hyalella azteca* and shall recommend monitoring frequencies that result in an effective evaluation of the discharge (e.g., monitoring conducted when pyrethroid pesticides may be prevalent in the discharge). The permit may be reopened to incorporate the testing if determined feasible.

<u>Task</u>	<u>Compliance Date</u>
i. Submit Workplan and Time Schedule	90 days from Adoption Date of this Order
ii. Begin Study	To be determined in Task i.
iii. Complete Study	To be determined in Task i.
iv. Submit Study Report	To be determined in Task i.

**d. Temperature Study.** The Discharger shall submit a workplan and time schedule for Executive Officer approval for determining whether permitted conditions are protective of the aquatic life beneficial uses of the Sacramento River. The workplan shall be implemented upon approval by the Executive Officer. The study will include an evaluation of: (1) the existing Thermal Plan Exception and its effects on aquatic life, and (2) any proposed request for new Thermal Plan Exception(s). The Discharger must consult with the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the California Department of Fish and Game, to consider additional issues (such a fish attractively to mixing zone areas) in development of the workplan for the Study.

<u>Task</u>	<u>Compliance Date</u>
i. Submit Workplan and Time Schedule	180 days from the Adoption Date of this Order
ii. Begin Study	To be determined in Task i.
iii. Complete Study	To be determined in Task i.
iv. Submit Study Report	To be determined in Task or by four years from the Adoption Date of this Order, whichever is sooner.

### 3. Best Management Practices and Pollution Prevention

**a. Pollution Prevention Plan for mercury.** Mercury concentrations in the SRWTP effluent have been reduced by implementation of the Discharger’s 2001 Pollution Prevention Plan. The Discharger shall update and continue to implement its Pollution Prevention Plan for mercury, in accordance with CWC section 13263.3. The minimum requirements for the Pollution Prevention Plan are outlined in the Fact Sheet (Attachment F section VII.B.7.b). The Pollution Prevention Plan for mercury shall be updated and submitted to the Central Valley Water Board

**within nine months of the adoption date of this Order** for the approval by the Executive Officer. The Discharger shall submit annual reports evaluating the effectiveness of the plan in accordance with the Monitoring and Reporting Program (Attachment E section X.D.1.)

- b. Salinity Evaluation and Minimization Plan.** The Discharger shall prepare a salinity evaluation and minimization plan to address sources of salinity from the Facility. The plan shall be completed and submitted to the Central Valley Water Board **within nine months of the adoption date of this Order** for the approval by the Executive Officer. The plan shall be implemented upon approval by the Executive Officer. The Discharger shall submit an annual report evaluating the effectiveness of the plan in accordance with the Monitoring and Reporting Program (Attachment E section X.D.1.).
- c. 2,3,7,8-TCDD and Other Dioxin and Furan Congeners Source Evaluation and Minimization Plan.** The Discharger shall prepare a 2,3,7,8-TCDD and other dioxin and furan congeners evaluation and minimization plan to address sources of detectable dioxins OCDD and 1,2,3,6,7,8-HpCDD from the Facility. The plan shall be completed and submitted to the Central Valley Water Board **within nine months of the adoption date of this Order** for review and approval by the Executive Officer.

#### **4. Construction, Operation and Maintenance Specifications**

- a. Turbidity.** Effective **1 December 2020** or upon compliance with Special Provisions VI.C.6.a, whichever is sooner, effluent turbidity shall not exceed:
  - i. 2 NTU, as a daily average;
  - ii. 5 NTU, more than 5% of the time within a 24-hour period; and
  - iii. 10 NTU, at any time.
- b.** The treatment facilities shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.
- c. Emergency Storage Basin Operating Requirements.**
  - i. The treatment facilities shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.
  - ii. Public contact with wastewater shall be precluded through such means as fences, signs, and other acceptable alternatives.
  - iii. Ponds shall be managed to prevent breeding of mosquitoes. In particular,

- a. An erosion control program should assure that small coves and irregularities are not created around the perimeter of the water surface.
- b. Weeds shall be minimized.
- c. Dead algae, vegetation, and debris shall not accumulate on the water surface.
- iv. Freeboard for the total ESB system shall never be less than 2 feet (measured vertically to the lowest point of overflow).
- v. The discharge of waste classified as “hazardous” as defined in section 2521(a) of Title 23, California Code of Regulations (CCR), or “designated”, as defined in section 13173 of the CWC, to the treatment ponds is prohibited.
- vi. Objectionable odors originating at this Facility shall not be perceivable beyond the limits of the wastewater treatment and disposal areas (or property owned by the Discharger).

#### **5. Special Provisions for Municipal Facilities (POTWs Only)**

- a. **Collection System.** On 2 May 2006, the State Water Board adopted State Water Board Order No. 2006-0003, a Statewide General WDR for Sanitary Sewer Systems. The Discharger shall be subject to the requirements of Order No. 2006-0003 and any future revisions thereto. Order No. 2006-0003 requires that all public agencies that currently own or operate sanitary sewer systems apply for coverage under the General WDR. The Discharger has applied for and has been approved for coverage under State Water Board Order 2006-0003 for operation of its wastewater collection system.
- b. **Pretreatment Requirements.**
  - i. The Discharger shall be responsible and liable for the performance of all Control Authority pretreatment requirements contained in 40 CFR Part 403, including any subsequent regulatory revisions to 40 CFR Part 403. Where 40 CFR Part 403 or subsequent revision places mandatory actions upon the Discharger as Control Authority but does not specify a timetable for completion of the actions, the Discharger shall complete the required actions within 6 months from the issuance date of this permit or the effective date of the 40 CFR Part 403 revisions, whichever comes later. For violations of pretreatment requirements, the Discharger shall be subject to enforcement actions, penalties, fines, and other remedies by USEPA or other appropriate parties, as provided in the CWA.

- ii.** The Discharger shall enforce the requirements promulgated under sections 307(b), 307(c), and 307(d), and 402(b) of the CWA with timely, appropriate and effective enforcement actions. The Discharger shall cause all nondomestic users subject to federal categorical standards to achieve compliance no later than the date specified in those requirements or, in the case of a new nondomestic user, upon commencement of the discharge.
- iii.** The Discharger shall perform the pretreatment functions as required by in 40 CFR Part 403 including, but not limited to:

  - (a)** Implement the necessary legal authorities required as provided in 40 CFR 403.8(f)(1);
  - (b)** Enforce the pretreatment requirements under 40 CFR 403.5 and 403.6;
  - (c)** Implement the programmatic functions as provided in 40 CFR 403.8(f)(2); and
  - (d)** Provide the requisite funding and personnel to implement the pretreatment program as provided in 40 CFR 403.8(f)(3).
- iv.** The Discharger shall implement, as more completely set forth in 40 CFR 403.5, the necessary legal authorities, programs, and controls to ensure that the following incompatible wastes are not introduced to the treatment system, where incompatible wastes are:

  - (a)** Wastes which create a fire or explosion hazard in the treatment works;
  - (b)** Wastes which will cause corrosive structural damage to treatment works, but in no case wastes with a pH lower than 5.0, unless the works is specially designed to accommodate such wastes;
  - (c)** Solid or viscous wastes in amounts which cause obstruction to flow in sewers, or which cause other interference with proper operation or treatment works;
  - (d)** Any waste, including oxygen demanding pollutants (BOD, etc.), released in such volume or strength as to cause inhibition or disruption in the treatment works, and subsequent treatment process upset and loss of treatment efficiency;
  - (e)** Heat in amounts that inhibit or disrupt biological activity in the treatment works, or that raise influent temperatures above 40°C (104°F), unless the Regional Water Board approves alternate temperature limits;
  - (f)** Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;

- (g) Pollutants which result in the presence of toxic gases, vapors, or fumes within the treatment works in a quantity that may cause acute worker health and safety problems; and:
- (h) Any trucked or hauled pollutants, except at points predesignated by the Discharger.
- v. The Discharger shall implement, as more completely set forth in 40 CFR 403.5, the legal authorities, programs, and controls necessary to ensure that indirect discharges do not introduce pollutants into the sewerage system that, either alone or in conjunction with a discharge or discharges from other sources:
  - (a) Flow through the system to the receiving water in quantities or concentrations that cause a violation of this Order, or:
  - (b) Inhibit or disrupt treatment processes, treatment system operations, or sludge processes, use, or disposal and either cause a violation of this Order or prevent sludge use or disposal in accordance with this Order.

**6. Other Special Provisions**

- a. **Effective 1 December 2020**, wastewater shall be oxidized, coagulated, filtered, and adequately disinfected pursuant to the Department of Public Health (DPH) reclamation criteria, CCR, Title 22, division 4, chapter 3, (Title 22), or equivalent, in accordance with the compliance schedule in Section VI.C.7.a, below.

**7. Compliance Schedules**

- a. **Compliance Schedule for Title 22, or Equivalent, Disinfection Requirements.** By **1 December 2020**, wastewater discharged to the Sacramento River shall be oxidized, coagulated, filtered, and adequately disinfected pursuant to the Department of Public Health (DPH) reclamation criteria, Title 22 CCR, Division 4, Chapter 3, (Title 22), or equivalent. This Order also requires compliance with the final effluent limitations for BOD<sub>5</sub>, total coliform organisms, and TSS by **1 December 2020**. Until final compliance, the Discharger shall submit progress reports in accordance with the Monitoring and Reporting Program (Attachment E, section X.D.1).

<u>Task</u>	<u>Date Due</u>
i. Submit Method of Compliance Workplan/Schedule	Within 6 months after adoption of this Order
ii. Progress Reports <sup>1</sup>	<b>1 February</b> , annually, after approval of work plan until final compliance
iii. Begin CEQA process for Compliance Project	Within 4 years after Adoption Date of this Order
iv. Begin construction of Compliance Project	Within 7 years after Adoption Date of

<u>Task</u>	<u>Date Due</u> this Order
v. Full Compliance	<b>1 December 2020</b>

<sup>1</sup> The progress reports shall detail what steps have been implemented towards achieving compliance with waste discharge requirements, including studies, construction progress, evaluation of measures implemented, and recommendations for additional measures as necessary to achieve full compliance by the final compliance date.

**b. Compliance Schedule for Final Effluent Limitations for ammonia.** This Order requires compliance with the final effluent limitations for ammonia by **1 December 2020**. The Discharger shall comply with the following time schedule to ensure compliance with the final effluent limitations:

<u>Task</u>	<u>Date Due</u>
i. Submit Method of Compliance Workplan/Schedule	Within 6 months after adoption of this Order
ii. Submit and Implement Pollution Prevention Plan (PPP) <sup>1</sup> for ammonia	Within 1 year after adoption of this Order
iii. Progress Reports <sup>2</sup>	<b>1 February</b> , annually, after approval of work plan until final compliance
iv. Begin CEQA process for Compliance Project	Within 4 years after Adoption Date of this Order
v. Begin construction of Compliance Project	Within 7 years after Adoption Date of this Order
vi. Full Compliance	<b>1 December 2020</b>

<sup>1</sup> The PPP shall be prepared and implemented in accordance with CWC section 13263.3(d)(3) as outlined in the Fact Sheet (Attachment F section VII.C.7.b). The PPP shall include an evaluation of methods for reducing effluent ammonia concentrations through treatment process optimization, eliminating high ammonia side streams, etc.

<sup>2</sup> The progress reports shall detail what steps have been implemented towards achieving compliance with waste discharge requirements, including studies, construction progress, evaluation of measures implemented, and recommendations for additional measures as necessary to achieve full compliance by the final compliance date.

## VII. COMPLIANCE DETERMINATION

**A. BOD<sub>5</sub> and TSS Effluent Limitations (Section IV.A.1.a. and 2.a.).** Compliance with the final and interim effluent limitations for BOD<sub>5</sub> and TSS required in Limitations and Discharge Requirements section IV.A.1.a. and 2.a. shall be ascertained by 24-hour composite samples. Compliance with effluent limitations required in Limitations and Discharge Requirements section IV.A.1.b for percent removal shall be calculated using the arithmetic mean of BOD<sub>5</sub> and TSS in effluent samples collected over a monthly period as a percentage of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period.



**B. Aluminum Effluent Limitations (Section IV.A.1.i).** Compliance with the final effluent limitations for aluminum can be demonstrated using either total or acid-soluble (inductively coupled plasma/atomic emission spectrometry or inductively coupled plasma/mass spectrometry) analysis methods, as supported by USEPA's Ambient Water Quality Criteria for Aluminum document (EPA 440/5-86-008), or other standard methods that exclude aluminum silicate particles as approved by the Executive Officer.

**C. Total Mercury Mass Loading Effluent Limitations (Section IV.A.1.k).** The procedures for calculating mass loadings are as follows:

1. The total pollutant mass load for each individual calendar month shall be determined using an average of all concentration data collected that month and the corresponding total monthly flow. All effluent monitoring data collected under the monitoring and reporting program, pretreatment program and any special studies shall be used for these calculations. The total calendar annual mass loading shall be the sum of the individual calendar months from January through December.
2. In calculating compliance, the Discharger shall count all non-detect measures at one-half of the detection level. If compliance with the effluent limitation is not attained due to the non-detect contribution, the Discharger shall improve and implement available analytical capabilities and compliance shall be evaluated with consideration of the detection limits.

**D. Average Dry Weather Flow Effluent Limitations (Section IV.A.1.h).** Compliance with the average dry weather flow effluent limitations will be determined annually based on the average daily flow over the three lowest consecutive dry weather months (e.g., July, August, and September).

**E. Total Coliform Organisms Final and Interim Effluent Limitations (Section IV.A.1.g. and 2.c.).** For each day that an effluent sample is collected and analyzed for total coliform organisms, compliance with the 7-day median final effluent limitation shall be determined by calculating the median concentration of total coliform bacteria in the effluent utilizing the bacteriological results of the last 7 days. For example, if a sample is collected on a Wednesday, the result from that sampling event and all results from the previous 6 days (i.e., Tuesday, Monday, Sunday, Saturday, Friday, and Thursday) are used to calculate the 7-day median..

Compliance with the interim weekly median effluent limitation shall be determined by taking the median value of all samples collected from Sunday through Saturday of each calendar week.

**F. Total Residual Chlorine Effluent Limitations (Section IV.A.1.f. and 2.b.).** Continuous monitoring analyzers for chlorine residual or for dechlorination agent residual in the effluent are appropriate methods for compliance determination. A positive residual dechlorination agent in the effluent indicates that chlorine is not

present in the discharge, which demonstrates compliance with the effluent limitations. This type of monitoring can also be used to prove that some chlorine residual exceedances are false positives. Continuous monitoring data showing either a positive dechlorination agent residual or a chlorine residual at or below the prescribed limit are sufficient to show compliance with the total residual chlorine effluent limitations, as long as the instruments are maintained and calibrated in accordance with the manufacturer's recommendations.

Any excursion above the 1-hour average or 4-day average total residual chlorine effluent limitations is a violation. If the Discharger conducts continuous monitoring and the Discharger can demonstrate, through data collected from a back-up monitoring system, that a chlorine spike recorded by the continuous monitor was not actually due to chlorine, then any excursion resulting from the recorded spike will not be considered an exceedance, but rather reported as a false positive. Records supporting validation of false positives shall be maintained in accordance with Section IV Standard Provisions (Attachment D).

- G. Chronic Whole Effluent Toxicity Effluent Limitation (Section IV.A.1.c).** Compliance with the accelerated monitoring and TRE/TIE provisions of Provision VI.C.2.a shall constitute compliance with the effluent limitation.
- H. Acute Whole Effluent Toxicity Effluent Limitation (Section IV.A.1.d).** For each 96-hour acute bioassay test result, compliance with the acute WET 90% median survival effluent limitation shall be determined based on the median of that test result and the previous two test results.
- I. Turbidity Receiving Water Limitation (Section V.A.17.).** Compliance shall be determined using data samples from receiving water monitoring station location RSWD-003 and analyzed with data samples for natural turbidity at receiving water monitoring station location RSWU-001.
- J. Chlorpyrifos and Diazinon Effluent Limitations (Section IV.A.1.I.).** Compliance shall be determined by calculating the sum (S), as provided in this Order, with analytical results that are reported as "non-detectable" concentrations to be considered to be zero.
- K. Mass Effluent Limitations (Section IV.A.1.a).** The mass effluent limitations contained in Final Effluent Limitations IV.A.1.a and Interim Effluent Limitations IV.A.2.a and d are based on the permitted average dry weather flow and calculated as follows:

$$\text{Mass (lbs/day)} = \text{Flow (MGD)} \times \text{Concentration (mg/L)} \times 8.34 \text{ (conversion factor)}$$

If the effluent flow exceeds the permitted average dry weather flow during wet-weather seasons, the effluent mass limitations contained in Final Effluent Limitations IV.A.1.a and Interim Effluent Limitations IV.A.2.a and d shall not apply. If the effluent flow is below the permitted average dry weather flow during wet-weather seasons, the effluent mass limitations do apply.

## **ATTACHMENT A – DEFINITIONS**

### **Arithmetic Mean ( $\mu$ )**

Also called the average, is the sum of measured values divided by the number of samples. For ambient water concentrations, the arithmetic mean is calculated as follows:

Arithmetic mean =  $\mu = \Sigma x / n$       where:  $\Sigma x$  is the sum of the measured ambient water concentrations, and  $n$  is the number of samples.

### **Average Monthly Effluent Limitation (AMEL)**

The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

### **Average Weekly Effluent Limitation (AWEL)**

The highest allowable average of daily discharges over a calendar week (Sunday through Saturday), calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

### **Bioaccumulative**

Those substances taken up by an organism from its surrounding medium through gill membranes, epithelial tissue, or from food and subsequently concentrated and retained in the body of the organism.

### **Carcinogenic**

Pollutants are substances that are known to cause cancer in living organisms.

### **Coefficient of Variation (CV)**

CV is a measure of the data variability and is calculated as the estimated standard deviation divided by the arithmetic mean of the observed values.

### **Daily Discharge**

Daily Discharge is defined as either: (1) the total mass of the constituent discharged over the calendar day (12:00 am through 11:59 pm) or any 24-hour period that reasonably represents a calendar day for purposes of sampling (as specified in the permit), for a constituent with limitations expressed in units of mass or; (2) the unweighted arithmetic mean measurement of the constituent over the day for a constituent with limitations expressed in other units of measurement (e.g., concentration).

The daily discharge may be determined by the analytical results of a composite sample taken over the course of 1 day (a calendar day or other 24-hour period defined as a day) or by the arithmetic mean of analytical results from one or more grab samples taken over the course of the day.

For composite sampling, if 1 day is defined as a 24-hour period other than a calendar day, the analytical result for the 24-hour period will be considered as the result for the calendar day in which the 24-hour period ends.

### **Diatoms**

Diatoms are planktonic micro algae.

### **Detected, but Not Quantified (DNQ)**

DNQ are those sample results less than the RL, but greater than or equal to the laboratory's MDL.

### **Dilution Credit**

Dilution Credit is the amount of dilution granted to a discharge in the calculation of a water quality-based effluent limitation, based on the allowance of a specified mixing zone. It is calculated from the dilution ratio or determined through conducting a mixing zone study or modeling of the discharge and receiving water.

### **Effluent Concentration Allowance (ECA)**

ECA is a value derived from the water quality criterion/objective, dilution credit, and ambient background concentration that is used, in conjunction with the coefficient of variation for the effluent monitoring data, to calculate a long-term average (LTA) discharge concentration. The ECA has the same meaning as waste load allocation (WLA) as used in USEPA guidance (Technical Support Document For Water Quality-based Toxics Control, March 1991, second printing, EPA/505/2-90-001).

### **Enclosed Bays**

Enclosed Bays means indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between the headlands or outermost harbor works is less than 75 percent of the greatest dimension of the enclosed portion of the bay. Enclosed bays include, but are not limited to, Humboldt Bay, Bodega Harbor, Tomales Bay, Drake's Estero, San Francisco Bay, Morro Bay, Los Angeles-Long Beach Harbor, Upper and Lower Newport Bay, Mission Bay, and San Diego Bay. Enclosed bays do not include inland surface waters or ocean waters.

### **Estimated Chemical Concentration**

The estimated chemical concentration that results from the confirmed detection of the substance by the analytical method below the ML value.

### **Estuaries**

Estuaries means waters, including coastal lagoons, located at the mouths of streams that serve as areas of mixing for fresh and ocean waters. Coastal lagoons and mouths of streams that are temporarily separated from the ocean by sandbars shall be considered estuaries. Estuarine waters shall be considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and seawater. Estuarine waters included, but are not limited to, the Sacramento-San Joaquin Delta, as defined in CWC section 12220, Suisun Bay, Carquinez Strait downstream to the Carquinez Bridge, and appropriate areas of the Smith, Mad, Eel, Noyo, Russian, Klamath, San Diego, and Otay rivers. Estuaries do not include inland surface waters or ocean waters.

### **Inland Surface Waters**

All surface waters of the State that do not include the ocean, enclosed bays, or estuaries.

### **Instantaneous Maximum Effluent Limitation**

The highest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous maximum limitation).

### **Instantaneous Minimum Effluent Limitation**

The lowest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous minimum limitation).

### **Larval Fish**

Larval Fish are early life stage in the life of fish.

### **LC<sub>50</sub>**

LC<sub>50</sub> is the concentration of effluent that is lethal to 50% of the exposed test organisms (measured in a dilution series ranging from 100% effluent to 0% effluent).

### **LOEC**

LOEC is the Lowest Observed Effect Concentration (the Lowest concentration of an effluent at which adverse effects are observed on the aquatic test organism).

### **Maximum Daily Effluent Limitation (MDEL)**

The highest allowable daily discharge of a pollutant, over a calendar day (or 24-hour period). For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the arithmetic mean measurement of the pollutant over the day.

### **Median**

The middle measurement in a set of data. The median of a set of data is found by first arranging the measurements in order of magnitude (either increasing or decreasing order). If the number of measurements ( $n$ ) is odd, then the median =  $X_{(n+1)/2}$ . If  $n$  is even, then the median =  $(X_{n/2} + X_{(n/2)+1})/2$  (i.e., the midpoint between the  $n/2$  and  $n/2+1$ ).

### **Method Detection Limit (MDL)**

MDL is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero, as defined in 40 CFR Part 136, Attachment B, revised as of 3 July 1999.

### **Minimum Level (ML)**

ML is the concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed.

### **Mixing Zone**

Mixing Zone is a limited volume of receiving water that is allocated for mixing with a wastewater discharge where water quality criteria can be exceeded without causing adverse effects to the overall water body.

### **NOEC**

NOEC is the No Observed Effect Concentration (the highest concentration of an effluent at which no adverse effects are observed on the aquatic test organism).

### **Not Detected (ND)**

Sample results which are less than the laboratory's MDL.

### **Ocean Waters**

The territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons. Discharges to ocean waters are regulated in accordance with the State Water Board's California Ocean Plan.

### **Pelagic Zone**

Pelagic Zone is a zone of the ocean with plants or animals living or growing at or near the surface of the ocean. Pelagic organisms may be found in the brackish water (water that is a combination of salt and fresh water) of deltas and estuaries.

### **Persistent Pollutants**

Persistent pollutants are substances for which degradation or decomposition in the environment is nonexistent or very slow.

### **Primary Production**

Primary production is the production of organic compounds from atmospheric or aquatic carbon dioxide, principally through the process of photosynthesis. The organisms responsible for primary production are known as primary producers and form the base of the food chain. In aquatic systems, algae are primary producers.

### **Pollutant Minimization Program (PMP)**

PMP means waste minimization and pollution prevention actions that include, but are not limited to, product substitution, waste stream recycling, alternative waste management methods, and education of the public and businesses. The goal of the PMP shall be to reduce all potential sources of a priority pollutant(s) through pollutant minimization (control) strategies, including pollution prevention measures as appropriate, to maintain the effluent concentration at or below the water quality-based effluent limitation. Pollution prevention measures may be particularly appropriate for persistent bioaccumulative priority pollutants where there is evidence that beneficial uses are being impacted. The Central Valley Water Board may consider cost effectiveness when establishing the requirements of a PMP. The completion and implementation of a Pollution Prevention Plan, if required pursuant to CWC section 13263.3(d), shall be considered to fulfill the PMP requirements.

### **Pollution Prevention**

Pollution Prevention means any action that causes a net reduction in the use or generation of a hazardous substance or other pollutant that is discharged into water and includes, but is not

limited to, input change, operational improvement, production process change, and product reformulation (as defined in Water Code section 13263.3). Pollution prevention does not include actions that merely shift a pollutant in wastewater from one environmental medium to another environmental medium, unless clear environmental benefits of such an approach are identified to the satisfaction of the State or Central Valley Water Board.

### **Reporting Level (RL)**

RL is the ML (and its associated analytical method) chosen by the Discharger for reporting and compliance determination from the MLs included in this Order. The MLs included in this Order correspond to approved analytical methods for reporting a sample result that are selected by the Central Valley Water Board either from Appendix 4 of the SIP in accordance with section 2.4.2 of the SIP or established in accordance with section 2.4.3 of the SIP. The ML is based on the proper application of method-based analytical procedures for sample preparation and the absence of any matrix interferences. Other factors may be applied to the ML depending on the specific sample preparation steps employed. For example, the treatment typically applied in cases where there are matrix-effects is to dilute the sample or sample aliquot by a factor of ten. In such cases, this additional factor must be applied to the ML in the computation of the RL.

### **Satellite Collection System**

The portion, if any, of a sanitary sewer system owned or operated by a different public agency than the agency that owns and operates the wastewater treatment facility that a sanitary sewer system is tributary to.

### **Source of Drinking Water**

Any water designated as municipal or domestic supply (MUN) in a Central Valley Water Board Basin Plan.

### **Standard Deviation ( $\sigma$ )**

Standard Deviation is a measure of variability that is calculated as follows:

$$\sigma = (\sum[(x - \mu)^2]/(n - 1))^{0.5}$$

where:

x is the observed value;

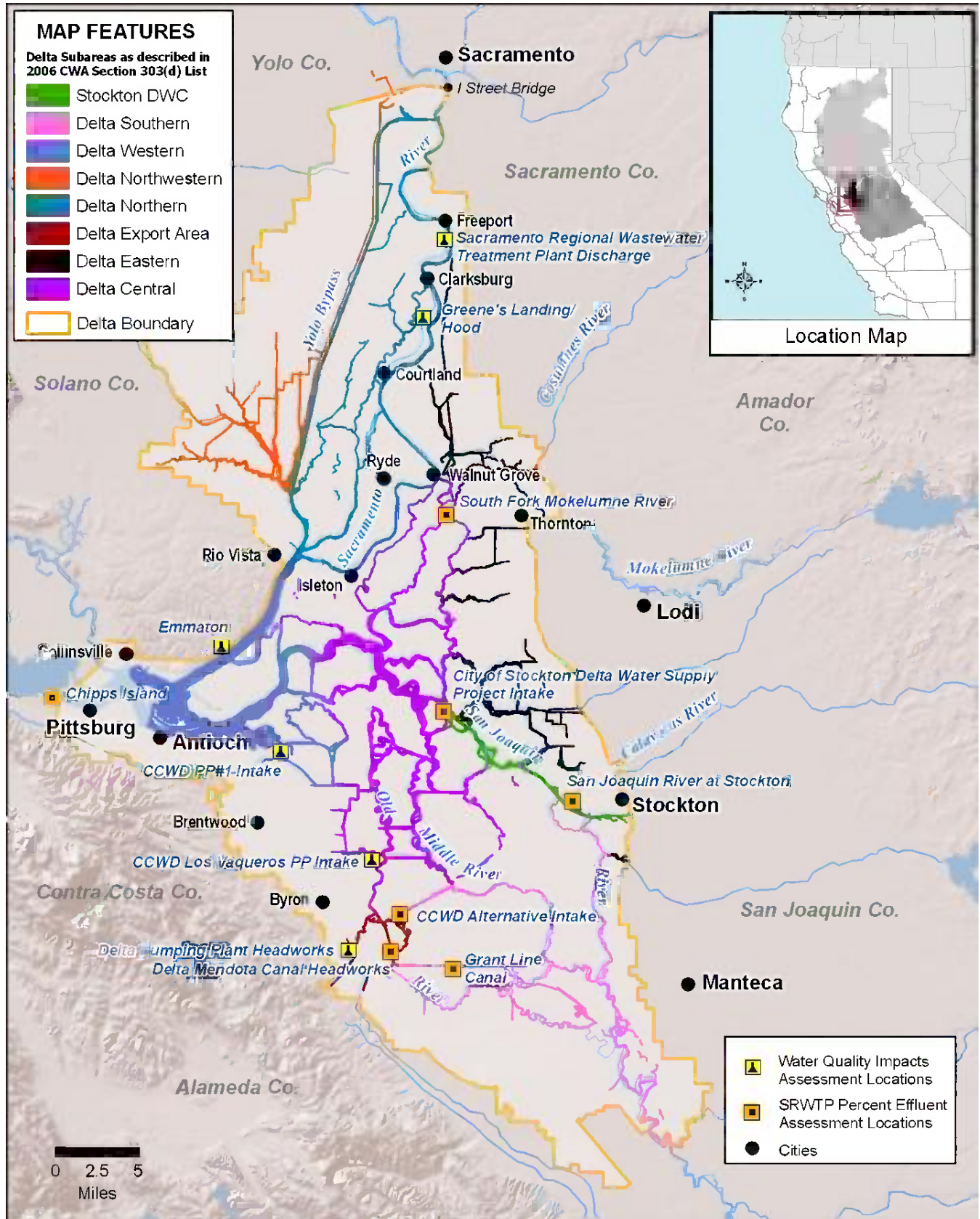
$\mu$  is the arithmetic mean of the observed values; and

n is the number of samples.

### **Toxicity Reduction Evaluation (TRE)**

TRE is a study conducted in a step-wise process designed to identify the causative agents of effluent or ambient toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in toxicity. The first steps of the TRE consist of the collection of data relevant to the toxicity, including additional toxicity testing, and an evaluation of facility operations and maintenance practices, and best management practices. A Toxicity Identification Evaluation (TIE) may be required as part of the TRE, if appropriate. (A TIE is a set of procedures to identify the specific chemical(s) responsible for toxicity. These procedures are performed in three phases (characterization, identification, and confirmation) using aquatic organism toxicity tests.)

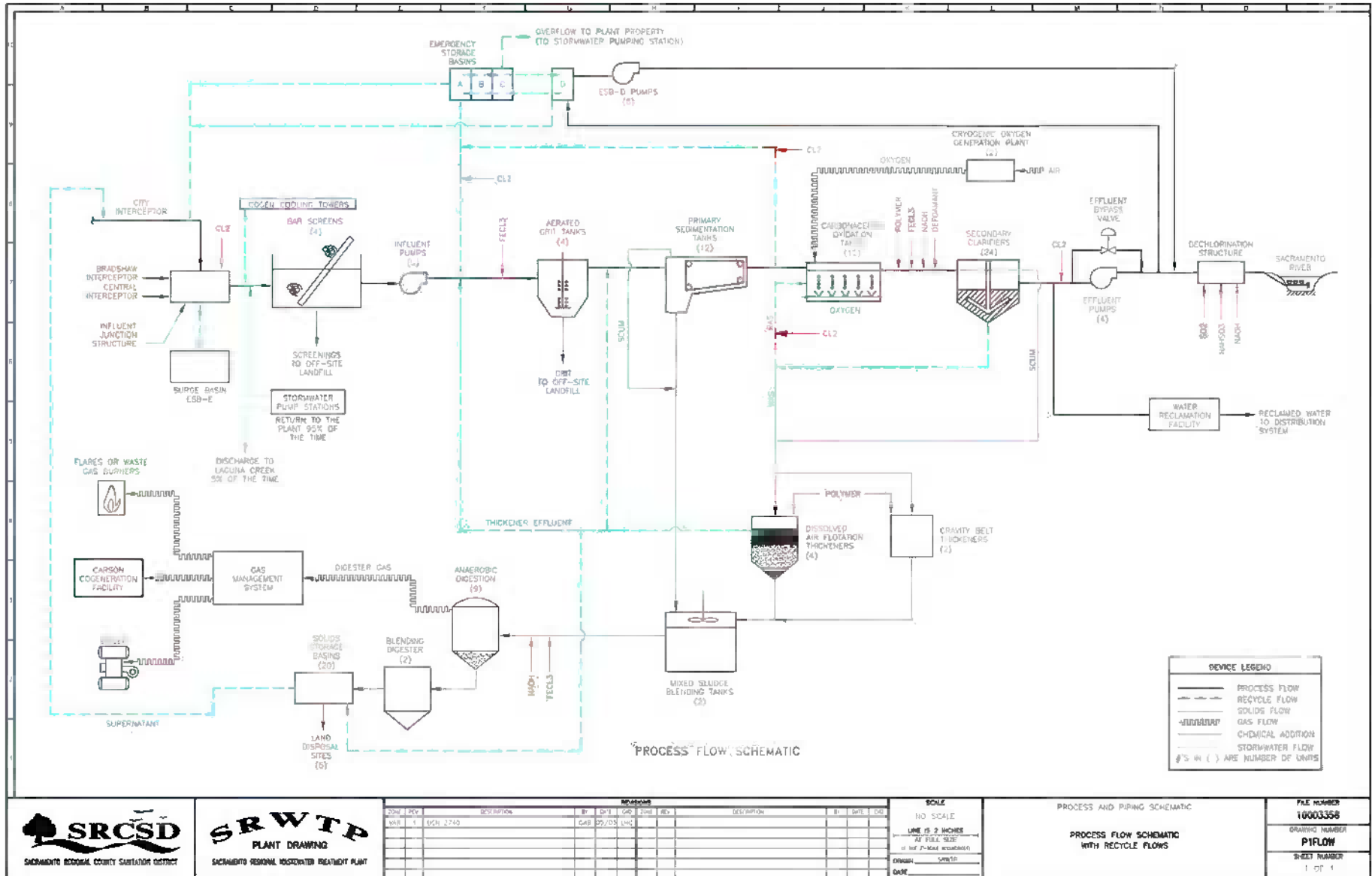
**ATTACHMENT B – MAP**



Attachment B - Map



**ATTACHMENT C – FLOW SCHEMATIC**



## **ATTACHMENT D – STANDARD PROVISIONS**

### **1. STANDARD PROVISIONS – PERMIT COMPLIANCE**

#### **A. Duty to Comply**

1. The Discharger must comply with all of the conditions of this Order. Any noncompliance constitutes a violation of the Clean Water Act (CWA) and the California Water Code (CWC) and is grounds for enforcement action, for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. (40 CFR 122.41(a).)
2. The Discharger shall comply with effluent standards or prohibitions established under section 307(a) of the CWA for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions, even if this Order has not yet been modified to incorporate the requirement. (40 CFR 122.41(a)(1).)

#### **B. Need to Halt or Reduce Activity Not a Defense**

It shall not be a defense for a Discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Order. (40 CFR 122.41(c).)

#### **C. Duty to Mitigate**

The Discharger shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment. (40 CFR 122.41(d).)

#### **D. Proper Operation and Maintenance**

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by a Discharger only when necessary to achieve compliance with the conditions of this Order. (40 CFR 122.41(e).)

#### **E. Property Rights**

1. This Order does not convey any property rights of any sort or any exclusive privileges. (40 CFR 122.41(g).)

2. The issuance of this Order does not authorize any injury to persons or property or invasion of other private rights, or any infringement of state or local law or regulations. (40 CFR 122.5(c).)

## **F. Inspection and Entry**

The Discharger shall allow the Central Valley Water Board, State Water Board, United States Environmental Protection Agency (USEPA), and/or their authorized representatives (including an authorized contractor acting as their representative), upon the presentation of credentials and other documents, as may be required by law, to (40 CFR 122.41(i); CWC section 13383):

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order (40 CFR 122.41(i)(1));
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order (40 CFR 122.41(i)(2));
3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order (40 CFR 122.41(i)(3)); and
4. Sample or monitor, at reasonable times, for the purposes of assuring Order compliance or as otherwise authorized by the CWA or the CWC, any substances or parameters at any location. (40 CFR 122.41(i)(4).)

## **G. Bypass**

1. Definitions
  - a. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility. (40 CFR 122.41(m)(1)(i).)
  - b. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production. (40 CFR 122.41(m)(1)(ii).)
2. Bypass not exceeding limitations. The Discharger may allow any bypass to occur which does not cause exceedances of effluent limitations, but only if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions listed in Standard Provisions – Permit Compliance I.G.3, I.G.4, and I.G.5 below. (40 CFR 122.41(m)(2).)

3. Prohibition of bypass. Bypass is prohibited, and the Central Valley Water Board may take enforcement action against a Discharger for bypass, unless (40 CFR 122.41(m)(4)(i)):
  - a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage (40 CFR 122.41(m)(4)(i)(A));
  - b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance (40 CFR 122.41(m)(4)(i)(B)); and
  - c. The Discharger submitted notice to the Central Valley Water Board as required under Standard Provisions – Permit Compliance I.G.5 below. (40 CFR 122.41(m)(4)(i)(C).)
4. The Central Valley Water Board may approve an anticipated bypass, after considering its adverse effects, if the Central Valley Water Board determines that it will meet the three conditions listed in Standard Provisions – Permit Compliance I.G.3 above. (40 CFR 122.41(m)(4)(ii).)
5. Notice
  - a. Anticipated bypass. If the Discharger knows in advance of the need for a bypass, it shall submit a notice, if possible at least 10 days before the date of the bypass. (40 CFR 122.41(m)(3)(i).)
  - b. Unanticipated bypass. The Discharger shall submit notice of an unanticipated bypass as required in Standard Provisions - Reporting V.E below (24-hour notice). (40 CFR 122.41(m)(3)(ii).)

## H. Upset

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the Discharger. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation. (40 CFR 122.41(n)(1).)

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of Standard Provisions – Permit Compliance I.H.2 below are met. No determination made during administrative review of claims that

- noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review. (40 CFR 122.41(n)(2).)
2. Conditions necessary for a demonstration of upset. A Discharger who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that (40 CFR 122.41(n)(3)):
    - a. An upset occurred and that the Discharger can identify the cause(s) of the upset (40 CFR 122.41(n)(3)(i));
    - b. The permitted facility was, at the time, being properly operated (40 CFR 122.41(n)(3)(ii));
    - c. The Discharger submitted notice of the upset as required in Standard Provisions – Reporting V.E.2.b below (24-hour notice) (40 CFR 122.41(n)(3)(iii)); and
    - d. The Discharger complied with any remedial measures required under Standard Provisions – Permit Compliance I.C above. (40 CFR 122.41(n)(3)(iv).)
  3. Burden of proof. In any enforcement proceeding, the Discharger seeking to establish the occurrence of an upset has the burden of proof. (40 CFR 122.41(n)(4).)

## **2. STANDARD PROVISIONS – PERMIT ACTION**

### **A. General**

This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any Order condition. (40 CFR 122.41(f).)

### **B. Duty to Reapply**

If the Discharger wishes to continue an activity regulated by this Order after the expiration date of this Order, the Discharger must apply for and obtain a new permit. (40 CFR 122.41(b).)

### **C. Transfers**

This Order is not transferable to any person except after notice to the Central Valley Water Board. The Central Valley Water Board may require modification or revocation and reissuance of the Order to change the name of the Discharger and incorporate such other requirements as may be necessary under the CWA and the CWC. (40 CFR 122.41(l)(3) and 122.61.)

### **3. STANDARD PROVISIONS – MONITORING**

- A.** Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. (40 CFR 122.41(j)(1).)
- B.** Monitoring results must be conducted according to test procedures under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503 unless other test procedures have been specified in this Order. (40 CFR 122.41(j)(4) and 122.44(i)(1)(iv).)

### **4. STANDARD PROVISIONS – RECORDS**

- A.** Except for records of monitoring information required by this Order related to the Discharger's sewage sludge use and disposal activities, which shall be retained for a period of at least 5 years (or longer as required by 40 CFR Part 503), the Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Central Valley Water Board Executive Officer at any time. (40 CFR 122.41(j)(2).)

#### **B. Records of monitoring information shall include:**

- 1. The date, exact place, and time of sampling or measurements (40 CFR 122.41(j)(3)(i));
- 2. The individual(s) who performed the sampling or measurements (40 CFR 122.41(j)(3)(ii));
- 3. The date(s) analyses were performed (40 CFR 122.41(j)(3)(iii));
- 4. The individual(s) who performed the analyses (40 CFR 122.41(j)(3)(iv));
- 5. The analytical techniques or methods used (40 CFR 122.41(j)(3)(v)); and
- 6. The results of such analyses. (40 CFR 122.41(j)(3)(vi).)

#### **C. Claims of confidentiality for the following information will be denied (40 CFR 122.7(b)):**

- 1. The name and address of any permit applicant or Discharger (40 CFR 122.7(b)(1)); and
- 2. Permit applications and attachments, permits and effluent data. (40 CFR 122.7(b)(2).)

## **5. STANDARD PROVISIONS – REPORTING**

### **A. Duty to Provide Information**

The Discharger shall furnish to the Central Valley Water Board, State Water Board, or USEPA within a reasonable time, any information which the Central Valley Water Board, State Water Board, or USEPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order or to determine compliance with this Order. Upon request, the Discharger shall also furnish to the Central Valley Water Board, State Water Board, or USEPA copies of records required to be kept by this Order. (40 CFR 122.41(h); Wat. Code, § 13267.)

### **B. Signatory and Certification Requirements**

1. All applications, reports, or information submitted to the Central Valley Water Board, State Water Board, and/or USEPA shall be signed and certified in accordance with Standard Provisions – Reporting V.B.2, V.B.3, V.B.4, and V.B.5 below. (40 CFR 122.41(k).)
2. All permit applications shall be signed by either a principal executive officer or ranking elected official. For purposes of this provision, a principal executive officer of a federal agency includes: (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of USEPA). (40 CFR 122.22(a)(3).)
3. All reports required by this Order and other information requested by the Central Valley Water Board, State Water Board, or USEPA shall be signed by a person described in Standard Provisions – Reporting V.B.2 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:
  - a. The authorization is made in writing by a person described in Standard Provisions – Reporting V.B.2 above (40 CFR 122.22(b)(1));
  - b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) (40 CFR 122.22(b)(2)); and
  - c. The written authorization is submitted to the Central Valley Water Board and State Water Board. (40 CFR 122.22(b)(3).)

4. If an authorization under Standard Provisions – Reporting V.B.3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard Provisions – Reporting V.B.3 above must be submitted to the Central Valley Water Board and State Water Board prior to or together with any reports, information, or applications, to be signed by an authorized representative. (40 CFR 122.22(c).)
5. Any person signing a document under Standard Provisions – Reporting V.B.2 or V.B.3 above shall make the following certification:

*“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”* (40 CFR 122.22(d).)

### **C. Monitoring Reports**

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program (Attachment E) in this Order. (40 CFR 122.22(l)(4).)
2. Monitoring results must be reported on a Discharge Monitoring Report (DMR) form or forms provided or specified by the Central Valley Water Board or State Water Board for reporting results of monitoring of sludge use or disposal practices. (40 CFR 122.41(l)(4)(i).)
3. If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, or as specified in this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Central Valley Water Board. (40 CFR 122.41(l)(4)(ii).)
4. Calculations for all limitations, which require averaging of measurements, shall utilize an arithmetic mean unless otherwise specified in this Order. (40 CFR 122.41(l)(4)(iii).)

### **D. Compliance Schedules**

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Order, shall be



submitted no later than 14 days following each schedule date.  
(40 CFR 122.41(l)(5).)

#### **E. Twenty-Four Hour Reporting**

1. The Discharger shall report any noncompliance that may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the Discharger becomes aware of the circumstances. A written submission shall also be provided within five (5) days of the time the Discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.  
(40 CFR 122.41(l)(6)(i).)
2. The following shall be included as information that must be reported within 24 hours under this paragraph (40 CFR 122.41(l)(6)(ii)):
  - a. Any unanticipated bypass that exceeds any effluent limitation in this Order.  
(40 CFR 122.41(l)(6)(ii)(A).)
  - b. Any upset that exceeds any effluent limitation in this Order.  
(40 CFR 122.41(l)(6)(ii)(B).)
3. The Central Valley Water Board may waive the above-required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours. (40 CFR 122.41(l)(6)(iii).)

#### **F. Planned Changes**

The Discharger shall give notice to the Central Valley Water Board as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required under this provision only when (40 CFR 122.41(l)(1)):

1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b)  
(40 CFR 122.41(l)(1)(i)); or
2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are not subject to effluent limitations in this Order. (40 CFR 122.41(l)(1)(ii).)
3. The alteration or addition results in a significant change in the Discharger's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not

reported during the permit application process or not reported pursuant to an approved land application plan. (40 CFR 122.41(l)(1)(iii).)

#### **G. Anticipated Noncompliance**

The Discharger shall give advance notice to the Central Valley Water Board or State Water Board of any planned changes in the permitted facility or activity that may result in noncompliance with General Order requirements. (40 CFR 122.41(l)(2).)

#### **H. Other Noncompliance**

The Discharger shall report all instances of noncompliance not reported under Standard Provisions – Reporting V.C, V.D, and V.E above at the time monitoring reports are submitted. The reports shall contain the information listed in Standard Provision – Reporting V.E above. (40 CFR 122.41(l)(7).)

#### **I. Other Information**

When the Discharger becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Central Valley Water Board, State Water Board, or USEPA, the Discharger shall promptly submit such facts or information. (40 CFR 122.41(l)(8).)

### **VI. STANDARD PROVISIONS – ENFORCEMENT**

- A.** The Central Valley Water Board is authorized to enforce the terms of this permit under several provisions of the CWC, including, but not limited to, sections 13385, 13386, and 13387

### **VII. ADDITIONAL PROVISIONS – NOTIFICATION LEVELS**

#### **A. Publicly-Owned Treatment Works (POTWs)**

All POTWs shall provide adequate notice to the Central Valley Water Board of the following (40 CFR 122.42(b)):

1. Any new introduction of pollutants into the POTW from an indirect discharger that would be subject to sections 301 or 306 of the CWA if it were directly discharging those pollutants (40 CFR 122.42(b)(1)); and
2. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of adoption of the Order. (40 CFR 122.42(b)(2).)
3. Adequate notice shall include information on the quality and quantity of effluent introduced into the POTW as well as any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW. (40 CFR 122.42(b)(3).)

**ATTACHMENT E – MONITORING AND REPORTING PROGRAM**

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## **ATTACHMENT E – MONITORING AND REPORTING PROGRAM**

Title 40 of the Code of Federal Regulations (CFR), section 122.48 (40 CFR 122.48) requires that all NPDES permits specify monitoring and reporting requirements. California Water Code (CWC) sections 13267 and 13383 also authorize the Central Valley Regional Water Quality Control Board (Central Valley Water Board) to require technical and monitoring reports. This Monitoring and Reporting Program establishes monitoring and reporting requirements, which implement the federal and California regulations.

### **I. GENERAL MONITORING PROVISIONS**

- A.** Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring locations specified below and, unless otherwise specified, before the monitored flow joins or is diluted by any other waste stream, body of water, or substance. Monitoring locations shall not be changed without notification to and the approval of this Central Valley Water Board.
- B.** Effluent samples shall be taken downstream of the last addition of wastes to the treatment or discharge works where a representative sample may be obtained prior to mixing with the receiving waters. Samples shall be collected at such a point and in such a manner to ensure a representative sample of the discharge.
- C.** Chemical, bacteriological, and bioassay analyses of any material required by this Order shall be conducted by a laboratory certified for such analyses by the Department of Public Health (DPH; formerly the Department of Health Services). Laboratories that perform sample analyses must be identified in all monitoring reports submitted to the Central Valley Water Board. In the event a certified laboratory is not available to the Discharger for any onsite field measurements such as pH, turbidity, temperature and residual chlorine, such analyses performed by a noncertified laboratory will be accepted provided a Quality Assurance-Quality Control Program is instituted by the laboratory. A manual containing the steps followed in this program for any onsite field measurements such as pH, turbidity, temperature and residual chlorine must be kept onsite in the treatment facility laboratory and shall be available for inspection by Central Valley Water Board staff. The Quality Assurance-Quality Control Program must conform to USEPA guidelines or to procedures approved by the Central Valley Water Board.
- D.** All chemical, bacteriological and bioassay analyses of any material required by this Order shall be performed in a laboratory certified to perform such analyses by DPH. Laboratories that perform sample analyses must be identified in all monitoring reports submitted to the Central Valley Water Board. The Discharger shall institute a Quality Assurance-Quality Control Program for any onsite field measurements such as pH, turbidity, temperature and residual chlorine. A manual containing the steps followed in this program must be kept onsite and shall be available for inspection by Central Valley Water Board staff. The Discharger must demonstrate sufficient capability (qualified and trained employees, properly calibrated and maintained field instruments, etc.) to adequately perform these field measurements. The Quality Assurance-Quality Control

Program must conform to USEPA guidelines or to procedures approved by the Central Valley Water Board.

- E.** Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. All monitoring instruments and devices used by the Discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary, at least yearly, to ensure their continued accuracy. All flow measurement devices shall be calibrated at least once per year to ensure continued accuracy of the devices.
- F.** Monitoring results, including noncompliance, shall be reported at intervals and in a manner specified in this Monitoring and Reporting Program.
- G.** Laboratories analyzing monitoring samples shall be certified by DPH, in accordance with the provision of CWC section 13176, and must include quality assurance/quality control data with their reports.
- H.** The Discharger shall conduct analysis on any sample provided by USEPA as part of the Discharge Monitoring Quality Assurance (DMQA) program. The results of any such analysis shall be submitted to USEPA's DMQA manager.
- I.** The Discharger shall file with the Central Valley Water Board technical reports on self-monitoring performed according to the detailed specifications contained in this Monitoring and Reporting Program.
- J.** The results of all monitoring required by this Order shall be reported to the Central Valley Water Board, and shall be submitted in such a format as to allow direct comparison with the limitations and requirements of this Order. Unless otherwise specified, discharge flows shall be reported in terms of the monthly average and the daily maximum discharge flows.

## II. MONITORING LOCATIONS

The Discharger shall establish the following monitoring locations to demonstrate compliance with the effluent limitations, discharge specifications, and other requirements in this Order:

**Table E-1. Monitoring Station Locations**

Discharge Point Name	Monitoring Location Name	Monitoring Location Description
--	INF-001	Location where a representative sample of the facility's influent can be obtained.
--	CAP-001	Groundwater Corrective Action Program (CAP) Discharge Monitoring
001	EFF-001	Location where a representative sample of the facility's effluent can be obtained. [Latitude 38° 27' 15"N and Longitude 121° 30' 00"W]
--	ESB (A-E)	Emergency Storage Basins A through E
--	RSWU-001	Sacramento River at Freeport Bridge
--	RSWD-003	Sacramento River 4200 feet downstream of Discharge Point No. 001 at Cliff's Marina
--	RSWD-004	Sacramento River at River Mile 44
--	RSWD-005	Sacramento River at River Mile 43
--	SPL-001	Municipal Water Supply

## III. INFLUENT MONITORING REQUIREMENTS

### A. Monitoring Location INF-001

1. The Discharger shall monitor influent to the facility at INF-001 as follows:

**Table E-2a. Influent Monitoring**

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow	mgd	Meter	Continuous	--
Biochemical Oxygen Demand (BOD) (5-day @ 20 Deg. C)	mg/L	24-hr Composite <sup>1</sup>	1/day	--
Total Suspended Solids (TSS)	mg/L	24-hr Composite <sup>1</sup>	1/day	--
pH	Standard Units	Meter	Continuous	--
Electrical Conductivity	µmhos/cm @ 25°C	24-hr Composite <sup>1</sup>	1/week	--
Total Dissolved Solids	mg/L	24-hour Composite <sup>1</sup>	1/month	--

<sup>1</sup> 24-hour flow proportional composite.

**B. Monitoring Location CAP-001**

1. The Discharger shall monitor the Groundwater Corrective Action Program (CAP) discharge to the facility at CAP-001 as follows in Table E-2b. The monitoring results may be submitted separate from the Self-Monitoring Reports. The monitoring results collected between 1 January and 30 June shall be submitted by 31 July each year, and results collected between 1 July and 31 December shall be submitted on 1 February each year.

**Table E-2b. Groundwater Corrective Action Program (CAP) Monitoring**

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow	mgd	Meter/Totalizer	1/month	--
Title 22 Metals <sup>1</sup>	µg/L	Grab	2/year	--
Nitrate Nitrogen, Total (as N)	mg/L	Grab	2/year	--
Electrical Conductivity	µmhos/cm @ 25°C	Grab	2/year	--
Total Dissolved Solids	mg/L	Grab	2/year	--

<sup>1</sup> Title 22 metals shall include the analyses of arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc.

**IV. EFFLUENT MONITORING REQUIREMENTS**

**A. Monitoring Location EFF-001**

1. The Discharger shall monitor final dechlorinated effluent at EFF-001 as follows. If more than one analytical test method is listed for a given parameter, the Discharger must select from the listed methods and corresponding Minimum Level:

**Table E-3a. Effluent Monitoring**

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow	mgd	Meter	Continuous	--
Chlorine, Total Residual <sup>1</sup>	mg/L	Meter	Continuous	--
Sulphur Dioxide or Sodium Bisulfite	mg/L	Meter	Continuous	--
Temperature	°F	Meter	Continuous	--
Turbidity <sup>13</sup>	NTU	Meter	Continuous	--
pH <sup>3</sup>	standard units	Meter	Continuous	--
Biochemical Oxygen Demand (5-day @ 20 °C) (BOD <sub>5</sub> )	mg/L	24-hr Composite <sup>6</sup>	1/day	--
Total Suspended Solids (TSS)	mg/L	24-hr Composite <sup>6</sup>	1/day	--
Total Coliform	MPN/100 mL	Grab	1/day	--

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Organisms				
Ammonia Nitrogen, Total (as N) <sup>2</sup>	mg/L	Grab <sup>14</sup>	1/day	--
Settleable Solids	mL/L	24-hr Composite <sup>6</sup>	1/day	--
Dissolved Oxygen	mg/L	Meter	Continuous	--
Cryptosporidium	Oocysts /100 mL	Grab	1/month	EPA method 1622/23
Giardia	Cysts/ 100 mL	Grab	1/month	EPA method 1623
Nitrate Nitrogen, Total (as N) <sup>4</sup>	mg/L	Grab <sup>14</sup>	1/week	--
Nitrite Nitrogen, Total (as N) <sup>4</sup>	mg/L	Grab <sup>14</sup>	1/week	--
Total Kjeldahl Nitrogen	mg/L	24-hr Composite <sup>6</sup>	1/week	--
Oil and Grease	mg/L	Grab	1/month	--
Electrical Conductivity @ 25 Deg. C	µmhos/cm	24-hr Composite <sup>6</sup>	1/week	--
Total Dissolved Solids (TDS)	mg/L	24-hr Composite <sup>6</sup>	1/week	--
Total Organic Carbon	mg/L	24-hr Composite <sup>6</sup>	1/month	--
Aluminum, Total Recoverable <sup>11</sup>	µg/L	24-hr Composite <sup>6,7</sup>	1/month	--
Cyanide, Total Recoverable <sup>4</sup>	µg/L	Grab	1/month	8
Mercury, Total	ng/L	Grab	1/month	EPA Method 1631 <sup>5</sup>
Mercury, Methyl	ng/L	Grab	1/month	EPA Method 1630 <sup>5</sup>
Manganese, Dissolved and Total Recoverable <sup>4</sup>	µg/L	24-hr Composite <sup>6</sup>	1/month	--
Copper, Dissolved and Total Recoverable	µg/L	24-hr Composite <sup>6,7</sup>	1/month	--
Methylene Chloride <sup>4</sup>	µg/L	Grab	1/month	--
Tetrachloroethylene <sup>4</sup>	µg/L	Grab	1/month	--
Pentachlorophenol <sup>4</sup>	µg/L	Grab	1/month	EPA method 625 w/ MDL 0.05 µg/L
Dibenzo(a,h)anthracene <sup>4</sup>	µg/L	Grab	1/month	EPA method 625 w/MDL 0.001-0.005 µg/L
N-nitrosodimethylamine	ng/L	Grab	1/month	EPA Method 521
Bis-2 (ethylhexyl) phthalate <sup>4,10</sup>	µg/L	Grab	1/month	--
Chlorodibromomethane <sup>4</sup>	µg/L	Grab	1/month	--
Dichlorobromomethane <sup>4</sup>	µg/L	Grab	1/month	--
Carbon Tetrachloride <sup>4</sup>	µg/L	Grab	1/month	--
Methyl-tert-butyl ether (MTBE) <sup>4</sup>	µg/L	Grab	1/month	--
Chlorpyrifos	µg/L	24-hr Composite <sup>6</sup>	1/month	EPA Method 625M;



Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
				Method 8141 or equivalent
Diazinon	µg/L	24-hr Composite <sup>6</sup>	1/month	EPA Method 625M; Method 8141 or equivalent
Hardness (as CaCO <sub>3</sub> )	mg/L	24-hr Composite <sup>6</sup>	1/month	--
Alkalinity	mg/L	24-hr Composite <sup>6</sup>	1/month	--
Effluent/River Dilution Ratio <sup>12</sup>	--	Calculation	Continuous	--
Effluent Diversions <sup>9</sup>	Hr:Min	Narrative description for reason of diversion--	1/month	--

- 1 Beginning 1 December 2011, total chlorine residual must be monitored with a method sensitive to and accurate at the permitted level of 0.01 mg/L. Report the magnitude and duration of all non-zero chlorine residual events within the reporting period.
- 2 Concurrent with whole effluent toxicity monitoring.
- 3 pH of effluent shall be measured continuously at one second intervals and tracked as a 20-minute running average. The highest and lowest 20-minute averages each day will be reported.
- 4 For priority pollutant constituents with effluent limitations, detection limits shall be below the effluent limitations. If the lowest minimum level (ML) published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Plan or SIP) is not below the effluent limitation, the detection limit shall be the lowest ML technically and economically achievable. For priority pollutant constituents without effluent limitations, the detection limits shall be equal to or less than the lowest ML published in Appendix 4 of the SIP. Sampling and analysis of Bis (2-ethylhexyl) phthalate shall be conducted using ultra-clean techniques that eliminate the possibility of sample contamination.
- 5 Unfiltered methylmercury and total mercury samples shall be taken using clean hands/dirty hands procedures, as described in U.S. EPA method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels, for collection of equipment blanks (section 9.4.4.2), and shall be analyzed by U.S. EPA method 1630/1631 (Revision E) with a method detection limit of 0.02 ng/l for methylmercury and 0.2 ng/l for total mercury.
- 6 24-hour flow proportioned composite. In the event of composite sample malfunction, a grab sample must be substituted.
- 7 Concurrent with hardness monitoring.
- 8 Samples taken at the effluent without preservatives, may be analyzed for cyanide within 15 minutes from collection and must be performed by a laboratory certified for such analyses by the State Department of Public Health.
- 9 An annual summary of effluent diversions to include date, time, duration and reason for the diversion.
- 10 In order to verify if bis (2-ethylhexyl) phthalate is truly present in the effluent discharge, the Discharger shall take steps to assure that sample containers, sampling apparatus, and analytical equipment are not sources of the detected contaminant.
- 11 Compliance with the final effluent limitations for aluminum can be demonstrated using either total or acid-soluble (inductively coupled plasma/atomic emission spectrometry or inductively coupled plasma/mass spectrometry) analysis methods, as supported by USEPA's Ambient Water Quality Criteria for Aluminum document (EPA 440/5-86-008), or other standard methods that exclude aluminum silicate particles as approved by the Executive Officer.
- 12 Running Hourly Average/Running Hourly Average. Report lowest, highest, and average ratio calculated for each day.
- 13 Continuous effluent turbidity monitoring is required effective **1 December 2020** or upon compliance with Special Provisions VI.C.6.a, whichever is sooner. Upon compliance with Special Provisions VI.C.6.a of the Permit, location for measurement of effluent turbidity may change due to change in disinfection systems.
- 14 A concurrent temperature sample should be taken.

**B. Effluent Characterization Monitoring Location EFF-001**

1. The Discharger shall monitor final dechlorinated effluent at EFF-001 as follows in Table E-3b. Beginning 1 January 2013, the Discharger shall monitor monthly for one calendar year (concurrent with receiving water characterization monitoring) and repeat the monitoring every other calendar year, beginning 1 January of that year. The effluent characterization monitoring results shall be submitted with the receiving water characterization monitoring results required in Table E-6b and may be submitted separate from the Self-Monitoring Reports, but no later than 1 April of the year following the calendar year of sampling.

**Table E-3b. Effluent Characterization Monitoring**

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Electrical Conductivity @ 25 Deg. C	µmhos/cm	Grab	1/month-every other year <sup>1</sup>	--
Total Dissolved Solids (TDS)	mg/L	Grab	1/month-every other year <sup>1</sup>	--
Dioxin <sup>10</sup>	µg/L	--	--	--
Pyrethroids <sup>6</sup>	ng/L	24-hr Composite <sup>4</sup>	1/month-every other year <sup>1</sup>	--
Priority Pollutants <sup>2</sup>	µg/L	<sup>8</sup>	1/month-every other year <sup>1</sup>	--
Standard Minerals <sup>3</sup>	mg/L	24-hr Composite <sup>4</sup>	1/month-every other year <sup>1</sup>	--
Non-CTR Persistent Chlorinated Hydrocarbon Pesticides <sup>5</sup>	µg/L	24-hr Composite <sup>4</sup>	1/month-every other year <sup>1</sup>	--
Other Constituents of Concern <sup>7</sup>	µg/L	24-hr Composite <sup>4</sup>	1/month-every other year <sup>1</sup>	--
Hardness (as CaCO <sub>3</sub> ) <sup>9</sup>	mg/L	24-hr Composite <sup>4</sup>	1/month-every other year <sup>1</sup>	--
Alkalinity	mg/L	24-hr Composite <sup>4</sup>	1/month-every other year <sup>1</sup>	--

<sup>1</sup> Monthly sampling for the 2013 calendar year and every other calendar year thereafter. These samples should be taken during the same time that monthly receiving water samples are taken for the Coordinated Monitoring Program (CMP)

<sup>2</sup> Priority pollutants include all 126 priority pollutants listed in the California Toxics Rule (CTR, 40 CFR 131.38), except dioxin. For priority pollutant constituents with effluent limitations, detection limits shall be below the effluent limitations. If the lowest minimum level (ML) published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Plan or SIP) is not below the effluent limitation, the detection limit shall be the lowest ML. For priority pollutant constituents without effluent limitations, the detection limits shall be equal to or less than the lowest ML published in Appendix 4 of the SIP.

<sup>3</sup> Standard minerals shall include the following: boron, calcium, iron, magnesium, potassium, sodium, chloride, manganese, phosphorus, total alkalinity (including alkalinity series), and hardness, and include verification that the analysis is complete (i.e., cation/anion balance).

<sup>4</sup> 24-hour flow proportioned composite.

- <sup>5</sup> Non-CTR Persistent Chlorinated Hydrocarbon pesticides include:
- |                 |                               |                                |
|-----------------|-------------------------------|--------------------------------|
| Captan          | Dicofol                       | Mirex                          |
| 2,4-D           | Dinoseb                       | PCNB (Pentachloronitrobenzene) |
| 2,4-DB          | Isodrin (an isomer of Aldrin) | Perthane                       |
| 2,4-D compounds | Kepone (Chlordecone)          | Strobane                       |
| Dalapon         | MCPA                          | 2,4,5-T                        |
| Dicamba         | MCPP                          | 2,4,5,TP (Silvex)              |
| Dichloran       | Methoxychlor                  | 2,4,5-T compounds              |
| Dichloroprop    |                               |                                |

<sup>6</sup> Pyrethroids to include bifenthrin, cyfluthrin, cypermethrin, esfenvalerate, lambda-cyhalothrin and permethrin.

<sup>7</sup> Other Constituents of Concern include:

Aluminum		
Alachlor	Di(2-ethylhexyl)adipate	Picloram
Atrazine	Endothal	Radionuclides
Barium	Ethylene dibromide	Simazine
Bentazon	Fluoride	Styrene
Carbofuran	Glyphosate	Sulfate
NEMA and NDEA	MBAS	Sulfide
Chromium, Total	Oxamyl	Trichlorofluoromethane
Diquat	Sulfite	1,1,2-trichloro-1,2,2-trifluoroethane
1,2-dibromo-3-chloropropane (DBCP)	Thiobencarb	Xylenes
Molinate (ordram)	Tributyltin	Disulfoton

<sup>8</sup> Sample types for priority pollutant volatile organic compounds and semi-volatile organic compounds, cyanide, and mercury shall be collected as grab samples. All other priority pollutant constituents shall be 24-hour flow proportioned composite samples.

<sup>9</sup> Hardness must be sampled concurrently with Priority Pollutant sampling.

<sup>10</sup> Dioxin sampling shall be in accordance with Attachment I.

## V. WHOLE EFFLUENT TOXICITY TESTING REQUIREMENTS

**A. Acute Toxicity Testing.** The Discharger shall conduct acute toxicity testing to determine whether the effluent is contributing acute toxicity to the receiving water. The Discharger shall meet the following acute toxicity testing requirements:

1. **Monitoring Frequency** – The Discharger shall perform a weekly 96-hour continuous flow-through acute toxicity testing, concurrent with effluent ammonia sampling.
2. **Sample Types** – The effluent shall be taken at the effluent monitoring location EFF-001. If the flow-through bioassay is not available for use, static renewal testing may be used. For static renewal testing, the samples shall be flow proportional 24-hour composites samples and shall be representative of the volume and quality of the discharge.
3. **Test Species** – **Effective immediately**, the test species shall be fathead minnows (*Pimephales promelas*). **Effective 1 July 2011** the test species shall be rainbow trout (*Oncorhynchus mykiss*).
4. **Methods** – The acute toxicity testing samples shall be analyzed using EPA-821-R-02-012, Fifth Edition and its subsequent amendments or revisions. Temperature,

total residual chlorine, and pH shall be recorded at the time of sample collection. No pH adjustment may be made unless approved by the Executive Officer.

5. Test Failure – If an acute toxicity test does not meet all test acceptability criteria, as specified in the test method, the Discharger must take all reasonable steps to determine reason for test failure.

**B. Chronic Toxicity Testing.** The Discharger shall conduct three species chronic toxicity testing on RSWU-001 and RSWD-003 and the effluent at EFF-001 to determine whether the effluent is contributing chronic toxicity to the receiving water. The Discharger shall meet the following chronic toxicity testing requirements:

1. Monitoring Frequency – The Discharger shall perform monthly three species chronic toxicity testing.
2. Sample Types – Effluent samples shall be flow proportional 24-hour composites and shall be representative of the volume and quality of the discharge. The effluent samples shall be taken at the effluent monitoring location EFF-001. The receiving water shall be a grab sample obtained from the RSWU-001 sampling location and RSWD-003 as identified in this Monitoring and Reporting Program.
3. Sample Volumes – Adequate sample volumes shall be collected to provide renewal water to complete the test in the event that the discharge is intermittent.
4. Test Species – Chronic toxicity testing measures sublethal (e.g., reduced growth, reproduction) and/or lethal effects to test organisms exposed to an effluent compared to that of the control organisms. The Discharger shall conduct chronic toxicity tests with:
  - a. The cladoceran, water flea, *Ceriodaphnia dubia* (survival and reproduction test);
  - b. The fathead minnow, *Pimephales promelas* (larval survival and growth test); and
  - c. The green alga, *Selenastrum capricornutum* (growth test).
5. Methods – The presence of chronic toxicity shall be estimated as specified in Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition, EPA/821-R-02-013, October 2002 and its subsequent amendments or revisions.
6. Reference Toxicant – As required by the SIP, all chronic toxicity tests shall be conducted with concurrent testing with a reference toxicant and shall be reported with the chronic toxicity test results.
7. Dilutions – The chronic toxicity testing shall be performed using the dilution series identified in the table, below. The receiving water control (RSWU-001) shall be used as the diluent (unless the receiving water is toxic). If the receiving water is toxic, lab control water may be substituted as the diluent.

**Table E-4. Chronic Toxicity Testing Dilution Series**

Sample	Dilutions (%)					Controls	
% EFF-001	100	50	25	12.5	6.25	--	--
% RSWU-001	0	50	75	87.5	93.75		100
% RSWD-003	0	0	0	0	0		100
% Laboratory Water	0	0	0	0	0		100

8. **Test Failure** – The Discharger must re-sample and re-test as soon as possible, but no later than fourteen (14) days after receiving notification of a test failure. A test failure is defined as follows:
  - a. The reference toxicant test or the effluent test does not meet all test acceptability criteria as specified in the Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition, EPA/821-R-02-013, October 2002 (Method Manual), and its subsequent amendments or revisions; or
  - b. The percent minimum significant difference (PMSD) measured for the test exceeds the upper PMSD bound variability criterion in Table 6 on page 52 of the Method Manual. (A retest is only required in this case if the test results do not exceed the monitoring trigger specified in the Special Provision at section VI. 2.a.iii. of the Order.)

**C. WET Testing Notification Requirements.** The Discharger shall notify the Central Valley Water Board within 24-hours after the receipt of test results exceeding the monitoring trigger during regular or accelerated monitoring, or an exceedance of the acute toxicity effluent limitation.

**D. WET Testing Reporting Requirements.** All toxicity test reports shall include the contracting laboratory’s complete report provided to the Discharger and shall be in accordance with the appropriate “Report Preparation and Test Review” sections of the method manuals. At a minimum, whole effluent toxicity monitoring shall be reported as follows:

1. **Chronic WET Reporting.** Regular chronic toxicity monitoring results shall be reported to the Central Valley Water Board within 45 days following completion of the test, and shall contain, at minimum:
  - a. The results expressed in TUC, measured as 100/NOEC, and also measured as 100/LC50, 100/EC25, 100/IC25, and 100/IC50, as appropriate.
  - b. The statistical methods used to calculate endpoints;

- c. The statistical output page, which includes the calculation of the percent minimum significant difference (PMSD);
- d. The dates of sample collection and initiation of each toxicity test; and
- e. The results compared to the numeric toxicity monitoring trigger.

Additionally, an annual report shall be submitted 1 February of each year that contains chronic toxicity test results for the previous calendar year expressed in TUc, and organized by test species, type of test (survival, growth or reproduction), and monitoring frequency, i.e., either quarterly, monthly, accelerated, or Toxicity Reduction Evaluation (TRE).

2. **Acute WET Reporting.** Acute toxicity test results shall be submitted with the monthly discharger self-monitoring reports and reported as percent survival. If more than one tank is used in the testing, percent survival for all tanks shall be reported. Additionally, the monthly discharge self-monitoring reports shall contain an updated chronology of the last 12 months of acute toxicity test results.
3. **TRE Reporting.** Reports for TREs shall be submitted in accordance with the schedule contained in the Discharger’s approved TRE Workplan.
4. **Quality Assurance (QA).** The Discharger must provide the following information for QA purposes :
  - a. Results of the applicable reference toxicant data with the statistical output page giving the species, NOEC, LOEC, type of toxicant, dilution water used, concentrations used, PMSD, and dates tested.
  - b. The reference toxicant control charts for each endpoint, which include summaries of reference toxicant tests performed by the contracting laboratory.
  - c. Any information on deviations or problems encountered and how they were dealt with.

**VI. LAND DISCHARGE MONITORING REQUIREMENTS**

**A. Monitoring Locations ESB (A through E)**

1. The Discharger shall monitor **diverted influent or treated effluent** at the Emergency Storage Basins, when wastewater is present, as follows:

**Table E-5. Land Discharge Monitoring Requirements**

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Reason for Diversion	--	Narrative	--	--
Duration of Diversion	hours	Narrative	Per each intermittent diversion event	--

Description (Influent or Effluent)	--	Narrative	Per each intermittent diversion event	--
Freeboard	0.1 feet	Measured	Weekly	--

**VII. RECLAMATION MONITORING REQUIREMENTS**

- A. Reclamation sampling shall be done in accordance with Waste Discharge Requirements Order No. 97-146 or subsequent Orders that regulate the reclamation of treated wastewater.

**VIII. RECEIVING WATER MONITORING REQUIREMENTS – SURFACE WATER AND GROUNDWATER**

**A. Monitoring Locations RSWU-001, RSWD-003, RSWD-004 and RSWD-005**

- 1. The Discharger shall monitor Sacramento River at RSWU-001, RSWD-003, RSWD-004 and RSWD-005 as follows:

**Table E-6a. Receiving Water Monitoring Requirements- Monitoring Locations RSWU-001 through RSWD-005**

Parameter	Units	Sample Type	Minimum Sampling Frequency <sup>1</sup>	Required Analytical Test Method
Flow (at RSWU-001 only)	cfs	--	Continuous	--
Fecal Coliform Organisms	MPN/100 mL	Grab	1/Quarter	--
pH <sup>1</sup>	standard units	Grab	1/Week	--
Ammonia Nitrogen, Total (as N) <sup>1</sup>	mg/L	Grab	1/Week	--
Nitrogen, Total	mg/L	Grab	1/Week	--
Dissolved Oxygen	mg/L	Grab	1/Week	--
Electrical Conductivity@ 25°C	µmhos/cm	Grab	1/Week	--
Hardness (as CaCO <sub>3</sub> )	mg/L	Grab	1/Month	--
Alkalinity (as CaCO <sub>3</sub> )	mg/L	Grab	1/Month	--
Temperature <sup>1</sup>	°F	Grab	1/Week	--
Turbidity	NTU	Grab	1/Week	--

<sup>1</sup> Temperature and pH shall be collected at the same time as the ammonia sample.

- 2. The Discharger shall monitor Sacramento River at RSWU-001 as follows in Table E-6b. Beginning 1 January 2013, the Discharger shall monitor monthly for one calendar year (concurrent with effluent characterization monitoring) and repeat the monitoring every other calendar year. The monitoring results shall be submitted with the effluent characterization monitoring results as required in Table E-3b and may be submitted separate from the Self-Monitoring Reports, but no later than 1 April of the year following the calendar year of sampling.

**Table E-6b. Receiving Water Monitoring Requirements – Monitoring Location RSWU-001**

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Electrical Conductivity @ 25 Deg. C	µmhos/cm	Grab	1/month-every other year <sup>1</sup>	--
Total Dissolved Solids (TDS)	mg/L	Grab	1/month-every other year <sup>1</sup>	--
Chlorpyrifos	µg/L	Grab	1/month-every other year <sup>1</sup>	EPA Method 625M; Method 8141, or equivalent GC/MS
Diazinon	µg/L	Grab	1/month-every other year <sup>1</sup>	EPA Method 625M Method 8141, or equivalent GC/MS
Dioxin <sup>8</sup>	µg/L	--	--	--
Pyrethroids <sup>5</sup>	ng/L	Grab	1/month-every other year <sup>1</sup>	--
Priority Pollutants <sup>2</sup>	µg/L	Grab	1/month-every other year <sup>1</sup>	--
Standard Minerals <sup>3</sup>	mg/L	Grab	1/month-every other year <sup>1</sup>	--
Non-CTR Persistent Chlorinated Hydrocarbon Pesticides <sup>4</sup>	µg/L	Grab	1/month-every other year <sup>1</sup>	--
Other Constituents of Concern <sup>6</sup>	µg/L	Grab	1/month-every other year <sup>1</sup>	--
Hardness (as CaCO <sub>3</sub> ) <sup>7</sup>	mg/L	Grab	1/month-every other year <sup>1</sup>	--
Alkalinity (as CaCO <sub>3</sub> )	mg/L	Grab	1/month-every other year <sup>1</sup>	--

<sup>1</sup> Monthly sampling for the 2013 calendar year and every other calendar year thereafter. These samples should be taken during the same time that monthly receiving water samples are taken for the Coordinated Monitoring Program (CMP).

<sup>2</sup> Priority pollutants include all 126 priority pollutants listed in the California Toxics Rule (CTR, 40 CFR 131.38), except dioxin. For priority pollutant constituents with effluent limitations, detection limits shall be below the effluent limitations. If the lowest minimum level (ML) published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Plan or SIP) is not below the effluent limitation, the detection limit shall be the lowest ML. For priority pollutant constituents without effluent limitations, the detection limits shall be equal to or less than the lowest ML published in Appendix 4 of the SIP.

<sup>3</sup> Standard minerals shall include the following: boron, calcium, iron, magnesium, potassium, sodium, chloride, manganese, phosphorus, total alkalinity (including alkalinity series), and hardness, and include verification that the analysis is complete (i.e., cation/anion balance).

<sup>4</sup> Non-CTR Persistent Chlorinated Hydrocarbon pesticides include:

Captan	Dicofol	Mirex
2,4-D	Dinoseb	PCNB (Pentachloronitrobenzene)
2,4-DB	Isodrin (an isomer of Aldrin)	Perthane
2,4-D compounds	Kepone (Chlordecone)	Strobane
Dalapon	MCPA	2,4,5-T
Dicamba	MCPP	2,4,5,TP (Silvex)
Dichloran	Methoxychlor	2,4,5-T compounds
Dichloroprop		

<sup>5</sup> Pyrethroids to include bifenthrin, cyfluthrin, cypermethrin, esfenvalerate, lambda-cyhalothrin and permethrin.

<sup>6</sup> Other Constituents of Concern include:  
 Aluminum



Alachlor	Di(2-ethylhexyl)adipate	Picloram
Atrazine	Endothal	Radionuclides
Barium	Ethylene dibromide	Simazine
Bentazon	Fluoride	Styrene
Carbofuran	Glyphosate	Sulfate
NEMA and NDEA	MBAS	Sulfide
Chromium, Total	Oxamyl	Trichlorofluoroethane
Diquat	Sulfite	1,1,2-trichloro-1,2,2-trifluoromethane
1,2-dibromo-3-chloropropane (DBCP)	Thiobencarb	Xylenes
Molinate (ordram)	Tributyltin	Disulfoton

<sup>7</sup> Hardness must be sampled concurrently with Priority Pollutant sampling.

<sup>8</sup> Dioxin sampling shall be in accordance with Attachment I.

**3.** In conducting the receiving water sampling when discharging to Sacramento River at Discharge Point No. 001, a log shall be kept of the receiving water conditions throughout the reach bounded by Monitoring Locations RSW-001 and RSW-003 and the reach bounded by Monitoring Locations RSW-004 and RSW-005. Attention shall be given to the presence or absence of:

- a. Floating or suspended matter;
- b. Discoloration;
- c. Bottom deposits;
- d. Aquatic life;
- e. Visible films, sheens, or coatings;
- f. Fungi, slimes, or objectionable growths; and
- g. Potential nuisance conditions.

Notes on receiving water conditions shall be summarized in the monitoring report.

**B. Groundwater Monitoring Locations (Not Applicable)**

Groundwater monitoring at the facility shall be conducted in accordance with Waste Discharge Requirements R5-2003-0076 or subsequent Orders that regulate the disposal of biosolids and protection of groundwater in the vicinity of the biosolids disposal.

**IX. OTHER MONITORING REQUIREMENTS**

**A. Biosolids (Not Applicable)**

Biosolids sampling and disposal shall be conducted in accordance with Waste Discharge Requirements Order No. R5-2003-0076 or subsequent Orders that regulate the disposal of biosolids.

## B. Municipal Water Supply

### 1. Monitoring Location SPL-001

The Discharger shall monitor the municipal water supply at SPL-001 as follows. A sampling station shall be established where a representative sample of the municipal water supply can be obtained. Municipal water supply samples shall be collected at approximately the same time as effluent samples.

**Table E-7. Municipal Water Supply Monitoring Requirements**

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Total Dissolved Solids <sup>1</sup>	mg/L	Grab	1/year	--
Electrical Conductivity @ 25°C <sup>1</sup>	µmhos/cm	Grab	1/year	--
Standard Minerals <sup>1,2</sup>	mg/L	Grab	1/year	--

<sup>1</sup> If the water supply is from more than one source, the total dissolved solids and electrical conductivity shall be reported as a weighted average and include copies of supporting calculations. Alternatively, the Discharger may composite individual grab samples on a flow-weighted basis from multiple locations to represent the water supply within the service area. Composited samples must be taken in accordance with the sample handling and preservation requirements specified in 40 CFR Part 136. Water supply quality and quantity information collected by water supply agencies and companies may be used for the calculations.

<sup>2</sup> Standard minerals shall include all major cations and anions and include verification that the analysis is complete (i.e., cation/anion balance).

## X. REPORTING REQUIREMENTS

### A. General Monitoring and Reporting Requirements

1. The Discharger shall comply with all Standard Provisions (Attachment D) related to monitoring, reporting, and recordkeeping.
2. Upon written request of the Regional Water Board, the Discharger shall submit a summary monitoring report. The report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous year(s).
3. **Compliance Time Schedules.** For compliance time schedules included in the Order, the Discharger shall submit to the Regional Water Board, on or before each compliance due date, the specified document or a written report detailing compliance or noncompliance with the specific date and task. If noncompliance is reported, the Discharger shall state the reasons for noncompliance and include an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Regional Water Board by letter when it returns to compliance with the compliance time schedule.
4. The Discharger shall report to the Regional Water Board any toxic chemical release data it reports to the State Emergency Response Commission within 15 days of

reporting the data to the Commission pursuant to section 313 of the "*Emergency Planning and Community Right to Know Act*" of 1986.

**B. Self Monitoring Reports (SMRs)**

1. At any time during the term of this permit, the State Water Board or the Central Valley Water Board may notify the Discharger to electronically submit Self-Monitoring Reports (SMRs) using the State Water Board's California Integrated Water Quality System (CIWQS) Program Web site (<http://www.waterboards.ca.gov/ciwqs/index.html>). Until such notification is given, the Discharger shall submit hard copy SMRs. The CIWQS Web site will provide additional directions for SMR submittal in the event there will be service interruption for electronic submittal.
2. The Discharger shall report in the SMR the results for all monitoring specified in this Monitoring and Reporting Program under sections III through IX, except that the monitoring required in Table E-3b and E-6b, and Groundwater Corrective Action Program (CAP) Monitoring required in Table E-2b, may be submitted as a separate reports as specified in this Monitoring and Reporting Program. The Discharger shall submit monthly SMRs including the results of all required monitoring using USEPA-approved test methods or other test methods specified in this Order. If the Discharger monitors any pollutant more frequently than required by this Order, the results of this monitoring shall be included in the calculations and reporting of the data submitted in the SMR. Sampling to meet one requirement may be used to satisfy another monitoring requirement (e.g., during the calendar year effluent characterization monitoring of priority pollutants is required per Table E-3b, the monitoring may satisfy the monthly effluent monitoring for the priority pollutants required in Table E-3a).
3. Monitoring periods and reporting for all required monitoring shall be completed according to the following schedule:

**Table E-8. Monitoring Periods and Reporting Schedule**

Sampling Frequency	Monitoring Period Begins On...	Monitoring Period	SMR Due Date
Continuous	Permit effective date	All	First day of second calendar month following month of sampling
1/Day	Permit effective date	(Midnight through 11:59 PM) or any 24-hour period that reasonably represents a calendar day for purposes of sampling.	First day of second calendar month following month of sampling
1/Week	Permit effective date	Sunday through Saturday	First day of second calendar month following month of sampling
2/Week	Permit effective date	Sunday through Saturday	First day of second calendar month following month of sampling

Sampling Frequency	Monitoring Period Begins On...	Monitoring Period	SMR Due Date
3/Week	Permit effective date	Sunday through Saturday	First day of second calendar month following month of sampling
1/Month	Permit effective date	1 <sup>st</sup> day of calendar month through last day of calendar month	First day of second calendar month following month of sampling
2/Month	Permit effective date	1 <sup>st</sup> day of calendar month through last day of calendar month	First day of second calendar month following month of sampling
1/Quarter	Permit effective date	1 January through 31 March 1 April through 30 June 1 July through 30 September 1 October through 31 December	1 May 1 August 1 November 1 February
1/Year	Permit effective date	January 1 through December 31	1 February
2/Year	Permit effective date	1 January through 30 June 1 July through 31 December	1 August 1 February

**4. Reporting Protocols.** The Discharger shall report with each sample result the applicable reported Minimum Level (ML) and the current Method Detection Limit (MDL), as determined by the procedure in 40 CFR Part 136.

The Discharger shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

- a. Sample results greater than or equal to the reported ML shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).
- b. Sample results less than the RL, but greater than or equal to the laboratory’s MDL, shall be reported as “Detected, but Not Quantified,” or DNQ. The estimated chemical concentration of the sample shall also be reported.

For the purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ as well as the words “Estimated Concentration” (may be shortened to “Est. Conc.”). The laboratory may, if such information is available, include numerical estimates of the data quality for the reported result. Numerical estimates of data quality may be percent accuracy (+ a percentage of the reported value), numerical ranges (low to high), or any other means considered appropriate by the laboratory.

- c. Sample results less than the laboratory’s MDL shall be reported as “Not Detected,” or ND.

- d. Dischargers are to instruct laboratories to establish calibration standards so that the ML value (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no time is the Discharger to use analytical data derived from extrapolation beyond the lowest point of the calibration curve.
- 5. Compliance Determination.** Compliance with effluent limitations for priority pollutants shall be determined using sample reporting protocols defined above and in Attachment A of this Order. For purposes of reporting and administrative enforcement by the Regional Water Board and the State Water Board, the Discharger shall be deemed out of compliance with effluent limitations if the concentration of the priority pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reporting level (RL).
  - 6. Multiple Sample Data.** When determining compliance with an AMEL, AWEL, or MDEL for priority and non-priority pollutants and more than one sample result is available, the Discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of “Detected, but Not Quantified” (DNQ) or “Not Detected” (ND). In those cases, the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:
    - a. The data set shall be ranked from low to high, ranking the reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.
    - b. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.
  - 7. The Discharger shall submit SMRs in accordance with the following requirements:**
    - a. In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner to illustrate clearly whether the discharge complies with waste discharge requirements (e.g., effluent limitations and discharge specifications, receiving water limitations, special provisions, etc.). The highest daily maximum for the month and monthly and weekly averages shall be determined and recorded as needed to demonstrate compliance. In addition, the following shall be calculated and reported in the SMRs:
      - i. **Annual Average Limitations.** For constituents with effluent limitations specified as “calendar annual average” (e.g., aluminum and EC) the Discharger shall report the calendar annual average in the December SMR.

The calendar annual average shall be calculated as the average of the monthly averages for January through December.

- ii. **Mass Loading Limitations.** For BOD<sub>5</sub>, TSS, and ammonia, the Discharger shall calculate and report the mass loading (lbs/day) in the SMRs. The mass loading shall be calculated as follows:  
  
$$\text{Mass Loading (lbs/day)} = \text{Flow (MGD)} \times \text{Concentration (mg/L)} \times 8.34$$
  
  
When calculating daily mass loading, the daily average flow and constituent concentration shall be used. For weekly average mass loading, the weekly average flow and constituent concentration shall be used. For monthly average mass loading, the monthly average flow and constituent concentration shall be used.
  - iii. **Mercury.** The Discharger shall calculate and report effluent total annual mass loading of total mercury in the December SMR. The total annual mass loading shall be calculated as specified in Section VII.G. of the Limitations and Discharge Requirements.
  - iv. **Removal Efficiency (BOD<sub>5</sub> and TSS).** The Discharger shall calculate and report the percent removal of BOD<sub>5</sub> and TSS in the SMRs. The percent removal shall be calculated as specified in Section VII.A. of the Limitations and Discharger Requirements.
  - v. **Average Dry Weather Flow.** The Discharger shall calculate and report the average dry weather flow for the Facility discharge in the December SMR. The average dry weather flow shall be calculated annually as specified in Section VII.D. of the Limitations and Discharge Requirements.
  - vi. **Total Coliform Organisms Effluent Limitations.** The Discharger shall calculate and report the 7-day median of total coliform organisms for the effluent. The 7-day median of total coliform organisms shall be calculated as specified in Section VII.C. of the Order.
  - vii. **Dissolved Oxygen Receiving Water Limitations.** The Discharger shall report monthly in the self-monitoring report the dissolved oxygen concentration of the receiving water.
  - viii. **Turbidity Receiving Water Limitations.** The Discharger shall calculate and report the turbidity increase in the receiving water applicable to the natural turbidity condition specified in Section V.A.17.a-d. of the Order.
- b. Unless otherwise specified, all constituents monitored on a continuous basis (metered), shall be reported as daily maximums, daily minimums, and daily averages; flow shall be reported as the total volume discharged per day for each day of discharge.

- c. A letter transmitting the SMRs shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty of perjury statement by the Discharger, or the Discharger’s authorized agent, as described in the Standard Provisions.
- d. SMRs must be submitted to the Regional Water Board, signed and certified as required by the Standard Provisions (Attachment D), to the address listed below:

Regional Water Quality Control Board  
 Central Valley Region  
 NPDES Compliance and Enforcement Unit  
 11020 Sun Center Dr., Suite #200  
 Rancho Cordova, CA 95670-6114

**C. Discharge Monitoring Reports (DMRs)**

- 1. DMRs must be signed and certified as required by the standard provisions (Attachment D). The Discharger shall submit the original DMR and one copy of the DMR to the address listed below:

<b>STANDARD MAIL</b>	<b>FEDEX/UPS/ OTHER PRIVATE CARRIERS</b>
State Water Resources Control Board Division of Water Quality c/o DMR Processing Center PO Box 100 Sacramento, CA 95812-1000	State Water Resources Control Board Division of Water Quality c/o DMR Processing Center 1001 I Street, 15 <sup>th</sup> Floor Sacramento, CA 95814

- 2. All discharge monitoring results must be reported on the official USEPA pre-printed DMR forms (EPA Form 3320-1). Forms that are self-generated will not be accepted unless they follow the exact same format of EPA Form 3320-1.

**D. Other Reports**

- 1. **Progress Reports.** As specified in the compliance time schedules required in the Special Provisions contained in section VI.C. of the Order, progress reports shall be submitted in accordance with the following reporting requirements. At minimum, the progress reports shall include a discussion of the status of final compliance, whether the Discharger is on schedule to meet the final compliance date, and the remaining tasks to meet the final compliance date.

**Table E-9. Reporting Requirements for Special Provisions Progress Reports**

<b>Special Provision</b>	<b>Reporting Requirements</b>
Pollution Prevention Plan for mercury Annual Report (Section VI.C.3.a)	<b>1 February</b> , annually, after approval of updated pollution prevention plan
Title 22 Disinfection Requirements (Section VI.C.7.a)	<b>1 February</b> , annually, until final compliance
Salinity Evaluation and Minimization Plan Annual Report (Section VI.C.3.b)	<b>1 February</b> , annually, after approval of plan
Compliance Schedules for Final Effluent Limitations for ammonia, compliance with final effluent limitations. (Section VI.C.7.b)	<b>1 February</b> , annually, until final compliance

2. The Discharger shall report the results of any special studies such as acute and chronic toxicity testing, TRE/TIE, Pollution Prevention Plans, Salinity Evaluation and Minimization Plan, and 2,3,7,8-TCDD and other Dioxin and Furan Congeners Source Evaluation and Minimization Plan required in this Order. The Discharger shall report the progress in satisfaction of compliance schedule dates specified in the Special Provision at section VI.C.7 of this Order. The Discharger shall submit reports with the first monthly SMR scheduled to be submitted on or immediately following the report due date AND/OR in compliance with SMR reporting requirements described in subsection X.B. above.
  
3. Within 90 days of permit adoption, the Discharger shall submit a report outlining minimum levels, method detection limits, and analytical methods for approval, with a goal to achieve detection levels below applicable water quality criteria. At a minimum, the Discharger shall comply with the monitoring requirements for CTR constituents as outlined in section 2.3 and 2.4 of the SIP.
  
4. **Annual Operations Report.** By 1 February of each year, the Discharger shall submit a written report to the Executive Officer containing the following:
  - a. The names, certificate grades, and general responsibilities of all persons employed at the Facility.
  - b. The names and telephone numbers of persons to contact regarding the plant for emergency and routine situations.
  - c. A statement certifying when the flow meter(s) and other monitoring instruments and devices were last calibrated, including identification of who performed the calibration.
  - d. A statement certifying whether the current operation and maintenance manual, and contingency plan, reflect the wastewater treatment plant as currently constructed and operated, and the dates when these documents were last revised and last reviewed for adequacy.



- e. The Discharger may also be requested to submit an annual report to the Central Valley Water Board with both tabular and graphical summaries of the monitoring data obtained during the previous year. Any such request shall be made in writing. The report shall discuss the compliance record. If violations have occurred, the report shall also discuss the corrective actions taken and planned to bring the discharge into full compliance with the waste discharge requirements.

## 5. Annual Pretreatment Reporting Requirements

- a. The Discharger shall submit annually a report to the Regional Water Board, with copies to USEPA Pacific Southwest Region and the State Water Board, describing its pretreatment activities over the previous 12 months. In the event that the Discharger is not in compliance with any conditions or requirements of this Order, then the Discharger shall also include the reasons for noncompliance and state how and when the Discharger shall comply with such conditions and requirements. This annual report shall cover operations from 1 January through 31 December and is due by **25 March** of each year. The report shall contain, but not be limited to, the following information:
  - i. A summary of analytical results from representative, flow proportioned, 24-hour composite sampling of the Publicly Owned Treatment Works (POTW's) influent and effluent for those pollutants USEPA has identified under section 307(a) of the CWA which are known or suspected to be discharged by nondomestic users. This will consist of an annual full priority pollutant scan, with quarterly samples analyzed only for those pollutants detected in the full scan. The Discharger is not required to sample and analyze for asbestos. Sampling and analysis shall be performed in accordance with the techniques prescribed in 40 CFR Part 136 and amendments thereto.
  - ii. A discussion of Upset, Interference, or Pass Through incidents, if any, at the treatment plant which the Discharger knows or suspects were caused by nondomestic users of the POTW system. The discussion shall include the reasons why the incidents occurred, the corrective actions taken and, if known, the name and address of, the nondomestic user(s) responsible. The discussion shall also include a review of the applicable pollutant limitations to determine whether any additional limitations, or changes to existing requirements, may be necessary to prevent pass through or interference, or noncompliance with sludge disposal requirements.
  - iii. The cumulative number of industrial users that the Discharger has notified regarding Baseline Monitoring Reports and the cumulative number of industrial user responses.
  - iv. An updated list of the Discharger's significant industrial users (SIUs) including their names and addresses, and a list of deletions, additions, and SIU name changes keyed to the previously submitted list. The Discharger shall provide a brief explanation for each change. The list shall identify the SIUs subject to

federal categorical standards by specifying which set(s) of standards are applicable to each SIU. The list shall also indicate the SIUs subject to federal categorical standards by specifying which set(s) of standards are applicable to each SIU. The list shall also indicate which SIUs are subject to local discharge limitations.

- v. The Discharger shall characterize the compliance status of each SIU through the year of record by providing a list or table which includes the following information for each industrial user:
  - a. Name of the SIU;
  - b. Category, if subject to federal categorical standards;
  - c. The type of wastewater treatment or control processes in place;
  - d. The number of samples taken by the Discharger during the year;
  - e. The number of samples taken by the SIU during the year;
  - f. For an SIU subject to discharge requirements for total toxic organics, whether all required certifications were provided;
  - g. Whether the SIU complied with baseline monitoring report requirements (where applicable);
  - h. Whether the SIU consistently achieved compliance;
  - i. Whether the SIU inconsistently achieved compliance;
  - j. A list of the standards violated during the year. Identify whether the violations were for categorical standards or local limits;
  - k. Whether the SIU is in significant noncompliance with applicable pretreatment requirements as defined by 40 CFR 403.8(f)(2)(vii);
  - l. Whether the SIU complied with schedule to achieve compliance (include the date final compliance is required);
  - m. Whether the SIU did not achieve compliance and not on a compliance schedule; and
  - n. Whether compliance status unknown.
  - o. A summary of enforcement or other actions taken during the year to return the SIU to compliance. Describe the type of action, final compliance date, and the amount of fines and penalties collected, if any. Describe any proposed actions for bringing the SIU into compliance.

A report describing the compliance status of each industrial user characterized by the descriptions in items a. through o. above shall be included as part of the annual report. The report shall identify the specific compliance status of each such industrial user and shall also identify the compliance status of the POTW with regards to audit/pretreatment compliance inspection requirements.

- vi. A brief description of any programs the Discharger implements to reduce pollutants from nondomestic users that are not classified as SIUs.
- vii. A brief description of any significant changes in operating the pretreatment program which differ from the previous year including, but not limited to, changes concerning the program's administrative structure, local industrial discharge limitations, monitoring program or monitoring frequencies, legal authority or enforcement policy, funding mechanisms, or staffing levels.
- viii. A summary of the annual pretreatment budget, including the cost of pretreatment program functions and equipment purchases.
- ix. A summary of activities to involve and inform the public of the program including a copy of the newspaper notice, if any, required under 40 CFR 403.8(f)(2)(vii).
- x. A summary of the inspection and sampling activities conducted by the Discharger during the past year to gather information and data regarding the industrial users. The summary shall include:
  - a. the names and addresses of the industrial users subjected to surveillance and an explanation of whether they were inspected, sampled, or both and the frequency of these activities at each user; and
  - b. the conclusions or results from the inspection or sampling of each industrial user.
- xi. A summary of the compliance and enforcement activities during the past year. The summary shall include the names and addresses of the industrial users affected by the following actions:
  - a. Warning letters or notices of violation regarding the industrial users' apparent noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the apparent violation concerned the federal categorical standards or local discharge limitations.
  - b. Administrative orders regarding the industrial users noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the violation concerned the federal categorical standards or local discharge limitations.

- c. Civil actions regarding the industrial users' noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the violation concerned the federal categorical standards or local discharge limitations.
  - d. Criminal actions regarding the industrial users noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the violation concerned the federal categorical standards or local discharge limitations.
  - e. Assessment of monetary penalties. For each industrial user identify the amount of the penalties.
  - f. Restriction of flow to the POTW.
  - g. Disconnection from discharge to the POTW.
- b.** The Discharger shall submit a semi-annual SIU noncompliance status report to the Regional Water Board, USEPA Pacific Southwest Region, and the State Water Board. The report shall cover the period of 1 January through 30 June, and shall be submitted by 31 July. The report shall contain:
- i. The name and address of all SIUs which violated any discharge or reporting requirements during the report period;
  - ii. A description of the violations including whether any discharge violations were for categorical standards or local limits;
  - iii. A description of the enforcement or other actions that were taken to remedy the noncompliance; and
  - iv. The status of active enforcement and other actions taken in response to SIU noncompliance identified in previous reports.

Duplicate signed copies of these Pretreatment Program reports shall be submitted to the Regional Water Board and the:

State Water Resources Control Board  
Division of Water Quality  
1001 I Street or P.O. Box 100  
Sacramento, CA 95812

and the

Regional Pretreatment Coordinator  
CWA Compliance Office (WTR-7)  
U.S. Environmental Protection Agency  
75 Hawthorne Street  
San Francisco, CA 94105-3901

**ATTACHMENT F – FACT SHEET**

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**ATTACHMENT F – FACT SHEET**

As described in the Findings in section II of this Order, this Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order.

This Order has been prepared under a standardized format to accommodate a broad range of discharge requirements for Dischargers in California. Only those sections or subsections of this Order that are specifically identified as “not applicable” have been determined not to apply to this Discharger. Sections or subsections of this Order not specifically identified as “not applicable” are fully applicable to this Discharger.

**I. PERMIT INFORMATION**

The following table summarizes administrative information related to the Facility.

**Table F-1. Facility Information**

<b>WDID</b>	5A340108002
<b>Discharger</b>	Sacramento Regional County Sanitation District
<b>Name of Facility</b>	Sacramento Regional Wastewater Treatment Plant
<b>Facility Address</b>	8521 Laguna Station Road
	Elk Grove, CA 95758
	Sacramento County
<b>Facility Contact, Title and Phone</b>	Stanley R. Dean, District Engineer, (916) 875-9101
<b>Authorized Person to Sign and Submit Reports</b>	Stanley R. Dean, District Engineer, (916) 875-9101
<b>Mailing Address</b>	10060 Goethe Road, Sacramento, CA 95827
<b>Billing Address</b>	Same
<b>Type of Facility</b>	POTW
<b>Major or Minor Facility</b>	Major
<b>Threat to Water Quality</b>	1
<b>Complexity</b>	A
<b>Pretreatment Program</b>	Y
<b>Reclamation Requirements</b>	Master Water Reclamation Permit No. 97-146
<b>Facility Permitted Flow</b>	181 million gallons per day (mgd)
<b>Facility Design Flow</b>	181 mgd
<b>Watershed</b>	Sacramento Watershed
<b>Receiving Water</b>	Sacramento River
<b>Receiving Water Type</b>	Sacramento-San Joaquin Delta

- A.** Sacramento Regional County Sanitation District (hereinafter Discharger) is the owner and operator of Sacramento Regional Wastewater Treatment Plant (hereinafter Facility), a Publicly-Owned Treatment Works.

For the purposes of this Order, references to the “discharger” or “permittee” in applicable federal and state laws, regulations, plans, or policy are held to be equivalent to references to the Discharger herein.

- B.** The Facility discharges wastewater to the Sacramento River within the Sacramento-San Joaquin Delta, a water of the United States, and was previously regulated by Order No. 5-00-188 which was adopted on 4 August 2000 and expired on 1 August 2005. The terms and conditions of the previous Order were administratively continued and remained in effect until this Order, serving as new Waste Discharge Requirements (WDRs) and a renewed National Pollutant Discharge Elimination System (NPDES) permit, was adopted pursuant to this Order.
- C.** The Discharger filed a report of waste discharge and submitted an application for renewal of its Waste Discharge Requirements (WDRs) and National Pollutant Discharge Elimination System (NPDES) permit on 1 February 2005. Supplemental information was requested on 19 August 2008 and received on 24 August 2010. A site visit was conducted on 22 July 2008, to observe operations and collect additional data to develop permit limitations and conditions. Additional information and reports were submitted by the Discharger for development of this Order.

## **II. FACILITY DESCRIPTION**

The Discharger provides wastewater treatment service to the Cities of Sacramento, Folsom, and West Sacramento, the communities of Courtland and Walnut Grove, and the Sacramento Area Sewer District. The Sacramento Area Sewer District service area includes the Cities of Elk Grove, Rancho Cordova, Citrus Heights, as well as, portions of the unincorporated areas of Sacramento County. The population served is approximately 1.3 million people. The collection systems are owned and operated by the various contributing agencies and not by the Discharger, and are regulated under the State Water Board general order, Water Quality Order No. 2006-0003, effective November 2006. The City of Sacramento operates both a separate sewer collection system and a combined (storm water and wastewater) collection system. During wet weather the Facility is contracted to accept up to 60 mgd of wastewater and storm runoff from the downtown Sacramento combined collection system. Combined collection flows in excess of 60 mgd are managed by the Combined Wastewater Collection and Treatment System (CWCTS) operated by the City of Sacramento. The CWCTS discharge is governed by Waste Discharge Requirements Order No. 2010-0004 issued to the City of Sacramento. Depending on treatment and conveyance capacity, flow in excess of 60 mgd maybe received at the Facility.

### **A. Description of Wastewater and Biosolids Treatment or Controls**

The Facility is staffed and operated 24 hours per day and consists of influent pumps, septage receiving station, mechanical bar screening; aerated grit handling, grit classifiers that wash and dewater grit, covered primary sedimentation tanks, pure oxygen biological treatment by activated sludge, secondary sedimentation, disinfection with chlorine gas, and dechlorination with sulfur dioxide. Effluent can be diverted to lined and unlined emergency storage basins as needed to meet effluent dilution, thermal, and disinfection requirements or divert excess flows. Odors are controlled through stripping towers and carbon treatment.



Solids are thickened by dissolved air floatation and gravity belt thickeners. Primary and secondary sludge is mixed and sent to anaerobic digesters for approximately fifteen days or more, stored at the solids storage basins for three to five years then harvested and injected into lined dedicated land disposal sites. Some biosolids are recycled with the Synagro Organic Fertilizer Company and the Discharger can dispose of biosolids at the Keifer Landfill as an emergency disposal option. Separate Waste Discharge Requirements (Order No. R5-2003-0076) in conformance with Title 27, California Code of Regulations, Division 2, Subdivision 1 regulate the biosolids and solids storage and disposal facilities, the Class II dedicated land treatment units, unclassified solids storage basins, the Class III grit and screenings landfill closure and the groundwater Corrective Action Program (CAP).

The Facility discharges to the Sacramento River just downstream of the Freeport Bridge via an outfall diffuser. The outfall diffuser is approximately 300 feet long with 74 ports and is placed perpendicular to the river flow. At times, the river flows in the reverse direction northeast towards the City of Sacramento, due to tidal activity during low river flows. The Discharger diverts its discharge to emergency storage basins whenever these conditions exist. The Discharger has determined in studies that River flows of at least 1,300 cubic feet per second (cfs) and providing a flow ratio of at least 14 to 1 (river:effluent) are required to allow for adequate mixing of the effluent through the outfall diffuser.

The current average dry weather flows are approximately 141 mgd and the Facility has a designed capacity of 181 mgd. The Discharger prepared a "Sacramento Regional Wastewater Treatment Plant Capacity Rating Study" by Carollo Engineers, February 2005, which concluded the overall capacity for the treatment plant is approximately 207 mgd. The Discharger proposed to expand the treatment plant capacity to 218 mgd as described in the "Draft Environmental Impact Report (EIR) for the Sacramento Regional County Sanitation District – Sacramento Regional Wastewater Treatment Plant 2020 Master Plan", August 2003 and the Responses to Comments and Additional Information Sacramento Regional County Sanitation District – Sacramento Regional Wastewater Treatment Plant 2020 Master Plan", 21 May 2004. However, the EIR was successfully challenged by the Contra Costa Water District and is described in Case No. 05CS00908, Superior Court of California, County of Sacramento, dated 28 November 2007 under Judge Raymond Cadei. Oral arguments are expected late in 2010. The California Environmental Quality Act (CEQA) requirements will not be completed until the case is resolved.

On 11 June 2010, the Discharger withdrew its proposal for increasing the SRWTP capacity from 181 mgd to 218 mgd. The Discharger cited slow growth and potential reclamation as the reasons not to expand the wastewater treatment plant at this time.

## **B. Discharge Points and Receiving Waters**

1. The Facility is located in Section 19, T7N, R5E, MDB&M, as shown in Attachment B, a part of this Order.

2. Treated municipal wastewater is discharged at Discharge Point No. 001 to Sacramento River, a water of the United States and within the legal boundary of the Sacramento-San Joaquin Delta at a point latitude 38° 27' 15" N and longitude 121° 30' 00" W.
3. The Facility and the Discharge Point are located near the community of Freeport outside the City of Sacramento and within the Sacramento River Watershed.

**C. Summary of Existing Requirements and Self-Monitoring Report (SMR) Data**

Effluent limitations and Discharge Specifications contained in Order No. 5-00-188 for discharges from Discharge Point No. 001 and representative monitoring data from the term of Order No. Order No. 5-00-188 are as follows:

**Table F-2. Historic Effluent Limitations and Monitoring Data**

Parameter	Units	Effluent Limitation			Monitoring Data (From June 2005 – July 2008) <sup>a</sup>		
		Average Monthly	Average Weekly	Average Daily	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	30	45	60	11.1	13	28
	lbs/day <sup>1,2</sup>	45,286 98,078	67,929 147,118	90,572 196,157	13,136	16,336	31,283
Total Suspended Solids	mg/L	30	45	90	11	15	25
	lbs/day <sup>1,2</sup>	45,286 98,078	67,929 147,118	90,572 196,157	12,266	17,219	37,232
Settleable Solids	mL/L	0.1	--	0.5 <sup>3</sup>	0.0	--	2.5
Total Coliform Organisms	MPN/100 mL	--	23 median	500 <sup>4</sup>	--	30	500
Oil & Grease	mg/L	10	--	--	<5.5	--	
Lead	µg/L	--	--	(5.1) <sup>5</sup> 7.8	--	--	1.19
	lbs/day <sup>1,2</sup>	--	--	12 26	--	--	1.3
Silver	µg/L	--	--	(0.57) <sup>5</sup> 0.72	--	--	0.149
	lbs/day <sup>1,2</sup>	--	--	1.1 2.3	--	--	0.175
Mercury	lbs/year	5.1 <sup>6</sup>	--	--	--	--	2.49
Copper	µg/L	--	--	(9.7) <sup>5</sup> 22.8	--	--	6.34
	lbs/day <sup>1,2</sup>	--	--	34 75	--	--	9.9
Cyanide	µg/L	--	--	(6.1) <sup>5</sup> 10.8	--	--	10
	lbs/day <sup>1,2</sup>	--	--	16 35	--	--	10.9

Parameter	Units	Effluent Limitation			Monitoring Data (From June 2005 – July 2008) <sup>a</sup>		
		Average Monthly	Average Weekly	Average Daily	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge
Zinc	µg/L	--	--	(46.7) <sup>5</sup> 69.8	--	--	33.5
	lbs/day <sup>1,2</sup>	--	--	105	--	--	37
Bromodichloromethane	µg/L	3.6	--	7.2	--	--	3.4
	lbs/day <sup>1,2</sup>	5.4	--	11	--	--	2.7
		12	--	24	--	--	
Lindane (lbs/yr)	µg/L		--	ND <sup>3</sup>	--	--	<0.003
	lbs/year	19.6 <sup>6</sup>	--		--	--	1.29
Methylene chloride	µg/L	14.3	--	32.1	--	--	5.4
	lbs/day <sup>1,2</sup>	22	--	48	--	--	6.4
		47	--	105	--	--	
Chloroform	µg/L	37.3	--	55.3	--	--	51
	lbs/day <sup>1,2</sup>	56	--	83			61.5
		122	--	181			
Chlorine, Total Residual	mg/L	0.011	--	0.018	--	--	0.07
	lbs/day <sup>1,2</sup>	17	--	27	--	--	82
		36	--	59	--	--	
Tetrachloroethylene	µg/L	14.1	--	35.6	--	--	0.9
Bis-2 (ethylhexyl) phthalate	µg/L	8.6	--	19.1	--	--	8.1
	lbs/day <sup>1,2</sup>	13	--	29	--	--	9.7
		28	--	62	--	--	
pH	standard units	--	--	6.0 – 7.5 <sup>7</sup>	--	--	6 – 7.5
Average Dry Weather Flow	MGD	181	--	--	147	--	--
Peak Wet Weather Flow	MGD	392	--	--	179	--	345
Acute Toxicity	% Survival		8	--	--	--	50% (lowest)
Temperature	°F		9	--	--	--	23 over natural receiving water

Parameter	Units	Effluent Limitation			Monitoring Data (From June 2005 – July 2008) <sup>a</sup>		
		Average Monthly	Average Weekly	Average Daily	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge

- 1 Based on average dry weather flow capacity of 181 mgd, applicable from May through October
- 2 Based on peak weather flow capacity of 392 mgd, applicable from November through April.
- 3 Daily Maximum.
- 4 Daily Maximum limit shall not be exceeded in any two (2) consecutive days.
- 5 (Trigger) and interim limits. Exceedance of the trigger concentration is a not violation, but when exceeded requires immediate investigation and action plan. Trigger concentration are not subsequently expressed as mass limits. Interim limits were pending additional studies, however final limits were never established under Order No. 5-00-188.
- 6 Based on lbs/year.
- 7 The discharge shall not have a pH value of less than 6.0 nor greater than 8.5 as calculated by a running 20-minute average of continuously monitored effluent pH nor have a pH value greater than 7.5 as calculated by a running 1-hour average of continuously monitored effluent pH. As discussed in Finding 23 and 24 the upper limit of 7.5 as 1-hour average is an interim limit until completion of further studies at which time its necessity will be reassessed.
- 8 Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:  
 Minimum for any one bioassay----- 70%  
 Median for any three or more consecutive bioassays ----- 90%
- 9 The maximum temperature of the discharge shall not exceed the natural receiving water temperature by more than 25°F from 1 October through 30 April or by more than 20°F from 1 May through 30 September.

**D. Compliance Summary**

Year:	2005	2006	2007	2008	2009
Chlorine Residual	2	0	1	0	0
Minimum Dilution	0	1	0	0	0
Total Coliform Organisms	0	0	1	0	0
Acute Aquatic Toxicity	0	0	0	6	9
Settleable Solids	0	0	0	1	0

**E. Planned Changes – Not Applicable**

**III. APPLICABLE PLANS, POLICIES, AND REGULATIONS**

The requirements contained in this Order are based on the applicable plans, policies, and regulations identified in the Findings in section II of this Order. The applicable plans, policies, and regulations relevant to the discharge include the following:

## **A. Legal Authorities**

This Order is issued pursuant to regulations in the Clean Water Act (CWA) and the California Water Code (CWC) as specified in the Finding contained at section II.C of this Order.

## **B. California Environmental Quality Act (CEQA)**

This Order meets the requirements of CEQA as specified in the Finding contained at section II.E of this Order.

## **C. State and Federal Regulations, Policies, and Plans**

**1. Water Quality Control Plans.** This Order implements the following water quality control plans as specified in the Finding contained at section II.H of this Order.

- a. *Water Quality Control Plan, Fourth Edition (Revised February 2007), for the Sacramento and San Joaquin River Basin (Basin Plan).*
- b. *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan)*
- c. *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Water and Enclosed Bays and Estuaries of California (Thermal Plan)*

For purposes of the Thermal Plan, the Discharger is considered to be an Existing Discharger of Elevated Temperature Waste. The Thermal Plan in section 5.A. contains the following temperature objectives for surface waters that are applicable to this discharge:

### *“5. Estuaries*

#### *A. Existing discharges*

*(1) Elevated temperature waste discharges shall comply with the following:*

- a. *The maximum temperature shall not exceed the natural receiving water temperature by more than 20°F.*
- b. *Elevated temperature waste discharges either individually or combined with other discharges shall not create a zone, defined by water temperatures of more than 1°F above natural receiving water temperature, which exceeds 25 percent of the cross-sectional area of a main river channel at any point.*
- c. *No discharge shall cause a surface water temperature rise greater than 4°F above the natural temperature of the receiving waters at any time or place.*
- d. *Additional limitations shall be imposed when necessary to assure protection of beneficial uses.*

The Regional Water Board, on 26 May 1989, adopted Resolution No. 89-094 granting an exception to objectives 5A(l)(a) (from 1 October to 30 April) and 5A(l)(b) of the Thermal Plan. Additionally, Resolution 89-094 requires that the temperature of the discharge shall not exceed the natural receiving water temperature by more than 25°F from 1 October through 30 April. The State Water Board, on 20 September 1990, adopted Resolution No. 90-103 approving and modifying Central Valley Water Board Resolution No.89-094. State Water Board Resolution No. 90-103 approved the exception to objective 5A(1)(a), but not the one to 5A(1)(b). It further required a study of the feasibility of meeting the existing objective,5A(l)(b). The Discharger submitted the required study in a report in October 1991, with supplements in November and December 1991. Based on the study, the State Water Board adopted Resolution No. 92-82 on 22 October 1992, granting the Discharger an exception to objective 5A(l)(b). Specifically, the exception allows a maximum increase of 2 °F in a zone that does not exceed 25 percent of the cross sectional area of the main river channel at any point. The exception also limited any excursion of objective 5A(l)(b) to no more than one hour per day as an average in any thirty-day period when the upstream temperature of the Sacramento River is 65 °F or greater. This exception was carried over in Waste Discharge Order No. 5-00-188.

2. **National Toxics Rule (NTR) and California Toxics Rule (CTR).** This Order implements the NTR and CTR as specified in the Finding contained at section II.I of this Order.
3. **State Implementation Policy (SIP).** This Order implements the SIP as specified in the Finding contained at section II.I of this Order.
4. **Alaska Rule.** This Order is consistent with the Alaska Rule as specified in the Finding contained at section II.L of this Order.
5. **Antidegradation Policy.** As specified in the Finding contained at section II.N of this Order and as discussed in detail in the Fact Sheet (Attachment F, Section IV.D.4.), the discharge is consistent with the antidegradation provisions of 40 CFR section 131.12 and State Water Resources Control Board (State Water Board) Resolution 68-16.
6. **Anti-Backsliding Requirements.** This Order is consistent with anti-backsliding policies as specified in the Finding contained at section II.M of this Order. Compliance with the anti-backsliding requirements is discussed in the Fact Sheet (Attachment F, Section IV.D.3).
7. **Emergency Planning and Community Right to Know Act**

Section 13263.6(a) of the CWC, requires that *“the Regional Water Board shall prescribe effluent limitations as part of the waste discharge requirements of a POTW for all substances that the most recent toxic chemical release data reported to the*

*state emergency response commission pursuant to Section 313 of the Emergency Planning and Community Right to Know Act of 1986 (42 U.S.C. Sec. 11023) (EPCRA) indicate as discharged into the POTW, for which the State Water Board or the Regional Water Board has established numeric water quality objectives, and has determined that the discharge is or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to, an excursion above any numeric water quality objective”.*

The most recent toxic chemical data report indicates all reportable off-site releases or discharges to the collection system for this Facility were included in the effluent database. Off-site discharges included chromium and chromium compounds, copper and copper compounds, lead and lead compounds, styrene and zinc compounds. Therefore, a reasonable potential analysis based on information from EPCRA includes the data in the effluent database. Based on information from EPCRA, there is no additional reasonable potential to cause or contribute to an excursion above any numeric water quality objectives included within the Basin Plan or in any State Water Board plan, so no effluent limitations are included in this permit pursuant to CWC section 13263.6(a).

However, as detailed elsewhere in this Order, available effluent data indicate that there are constituents present in the effluent that have a reasonable potential to cause or contribute to exceedances of water quality standards and require inclusion of effluent limitations based on federal and state laws and regulations.

- 8. Storm Water Requirements.** USEPA promulgated federal regulations for storm water on 16 November 1990 in 40 CFR Parts 122, 123, and 124. The NPDES Industrial Storm Water Program regulates storm water discharges from wastewater treatment facilities. Wastewater treatment plants are applicable industries under the storm water program and are obligated to comply with the federal regulations. The Discharger captures all storm water from the process areas, chemical storage facilities, administration and maintenance buildings, parking lots, undeveloped drainage areas immediately surrounding the Facilities and the Cogeneration/Ice Plant. All collected stormwater is conveyed to the stormwater pump station and is pumped to the headworks. Once or twice a year, during heavy storms, stormwater is discharged to Laguna Creek when the pumping capacity to the headworks is exceeded. This discharge is covered under the general Waste Discharge Order No. 97-03-DWQ.
- 9. Endangered Species Act.** This Order is consistent with the Endangered Species Act as specified in the Finding contained at section II.P of this Order.

#### **D. Impaired Water Bodies on CWA 303(d) List**

- 1.** Under section 303(d) of the 1972 CWA, states, territories and authorized tribes are required to develop lists of water quality limited segments. The waters on these lists do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. On

30 November 2006 USEPA gave final approval to California's 2006 section 303(d) List of Water Quality Limited Segments. The Basin Plan references this list of Water Quality Limited Segments (WQLSs), which are defined as "...those sections of lakes, streams, rivers or other fresh water bodies where water quality does not meet (or is not expected to meet) water quality standards even after the application of appropriate limitations for point sources (40 CFR Part 130, et seq.)." The Basin Plan also states, "Additional treatment beyond minimum federal standards will be imposed on dischargers to [WQLSs]. Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment." The listing for the Sacramento-San Joaquin Delta includes: Chlorpyrifos, DDT, Diazinon, Exotic Species, Group A Pesticides, Mercury, Polychlorinated biphenyls (PCBs) and unknown toxicity.

- 2. Total Maximum Daily Loads (TMDLs).** USEPA requires the Central Valley Water Board to develop TMDLs for each 303(d) listed pollutant and water body combination.

**Table F-3. TMDLs in Delta**

<b>Pollutant</b>	<b>Potential Sources</b>	<b>Proposed TMDL Completion</b>
Chlorpyrifos	Agriculture, Urban Runoff/Storm Sewers	Completed
DDT	Agriculture	2011
Diazinon	Agriculture, Urban Runoff/Stormwater Sewers	Completed
Exotic Species	Source Unknown	2019
Group A Pesticides	Agriculture	2011
Mercury	Resource Extraction	Phase I completed
PCBs (Polychlorinated biphenyls)	Source Unknown	2019
Unknown Toxicity	Source Unknown	2019

The 303(d) listings and TMDLs have been considered in the development of the Order. A pollutant-by-pollutant evaluation of each pollutant of concern is described in section IV.C.3. of this Fact Sheet.



## E. Other Plans, Policies and Regulations

**Title 27, California Code of Regulations (CCR), section 20005 et seq. (hereafter Title 27)** Title 27 regulations contains the State Water Resources Control Board's water quality regulations for discharges of solid wastes to land. Exemption from Title 27 is provided if the discharges of domestic sewage or treated effluent are regulated by WDRs and are consistent with applicable water quality objectives and treatment or storage facilities associated with municipal wastewater treatment plants, provided solid wastes are discharged only in accordance with Title 27. Historically discharges of wastewater to land, including but not limited to evaporation ponds or percolation ponds, storage ponds have been exempt from the requirements of Title 27, CCR, based on section 20090 et seq. However, the State Water Resources Control Board issued a decision on another municipal wastewater treatment plant, the City of Lodi, that storage basins must be part of the treatment process in order to be included in the Title 27 exemptions.

The Facility contains solids storage, land disposal and emergency influent and effluent storage. A determination has been made by the Central Valley Water Board whether the facilities meet the exemptions from Title 27. These facilities include the Solid Storage Basins (SSBs) and Dedicated Land Disposal areas (DLDs) and Emergency Storage Basins. The Central Valley Water Board's findings regarding Title 27 exemptions are discussed below.

- 1. Solids Storage Basins (SSBs).** The SSBs are unlined storage ponds for anaerobically digested primary and secondary sludge and scum. The SSBs receive about 6,000 tons of wet sludge per day. The digested sludge has about 0.4 to 3% solids and is composed of 50 to 80% volatile solids. Digested sludge may also contain variable concentrations of contaminants such as heavy metals, chlorinated hydrocarbons and pathogens. The sludge remains in the basins from three to five years prior to discharge to the DLDs. The SSBs provide additional stabilization treatment, storage and evaporation of the sludge. The EIR states that settled sludge has created a barrier to groundwater similar to being lined. In July 2009, the District installed six new wells to monitor groundwater water quality. The results from those wells will determine if the SSBs are impacting groundwater and need to be lined. The SSBs are governed by Order No. R5-2003-0076, Sacramento Regional County Sanitation District Biosolids and Solids Storage and Disposal Facilities. Order No. R5-2003-0076 is scheduled to be renewed in 2013.
- 2. Dedicated Land Disposal Areas (DLDs).** The DLDs are lined land disposal units that receive stabilized sludge from the SSBs. The semi-liquid sludge is applied to the DLDs by subsurface injection during dry seasons. To prevent leaching of heavy metals, the District applies lime to maintain proper soil pH. The DLDs are not exempt from Title 27 and are governed by Order No. R5-2003-0076, Sacramento Regional County Sanitation District Biosolids and Solids Storage and Disposal Facilities.

- 3. Corrective Action Program (CAP).** During the 1990's the groundwater beneath the DLDs were found to be impacted by elevated concentrations of nitrates, chlorides and total dissolved solids (TDS). To mitigate the impacted groundwater, the Class III landfill that took grit and screenings was closed and the DLDs were either lined or closed. The District implemented a Corrective Action Program in December 1995 to remediate the impacted groundwater and it consisted of extraction wells down gradient of the DLDs. The extraction wells keep the groundwater from migrating off the Facility site. The groundwater is discharged downstream of the secondary clarifiers of the WWTP where it continues through the remaining treatment processes and discharged to the Sacramento River or to the onsite constructed wetlands. The CAP is operational and is regulated under Order No. R5-2003-0076, Sacramento Regional County Sanitation District Biosolids and Solids Storage and Disposal Facilities
- 4. Emergency Storage Basins (ESBs).** The Facility includes five Emergency Storage Basins (ESBs), ESB-A through E with a total capacity of 302 million gallons (MG). ESB-A is lined with concrete and has 15.5 MG of capacity. The purpose of ESB-A is to store diverted influent flows above the SRWTP hydraulic capacity (peak wet weather flows) and store diverted effluent flows to meet various conditions to comply with the NPDES permit. Reasons to divert final effluent to ESB-A and not discharge to the Sacramento River include maintaining the minimum 14:1 river to effluent ratio, maintaining effluent temperature requirements, and maintaining chlorine limits. Flow stored in ESB-A is returned to the SRWTP headworks for treatment. Overflow from ESB-A discharges to unlined ESB-B that can if necessary overflow to unlined ESB-C. The combined capacity of ESB-B and C is 206 MG. Since construction of ESB-D, ESB-A is typically only used to store excess influent flows. ESB-A, B and C are exempt from Title 27, § 20090(a) since these basins are integral to protecting the SRWTP treatment processes from washing out due to peak wet weather flows or for storage of diverted flow to comply NPDES permit conditions.

ESB-D is lined with 60-mil reinforced polypropylene liner and has a capacity of 60-75 MG. The primary use of ESB-D is to store diverted chlorinated effluent to comply with flow dilution, potential chlorine excursions and thermal requirements. Chlorinated effluent from ESB-D is returned to the SRWTP for dechlorination prior to discharge to the Sacramento River. Since ESB-D is lined there is minimal threat to groundwater and is consistent with water quality objectives and therefore is exempt from Title 27 § 20090(a).

ESB-E is part of the surge relief mechanism and designed to relieve water hammer effects in the influent conduit. ESB-E stores raw influent in an unlined earthen 20 MG basin and is exempt from Title 27 § 20090(a).

#### **IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS**

Effluent limitations and toxic and pretreatment effluent standards established pursuant to sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 304

(Information and Guidelines), and 307 (Toxic and Pretreatment Effluent Standards) of the CWA and amendments thereto are applicable to the discharge.

The CWA mandates the implementation of effluent limitations that are as stringent as necessary to meet water quality standards established pursuant to state or federal law [33 U.S.C., §1311(b)(1)(C); 40 CFR 122.44(d)(1)]. NPDES permits must incorporate discharge limits necessary to ensure that water quality standards are met. This requirement applies to narrative criteria as well as to criteria specifying maximum amounts of particular pollutants. Pursuant to federal regulations, 40 CFR 122.44(d)(1)(i), NPDES permits must contain limits that control all pollutants that *“are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality.”* Federal regulations, 40 CFR 122.44(d)(1)(vi), further provide that *“[w]here a state has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits.”*

The CWA requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. There are two principal bases for effluent limitations in the Code of Federal Regulations: 40 CFR 122.44(a) requires that permits include applicable technology-based limitations and standards; and 40 CFR 122.44(d) requires that permits include WQBELs to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water where numeric water quality objectives have not been established. The Basin Plan at page IV-17.00, contains an implementation policy, *“Policy for Application of Water Quality Objectives”*, that specifies that the Regional Water Board *“will, on a case-by-case basis, adopt numerical limitations in orders which will implement the narrative objectives.”* This Policy complies with 40 CFR 122.44(d)(1). With respect to narrative objectives, the Regional Water Board must establish effluent limitations using one or more of three specified sources, including: (1) USEPA’s published water quality criteria, (2) a proposed state criterion (i.e., water quality objective) or an explicit state policy interpreting its narrative water quality criteria (i.e., the Regional Water Board’s *“Policy for Application of Water Quality Objectives”*)(40 CFR 122.44(d)(1)(vi)(A), (B) or (C)), or (3) an indicator parameter.

The Basin Plan includes numeric site-specific water quality objectives and narrative objectives for toxicity, chemical constituents, discoloration, radionuclides, and tastes and odors. The narrative toxicity objective states: *“All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.”* (Basin Plan at III-8.00.) The Basin Plan states that material and relevant information, including numeric criteria, and recommendations from other agencies and scientific literature will be utilized in evaluating compliance with the narrative toxicity objective. The narrative chemical constituents objective states that waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. At minimum, *“...water designated for use as domestic or municipal supply (MUN) shall not*

*contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs)” in Title 22 of CCR. The Basin Plan further states that, to protect all beneficial uses, the Regional Water Board may apply limits more stringent than MCLs. The narrative tastes and odors objective states: “Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses.”*

## **A. Discharge Prohibitions**

1. As stated in section I.G of Attachment D, Standard Provisions, this Order prohibits bypass from any portion of the treatment facility. Federal regulations, 40 CFR 122.41(m), define “bypass” as the intentional diversion of waste streams from any portion of a treatment facility. This section of the federal regulations, 40 CFR 122.41(m)(4), prohibits bypass unless it is unavoidable to prevent loss of life, personal injury, or severe property damage. In considering the Regional Water Board’s prohibition of bypasses, the State Water Board adopted a precedential decision, Order No. WQO 2002-0015, which cites the federal regulations, 40 CFR 122.41(m), as allowing bypass only for essential maintenance to assure efficient operation.
2. Order No. 5-00-118 included the discharge prohibition of no discharge unless the river is flowing more than 1300 cfs and there is at least a 14 to 1 flow ratio (river:effluent). These conditions were based on previous studies that determined river flows of at least 1300 cfs and providing a flow ratio of at least 14 to 1 (river:effluent) are required to allow adequate mixing of the effluent. Although the diffuser configuration has changed from 99 ports to 74 ports and new dye studies confirmed the dynamic modeling showing mixing zones, all the recent analysis for the antidegradation, thermal plumes, dilution credits have been based on continuing these conditions. Therefore, these conditions remain in this Order.

## **B. Technology-Based Effluent Limitations**

### **Scope and Authority**

Section 301(b) of the CWA and implementing USEPA permit regulations at 40 CFR 122.44 require that permits include conditions meeting applicable technology-based requirements at a minimum, and any more stringent effluent limitations necessary to meet applicable water quality standards. The discharge authorized by this Order must meet minimum federal technology-based requirements based on Secondary Treatment Standards at 40 CFR Part 133.

Regulations promulgated in 40 CFR 125.3(a)(1) require technology-based effluent limitations for municipal Dischargers to be placed in NPDES permits based on Secondary Treatment Standards or Equivalent to Secondary Treatment Standards.

The Federal Water Pollution Control Act Amendments of 1972 (PL 92-500) established the minimum performance requirements for POTWs [defined in section

304(d)(1)]. Section 301(b)(1)(B) of that Act requires that such treatment works must, as a minimum, meet effluent limitations based on secondary treatment as defined by the USEPA Administrator.

Based on this statutory requirement, USEPA developed secondary treatment regulations, which are specified in 40 CFR Part 133. These technology-based regulations apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by secondary treatment in terms of 5-day biochemical oxygen demand (BOD<sub>5</sub>), total suspended solids (TSS), and pH.

**Applicable Technology-Based Effluent Limitations**

- a. **BOD<sub>5</sub> and TSS.** Federal regulations, 40 CFR Part 133, establish the minimum weekly and monthly average level of effluent quality attainable by secondary treatment for BOD<sub>5</sub> and TSS. However, as described in section IV.C.3.c.xi, this Order requires water quality-based effluent limitations (WQBELs) more stringent than the applicable technology-based effluent limitations which are based on tertiary treatment, which is necessary to protect the beneficial uses of the receiving stream. Effluent limitations prescribed by this Order are equal to or are more stringent than the Technology-Based Effluent Limits for BOD<sub>5</sub>, TSS and pH. In addition, 40 CFR 133.102, in describing the minimum level of effluent quality attainable by secondary treatment, states that the 30-day average percent removal shall not be less than 85 percent. This Order contains a limitation requiring an average of 85 percent removal of BOD<sub>5</sub> and TSS over each calendar month.
- b. **Flow.** The Facility was designed to provide a secondary level of treatment for up to a design flow of 181 mgd. Therefore, this Order contains an average dry weather discharge flow effluent limit of 181 mgd.
- c. **pH.** The secondary treatment regulations at 40 CFR Part 133 also require that pH be maintained between 6.0 and 9.0 standard units.

**Summary of Technology-based Effluent Limitations  
 Discharge Point No. 001**

**Table F-4. Summary of Technology-based Effluent Limitations**

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
BOD 5-day @ 20°C	mg/L	30	45	60	--	--
Total Suspended Solids	mg/L	30	45	60	--	--
PH	Standard Units	--	--	--	6.0	9.0
85% Removal of BOD 5-day @ 20°C and Total Suspended Solids						

## **C. Water Quality-Based Effluent Limitations (WQBELs)**

### **1. Scope and Authority**

Section 301(b) of the CWA and 40 CFR 122.44(d) require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards. This Order contains requirements, expressed as a technology equivalence requirement, more stringent than secondary treatment requirements that are necessary to meet applicable water quality standards. The rationale for these requirements, which consist of tertiary treatment or equivalent requirements and other provisions, is discussed in section IV.C.3 of this Fact Sheet.

40 CFR 122.44(d)(1)(i) mandates that permits include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, WQBELs must be established using: (1) USEPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in 40 CFR 122.44(d)(1)(vi).

The process for determining reasonable potential and calculating WQBELs when necessary is intended to protect the designated uses of the receiving water as specified in the Basin Plan, and achieve applicable water quality objectives and criteria that are contained in other state plans and policies, or any applicable water quality criteria contained in the CTR and NTR.

### **2. Applicable Beneficial Uses and Water Quality Criteria and Objectives**

The Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. In addition, the Basin Plan implements State Water Board Resolution No. 88-63, which established state policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply.

The Basin Plan on page II-1.00 states: "*Protection and enhancement of existing and potential beneficial uses are primary goals of water quality planning...*" and with respect to disposal of wastewaters states that "*...disposal of wastewaters is [not] a prohibited use of waters of the State; it is merely a use which cannot be satisfied to the detriment of beneficial uses.*"

The federal CWA section 101(a)(2), states: “it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and for recreation in and on the water be achieved by July 1, 1983.” Federal Regulations, developed to implement the requirements of the CWA, create a rebuttable presumption that all waters be designated as fishable and swimmable. Federal Regulations, 40 CFR sections 131.2 and 131.10, require that all waters of the State regulated to protect the beneficial uses of public water supply, protection and propagation of fish, shell fish and wildlife, recreation in and on the water, agricultural, industrial and other purposes including navigation. Section 131.3(e), 40 CFR, defines existing beneficial uses as those uses actually attained after 28 November 1975, whether or not they are included in the water quality standards. Federal Regulation, 40 CFR section 131.10 requires that uses be obtained by implementing effluent limitations, requires that all downstream uses be protected and states that in no case shall a state adopt waste transport or waste assimilation as a beneficial use for any waters of the United States.

**a. Receiving Water and Beneficial Uses.** Beneficial uses applicable to Sacramento-San Joaquin Delta are as follows:

**Table F-5. Basin Plan Beneficial Uses**

Discharge Point	Receiving Water Name	Beneficial Use(s)
001	<b>Sacramento – San Joaquin Delta</b>	<u>Existing:</u> Municipal and domestic supply (MUN); Agricultural supply, including irrigation and stock watering (AGR); Industrial process supply (PROC); Industrial service supply (IND); Water contact recreation, including canoeing and rafting (REC-1); Non-contact water recreation (REC-2); Warm freshwater habitat (WARM); Cold freshwater habitat (COLD); Migration of aquatic organisms, warm and cold (MIGR); Spawning, reproduction, and/or early development, warm (SPWN); Wildlife habitat (WILD); and Navigation (NAV).
NA	<b>Groundwater</b>	Municipal and domestic water supply (MUN); Agricultural supply (AGR); Industrial service supply (IND), and Industrial process supply (PRO).

The Delta is vital to California and comprises over 700 miles of interconnected waterways and encompasses 1,153 square miles. The Delta is home to over two hundred eighty species of birds and more than fifty species of fish, making it one of the most ecologically important aquatic habitats in the State. Drinking water for over 25 million Californians is pumped from the Delta via the State Water Project, Central Valley Water Project, and local water intakes. The Delta

supports California's trillion dollar economy with \$27 billion annually for agriculture. Additionally, the Delta has 12 million user-days for recreation each year.

**b. Effluent and Ambient Background Data.** The reasonable potential analysis (RPA), as described in section IV.C.3 of this Fact Sheet, was based on effluent data from 1 June 2005 through 30 July 2008 effluent and ambient background data from 1 January 1998 through 30 July 2008 submitted in SMRs, the Report of Waste Discharge (ROWD), the Pretreatment Program Annual Reports and the Coordinated Monitoring Program. Additional data outside of this range was also analyzed where there was inadequate data to perform an analysis. Effluent and ambient data for iron and manganese was collected in 2009 because this data was not included in the other databases described above. The Discharger collected effluent and receiving water dioxin and furan data in 2002 and 2004 and are included under a technical memorandum SRWTP 13267 Dioxin Data.

**c. Priority Pollutant Metals**

**i. Hardness Dependent CTR Metals Criteria.** The *California Toxics Rule* and the *National Toxics Rule* contain water quality criteria for seven metals that vary as a function of hardness. The lower the hardness the lower the water quality criteria. The metals with hardness-dependent criteria include cadmium, copper, chromium III, lead, nickel, silver, and zinc.

This Order has established the criteria for hardness-dependent metals based on the reasonable worst-case ambient hardness as required by the SIP<sup>1</sup>, the CTR<sup>2</sup> and State Water Board Order No. WQO 2008-0008 (City of Davis). The SIP and the CTR require the use of "receiving water" or "actual ambient" hardness, respectively, to determine effluent limitations for these metals. (SIP, § 1.2; 40 CFR § 131.38(c)(4), Table 4, note 4.) The CTR does not define whether the term "ambient," as applied in the regulations, necessarily requires the consideration of upstream as opposed to downstream hardness conditions. Therefore, where reliable, representative data are available, the hardness value for calculating criteria can be the downstream receiving water hardness, after mixing with the effluent (Order WQO 2008-0008, p. 11). The Central Valley Water Board thus has considerable discretion in determining ambient hardness (*Id.*, p.10.).

The hardness values must also be protective under all flow conditions (*Id.*, pp. 10-11). As discussed below, scientific literature provides a reliable method for calculating protective hardness-dependent CTR criteria,

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<sup>1</sup> The SIP does not address how to determine the hardness for application to the equations for the protection of aquatic life when using hardness-dependent metals criteria. It simply states, in Section 1.2, that the criteria shall be properly adjusted for hardness using the hardness of the receiving water.

<sup>2</sup> The CTR requires that, for waters with a hardness of 400 mg/L (as CaCO<sub>3</sub>), or less, the actual ambient hardness of the surface water must be used. It further requires that the hardness values used must be consistent with the design discharge conditions for design flows and mixing zones.



considering all discharge conditions. This methodology produces criteria that ensure these metals do not cause receiving water toxicity, while avoiding criteria that are unnecessarily stringent.

**(a) Reasonable Potential Analysis (RPA).** The SIP in Section 1.3 states, “The RWQCB shall...determine whether a discharge may: (1) cause, (2) have a reasonable potential to cause, or (3) contribute to an excursion above any applicable priority pollutant criterion or objective.” Section 1.3 provides a step-by-step procedure for conducting the RPA. The procedure requires the comparison of the Maximum Effluent Concentration (MEC) and Maximum Ambient Background Concentration to the applicable criterion that has been properly adjusted for hardness. Unless otherwise noted, for the hardness-dependent CTR metals criteria the following procedures were followed for properly adjusting the criterion for hardness when conducting the RPA.

- For comparing the MEC to the applicable criterion, in accordance with the SIP, CTR, and Order WQO 2008-0008, the reasonable worst-case downstream hardness was used to adjust the criterion. In this evaluation the portion of the receiving water affected by the discharge is analyzed. For hardness-dependent criteria, the hardness of the effluent has an impact on the determination of the applicable criterion in areas in the receiving water affected by the discharge. Therefore, for this situation it is necessary to consider the hardness of the effluent in determining the applicable hardness to adjust the criterion. The procedures for determining the applicable criterion after proper adjustment using the reasonable worst-case downstream hardness is outlined in subsection ii, below.
- For comparing the Maximum Ambient Background Concentration to the applicable criterion, in accordance with the SIP, CTR, and Order WQO 2008-0008, the reasonable worst-case upstream hardness was used to adjust the criterion. In this evaluation the area outside the influence of the discharge is analyzed. For this situation, the discharge does not impact the upstream hardness. Therefore, the effect of the effluent hardness was not included in this evaluation. Upstream receiving water hardness data for the Sacramento River ranged from 26 mg/L to 100 mg/L (as CaCO<sub>3</sub>), based on 100 samples from June 2005 to July 2008. The minimum observed upstream receiving water hardness, 26 mg/L as CaCO<sub>3</sub>, was used to adjust the CTR criteria when comparing Maximum Background Ambient Concentration to the criterion.

**(b) Effluent Concentration Allowances (ECA) Calculations.** A 2006 Study<sup>1</sup> developed procedures for calculating the effluent concentration allowance (ECA)<sup>2</sup> for CTR hardness-dependent metals. The 2006 Study demonstrated that it is necessary to evaluate all discharge conditions (e.g. high and low flow conditions) and the hardness and metals concentrations of the effluent and receiving water when determining the appropriate ECA for these hardness-dependent metals. Simply using the lowest recorded upstream receiving water hardness to calculate the ECA may result in over or under protective water quality-based effluent limitations.

The equation describing the total recoverable regulatory criterion, as established in the CTR, is as follows:

$$\text{CTR Criterion} = \text{WER} \times (e^{m[\ln(H)]+b}) \text{ (Equation 1)}$$

Where:

H = hardness (as CaCO<sub>3</sub>)  
WER = water-effect ratio  
m, b = metal- and criterion-specific constants

In accordance with the CTR, the default value for the WER is 1. A WER study must be conducted to use a value other than 1. The constants “m” and “b” are specific to both the metal under consideration, and the type of total recoverable criterion (i.e., acute or chronic). The metal-specific values for these constants are provided in the CTR at paragraph (b)(2), Table 1.

The equation for the ECA is defined in Section 1.4, Step 2, of the SIP and is as follows:

$$\text{ECA} = C \text{ (when } C \leq B)^3 \text{ (Equation 2)}$$

Where

C = the priority pollutant criterion/objective, adjusted for hardness (see Equation 1, above)  
B = the ambient background concentration

The 2006 Study demonstrated that the relationship between hardness and the calculated criteria is the same for some metals, so the same procedure for calculating the ECA may be used for these metals. The

<sup>1</sup> Emerick, R.W.; Borroum, Y.; & Pedri, J.E., 2006. California and National Toxics Rule Implementation and Development of Protective Hardness Based Metal Effluent Limitations. WEFTEC, Chicago, Ill.

<sup>2</sup> The ECA is defined in Appendix 1 of the SIP (page Appendix 1-2). The ECA is used to calculate water quality-based effluent limitations in accordance with Section 1.4 of the SIP.

<sup>3</sup> The 2006 Study assumes the ambient background metals concentration is equal to the CTR criterion (i.e. C ≤ B)

same procedure can be used for chronic cadmium, chromium III, copper, nickel, and zinc. These metals are hereinafter referred to as “Concave Down Metals”. “Concave Down” refers to the shape of the curve represented by the relationship between hardness and the CTR criteria in Equation 1. Another similar procedure can be used for determining the ECA for acute cadmium, lead, and acute silver, which are referred to hereafter as “Concave Up Metals”.

**ECA for Concave Down Metals** – For Concave Down Metals (i.e., chronic cadmium, chromium III, copper, nickel, and zinc) the 2006 Study demonstrates that when the effluent is in compliance with the CTR criteria and the upstream receiving water is in compliance with the CTR criteria, any mixture of the effluent and receiving water will always be in compliance with the CTR criteria. Therefore, based on any observed ambient background hardness, no receiving water assimilative capacity for metals (i.e., ambient background metals concentrations are at their respective CTR criterion) and the minimum effluent hardness, the ECA calculated using Equation 1 with a hardness equivalent to the minimum effluent hardness is protective under all discharge conditions (i.e., high and low dilution conditions and under all mixtures of effluent and receiving water as the effluent mixes with the receiving water). This is applicable whether the effluent hardness is less than or greater than the ambient background receiving water hardness.

The effluent hardness ranged from 80 mg/L to 150 mg/L (as CaCO<sub>3</sub>), based on 216 samples from June 2005 to July 2008. The upstream receiving water hardness varied from 26 mg/L to 100 mg/L (as CaCO<sub>3</sub>), based on 100 samples from June 2005 to July 2008. Using a hardness of 80 mg/L (as CaCO<sub>3</sub>) to calculate the ECA for all Concave Down Metals will result in water quality-based effluent limitations that are protective under all potential effluent/receiving water mixing scenarios and under all known hardness conditions, as demonstrated in the example using copper shown in Table F-6, below. This example assumes the following conservative conditions for the upstream receiving water:

- Upstream receiving water always at the lowest observed upstream receiving water hardness (i.e., 26 mg/L as CaCO<sub>3</sub>).
- Upstream receiving water copper concentration always at the CTR criteria (i.e., no assimilative capacity). Based on available data, the receiving water never exceeded the CTR criteria for any metal with hardness-dependent criteria.

As demonstrated in Table F-6, using a hardness of 80 mg/L (as CaCO<sub>3</sub>) to calculate the ECA for Concave Down Metals ensures the discharge is protective under all discharge and mixing conditions. In this example, the effluent is in compliance with the CTR criteria and any mixture of the effluent and receiving water is in compliance with the CTR criteria. An

ECA based on a lower hardness (e.g. lowest upstream receiving water hardness) would also be protective, but would result in unreasonably stringent effluent limits considering the known conditions. Therefore, in this Order the ECA for all Concave Down Metals has been calculated using Equation 1 with a hardness of 80 mg/L (as CaCO<sub>3</sub>). Table F-6.

**Table F-6. Copper ECA Evaluation**

<b>Minimum Observed Effluent Hardness</b>		80 mg/L (as CaCO <sub>3</sub> )	
<b>Minimum Observed Upstream Receiving Water Hardness</b>		26 mg/L (as CaCO <sub>3</sub> )	
<b>Maximum Assumed Dissolved Upstream Receiving Water Copper Concentration</b>		3.0 µg/L <sup>1</sup>	
<b>Dissolved Copper ECA<sub>chronic</sub><sup>2</sup></b>		<b>7.7 µg/L</b>	
<b>Effluent Fraction</b>	<b>Mixed Downstream Ambient Concentration</b>		
	<b>Hardness<sup>3</sup> (mg/L) (as CaCO<sub>3</sub>)</b>	<b>CTR Criteria<sup>4</sup> (µg/L)</b>	<b>Copper<sup>5</sup> (µg/L)</b>
1%	26.5	3.0	3.0
5%	28.7	3.2	3.2
15%	34.1	3.7	3.7
25%	39.5	4.2	4.1
50%	53	5.4	5.3
75%	66.5	6.6	6.5
100%	80	7.7	7.7

- <sup>1</sup> Maximum assumed upstream receiving water dissolved copper concentration calculated using Equation 1 for chronic criterion at a hardness of 26 mg/L (as CaCO<sub>3</sub>).
- <sup>2</sup> Dissolved ECA calculated using Equation 1 for chronic criterion at a hardness of 80 mg/L (as CaCO<sub>3</sub>).
- <sup>3</sup> Mixed downstream ambient hardness is the mixture of the receiving water and effluent hardness at the applicable effluent fraction.
- <sup>4</sup> Mixed downstream ambient criteria (as dissolved) are the chronic criteria calculated using Equation 1 at the mixed hardness.
- <sup>5</sup> Mixed downstream ambient copper concentration (dissolved) is the mixture of the receiving water and effluent dissolved copper concentrations at the applicable effluent fraction.

**ECA for Concave Up Metals** - For Concave Up Metals (i.e., acute cadmium, lead, and acute silver), the 2006 Study demonstrates that due to a different relationship between hardness and the metals criteria, the effluent and upstream receiving water can be in compliance with the CTR criteria, but the resulting mixture may be out of compliance. Therefore, the 2006 Study provides a mathematical approach to calculate the ECA to ensure that any mixture of effluent and receiving water is in compliance with the CTR criteria (see Equation 3, below). The ECA, as calculated using Equation 3, is based on the reasonable worst-case ambient background hardness, no receiving water assimilative capacity for metals (i.e., ambient background metals concentrations are at their respective CTR criterion), and the minimum observed effluent hardness. The

reasonable worst-case ambient background hardness depends on whether the effluent hardness is greater than or less than the upstream receiving water hardness. There are circumstances where the conservative ambient background hardness assumption is to assume that the upstream receiving water is at the highest observed hardness concentration. The conservative upstream receiving water condition as used in the Equation 3 below is defined by the term  $H_{rw}$ .

$$ECA_l = \left( \frac{m(H_e - H_{rw}) \left( e^{m \{\ln(H_{rw})\} + b} \right)}{H_{rw}} \right) + e^{m \{\ln(H_{rw})\} + b} \quad \text{(Equation 3)}$$

$m, b$  = criterion specific constants (from CTR)

$H_e$  = minimum observed effluent hardness

$H_{rw}$  = minimum observed upstream receiving water hardness when the minimum effluent hardness is always greater than observed upstream receiving water hardness ( $H_{rw} < H_e$ )

-or-

maximum observed upstream receiving water hardness when the minimum effluent hardness is always less than observed upstream receiving water hardness ( $H_{rw} > H_e$ )<sup>1</sup>

A similar example as was done for the Concave Down Metals is shown for lead, a Concave Up Metal, in Tables F-6 and F-7, below. As previously mentioned, the minimum effluent hardness is 80 mg/L (as  $CaCO_3$ ), while the upstream receiving water hardness ranged from 26 mg/L to 100 mg/L (as  $CaCO_3$ ), based on 100 samples from June 2005 to July 2008. In this case, the minimum effluent concentration is within the range of observed upstream receiving water hardness concentrations. Therefore, Equation 3 was used to calculate two ECAs, one based on the minimum observed upstream receiving water hardness and one based on the maximum observed upstream receiving water hardness. Using Equation 3, the lowest ECA results from using the minimum upstream receiving water hardness, the minimum effluent hardness, and assuming no receiving water assimilative capacity for lead (i.e., ambient background lead concentration is at the CTR chronic criterion).

<sup>1</sup> When the minimum effluent hardness falls within the range of observed receiving water hardness concentrations, Equation 3 is used to calculate two ECAs, one based on the minimum observed upstream receiving water hardness and one based on the maximum observed upstream receiving water hardness. The minimum of the two calculated ECAs represents the ECA that ensures any mixture of effluent and receiving water is in compliance with the CTR criteria.

**Table F-7. Lead ECA Evaluation Using Minimum Receiving Water Hardness**

<b>Minimum Observed Effluent Hardness</b>		80 mg/L (as CaCO <sub>3</sub> )	
<b>Minimum Observed Upstream Receiving Water Hardness</b>		26 mg/L (as CaCO <sub>3</sub> )	
<b>Maximum Assumed Upstream Receiving Water Lead Concentration</b>		0.57 µg/L <sup>1</sup>	
<b>Lead ECA<sub>acute</sub><sup>2</sup></b>		<b>2.1 µg/L</b>	
<b>Effluent Fraction</b>	<b>Mixed Downstream Ambient Concentration</b>		
	<b>Hardness<sup>3</sup> (mg/L) (as CaCO<sub>3</sub>)</b>	<b>CTR Criteria<sup>4</sup> (µg/L)</b>	<b>Lead<sup>5</sup> (µg/L)</b>
1%	26.5	0.6	0.6
5%	28.7	0.6	0.6
15%	34.1	0.8	0.8
25%	39.5	1.0	1.0
50%	53.0	1.4	1.3
75%	66.5	1.9	1.7
100%	80.0	2.4	2.1

<sup>1</sup> Maximum assumed upstream receiving water lead concentration calculated using Equation 1 for acute criterion at a hardness of 26 mg/L (as CaCO<sub>3</sub>).

<sup>2</sup> ECA calculated using Equation 3 for chronic criteria.

<sup>3</sup> Mixed downstream ambient hardness is the mixture of the receiving water and effluent hardness at the applicable effluent fraction.

<sup>4</sup> Mixed downstream ambient criteria and the chronic criteria calculated using Equation 1 at the mixed hardness.

<sup>5</sup> Mixed downstream ambient lead concentration is the mixture of the receiving water and effluent lead concentrations at the applicable effluent fraction.

**Table F-8. Lead ECA Evaluation Using Maximum Receiving Water Hardness**

<b>Minimum Observed Effluent Hardness</b>		80 mg/L (as CaCO <sub>3</sub> )	
<b>Maximum Observed Upstream Receiving Water Hardness</b>		100 mg/L (as CaCO <sub>3</sub> )	
<b>Maximum Assumed Upstream Receiving Water Lead Concentration</b>		3.2 µg/L <sup>1</sup>	
<b>Lead ECA<sub>acute</sub><sup>2</sup></b>		<b>2.4 µg/L</b>	
<b>Effluent Fraction</b>	<b>Mixed Downstream Ambient Concentration</b>		
	<b>Hardness<sup>3</sup> (mg/L) (as CaCO<sub>3</sub>)</b>	<b>CTR Criteria<sup>4</sup> (µg/L)</b>	<b>Lead<sup>5</sup> (µg/L)</b>
1%	99.8	3.2	3.2
5%	99.0	3.1	3.1
15%	97.0	3.1	3.1
25%	95.0	3.0	3.0
50%	90.0	2.8	2.8
75%	85.0	2.6	2.6
100%	80.0	2.4	2.4

<sup>1</sup> Maximum assumed upstream receiving water lead concentration calculated using Equation 1 for chronic criterion at a hardness of 100 mg/L (as CaCO<sub>3</sub>).

<sup>2</sup> ECA calculated using Equation 3 for chronic criteria.

<sup>3</sup> Mixed downstream ambient hardness is the mixture of the receiving water and effluent hardness at the applicable effluent fraction.

<sup>4</sup> Mixed downstream ambient criteria and the acute criteria calculated using Equation 1 at the mixed hardness.

<sup>5</sup> Mixed downstream ambient lead concentration is the mixture of the receiving water and effluent lead concentrations at the applicable effluent fraction.

Using Equation 3 to calculate the ECA for all Concave Up Metals will result in water quality-based effluent limitations that are protective under all potential effluent/receiving water mixing scenarios and under all known hardness conditions, as demonstrated in Tables F-6 and F-7, for lead. In this example, the effluent is in compliance with the CTR criteria and any mixture of the effluent and receiving water is in compliance with the CTR criteria. Use of a lower ECA (e.g., calculated based solely on the lowest upstream receiving water hardness) is also protective, but would lead to unreasonably stringent effluent limits considering the known conditions. Therefore, Equation 3 has been used to calculate the ECA for all Concave Up Metals in this Order.

Table F-9 summarizes the ECAs calculated for all hardness-dependant metals.

**Table F-9. Summary of ECA Evaluations**

Metals	Effluent Concentration Allowances, ECAs (ug/L) as total recoverable metals	
	acute	chronic
Copper	11	7.7
Chromium III	1500	72
Cadmium	3.3	2.1
Lead	54	2.1
Nickel	390	43
Silver	1.8	--
Zinc	99	99

ii. **Conversion Factors.** The CTR contains aquatic life criteria for arsenic, cadmium, chromium III, chromium VI, copper, lead, nickel, silver, and zinc which are presented in dissolved concentrations. USEPA recommends conversion factors to translate dissolved concentrations to total concentrations. The default USEPA conversion factors contained in Appendix 3 of the SIP were used to convert the applicable dissolved criteria to total recoverable criteria.

d. **Dilution Credits/Mixing Zones.** The SRCSD has requested mixing zones and dilution credits for compliance with acute and chronic aquatic life water quality criteria, and human carcinogen water quality criteria. The Central Valley Water Board has the discretion to accept or deny mixing zones and dilution credits. The CWA directs states to adopt water quality standards to protect the quality of its waters. USEPA’s current water quality standards regulation authorizes states to adopt general policies, such as mixing zones, to implement state water quality standards (40 CFR section 122.44 and section 122.45). The USEPA allows states to have broad flexibility in designing its mixing zone policies. Primary policy and guidance on determining mixing zone and dilution credits is provided by the SIP and the Basin Plan. If no procedure applies in the SIP or the Basin Plan, then the Central Valley Water Board may use the USEPA Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) (TSD).

The TSD defines a mixing zone as follows, “...a mixing zone is an area where an effluent discharge undergoes initial dilution and is extended to cover the secondary mixing in the ambient waterbody. A mixing zone is an allocated impact zone where water quality criteria can be exceeded as long as acutely toxic conditions are prevented.”<sup>1</sup> The SIP provides guidance on mixing zones and dilution credits in establishing water quality-based effluent limitations. Water quality criteria and objectives must be met throughout a water body except within

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1 TSD, Glossary



a mixing zone. All mixing zones shall be as small as practicable and must meet specific conditions. The allowance of mixing zones by the Central Valley Water Board is discretionary and can be granted parameter-by-parameter and/or type of criteria (e.g., acute or chronic aquatic life criteria).

The allowance of mixing zones by the Central Valley Water Board is discussed in the Basin Plan, Policy for Application of Water Quality Objectives, which states in part, *“In conjunction with the issuance of NPDES and storm water permits, the Regional Board may designate mixing zones within which water quality objectives will not apply provided the discharger has demonstrated to the satisfaction of the Regional Board that the mixing zone will not adversely impact beneficial uses. If allowed, different mixing zones may be designated for different types of objectives, including, but not limited to, acute aquatic life objectives, chronic aquatic life objectives, human health objectives, and acute and chronic whole effluent toxicity objectives, depending in part on the averaging period over which the objectives apply. In determining the size of such mixing zones, the Regional Board will consider the applicable procedures and guidelines in the EPA’s Water Quality Standards Handbook and the [TSD]. Pursuant to EPA guidelines, mixing zones designated for acute aquatic life objectives will generally be limited to a small zone of initial dilution in the immediate vicinity of the discharge.”*<sup>1</sup>

Section 1.4.2 of the SIP states, in part, *“...with the exception of effluent limitations derived from TMDLs, in establishing and determining compliance with effluent limitations for applicable human health, acute aquatic life, or chronic aquatic life priority pollutant criteria/objectives or the toxicity objective for aquatic life protection in a basin plan, the Regional Board may grant mixing zones and dilution credits to dischargers ... The applicable priority pollutant criteria and objectives are to be met throughout a water body except within any mixing zone granted by the Regional Board. The allowance of mixing zones is discretionary and shall be determined on a discharge-by-discharge basis. The Regional Board may consider allowing mixing zones and dilution credits only for discharges with a physically identifiable point of discharge that is regulated through an NPDES permit issued by the Regional Board.”*<sup>2</sup>

Both federal and state guidance include similar mixing zone conditions, the SIP conditions are as follows:

*“A mixing zone shall be as small as practicable. The following conditions must be met in allowing a mixing zone:*

*A: A mixing zone shall not:*

- 1. compromise the integrity of the entire water body;*

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1 Basin Plan, page IV-16.00

2 SIP, pg. 15

2. *cause acutely toxic conditions to aquatic life passing through the mixing zone;*
3. *restrict the passage of aquatic life;*
4. *adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws;*
5. *produce undesirable or nuisance aquatic life;*
6. *result in floating debris, oil, or scum;*
7. *produce objectionable color, odor, taste, or turbidity;*
8. *cause objectionable bottom deposits;*
9. *cause nuisance;*
10. *dominate the receiving water body or overlap a mixing zone from different outfalls; or*
11. *be allowed at or near any drinking water intake. A mixing zone is not a source of drinking water. To the extent of any conflict between this determination and the Sources of Drinking Water Policy (Resolution No. 88-63), this SIP supersedes the provisions of that policy.”<sup>1</sup>*

The mixing zone is thus an administrative construct defined as an area around the outfall that may exceed water quality objectives, but is otherwise protective of the beneficial uses. Dilution is defined as the amount of mixing that has occurred at the edge of this mixing zone under critical conditions, thus protecting the beneficial uses at the concentration and for the duration and frequency required.

- i. **Sacramento River Hydrology.** The lower Sacramento River in the vicinity of the discharge is a large river with sufficient flows for dilution. The Sacramento watershed is a heavily managed system of reservoirs and diversions. The Sacramento River near the discharge location (Freeport) drains a 26,146-square-mile basin that spans the entire northern Central Valley of California from the crest of the Coast Range to the crest of the Sierra Nevada. Flows in the Sacramento River are influenced by precipitation (rainfall and snowpack/snowmelt), but are also influenced by several reservoirs on the tributaries and main stem, which are managed for flood control, water supply, and hydroelectric power generation. Irrigation diversions and agricultural return flows also affect the river regime. Winter

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1 SIP, pg. 17

and spring flows in the Sacramento River often exceed 50,000 cfs. While summer flows average 10,000 cfs, they can fall below 4,000 cfs. Daily flow probabilities for the Sacramento River at Freeport, based on U.S. Geologic Survey gauged flow data from 1942-1989, indicate that there is only a 10% probability of flows less than or equal to 10,000 cfs, and a 10% probability of flows greater than 70,000 cfs. Therefore, typical flows in the Sacramento range from 10,000 to 70,000 cfs. The critical low flows for the Sacramento River based on flow data at Freeport from 1970 to 2009 are shown in Table F-10, below.

**Table F-10. Critical Receiving Water Flows**

Critical Low Flows	Receiving Water Flow (cfs)
1Q10 <sup>1</sup>	5060
7Q10 <sup>2</sup>	5846
30Q5 <sup>3</sup>	8234
Harmonic Mean <sup>4</sup>	15733

<sup>1</sup> Lowest daily average flow with a return frequency of 10 years.

<sup>2</sup> Lowest 7-day average flow with a return frequency of 10 years.

<sup>3</sup> Lowest 30-day average flow with a return frequency of 5 years.

<sup>4</sup> At Freeport from 1 January 1970 through 31 December 2009.

ii. **Water Quality Models.** For completely-mixed discharges, the Central Valley Water Board may grant a mixing zone and apply a dilution credit in accordance with Section 1.4.2.1 of the SIP, based on the dilution ratio. For incompletely-mixed discharges, the Discharger must perform a mixing zone study to demonstrate to the Central Valley Water Board that a dilution credit is appropriate. The SRWTP discharge is considered an incompletely-mixed discharge, so the Discharger conducted a mixing zone study. A mathematical dynamic model was developed by Flow Sciences Incorporated and consists of five models linked in series, with the output from previous models used as part of the inputs to subsequent models. The models are linked as shown in Figure F-1 and are described below.

*PROSIM – U.S. Bureau of Reclamation’s Project Simulation Model.* PROSIM simulates the existing hydrologic conditions in the Delta study area and was used to calculate the 70-year period of record (1922-1991) that served as the basis for the SRCSD study. Flow and storage calculated by PROSIM was used as input to the Temperature Models. Also, output from PROSIM were used as input to the Fischer Delta Model (FDM) and includes: export pumping rates from Tracy and Banks; Contra Costa Water District pumping at Rock Slough and Old River; North Bay Aqueduct pumping; City of Vallejo pumping; net Delta consumptive use; Delta Cross Channel position; and Delta inflows from Yolo Bypass, San Joaquin River, Calaveras River, Cosumnes River, Mokelumne River, and Sacramento River.

Temperature Models – *U.S. Bureau of Reclamation models*. The Bureau of Reclamation has developed temperature models for five reservoirs (Trinity, Whiskeytown, Shasta, Oroville, and Folsom) and three river systems (Sacramento, Feather, and American). These models estimate mean monthly water temperatures based on flow and storage quantities calculated by PROSIM.

*FDM – Fischer Delta Model*. The Fischer Delta Model was used to support both the near-field and far-field modeling. For the near-field region, FDM was used to disaggregate hourly flow rates for the Sacramento River at Freeport from the 70-year record of monthly flows calculated by PROSIM. The hourly flow data were then used as input to the 3-D near-field model (FLOWMOD) as well as the Longitudinal Dispersion model. For the far-field region, FDM was used to simulate the contribution of SRWTP discharges to water quality concentrations at various critical locations in the Delta

*FLOWMOD – Flow Science’s computational fluid dynamics model*. The near-field modeling was accomplished with the 3-dimensional FLOWMOD computational fluid dynamics model developed by Flow Science. FLOWMOD was used to calculate the steady-state concentration of effluent in each grid cell of the model domain for specific combinations of river and effluent flow rates. A horizontal grid resolution of 6 feet was defined from the diffuser to a point 300 feet downstream of the diffuser. The grid resolution increased geometrically from 300 feet to 700 feet downstream of the diffuser. Results from the model defined the average effluent concentration in the area of impact (i.e., within the 200:1 dilution contour) downstream of the diffuser. SRCSD is using this model to separately evaluate the thermal characteristics of the discharge plume.

*LD – Flow Science’s Longitudinal Dispersion Model*. The LD model was developed by Flow Science and the computer code is written in the Matlab programming language for implementation on an IBM-PC compatible microcomputer. This 1-dimensional model simulates the advection and dispersion of effluent discharged to the Sacramento River including reverse tidal flow conditions. The LD model is used to estimate the concentration in the near-field vicinity of the diffuser following the start of a diversion event in which the effluent discharge is diverted to storage when the Sacramento River flow rate falls below the minimum required 14:1 dilution ratio<sup>1</sup>.

The results from the LD model are combined with the results from the FLOWMOD model (by method of superposition) to estimate the concentrations of the effluent in the near-field zone that result from “double dosing” during the flow reversal events. The length of the LD model domain

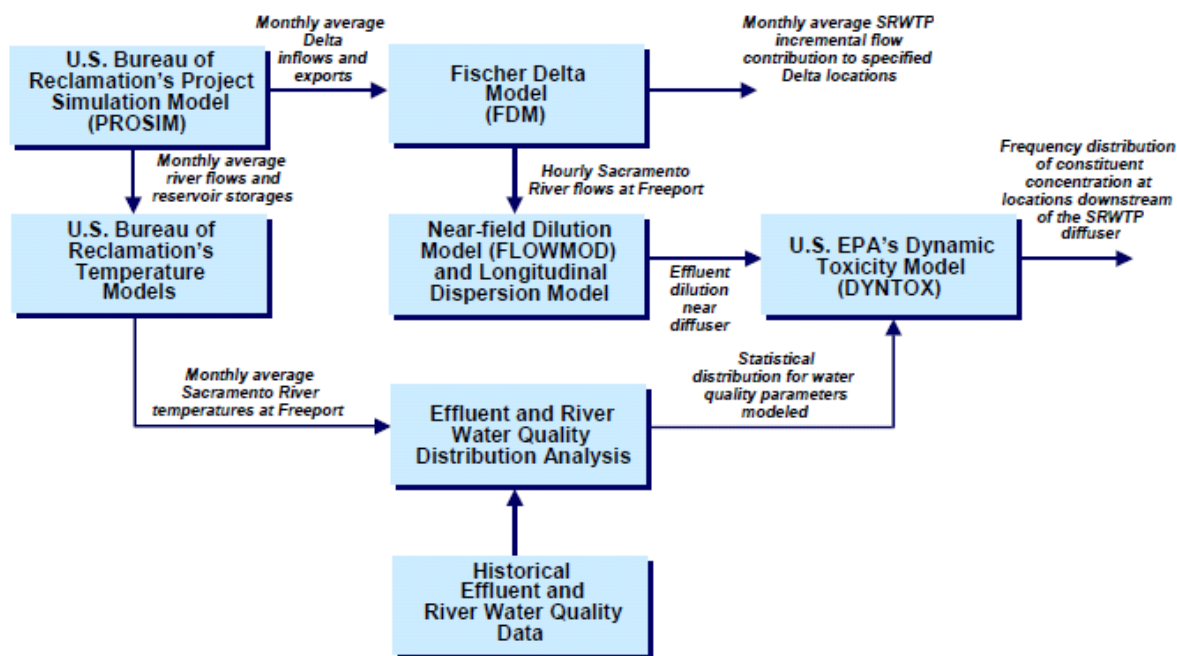
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<sup>1</sup> The Discharger is prohibited from discharging when the dilution ratio (river:effluent) is less than 14:1 or if river flows are less than 1300 cfs and diverts all effluent discharge to emergency storage basins. These requirements ensure the diffuser is operating as designed and limits double-dosing of the discharge during flow reversals.

is 53,000 feet (about 10 miles) and includes the diffuser. The model domain is represented by 530 discrete spatial intervals, each 100 feet long. Calculations are made at a 400-second time step.

*DYNTOX – U.S. EPA’s Dynamic Toxicity Model.* DYNTOX was developed in 1985 with funding support provided by EPA. The model is designed for waste load allocations of toxic substances. DYNTOX contains three procedures to define the frequency and duration of exposure above a specific water quality criterion: (1) continuous simulation, (2) Monte Carlo simulation, and (3) log normal analysis. The continuous simulation procedure with randomly generated water quality distributions was used for the SRWTP study. Hourly values for the 70-year simulation period resulted in over 600,000 data points that were representative of the statistical concentration distribution at 6 key locations downstream of the diffuser.

**Figure F-1: Dynamic Model Flow Diagram**



In the period from 2005 through 2007, the Discharger performed several field validation studies to corroborate the effectiveness of the modeling tools in representing water quality conditions in the Sacramento River. Due to the complexity of the mathematical models, in 2006 the Central Valley Water Board used the services of Tetra Tech, a USEPA contractor, to assist with the review of the dynamic model. Tetra Tech’s modeling experts concluded that the model study was conducted in a sound and scientifically defensible manner. The modeling experts determined that the linked dynamic modeling system is capable of providing an accurate probabilistic representation of

receiving water quality conditions. The only perceived short coming noted by the model experts from a regulatory perspective was the complexity of the system of linked models and the proprietary status of some of the model components preventing its transmittal and direct use by Central Valley Water Board staff. The results of Tetra Tech's review are summarized in a Tetra Tech memorandum dated 30 June 2008.

**iii. Evaluation of Available Dilution for Acute Aquatic Life Criteria.** USEPA Region VIII, in its "EPA Region VIII Mixing Zones and Dilution Policy", recommends no dilution for acute aquatic life criteria, stating the following, "*In incomplete mix situations, discharge limitations to implement acute chemical-specific aquatic life criteria and narrative (no acute toxicity) criteria shall be based on achieving such acute criteria at the end-of-pipe (i.e., without an allowance for dilution). This approach is intended to implement the narrative requirement prohibiting acutely toxic conditions in the mixing zone.*"<sup>1</sup> The SRCSD has requested an acute mixing zone for compliance with acute water quality criteria for ammonia, copper, cyanide, and chlorpyrifos.

The requested acute aquatic life mixing zone is 400 feet wide and extends 60 feet downstream of the diffuser. The proposed acute mixing zone meets the requirements of the SIP as follows:

(1) *Shall not compromise the integrity of the entire waterbody* - The TSD states that, "*If the total area affected by elevated concentrations within all mixing zones combined is small compared to the total area of a waterbody (such as a river segment), then mixing zones are likely to have little effect on the integrity of the waterbody as a whole, provided that the mixing zone does not impinge on unique or critical habitats.*"<sup>2</sup> The Sacramento River is approximately 600 feet wide at the surface. The acute mixing zone is approximately 60 ft x 350 ft. The Sacramento River is a very large waterbody. Except as noted for ammonia in subsection vi., below, the acute mixing zone would not compromise the integrity of the entire waterbody.

(2) *Shall not cause acutely toxic conditions to aquatic life passing through the mixing zone* - The SIP requires that the acute mixing zone be appropriately sized to prevent lethality to organisms passing through the mixing zone. USEPA recommends that float times through a mixing zone less than 15 minutes ensures that there will not be lethality to passing organisms. The acute mixing zone proposed by the Discharger extends 60 feet downstream from the outfall. Based on a minimum river velocity of 0.35 feet/sec, the minimum float time is 2.8 minutes<sup>3</sup>. Furthermore, this Order includes an acute toxicity effluent limitation that requires compliance to be determined based on acute bioassays using 100% effluent. Compliance with these

<sup>1</sup> USEPA Region VIII Mixing Zones and Dilution Policy, December 1994 (Updated September 1995), (page 18)

<sup>2</sup> TSD, pg. 33

<sup>3</sup> Memorandum from Larry Walker Associates to SRCSD, Mixing Zones and Prevention of Acutely Toxic Conditions, dated 13 July 2009.

requirements ensures that acutely toxic conditions to aquatic life passing through the chronic mixing zone do not occur.

(3) *Shall not restrict the passage of aquatic life* – The SRCSD developed a dynamic model to evaluate the near-field effects of the discharge. The dynamic model was used to evaluate the zone of passage around the mixing zone where water quality objectives are met. The dynamic model indicates there is a zone of passage for aquatic life, which was verified through dye testing. The size of the zone of passage varies on either side of the river depending on the river geometry<sup>1</sup>. The surface of the river is approximately 600 feet across and the bottom of the river is approximately 400 feet across. Based on the model the zone of passage at the surface of the river is generally at least 100 feet on both sides of the river, while the zone of passage at the bottom of the river is greater than 40 feet from both sides of the river.

(4) *Shall not adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws* – The acute mixing zone will not cause acutely toxic conditions, allows adequate zones of passage, and, except as noted for ammonia in subsection vi., below, is sized appropriately to ensure that there will be no adverse impacts to biologically sensitive or critical habitats.

(5) *Shall not produce undesirable or nuisance aquatic life; result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; cause nuisance* – The current discharge has not been shown to result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; or cause nuisance. This Order requires the discharge meets Title 22 (or equivalent) tertiary filtration, which will ensure continued compliance with these mixing zone requirements. There is concern that the high ammonia concentrations in the discharge create undesirable or nuisance aquatic life (see subsection vi. for ammonia, below), therefore, an acute mixing zone for ammonia is not allowed. With these requirements the acute mixing zone will not produce undesirable or nuisance aquatic life, result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; or cause nuisance.

(6) *Shall not dominate the receiving water body or overlap a mixing zone from different outfalls* – The acute mixing zone is small relative to the water body, so it will not dominate the water body. Furthermore, the mixing zone does not overlap mixing zones from other outfalls. There are no outfalls or mixing zones in the vicinity of the discharge.

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<sup>1</sup> Model Verification Results for FLOWMOD Simulations of SRCSD Effluent Discharge to the Sacramento River at Freeport, November 2007 Field Study, Flow Science

(7) *Shall not be allowed at or near any drinking water intake* – The acute mixing zone is not near a drinking water intake. The nearest downstream drinking water intake is the Barker Slough Pumping Plant, which is approximately 40 miles downstream of the discharge.

Although the acute aquatic life mixing zone complies with the SIP and the Basin Plan, due to concerns with aquatic toxicity in the Delta, the Central Valley Water Board has denied the allowance of an acute aquatic life mixing zone in this Order. Section 1.4.2 of the SIP states, in part, "...The allowance of mixing zones is discretionary and shall be determined on a discharge-by-discharge basis." In this case, the Delta is impaired for unknown toxicity and has experienced a significant pelagic organism decline. Therefore, the Central Valley Water Board finds that the allowance of an acute aquatic life mixing zone is not acceptable for this discharge. Furthermore, as discussed in subsection vi, below, based on Facility performance, an acute mixing zone is either not needed for the constituents requested by the Discharger or not allowed by the Basin Plan. See subsection vi, below, for a pollutant-by-pollutant evaluation for these constituents.

- iv. Evaluation of Available Dilution for Chronic Aquatic Life Criteria.** The chronic aquatic life mixing zone is sized to protect the water body as a whole and is generally larger than the acute mixing zone. A mixing zone for chronic aquatic life criteria has been allowed in this Order for development of the WQBELs for cyanide.

The chronic aquatic life mixing zone is 400 feet wide and extends 350 feet downstream of the diffuser. The chronic mixing zone meets the requirements of the SIP as follows:

(1) *Shall not compromise the integrity of the entire waterbody* - The TSD states that, "If the total area affected by elevated concentrations within all mixing zones combined is small compared to the total area of a waterbody (such as a river segment), then mixing zones are likely to have little effect on the integrity of the waterbody as a whole, provided that the mixing zone does not impinge on unique or critical habitats."<sup>1</sup> The Sacramento River is approximately 600 feet wide at the surface. The chronic mixing zone is approximately 400 ft x 350 ft. The Sacramento River is a very large waterbody. Except as noted for ammonia in subsection vi., below, the chronic mixing zone would not compromise the integrity of the entire waterbody.

(2) *Shall not cause acutely toxic conditions to aquatic life passing through the mixing zone* – The chronic mixing zone does not allow acute aquatic life criteria to be exceeded and this Order requires acute bioassays to be conducted using 100% effluent. Compliance with these requirements

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<sup>1</sup> TSD, pg. 33



ensures that acutely toxic conditions to aquatic life passing through the chronic mixing zone do not occur.

(3) *Shall not restrict the passage of aquatic life* – The SRCSD developed a dynamic model to evaluate the near-field effects of the discharge. The dynamic model was used to evaluate the zone of passage around the mixing zone where water quality objectives are met. The dynamic model indicates there is a zone of passage for aquatic life, which was verified through dye testing. The size of the zone of passage varies on either side of the river depending on the river geometry<sup>1</sup>. The surface of the river is approximately 600 feet across and the bottom of the river is approximately 400 feet across. Based on the model the zone of passage at the surface of the river is generally at least 100 feet on both sides of the river, while the zone of passage at the bottom of the river is greater than 40 feet from both sides of the river.

(4) *Shall not adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws* – The chronic mixing zone will not cause acutely toxic conditions, allows adequate zones of passage, and, except as noted for ammonia in subsection vi., below, is sized appropriately to ensure that there will be no adverse impacts to biologically sensitive or critical habitats.

(5) *Shall not produce undesirable or nuisance aquatic life; result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; cause nuisance* – The current discharge has not been shown to result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; or cause nuisance. This Order requires the discharge meets Title 22 (or equivalent) tertiary filtration, which will ensure continued compliance with these mixing zone requirements. There is concern that the high ammonia concentrations in the discharge create undesirable or nuisance aquatic life (see subsection vi. for ammonia, below), therefore, a chronic mixing zone for ammonia is not allowed. With these requirements the chronic mixing zone will not produce undesirable or nuisance aquatic life, result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; or cause nuisance.

(6) *Shall not dominate the receiving water body or overlap a mixing zone from different outfalls* – The chronic mixing zone is small relative to the water body, so it will not dominate the water body. Furthermore, the mixing zone does not overlap mixing zones from other outfalls. There are no outfalls or mixing zones in the vicinity of the discharge.

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1 Model Verification Results for FLOWMOD Simulations of SRCSD Effluent Discharge to the Sacramento River at Freeport, November 2007 Field Study, Flow Science

(7) *Shall not be allowed at or near any drinking water intake* – The chronic mixing zone is not near a drinking water intake. The nearest downstream drinking water intake is the Barker Slough Pumping Plant, which is approximately 40 miles downstream of the discharge.

The chronic aquatic life mixing zone therefore complies with the SIP. The mixing zone also complies with the Basin Plan, which requires that the mixing zone not adversely impact beneficial uses. Beneficial uses will not be adversely affected for the same reasons discussed above. In determining the size of the mixing zone, the Central Valley Water Board considered the procedures and guidelines in the EPA's Water Quality Standards Handbook, 2d Edition (updated July 2007), Section 5.1, and Section 2.2.2 of the Technical Support Document for Water Quality-based Toxics Control (TSD). The SIP incorporates the same guidelines.

- v. Evaluation of Available Dilution for Human Health Criteria.** The Discharger's dynamic model is useful in determining the mixing and dilution near the discharge (i.e., near-field) and the model domain extends 700 feet downstream. Human health-based criteria are generally based long-term exposures, such as safe levels for lifetime exposure (e.g., for carcinogens, consumption of 1 liter/day for 70 years) and the mixing zones typically extend beyond the near-field mixing estimated by the Discharger's dynamic model. Since the human health mixing zone extends beyond the model domain of the dynamic model, the Discharger conducted a study titled "Sacramento River Harmonic Mean Mixing Zone Report" (June 2010) to establish the human health mixing zone and dilution. The June 2010 study identified the point downstream of the discharge where complete mixing occurs. Based on the results of the June 2010 study, the discharge is completely mixed approximately 3 miles downstream. The Discharger has requested the human health mixing zone extend to this point.

In determining the available receiving water dilution for compliance with human carcinogen criteria, the SIP, section 1.4.2.1 requires that the harmonic mean of the receiving water flow be compared against the arithmetic mean of the effluent flow of the observed discharge period. Based on Sacramento River flow data at Freeport from 1 January 1970 to 31 December 2009 the harmonic mean river flow is 15,733 cfs. The permitted average dry weather flow for the Facility is 181 mgd (280 cfs). Therefore, a dilution ratio of 56:1 is available for compliance with human carcinogen criteria. This Order allows a dilution credit for human carcinogen criteria of 56:1 and the mixing zone extends 3 miles downstream of the discharge. For non-human carcinogen human health criteria, the TSD recommends dilution based on a 30Q5 receiving water flow<sup>1</sup>, which is the lowest 30 day average flow with a recurrence frequency of once in five years. Based on Sacramento River flow

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1 USEPA Water Quality Handbook, Section 5.2

data at Freeport from 1 January 1970 to 31 December 2009 the 30Q5 flow is 8234 cfs, resulting in a dilution credit of 29:1.

The human health mixing zone meets the requirements of the SIP as follows:

(1) *Shall not compromise the integrity of the entire waterbody* - The TSD states that, "If the total area affected by elevated concentrations within all mixing zones combined is small compared to the total area of a waterbody (such as a river segment), then mixing zones are likely to have little effect on the integrity of the waterbody as a whole, provided that the mixing zone does not impinge on unique or critical habitats."<sup>1</sup> The Sacramento River is a very large waterbody and the human health mixing zone is not applicable to aquatic life criteria. Except as noted for nitrate in subsection vi., below, the human health mixing zone does not compromise the integrity of the entire waterbody.

(2) *Shall not cause acutely toxic conditions to aquatic life passing through the mixing zone* –The human health mixing zone is not applicable to aquatic life criteria. Therefore, acutely toxic conditions will not occur in the mixing zone.

(3) *Shall not restrict the passage of aquatic life* – The human health mixing zone is not applicable to aquatic life criteria. Therefore, the mixing zone will not restrict the passage of aquatic life.

(4) *Shall not adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws* – The human health mixing zone is not applicable to aquatic life criteria. Except as noted for nitrate in subsection vi., below, the mixing zone will not impact biologically sensitive or critical habitats.

(5) *Shall not produce undesirable or nuisance aquatic life; result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; cause nuisance* – Except as noted for nitrate (see subsection vi, below), the allowance of a human health mixing zone will not produce undesirable or nuisance aquatic life, result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; or cause nuisance.

(6) *Shall not dominate the receiving water body or overlap a mixing zone from different outfalls* – The human health mixing zone is small relative to the water body, so it will not dominate the water body. Furthermore, the mixing zone does not overlap mixing zones from other outfalls. There are no outfalls or mixing zones in the vicinity of the discharge.

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1 TSD, pg. 33

(7) *Shall not be allowed at or near any drinking water intake* – There are no drinking water intakes within the human health mixing zone. The nearest drinking water intake is the Freeport Regional Water Authority intake one mile upstream of the discharge at Freeport, which is owned and operated by East Bay Municipal Utility District (EBMUD). An operating agreement between the EBMUD and the Discharger dated 2006 will prevent diversion of river water containing diluted treated wastewater at the Freeport water intake. The nearest downstream drinking water intake is the Barker Slough Pumping Plant, which is approximately 40 miles downstream of the discharge.

The human health mixing zone therefore complies with the SIP. The mixing zone also complies with the Basin Plan, which requires that the mixing zone not adversely impact beneficial uses. Beneficial uses will not be adversely affected for the same reasons discussed above. In determining the size of the mixing zone, the Central Valley Water Board considered the procedures and guidelines in the EPA's Water Quality Standards Handbook, 2d Edition (updated July 2007), Section 5.1, and Section 2.2.2 of the Technical Support Document for Water Quality-based Toxics Control (TSD). The SIP incorporates the same guidelines.

**vi. Evaluation of Available Dilution for Specific Constituents (Pollutant-by-Pollutant Evaluation).** When determining to allow dilution credits for a specific pollutant several factors must be considered, such as, available assimilative capacity, facility performance, and best practicable treatment or control. In this subsection a pollutant-by-pollutant evaluation of dilution is discussed. The SRCSD requested acute and chronic aquatic life dilution credits for ammonia, copper, cyanide, and chlorpyrifos. Human carcinogen dilution credits were requested for carbon tetrachloride, chlorodibromomethane, dichlorobromomethane, methylene chloride, tetrachloroethylene, pentachlorophenol, bis(2-ethylhexyl)phthalate, dibenzo(ah)anthracene, and N-nitrosodimethylamine. Additionally, human health dilution credits were requested for manganese, nitrate, and MTBE. A pollutant-by-pollutant evaluation is discussed below.

**Ammonia** – An acute or chronic mixing zone for ammonia does not meet the mixing zone requirements of the SIP. The SIP requires, in part, that mixing zones do not;

- (1) compromise the integrity of the entire water body;
- (2) adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws; and
- (3) produce undesirable or nuisance aquatic life;

The allowance of acute or chronic mixing zones for ammonia do not meet these requirements, because ammonia discharges from the Facility have

been shown to be negatively affecting the receiving water far downstream of the discharge within the Delta, not just the areas defined by the requested mixing zones. The allowance of the requested mixing zones for ammonia would comprise the integrity of the entire water body, adversely impact biologically sensitive or critical habitats, and produce undesirable or nuisance aquatic life.

Acute and chronic aquatic life dilution credits for ammonia have not been granted. This Order requires full nitrification for removal of ammonia. See Section IV.C.3 of the Fact Sheet for a detailed discussion.

**Copper** – Assimilative capacity is available for copper in the receiving water. However, based on facility performance, dilution credits for copper are not needed, therefore, dilution credits have not been allowed for copper. Table F-11, below, shows the WQBELs calculated using SRCSD’s dynamic model with the allowance of acute and chronic aquatic life dilution, end-of-pipe effluent limitations using a reasonable worst-case steady-state approach, and the Facility’s performance. This information demonstrates the Facility can meet end-of-pipe effluent limitations, therefore, no dilution credits have been allowed for copper.

**Table F-11. WQBELs for Copper**

	Average Monthly Effluent Limitation	Maximum Daily Effluent Limitation
Dynamic Modeling	7.7 µg/L	9.8 µg/L
Steady-State Approach	7.3 µg/L	9.3 µg/L
Facility Performance <sup>1</sup>	6.8 µg/L	

<sup>1</sup> Projected 99.9<sup>th</sup> percentile of effluent copper data from June 2005-October 2009

**Cyanide** – Table F-12, below, shows the WQBELs for cyanide calculated using SRCSD’s dynamic model with the allowance of acute and chronic aquatic life dilution, WQBELs calculated using SRCSD’s dynamic model with the allowance of only chronic aquatic life dilution, end-of-pipe effluent limitations using a reasonable worst-case steady-state approach, and the Facility’s performance. This information demonstrates the Facility cannot meet end-of-pipe effluent limits, but can meet WQBELs calculated with the allowance of chronic aquatic life dilution. Acute aquatic life dilution is not needed for cyanide. Assimilative capacity is available for cyanide in the receiving water, and, as discussed above, the chronic aquatic life mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for cyanide have been developed considering the allowance of chronic aquatic life dilution.

**Table F-12. WQBELs for Cyanide**

	Average Monthly Effluent Limitation	Maximum Daily Effluent Limitation
Dynamic Modeling (acute and chronic dilution)	21 µg/L	40 µg/L
Dynamic Modeling (chronic dilution only)	11 µg/L	22 µg/L
Steady-State Approach	4.3 µg/L	8.3 µg/L
Facility Performance <sup>1</sup>	11 µg/L	

<sup>1</sup> Projected 99.9<sup>th</sup> percentile of effluent cyanide data from June 2005-October 2009

**Chlorpyrifos** – A TMDL has been adopted for chlorpyrifos and diazinon and includes waste load allocations (WLA) for NPDES dischargers. The WLA have been adopted in the Basin Plan as water quality objectives and dilution are not allowed. Therefore, end-of-pipe effluent limitations based on the Basin Plan water quality objectives are required by the Basin Plan.

**Aluminum**– Based on existing effluent data from June 2005 – October 2009, the Facility can meet end-of-pipe effluent limitations for aluminum of 200 µg/L annual average. Therefore, a dilution credit has not been allowed. Additionally, there is no assimilative capacity in the receiving water. The Sacramento River maximum aluminum concentrations are over 8000 µg/L. The Discharger collected 61 samples during this time period resulting in samples ranging from 12 to 35.2 µg/L. The effluent sampling was part of the three times per year sampling required in the previous permit, which required daily sampling for one week three times per year. The discharge never exceeded the new AMEL or MDEL.

**Carbon tetrachloride** - Based on existing effluent data from June 2005-October 2009, it appears that the Facility cannot meet end-of-pipe effluent limitations for carbon tetrachloride of 0.25 µg/L and 0.50 µg/L, as an average monthly effluent limitation (AMEL) and maximum daily effluent limitation (MDEL), respectively. The Discharger collected 101 samples during this time period resulting in 95 non-detect samples (i.e., ranging from <0.06 µg/L to <0.5 µg/L), three J-flagged estimates of 0.1 µg/L, 0.1 µg/L, and 0.2 µg/L, and three samples above the reporting level at 0.5 µg/L, 1.4 µg/L, and 1.7 µg/L. The effluent sampling was part of the three times per year sampling required in the previous permit, which required daily sampling for one week three times per year. Assimilative capacity is available for carbon tetrachloride in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for carbon tetrachloride have been developed considering the allowance of human carcinogen dilution credits.

**Chlorodibromomethane** – Based on existing effluent data from June 2005 – October 2009, the Facility cannot meet end-of-pipe effluent limitations for chlorodibromomethane of 0.41 µg/L and 0.82 µg/L, as an AMEL and MDEL, respectively. Assimilative capacity is available for chlorodibromomethane in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for chlorodibromomethane have been developed considering the allowance of human carcinogen dilution credits.

**Dichlorobromomethane** – Based on existing effluent data from June 2005– October 2009, it appears that the Facility cannot meet end-of-pipe effluent limitations for dichlorobromomethane of 0.56 µg/L and 1.1 µg/L, as an AMEL and MDEL, respectively. Assimilative capacity is available for dichlorobromomethane in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for dichlorobromomethane have been developed considering the allowance of human carcinogen dilution credits.

**Methylene chloride** – Based on existing effluent data from June 2005- October 2009, the Facility cannot meet end-of-pipe effluent limitations for methylene chloride of 4.7 µg/L and 11 µg/L, as an AMEL and MDEL, respectively. Assimilative capacity is available for methylene chloride in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for methylene chloride have been developed considering the allowance of human carcinogen dilution credits.

**Tetrachloroethylene** – Based on existing effluent data from June 2005- October 2009, the Facility cannot meet end-of-pipe effluent limitations for tetrachloroethylene of 0.8 µg/L and 1.6 µg/L, as an AMEL and MDEL, respectively. Assimilative capacity is available for tetrachloroethylene in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for tetrachloroethylene have been developed considering the allowance of human carcinogen dilution credits.

**Pentachlorophenol** – Based on existing effluent data from June 2005- October 2009, it appears that the Facility cannot meet end-of-pipe effluent limitations for pentachlorophenol of 0.28 µg/L and 0.56 µg/L, as an AMEL and MDEL, respectively. Assimilative capacity is available for pentachlorophenol in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for pentachlorophenol have been developed considering the allowance of human carcinogen dilution credits.

**Bis(2-ethylhexyl)phthalate** – Based on existing effluent data from June 2005- October 2009, it appears that the Facility cannot meet end-of-pipe effluent limitations for bis(2-ethylhexyl)phthalate of 1.8 µg/L and 3.4 µg/L, as an AMEL and MDEL, respectively. Assimilative capacity is available for bis(2-ethylhexyl)phthalate in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for bis(2-ethylhexyl)phthalate have been developed considering the allowance of human carcinogen dilution credits.

**Dibenzo(ah)anthracene** – Based on existing effluent data from June 2005- October 2009, it appears that the Facility cannot meet end-of-pipe effluent limitations for dibenzo(ah)anthracene of 4 ng/L and 9 ng/L, as an AMEL and MDEL, respectively. Assimilative capacity is available for dibenzo(ah)anthracene in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for dibenzo(ah)anthracene have been developed considering the allowance of human carcinogen dilution credits.

**N-nitrosodimethylamine** – Based on existing effluent data from June 2005- October 2009, it appears that the Facility cannot meet end-of-pipe effluent limitations for N-nitrosodimethylamine of 0.69 ng/L and 1.38 ng/L, as an AMEL and MDEL, respectively. The receiving water showed no detectable concentrations for NDMA out of 47 samples, but the detection levels are too high to detect low concentrations. Thus, no assimilative capacity is available for N-nitrosodimethylamine in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, no dilution credits have been allowed to develop the WQBELs for N-nitrosodimethylamine.

**Manganese** – Based on existing effluent data from April 2009-June 2009, it appears that the Facility cannot meet an end-of-pipe AMEL for manganese of 50 µg/L. The Discharger collected 34 samples during this time period and the maximum effluent concentration was 82 µg/L and averaged 64 µg/L. Assimilative capacity is available for manganese in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for manganese have been developed considering the allowance of non-human carcinogen dilution credits.

**Nitrate** – Currently, the Discharger's effluent contains very low concentrations of nitrate, ranging from 0.016 to 1.4 mg/L with an average of 0.13 mg/L. However, this Order requires the Discharger nitrify its effluent, therefore, the ammonia will convert to nitrate and the nitrate concentrations will increase. Consequently, the Facility will not be able to meet end-of-pipe effluent limits for Nitrate, based on the primary MCL of 10 mg/L (as N). Although assimilative capacity and dilution is available in the receiving water for compliance with the primary MCL, a human health mixing zone for nitrate



does not meet the mixing zone requirements of the SIP. The SIP requires, in part, that mixing zones do not;

- (1) compromise the integrity of the entire water body;
- (2) adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws; and
- (3) produce undesirable or nuisance aquatic life;

The allowance of a human health mixing zone for nitrate does not meet these requirements, because elevated nitrogen discharges from the Facility have been shown to be negatively affecting the receiving water far downstream of the discharge within the Delta, not just the areas defined by the requested mixing zone. The allowance of the requested mixing zone for nitrate would compromise the integrity of the entire water body, adversely impact biologically sensitive or critical habitats, and produce undesirable or nuisance aquatic life.

Human health dilution credits for nitrate have not been granted. This Order requires denitrification for removal of nitrate to meet the primary MCL at the end-of-pipe. See Section IV.C.3 of the Fact Sheet for a detailed discussion.

**MTBE** – Based on existing effluent data from June 2005- October 2009, it appears that the Facility cannot meet an end-of-pipe annual average effluent limitation for MTBE of 5 µg/L. Assimilative capacity is available for MTBE in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for MTBE have been developed considering the allowance of non-human carcinogen dilution credits.

### 3. Determining the Need for WQBELs

- a. Unless otherwise stated, the Central Valley Water Board conducted the RPA in accordance with section 1.3 of the SIP. Although the SIP applies directly to the control of CTR priority pollutants, the State Water Board has held that the Central Valley Water Board may use the SIP as guidance for water quality-based toxics control.<sup>1</sup> The SIP states in the introduction “*The goal of this Policy is to establish a standardized approach for permitting discharges of toxic pollutants to non-ocean surface waters in a manner that promotes statewide consistency.*” Therefore, unless otherwise stated, in this Order the RPA procedures from the SIP were used to evaluate reasonable potential for both CTR and non-CTR constituents based on information submitted as part of the application, in studies, and as directed by monitoring and reporting programs.

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<sup>1</sup> See Order WQO 2001-16 (Napa) and Order WQO 2004-0013 (Yuba City).

**b. Constituents with Limited Data.** Reasonable potential cannot be determined for the following constituents because effluent data are limited or ambient background concentrations are not available. The Discharger is required to continue to monitor for these constituents in the effluent using analytical methods that provide the best feasible detection limits. When additional data become available, further analysis will be conducted to determine whether to add numeric effluent limitations or to continue monitoring.

- i. 2,3,7,8-TCDD and TCDD-Equivalents.** The CTR includes a criterion for 2,3,7,8-TCDD of 0.013 pg/l for the protection of human health based on consumption of water and organisms and 0.014 pg/L for ingestion of organisms only. The CTR does not include criteria for other dioxin congeners and there are no formally promulgated numeric water quality criteria for the other dioxin congeners. Therefore, determination of reasonable potential and effluent limitations, when appropriate, would be based on an interpretation of the Basin Plan narrative toxicity standard. The SIP does not explicitly direct the Regional Water Boards to establish effluent limits when dioxin congeners are detected in the effluent. Rather it directs the discharger to report the data and in its report to multiply each measured or estimated congener concentration by its respective toxic equivalency factors (TEF) value and report the sum of these values to the Regional Boards.

2,3,7,8-TCDD was not detected in any of the samples collected in the Facility effluent or in the receiving water. The MEC for TCDD-equivalents was 26.0 µg/L. In the effluent two of the congeners, OCDD and 1,2,3,6,7,8-HpCDD were reported as detected. The maximum observed upstream receiving water TCDD-equivalents concentration was 28.0. The CTR includes a criterion for 2,3,7,8-TCDD of 0.013 pg/L for the protection of human health based on consumption of water and organisms and 0.014 pg/L for ingestion of organisms only. The CTR does not include criteria for other dioxin congeners and there are no formally promulgated numeric water quality criteria for the other dioxin congeners. Therefore, determination of reasonable potential and effluent limitations, when appropriate, would be based on an interpretation of the Basin Plan narrative toxicity standard. In the receiving water, two of the congeners OCDD and 1,2,3,6,7,8-HpCDD were reported as detected.

Based on the limited data provided, the Central Valley Water Board is unable to determine if the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for TCDD-equivalents. WQBELs for TCDD-equivalents are not included in this Order due to the fact that 1) only TCDD-equivalents were detected in the effluent and receiving water and not TCDD and, 2) the Sacramento-San Joaquin Delta is not listed as impaired for dioxins and furans.

Due to the concerns of the potential impacts of dioxins and furans on the receiving water, this Order will require consecutive three times annually

monitoring of all 2,3,7,8 TCDD congeners. If monitoring data indicates the potential for exceedance of applicable criteria, then the Central Valley Water Board will reopen the Order and establish applicable WQBELs for TCDD-equivalents. This Order also requires the Discharger to implement measures to evaluate and reduce detected dioxins OCDD and 1,2,3,6,7,8-HpCDD in its discharge to the receiving water. The Special Provision in section VI.C.3.c of this Order requires the Discharger to prepare a 2,3,7,8-TCDD congeners source evaluation and minimization plan. Implementation measures to reduce detectable amounts of congeners may include source control and other effective means. Compliance with these requirements should result in the reduction of detectable amounts of TCDD-equivalents in the effluent discharged to the receiving water.

- ii. **Perchlorate.** The primary MCL for perchlorate is 6 µg/L. As part of the pretreatment monitoring program the Discharger began monitoring for perchlorate in February 2000. The MEC for perchlorate is 600 µg/L and was detected 14 out of 81 samples. All R-1 samples showed no detection for perchlorate. The analytical test method used was EPA 300.0 followed by EPA 314 starting in October 2008. Neither EPA 300.0 or 314 are recommended for wastewater analyses, instead these tests are used for surface and ground water. Both these tests can be influenced by salts and give false positive readings. Starting in February 2009, any detection of perchlorate by EPA 314 is further confirmed with EPA 331. Since initiating the confirmation testing with EPA 331, no perchlorate has been detected in the effluent. This Order requires the Discharger conduct a study for perchlorate to evaluate if perchlorate is actually present in the discharge. If monitoring indicates exceedance of applicable criteria, then the Central Valley Water Board will reopen the Order and will establish applicable WQBELs for perchlorate.
- c. **Constituents with No Reasonable Potential.** WQBELs are not included in this Order for constituents that do not demonstrate reasonable potential; however, monitoring for those pollutants is established in this Order as required by the SIP. If the results of effluent monitoring demonstrate reasonable potential, this Order may be reopened and modified by adding an appropriate effluent limitation.

  - i. **Oil and Grease.** The Basin Plan contains a narrative oil and grease objective which states, "Waters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses."

Effluent oil and grease concentrations from June 2005 to July 2008 are always less than 6 mg/L. Therefore, oil and grease in the discharge has no reasonable potential to cause or contribute to an in-stream excursion above the narrative toxicity objective or Basin Plan numeric objectives and waste load allocation.

**ii. Persistent Chlorinated Hydrocarbon Pesticides.** The Basin Plan requires that no individual pesticides shall be present in concentrations that adversely affect beneficial uses; discharges shall not result in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses; persistent chlorinated hydrocarbon pesticides shall not be present in the water column at detectable concentrations; and pesticide concentrations shall not exceed those allowable by applicable antidegradation policies. Persistent chlorinated hydrocarbon pesticides include aldrin; alpha-BHC; beta-BHC; gamma-BHC (lindane); delta-BHC; chlordane; 4,4-DDT; 4,4-DDE; 4,4-DDD; dieldrin; alpha-endosulfan; beta-endosulfan; endosulfan sulfate; endrin; endrin aldehyde; heptachlor; heptachlor epoxide; and toxaphene.

Aldrin; alpha-BHC; beta-BHC; gamma-BHC; delta-BHC; chlordane; 4,4-DDT; 4,4-DDE; 4,4-DDD; dieldrin; alpha-endosulfan; beta-endosulfan; endosulfan sulfate; endrin; endrin aldehyde; heptachlor; heptachlor epoxide; and toxaphene were not detected in the effluent in concentrations with detection levels ranging from as high as 0.04 µg/L to 0.002. There is no reasonable potential for these constituents to exceed the Basin Plan objectives for persistent chlorinated hydrocarbon pesticides.

**iii. Salinity.** There are no USEPA water quality criteria for the protection of aquatic organisms for electrical conductivity, total dissolved solids, sulfate, and chloride. The Basin Plan contains a chemical constituent objective that incorporates state MCLs, contains a narrative objective, and contains numeric water quality objectives for electrical conductivity, total dissolved solids, sulfate, and chloride.

**Table F-13. Salinity Water Quality Criteria/Objectives**

Parameter	Agricultural WQ Goal <sup>1</sup>	Secondary MCL <sup>3</sup>	Average Ambient Background	Effluent	
				Average	Maximum
EC (µmhos/cm)	Varies <sup>2</sup>	900, 1600, 2200	163	764	960
TDS (mg/L)	Varies	500, 1000, 1500	98	410	540
Sulfate (mg/L)	Varies	250, 500, 600	--	90	110
Chloride (mg/L)	Varies	250, 500, 600	5.1	90	100

<sup>1</sup> Agricultural water quality goals based on *Water Quality for Agriculture*, Food and Agriculture Organization of the United Nations—Irrigation and Drainage Paper No. 29, Rev. 1 (R.S. Ayers and D.W. Westcot, Rome, 1985)

<sup>2</sup> The EC level in irrigation water that harms crop production depends on the crop type, soil type, irrigation methods, rainfall, and other factors. An EC level of 700 umhos/cm is generally considered to present no risk of salinity impacts to crops. However, many crops are grown successfully with higher salinities.

<sup>3</sup> The secondary MCLs are stated as a recommended level, upper level, and a short-term maximum level.

**Table F-14. Basin Plan Water Quality Objectives for EC Sacramento River at Emmaton, Based on Water Year Type (maximum 14-day running average of mean daily EC in µmhos/cm)**

Date	Water Year Type				
	Wet	Above Normal	Below Normal	Dry	Critical
1 April – 14 June	450	450	450	450	2780
15 June – 19 June	450	450	450	1670	2780
20 June – 30 June	450	450	1140	1670	2780
1 July - 15 August	450	630	1140	1670	2780

For priority pollutants, the SIP dictates the procedures for conducting the RPA. EC, TDS, chloride, and sulfate are not priority pollutants. Therefore, the Central Valley Water Board is not restricted to one particular RPA method. Due to the site-specific conditions of the discharge, the Central Valley Water Board has used best professional judgment in determining the appropriate method for conducting the RPA for these non-priority pollutant salinity constituents. For conducting the RPA, the USEPA recommends using a mass-balance approach to determine the expected critical downstream receiving water concentration using a steady-state approach<sup>1</sup>. This downstream receiving water concentration is then compared to the applicable water quality objectives to determine if the discharge has reasonable potential to cause or contribute to an in-stream excursion. This approach allows assimilative capacity and dilution to be factored into the RPA. This USEPA recommended approach has been used for these salinity constituents. The critical downstream receiving water concentration is calculated using equation 2 below:

$$C_r = \frac{Q_s C_s + Q_d C_d}{Q_r} \quad \text{(Equation 2)}$$

Where,

- Q<sub>s</sub> = Critical stream flow (30Q5) recommended by USEPA for non-carcinogen human health criteria.
- Q<sub>d</sub> = Critical effluent flow from discharge flow data (maximum permitted discharge)
- Q<sub>r</sub> = Sum of critical stream flow and critical effluent flow
- C<sub>s</sub> = Critical upstream pollutant concentration
- C<sub>d</sub> = Critical effluent pollutant concentration
- C<sub>r</sub> = Critical downstream receiving water pollutant concentration

<sup>1</sup> USEPA NPDES Permit Writers' Course (EPA 833-B-97-001 rev. October 2009)

The critical stream flow used in this evaluation for the salinity constituents is a 30Q5 flow of 8234 cubic feet per second (cfs) The critical stream flow was calculated based on USGS flow data for the Sacramento River at the Freeport Bridge for the period of 1970 – 2009.

The critical effluent flow,  $Q_d$ , is 181 million gallons per day (mgd) (i.e., 281 cfs), which is the maximum permitted flow allowed in this Order. The critical effluent pollutant concentration,  $C_d$ , was determined using statistics recommended in the TSD for statistically calculating the projected maximum effluent concentration (MEC) (i.e., Table 3-1 of the TSD using the 99% probability basis and 99% confidence level).

**(a) Chloride.** Chloride concentrations in the effluent ranged from 76 mg/L to 100 mg/L, with an average of 91 mg/L. Background concentrations in Sacramento-San Joaquin Delta ranged from 2.1 mg/L to 11 mg/L, with an average of 5.2 mg/L, for 98 samples collected by the Discharger from 15 January 1998 through 12 June 2008. The effluent and receiving water chloride levels do not exceed the agricultural water goal. Therefore, there is no reasonable potential for the discharge to cause or contribute to an instream excursion of the applicable water quality objectives for chloride.

**(b) Electrical Conductivity.** A review of the Discharger's monitoring reports shows an average effluent EC of 764  $\mu\text{mhos/cm}$ , with a range from 369  $\mu\text{mhos/cm}$  to 960  $\mu\text{mhos/cm}$ . The projected maximum effluent concentration, calculated as discussed above, is 972  $\mu\text{mhos/cm}$ . The maximum background receiving water concentration was 260  $\mu\text{mhos/cm}$ , and averaged 160  $\mu\text{mhos/cm}$ , based on 72 samples collected from November 2000 to July 2008. The maximum instream EC concentration is 283  $\mu\text{mhos/cm}$ , using Equation 2, above. The maximum instream EC concentration is less than all applicable water quality objectives for EC. Therefore, there is no reasonable potential for the discharge to cause or contribute to an instream excursion of the applicable water quality objectives for EC.

**(c) Sulfate.** Sulfate concentrations in the effluent ranged from 50 mg/L to 110 mg/L, with an average of 90 mg/L. Background concentrations in the Sacramento-San Joaquin Delta were not monitored. However, based on the low chloride, electrical conductivity, the sulfate concentrations are probably also low. There is no reasonable potential for the discharge to cause or contribute to an instream excursion of the applicable water quality objectives for sulfate.

**(d) Total Dissolved Solids.** The average TDS effluent concentration was 410 mg/L with concentrations ranging from 200 mg/L to 540 mg/L. The projected maximum effluent concentration, calculated as discussed above, is 547 mg/L. The background receiving water TDS ranged from 35 mg/L to

180 mg/L, with an average of 98 mg/L. The maximum instream TDS concentration is 192 mg/L, using Equation 2, above. The maximum instream TDS concentration is less than all applicable water quality objectives for TDS. Therefore, there is no reasonable potential for the discharge to cause or contribute to an instream excursion of the applicable water quality objectives for TDS.

Based on the relatively low reported salinity, the discharge does not have reasonable potential to cause or contribute to an in-stream excursion of water quality objectives for salinity. However, since the discharge is to the Sacramento-San Joaquin Delta, an additional concern is the salt contribution to Delta waters. Allowing the Discharger to increase its current salt loading may be contrary to the Region-wide effort to address salinity in the Central Valley. Therefore, this Order includes a performance-based effluent limitation of 900  $\mu\text{mhos/cm}$  for EC to be applied as an annual average to limit the discharge to current levels. This performance-based effluent limitation was calculated as the 99.9<sup>th</sup> percentile of the running annual average effluent EC based on effluent data from June 2006 through April 2010.

In order to ensure that the Discharger will continue to control the discharge of salinity, this Order includes a requirement to develop and implement a salinity evaluation and minimization plan. Also water supply monitoring is required to evaluate the relative contribution of salt from the source water to the effluent.

#### iv. Lead.

**(a) WQO.** The CTR includes hardness-dependant criteria for the protection of freshwater aquatic life for lead. The criteria for lead are presented in dissolved concentrations. USEPA recommends conversion factors to translate dissolved concentration to total concentrations. The USEPA default conversion factors for lead were used for the discharge.

**(b) RPA Results.** For the effluent, the applicable lead chronic criterion (maximum 4-day average concentration) is 2.1  $\mu\text{g/L}$  and the applicable acute criterion (maximum (1-hour concentration) is 54  $\mu\text{g/L}$ , as total recoverable, (see Table F-9, above). The MEC for total lead was 1.19  $\mu\text{g/L}$ , based on data collected between June 2005 and July 2008. For the receiving water, the applicable lead chronic criterion is 0.57  $\mu\text{g/L}$  and the applicable acute criterion is 15  $\mu\text{g/L}$ , as total recoverable, based on a hardness of 26 mg/L (as  $\text{CaCO}_3$ ), using USEPA default translators. The maximum observed upstream total lead concentration was 0.12  $\mu\text{g/L}$ , based on data from 1992-2008. Based on this information, lead in the discharge does not exhibit reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of freshwater aquatic life.

**v. Silver.**

- (a) WQO.** The CTR includes hardness-dependant criteria for the protection of freshwater aquatic life for silver. The criteria for silver are presented in dissolved concentrations. USEPA recommends conversion factors to translate dissolved concentration to total concentrations. The USEPA default conversion factors for silver were used for the discharge.
- (b) RPA Results.** For the effluent, the applicable silver acute criterion (maximum (1-hour concentration) is 1.8 µg/L, as total recoverable, (see Table F-9, above). The MEC for total silver was 0.15 µg/L, based on data collected between June 2005 and July 2008. For the receiving water, the applicable silver acute criterion is 0.4 µg/L, as total recoverable, based on a hardness of 26 mg/L (as CaCO<sub>3</sub>), using USEPA default translators. The maximum observed upstream total silver concentration was 0.02 µg/L, based on data from 1992-2008. Based on this information, silver in the discharge does not exhibit reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of freshwater aquatic life.

**vi. Zinc.**

- (a) WQO.** The CTR includes hardness-dependant criteria for the protection of freshwater aquatic life for zinc. The criteria for zinc are presented in dissolved concentrations. USEPA recommends conversion factors to translate dissolved concentration to total concentrations. The USEPA default conversion factors for silver were used for the discharge.
- (b) RPA Results.** For the effluent, the applicable zinc chronic criterion (maximum 4-day average concentration) is 99 µg/L and the applicable acute criterion (maximum (1-hour concentration) is 99 µg/L, as total recoverable, (see Table F-9, above). The MEC for total zinc was 33.5 µg/L, based on data collected between June 2005 and July 2008. For the receiving water, the applicable zinc acute and chronic criterion is 38 µg/L, as total recoverable, based on a hardness of 26 mg/L (as CaCO<sub>3</sub>), using USEPA default translators. The maximum observed upstream total zinc concentration was 2.17 µg/L, based on data from 1992-2008. Based on this information, zinc in the discharge does not exhibit reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of freshwater aquatic life.

**vi. 1,2-Diphenyl-hydrazine**

- (a) WQO.** The CTR includes a criterion of 0.04 µg/L for 1,2-diphenyl-hydrazine for the protection of human health for waters from which both water and organisms are consumed.



**(b) RPA Results.** The maximum observed upstream receiving water concentration was not detected out of 17 samples at a MDL of <0.1 µg/L. The maximum effluent concentration (MEC) for 1,2-diphenyl-hydrazine was 2.8 µg/L J-flagged on 8 June 2007 with another J-flagged of 2.1 µg/L on 9 June 2007 out of 85 samples. However, the Discharger submitted a technical memorandum (TM) from Larry Walker Associates dated 26 May 2010 that provided evidence that the two detected samples are not representative of the effluent. The TM found that, “1,2-diphenyl-hydrazine rapidly oxidizes to azobenzene in water. The Agency for Toxic Substances and Disease Registry (ATSDR) toxicological profile<sup>1</sup> reports that analysis of 1,2-diphenylhydrazine in wastewater is “virtually meaningless” because, due to this oxidation, the concentration measured in the sample cannot be directly related to the actual concentration at the time of collection. One study referenced in the ATSDR toxicological profile reported that 1,2-diphenylhydrazine, ‘ . . . instantaneously decomposes to azobenzene in the GC injection port,’ and therefore gas chromatography (GC) is not suitable for detecting 1,2-diphenyl-hydrazine.” This information puts into question the two j-flagged samples that were measured using EPA Method 625, which is a gas chromatography method.

Therefore, at this time there is insufficient information to make a determination whether 1,2-diphenyl-hydrazine in the discharge has reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health. This Order requires the Discharger conduct a study to evaluate the effluent for 1,2-diphenyl-hydrazine using appropriate analytical methods to determine if there is reasonable potential.

**d. Constituents with Reasonable Potential.** The Central Valley Water Board finds that the discharge has a reasonable potential to cause or contribute to an in-stream excursion above a water quality standard for copper, mercury, cyanide, carbon tetrachloride, chlorodibromomethane, dichlorobromomethane, methylene chloride, tetrachloroethylene, pentachlorophenol, bis(2-ethylhexyl)phthalate, dibenzo(ah)anthracene, N-nitrosodimethylamine, aluminum, ammonia, nitrate, manganese, chlorpyrifos and MTBE. WQBELs for these constituents are included in this Order. A summary of the RPA is provided in Attachment G, and a detailed discussion of the RPA for each constituent is provided below.

**i. Aluminum**

**(a) WQO.** The Secondary MCL for aluminum for the protection of the MUN beneficial use is 200 µg/L. In addition, USEPA developed National Recommended Ambient Water Quality Criteria (NAWQC) for protection of freshwater aquatic life for aluminum. The recommended 4-day average

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<sup>1</sup> ATSDR, 1990. Toxicological Profile for 1,2,-Diphenylhydrazine. Available at: <http://www.atsdr.cdc.gov/toxprofiles/tp136.html>.

(chronic) and 1-hour average (acute) criteria for aluminum are 87 µg/L and 750 µg/L, respectively, for waters with a pH of 6.5 to 9.0. USEPA recommends that the ambient criteria are protective of the aquatic beneficial uses of receiving waters in lieu of site-specific criteria. However, information contained in the footnotes to the NAWQC indicate that the development of the chronic criterion was based on specific receiving water conditions where there is low pH (below 6.5) and low hardness levels (below 50 mg/L as CaCO<sub>3</sub>). The Sacramento River (SR) has been measured to have hardness values—typically between 26 and 100 mg/L as CaCO<sub>3</sub>. The SR has been measured above the discharge to have a pH between 6.4 to 8.8. Thus, it is unlikely that application of the chronic criterion of 87 µg/L is necessary to protect aquatic life in the Sacramento River in the vicinity of the discharge. For similar reasons, the Utah Department of Environmental Quality (Department) only applies the 87 µg/L chronic criterion for aluminum where the pH is less than 7.0 and the hardness is less than 50 mg/L as CaCO<sub>3</sub> the receiving water after mixing. For conditions where the pH equals or exceeds 7.0 and the hardness is equal to or exceeds 50 mg/L as CaCO<sub>3</sub>, the Department regulates aluminum based on the 750 µg/L acute criterion. In this site-specific case it is likely that application of the stringent chronic criteria (87µg/L) is overly protective.

- (b) RPA Results.** The maximum effluent concentration (MEC) for acid soluble aluminum was 35.2 µg/L out of 61 samples while the maximum observed upstream receiving water total concentration was 8800 µg/L out of 32 samples. Therefore, aluminum in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above both the NAWQA chronic water quality object and the secondary MCL.
- (c) WQBELs.** Due to no assimilative capacity, dilution credits are not allowed for development of the WQBELs for aluminum. This Order contains a final annual average effluent limitation for aluminum of 200 µg/L based on the secondary MCL. In addition, an AMEL of 503 µg/L and MDEL of 750 µg/L has been applied based on USEPA's NAWQC for aluminum for protection of aquatic life.
- (d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 35.2 µg/L is less than the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

## ii. Ammonia

- (a) WQO.** The NAWQC for the protection of freshwater aquatic life for total ammonia, recommends acute (1-hour average; criteria maximum concentration or CMC) standards based on pH and chronic (30-day average; criteria continuous concentration or CCC) standards based on

pH and temperature. USEPA also recommends that no 4-day average concentration should exceed 2.5 times the 30-day CCC. USEPA found that as pH increased, both the acute and chronic toxicity of ammonia increased. Salmonids were more sensitive to acute toxicity effects than other species. However, while the acute toxicity of ammonia was not influenced by temperature, it was found that invertebrates and young fish experienced increasing chronic toxicity effects with increasing temperature. Because the Sacramento-San Joaquin Delta has a beneficial use of cold freshwater habitat and the presence of salmonids and early fish life stages in the Sacramento-San Joaquin Delta is well-documented, the recommended criteria for waters where salmonids and early life stages are present were used.

The maximum permitted effluent pH is 8.0, and is based on Facility performance. The Basin Plan objective for pH in the receiving stream is the range of 6.5 to 8.5. In order to protect against the worst-case short-term exposure of an organism, a pH value of 8.0 was used to derive the acute criterion. The resulting acute criterion is 5.62 mg/L.

The maximum observed 30-day rolling average temperature and the maximum observed pH of the Sacramento River were used to calculate the 30-day CCC. The maximum observed 30-day average Sacramento River temperature was 72.5°F (22.5°C), for the rolling 30-day period ending 4 September 2001. The maximum observed Sacramento River pH value was 8.0 on 9 September 2000. Using a pH value of 8.0 and the worst-case temperature value of 72.5°F (22.5°C) on a rolling 30-day basis, the resulting 30-day CCC is 1.68 mg/L (as N). The 4-day average concentration is derived in accordance with the USEPA criterion as 2.5 times the 30-day CCC. Based on the 30-day CCC of 1.68 mg/L (as N), the 4-day average concentration that should not be exceeded is 4.2 mg/L (as N).

- (b) RPA Results.** Untreated domestic wastewater contains ammonia. Nitrification is a biological process that converts ammonia to nitrite and nitrite to nitrate. Denitrification is a process that converts nitrate to nitrite or nitric oxide and then to nitrous oxide or nitrogen gas, which is then released to the atmosphere. The Discharger does not currently use nitrification to remove ammonia from the waste stream. Ammonia is known to cause acute and/or chronic toxicity to aquatic organisms. Therefore, the discharge has reasonable potential to cause or contribute to an exceedance of the Basin Plan's narrative toxicity objective in the receiving water.
- (c) Dilution Considerations.** As discussed in Section IV.C.2.d of the Fact Sheet, an allowance for chronic aquatic life dilution may be granted. However, based on the considerations below and discussed in more detail in Attachment J, no dilution has been allowed for ammonia. The Central

Valley Water Board determines that the Discharger must fully nitrify and denitrify its wastewater to reduce ammonia and nitrogen for the following reasons:

- (1) Recent studies suggest that ammonia at ambient concentrations in the Sacramento River, Delta and Suisun Bay may be acutely toxic to native *Pseudodiaptomus forbesi* (copepod).
- (2) A consensus of scientific experts concluded the SRWTP is a major source of ammonia to the Delta<sup>1</sup>.
- (3) Recent studies provide evidence that ammonia from the SRWTP discharge is contributing to the inhibition nitrogen uptake by diatoms in Suisun Bay.
- (4) Ammonia along with the clam, *Corbula* and high turbidity are attributed to reducing diatom production and standing biomass in the Suisun Bay.
- (5) Downstream of the discharge point, ammonia may be a cause in the shift of the aquatic community from diatoms to smaller phytoplankton species that are less desirable as food species.
- (6) Regardless of whether ammonia is directly or indirectly contributing to the POD, ammonia is shown to affect adult *Pseudodiaptomus forbesi* reproduction at concentrations greater than or equal to 0.79 mg/L. And nauplii and juvenile *Pseudodiaptomus forbesi* are affected at ammonia concentrations greater to or equal 0.36 mg/L. These ammonia concentrations can be found downstream of the discharge. The beneficial use protection extends to all aquatic life and not limited to pelagic organisms.
- (7) USEPA expects to publish the 2009 Ammonia Criteria Update which includes more stringent ammonia criteria for freshwater mussels compared with criteria for salmonids in early 2011<sup>2</sup>. Freshwater mussels reside in the Upper Sacramento River above and likely below the SRWTP discharge.
- (8) The Discharger's effluent contains ammonia and BOD at levels that use all the assimilative capacity for oxygen demanding substances in the Sacramento-San Joaquin Delta. This results in no assimilative capacity for other cities and communities to discharge oxygen demanding constituents, which is needed for them to grow despite the fact that most of these cities and communities are already

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<sup>1</sup> Sommer, T., Cl Armor, R. Baxter, L. Brown, M. Chotkowski, S. Culberson, F. Feyrer, M. Gingras, B. Herbold, W. Kimmerer, A. Mueller-Solger, M. Nobriga, and K Souza. 2007. The Collapse of Pelagic Fishes in the Upper San Francisco Estuary. Fisheries 32(6):270-277.

<sup>2</sup> Personal Communication with Lisa Huff USEPA with Kathy Harder, August 2010.

implementing Best Practical Treatment and Control (BPTC) at their own facilities and SRWTP is not.

- (9) The Discharger's effluent contains nitrosoamines at levels that are greater than 100 times the primary MCL. Nitrosamines are disinfection byproducts that are created when wastewater effluent contains ammonia and is then disinfected with chlorine, which is the case at the SRWTP.
- (10) The Discharger must fully comply with Resolution No. 68-16 that requires Best Practical Treatment and Control, which for this discharge includes nitrification and denitrification of their wastewater.
- (11) The mixing zone requirement for the SIP are not met for ammonia:
  - a. Compromise the integrity of the entire water body;
  - b. Adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or state endangered species laws; and
  - c. Produce undesirable or nuisance aquatic life.

**(d) WQBELs.** The Central Valley Water Board calculates WQBELs in accordance with SIP procedures for non-CTR constituents, and ammonia is a non-CTR constituent. The SIP procedure assumes a 4-day averaging period for calculating the long-term average discharge condition (LTA). However, USEPA recommends modifying the procedure for calculating permit limits for ammonia using a 30-day averaging period for the calculation of the LTA corresponding to the 30-day CCC. Therefore, while the LTAs corresponding to the acute and 4-day chronic criteria were calculated according to SIP procedures, the LTA corresponding to the 30-day CCC was calculated assuming a 30-day averaging period. The lowest LTA representing the acute, 4-day CCC, and 30-day CCC is then selected for deriving the average monthly effluent limitation (AMEL) and the maximum daily effluent limitation (MDEL). The remainder of the WQBEL calculation for ammonia was performed according to the SIP procedures. This Order contains a final average monthly effluent limitation (AMEL) and maximum daily effluent limitation (MDEL) for ammonia of 1.8 mg/L and 2.2 mg/L, respectively, based on the NAWQC ammonia criteria for aquatic toxicity with no dilution credit.

**(e) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 45 mg/L is greater than the applicable WQBELs. See Table F-20. Performance-based Effluent Limitations Statistics. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is not feasible and appears to

put the Discharger in immediate non-compliance with the ammonia final effluent limitations. New or modified control measures may be necessary in order to comply with the effluent limitations, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. The Discharger submitted an infeasibility analysis dated August 2010. As discussed in section IV.E of this Fact Sheet, a compliance schedule has been included in this Order for ammonia.

### iii. Bis(2-ethylhexyl) phthalate

- (a) **WQO.** The CTR includes a criterion of 1.8 µg/L for bis(2-ethylhexyl) phthalate for the protection of human health for waters from which both water and organisms are consumed.
- (b) **RPA Results.** The maximum effluent concentration (MEC) for bis(2-ethylhexyl) phthalate was 8.1 µg/L out of 87 samples while the maximum observed upstream receiving water concentration was 0.58 µg/L out of 55 samples. Therefore, bis(2-ethylhexyl) phthalate in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.
- (c) **WQBELs.** The receiving water contains assimilative capacity for bis(2-ethylhexyl) phthalate, therefore, a dilution credit of 56:1 was allowed in the development of the WQBELs for bis(2-ethylhexyl) phthalate. Based on the allowable dilution credit, an AMEL of 94 µg/L and a MDEL of 180 µg/L is calculated. The Central Valley Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilative capacity of bis(2-ethylhexyl) phthalate and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is calculated (see See Table F-20. Performance-based Effluent Limitations Statistics.). This Order contains a final maximum daily effluent limitation (MDEL) for bis(2-ethylhexyl) phthalate of 13 µg/L.
- (d) **Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 8.1 µg/L is less than the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

### iv. Carbon Tetrachloride

- (a) **WQO.** The CTR includes a criterion of 0.25 µg/L for carbon tetrachloride for the protection of human health for waters from which both water and organisms are consumed.
- (b) **RPA Results.** The Discharger collected 101 samples during this time period resulting in 95 non-detect samples (i.e., ranging from <0.06 µg/L to <0.5 µg/L), three J-flagged estimates of 0.1 µg/L, 0.1 µg/L, and 0.2 µg/L,

and three samples above the reporting level at 0.5 µg/L, 1.4 µg/L, and 1.7 µg/L. Therefore, carbon tetrachloride in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.

- (c) **WQBELs.** The receiving water contains assimilative capacity for carbon tetrachloride, therefore, a dilution credit of 56:1 was allowed in the development of the WQBELs for carbon tetrachloride. Based on the allowable dilution credit, an AMEL of 9 µg/L and a MDEL of 17 µg/L is calculated. The Central Valley Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilation capacity of carbon tetrachloride and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is calculated (See Table F-20. Performance-based Effluent Limitations Statistics). This Order contains a maximum daily effluent limitation (MDEL) for carbon tetrachloride of 5.3 µg/L.
- (d) **Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 1.7 µg/L is less than the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

#### v. **Dibenzo(ah)anthracene**

- (a) **WQO.** The CTR includes a criterion of 0.0044 µg/L for dibenzo(ah)anthracene for the protection of human health for waters from which both water and organisms are consumed.
- (b) **RPA Results.** The maximum effluent concentration (MEC) for dibenzo(ah)anthracene was 0.51 µg/L with only one out of 117 samples showing detection while the maximum observed upstream receiving water concentration was 0.0026 µg/L with one detected sample and a J-flagged sample out of 23 samples showing detection. The detection levels varied from 0.001 to 10 µg/L. Therefore, dibenzo(ah)anthracene in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.
- (c) **WQBELs.** Assimilative capacity within a water body is determined using detected and non-detected receiving water samples. Sampling for dibenzo(ah)anthracene was conducted between January 1998 to July 2008. Several analytical laboratory methods were used to detect dibenzo(ah)anthracene with MDLs varying from 10 µg/L to 0.00029 µg/L. To determine assimilative capacity the detected and non-detected sample concentrations are averaged and the averaged number is subtracted from the water quality criterion. If all the non-detected samples are used in determined assimilative capacity calculations then no assimilative capacity for dibenzo(ah)anthracene exists in the receiving water. However, this calculation may not provide an accurate assessment of assimilative

capacity. Since October 2003 EPA method 625 with a MDL of 0.001 µg/L was used to determine if dibenzo(ah)anthracene was detected in the receiving water. One sample was detected with a J-flagged estimate of 0.0021 µg/L. Using 23 samples with EPA method 625 to determine assimilative capacity for dibenzo(ah)anthracene appears to be reasonable without using the samples with greater MDLs. The receiving water contains assimilative capacity for dibenzo(ah)anthracene, therefore, a dilution credit of 56:1 based on the harmonic mean of the river flow was allowed in the development of the WQBELs for dibenzo(ah)anthracene. Based on the allowable dilution credit, an AMEL of 0.2 µg/L and a MDEL of 0.4 µg/L is calculated. This Order contains a final average monthly effluent limitation (AMEL) and maximum daily effluent limitation (MDEL) for dibenzo(ah)anthracene of 0.2 µg/L and 0.4 µg/L, respectively, based on the CTR criterion for the protection of human health.

**(d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 0.51 µg/L is greater than applicable WQBELs. Based on the sample results for the effluent, the limitations appear to put the Discharger in immediate non-compliance. New or modified control measures may be necessary in order to comply with the effluent limitations, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. Furthermore, the effluent limitations for dibenzo(ah)anthracene are a new regulatory requirement within this permit, which becomes applicable to the waste discharge with the adoption of this Order, which was adopted after 1 July 2000. Therefore, a compliance time schedule for compliance with the dibenzo(ah)anthracene effluent limitations is established in TSO No. R5-2010-0115 in accordance with CWC section 13300, that requires preparation and implementation of a pollution prevention plan in compliance with CWC section 13263.3.

#### vi. Chlorodibromomethane

- (a) WQO.** The CTR includes a criterion of 0.41 µg/L for chlorodibromomethane for the protection of human health for waters from which both water and organisms are consumed.
- (b) RPA Results.** The maximum effluent concentration (MEC) for chlorodibromomethane was 0.7 µg/L out of 73 samples while the maximum observed upstream receiving water concentration was not detected out of 44 samples at a MDL of <0.18 µg/L. Therefore, chlorodibromomethane in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.
- (c) WQBELs.** The receiving water contains assimilative capacity for chlorodibromomethane, therefore, a dilution credit of 56:1 was allowed in



the development of the WQBELs for chlorodibromomethane. Based on the allowable dilution credit, an AMEL of 12 µg/L and a MDEL of 25 µg/L is calculated. The Central Valley Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilation capacity of chlorodibromomethane and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is calculated (See Table F-20. Performance-based Effluent Limitations Statistics). This Order contains a maximum daily effluent limitation (MDEL) for chlorodibromomethane of 2.2 µg/L.

**(d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 0.7 µg/L is less than the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

### vii. Dichlorobromomethane

**(a) WQO.** The CTR includes a criterion of 0.56 µg/L for dichlorobromomethane for the protection of human health for waters from which both water and organisms are consumed.

**(b) RPA Results.** The maximum effluent concentration (MEC) for dichlorobromomethane was 2.5 µg/L out of 73 samples while the maximum observed upstream receiving water concentration was not detected out of 44 samples at a MDL of <0.14 µg/L. Therefore, dichlorobromomethane in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.

**(c) WQBELs.** The receiving water contains assimilative capacity for dichlorobromomethane, therefore, a dilution credit of 56:1 was allowed in the development of the WQBELs for dichlorobromomethane. Based on the allowable dilution credit, an AMEL of 27 µg/L and a MDEL of 47 µg/L is calculated. The Central Valley Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilation capacity of dichlorobromomethane and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is calculated (See Table F-20. Performance-based Effluent Limitations Statistics). The performance-based effluent MDEL is 3.4 µg/L. Using the performance-based limit for the MDEL provides protection of the drinking water beneficial use and meets the antidegradation policy of no increase in concentration of dichlorobromomethane discharged by the Facility. This Order contains a final MDEL for dichlorobromomethane of 3.4 µg/L.

**(d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 2.5 µg/L is less than the applicable WQBELs. The

Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

**viii. Methylene Chloride**

- (a) WQO.** The CTR includes a criterion of 4.7 µg/L for methylene chloride for the protection of human health for waters from which both water and organisms are consumed.
- (b) RPA Results.** The maximum effluent concentration (MEC) for methylene chloride was 5.4 µg/L out of 73 samples while the maximum observed upstream receiving water concentration was not detected out of 44 samples at MDL of <0.35 µg/L. Therefore, methylene chloride in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.
- (c) WQBELs.** Although the receiving water contains assimilative capacity for methylene chloride, the Discharger can immediately comply with the applicable WQBELs without dilution. This Order contains a final average monthly effluent limitation (AMEL) and maximum daily effluent limitation (MDEL) for methylene chloride of 4.7 µg/L and 11 µg/L, respectively, based on the CTR criterion for the protection of human health.
- (d) Plant Performance and Attainability.** Analysis of the effluent data shows that the effluent never exceeded the WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

**ix. N-nitrosodimethylamine**

- (a) WQO.** The CTR includes a criterion of 0.00069 µg/L for N-nitrosodimethylamine (NDMA) for the protection of human health for waters from which both water and organisms are consumed. NDMA is a highly mutagenic compound suspected of carcinogenic activity to the human body. NDMA is formed as a disinfection by-product from wastewater and chlorination. Historically, NDMA was used to make rocket fuel until contamination was found in air, soil and water. NDMA is produced currently only as a research chemical. Detection levels for NDMA are greater than the water quality criterion and can range from 0.002 µg/L to 30 µg/L. From June 2005 to July 2008, 15 percent of effluent samples detected NDMA at levels greater than the water criterion. However, this detection percentage may be underestimated since the detection levels for sampling effluent are often too high to detect low concentrations of NDMA. Similarly, the receiving water showed no detectable concentrations for NDMA, but the detection limits are too high to detect low concentrations. The California Department of Water Resources (DWR) is currently studying NDMA in the Sacramento-San

Joaquin Delta. Preliminary data shows NDMA has not been detected at Hood, eight miles downstream of the discharge on the Sacramento River. However, DWR did find the NDMA precursors significantly greater (i.e., 3 to 4 times) below the discharge compared with above the discharge<sup>1</sup>

- (b) RPA Results.** The maximum effluent concentration (MEC) for NDMA between June 2005-July 2008 was 0.044 µg/L (subsequently the MEC was 0.082 µg/L on 6 October 2008) out of 97 samples while the maximum observed upstream receiving water concentration was not detected out of 47 samples at a MDL of <0.01 µg/L. Therefore, NDMA in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.
- (c) WQBELs.** Although NDMA was not detected in the receiving water, the detection level for NDMA is greater than the water quality criterion. Therefore, there is no assimilative capacity, dilution credits are not allowed for development of the WQBELs for NDMA. This Order contains a final average monthly effluent limitation (AMEL) and maximum daily effluent limitation (MDEL) for NDMA of 0.00069 µg/L and 0.0014 µg/L, respectively, based on the CTR criterion for the protection of human health.
- (d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 0.0044 µg/L is greater than applicable WQBELs. Based on the sample results for the effluent, the limitations appear to put the Discharger in immediate non-compliance. New or modified control measures may be necessary in order to comply with the effluent limitations, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. Furthermore, the effluent limitations for NDMA are a new regulatory requirement within this permit, which becomes applicable to the waste discharge with the adoption of this Order, which was adopted after 1 July 2000. Therefore, a compliance time schedule for compliance with the NDMA effluent limitations is established in TSO No. R5-2010-0115 in accordance with CWC section 13300, that requires preparation and implementation of a pollution prevention plan in compliance with CWC section 13263.3.

#### x. Pentachlorophenol

- (a) WQO.** The CTR includes a criterion of 0.28 µg/L for pentachlorophenol for the protection of human health for waters from which both water and organisms are consumed.

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<sup>1</sup> "Investigation into the sources of nitrosamines and their precursors in the Sacramento-San Joaquin Delta, California", Carol L DiGiorgio, California Department of Water Resources, Municipal Water Quality Investigations Unit. Poster presented from 10 -11 August 2009.

- (b) **RPA Results.** The maximum effluent concentration (MEC) for pentachlorophenol was 5.7 µg/L out of 87 samples while the maximum observed upstream receiving water concentration was 0.026 µg/L out of 60 samples. Therefore, pentachlorophenol in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.
- (c) **WQBELs.** The receiving water contains assimilative capacity for pentachlorophenol, therefore, a dilution credit of 56:1 was allowed in the development of the WQBELs for pentachlorophenol. Based on the allowable dilution credit, an AMEL of 12 µg/L and a MDEL of 24 µg/L is calculated. The Central Valley Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilation capacity of pentachlorophenol and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is calculated (See Table F-20. Performance-based Effluent Limitations Statistics). This Order contains a final MDEL for pentachlorophenol of 18 µg/L.
- (d) **Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 5.7 µg/L is less than the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible

#### xi. Tetrachloroethylene

- (a) **WQO.** The CTR includes a criterion of 0.8 µg/L for tetrachloroethylene for the protection of human health for waters from which both water and organisms are consumed.
- (b) **RPA Results.** The maximum effluent concentration (MEC) for tetrachloroethylene was 0.9 µg/L out of 73 samples while the maximum observed upstream receiving water concentration was 0.21 µg/L out of 43 samples. Therefore, tetrachloroethylene in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.
- (c) **WQBELs.** The receiving water contains assimilative capacity for pentachlorophenol, therefore, a dilution credit of 56:1 was allowed in the development of the WQBELs for tetrachloroethylene. Based on the allowable dilution credit, an AMEL of 37 µg/L and a MDEL of 75 µg/L is calculated. The Central Valley Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilation capacity of tetrachloroethylene and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is calculated (See Table F-20. Performance-based Effluent Limitations Statistics). This Order contains a final MDEL for tetrachloroethylene of 4.4 µg/L.

- (d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 0.9 µg/L is less than the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

## xii. Copper

- (a) WQO.** The CTR includes hardness-dependant criteria for the protection of freshwater aquatic life for copper. The criteria for copper are presented in dissolved concentrations. USEPA recommends conversion factors to translate dissolved concentration to total concentrations. The USEPA default conversion factors for copper in freshwater of 0.96 for both the acute and the chronic criteria were used for the discharge.
- (b) RPA Results.** For the effluent, the applicable copper chronic criterion (maximum 4-day average concentration) is 7.7 µg/L and the applicable acute criterion (maximum (1-hour concentration) is 11 µg/L, as total recoverable, (see Table F-9, above). The MEC for total copper was 6.34 µg/L, based on data collected between June 2005 and July 2008. For the receiving water, the applicable copper chronic criterion is 3.0 µg/L and the applicable acute criterion is 4.0 µg/L, as total recoverable, based on a hardness of 26 mg/L (as CaCO<sub>3</sub>), using USEPA default translators. The maximum observed upstream total copper concentration was 20.4 µg/L, based on data from 1992-2008. Based on this information, copper in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of freshwater aquatic life.
- (c) WQBELs.** As discussed in Section IV.C.3.d.vi of the Fact Sheet, the Facility can meet end-of-pipe effluent limits for copper. Therefore, dilution credits have not been applied in the calculation of the WQBELs.

Using the acute and chronic ECAs for copper shown in Table F-9, above, this Order contains final Average Monthly Effluent Limitations (AMEL) and Maximum Daily Effluent Limitations (MDEL) for copper of 7.3 µg/L and 9.3 µg/L (total recoverable), respectively.

- (d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 6.7 µg/L is less than the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

## xiii. Cyanide

- (a) WQO.** The CTR includes maximum 1-hour average and 4-day average criteria of 22 µg/L and 5.2 µg/L, respectively, for cyanide for the protection of freshwater aquatic life.

- (b) **RPA Results.** The maximum effluent concentration (MEC) for cyanide was 10 µg/L while the maximum observed upstream receiving water concentration was 5.0 µg/L. Therefore, cyanide in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of freshwater aquatic life.
- (c) **WQBELs.** As discussed in Section IV.C.3.d.vi of the Fact Sheet, based on Facility performance acute aquatic life dilution is not needed and has not been allowed for cyanide. However, chronic aquatic life dilution may be allowed for cyanide. Based on results of the Discharger's dynamic model for compliance with the CTR criteria for cyanide at the edge of the chronic aquatic life mixing zone, MDEL of 22 µg/L, and an AMEL of 11 µg/L is calculated. The Central Valley Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilation capacity of cyanide and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is calculated (See Table F-20. Performance-based Effluent Limitations Statistics). This Order contains a maximum daily effluent limitation (MDEL) for cyanide of 11 µg/L.
- (d) **Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 10 µg/L is less than the MDEL. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

#### xiv. Manganese

- (a) **WQO.** The Secondary MCL – Consumer Acceptance Limit for manganese is 50 µg/L which is used to implement the Basin Plan's chemical constituent objective for the protection of municipal and domestic supply.
- (b) **RPA Results.** The maximum effluent concentration (MEC) for dissolved manganese was 82 µg/L out of 34 samples while the maximum observed upstream receiving water concentration was 5 µg/L out of 7 samples. Therefore, manganese in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the secondary MCL.
- (c) **WQBELs.** The receiving water contains assimilative capacity for manganese, therefore, a dilution credit of 56:1 was allowed in the development of the WQBELs for manganese. Based on the allowable dilution credit, an annual average effluent limit of 2700 µg/L is calculated. The Central Valley Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilation capacity of manganese and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is calculated (See Table F-20. Performance-based Effluent Limitations

Statistics). The performance-based annual average effluent limit is 85 µg/L. This Order contains MDEL for manganese of 85 µg/L.

- (d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 82 µg/L is less than the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

#### **xv. Methyl Tertiary Butyl Ether (MTBE)**

- (a) WQO.** The Secondary MCL – Consumer Acceptance Limit for MTBE is 5.0 µg/L, which is used to implement the Basin Plan’s chemical constituent objective for the protection of municipal and domestic supply.
- (b) RPA Results.** The maximum effluent concentration (MEC) for methyl tertiary butyl ether (MTBE) was 5.8 µg/L out 101 samples while the maximum observed upstream receiving water concentration was 1.9 µg/L out of 30 samples. Therefore, MTBE in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the secondary MCL.
- (c) WQBELs.** The receiving water contains assimilative capacity for MTBE, therefore, a dilution credit of 56:1 was allowed in the development of the WQBELs for MTBE. Based on the allowable dilution credit, an annual average effluent limit of 260 µg/L is calculated. The Central Valley Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water’s assimilation capacity of MTBE and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is calculated (See Table F-20. Performance-based Effluent Limitations Statistics). This Order contains MDEL for MTBE of 18 µg/L.
- (d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 5.8 µg/L is less than the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

#### **xvi. Chlorine Residual**

- (a) WQO.** USEPA developed NAWQC for protection of freshwater aquatic life for chlorine residual. The recommended 4-day average (chronic) and 1-hour average (acute) criteria for chlorine residual are 0.011 mg/L and 0.019 mg/L, respectively. These criteria are protective of the Basin Plan’s narrative toxicity objective.
- (b) RPA Results.** The Discharger uses chlorine for disinfection, which is extremely toxic to aquatic organisms. The Discharger uses a sulfur dioxide process to dechlorinate the effluent prior to discharge to

Sacramento River. Due to the existing chlorine use and the potential for chlorine to be discharged, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the NAWQC.

- (c) **WQBELs.** The USEPA Technical Support Document for Water Quality-Based Toxics Control [EPA/505/2-90-001] contains statistical methods for converting chronic (4-day) and acute (1-hour) aquatic life criteria to average monthly and maximum daily effluent limitations based on the variability of the existing data and the expected frequency of monitoring. However, because chlorine is an acutely toxic constituent that can and will be monitored continuously, an average 1-hour limitation is considered more appropriate than an average daily limitation. This Order contains a 4-day average effluent limitation and 1-hour average effluent limitation for chlorine residual of 0.011 mg/L and 0.019 mg/L, respectively, based on USEPA's NAWQC, which implements the Basin Plan's narrative toxicity objective for protection of aquatic life.
- (d) **Plant Performance and Attainability.** Although, the Discharger violated the chlorine residual limit twice since June 2005, the Central Valley Water Board believes that immediate compliance with these effluent limitations is feasible.

**xvii. Chlorpyrifos and Diazinon**

- (a) **WQO.** The Central Valley Water Board recently completed a total maximum daily load (TMDL) for chlorpyrifos and diazinon in the Sacramento and Feather Rivers and amended the Basin Plan to include chlorpyrifos and diazinon waste load allocations and water quality objectives on 23 June 2006. The Basin Plan contains water quality objectives for chlorpyrifos of 0.025 µg/L as a 1-hour average and 0.015 µg/L as a 4-day average for the Sacramento River from the Colusa Basin Drain to the I Street Bridge. The Basin Plan also states that "Compliance with water quality objectives, waste load allocations, and load allocations for diazinon and chlorpyrifos in the Sacramento and Feather Rivers is required by August 11, 2008"
- (b) **RPA Results.** The maximum effluent concentration (MEC) for chlorpyrifos was 0.039 µg/L while the maximum observed upstream receiving water concentration was 0.006 µg/L. Therefore, chlorpyrifos in the discharge has reasonable potential to cause or contribute to an in-stream excursion above the Basin Plan's water quality objective for chlorpyrifos. Diazinon has not be detected in the effluent.
- (c) **WQBELs.** The waste load allocations (WLA) for chlorpyrifos and diazinon have been adopted as water quality objectives in the Basin Plan. NPDES dischargers must meet the WLA, therefore, no dilution can be granted for compliance with the water quality objectives for chlorpyrifos and diazinon. Due to the additive toxicity of chlorpyrifos and diazinon, the Basin Plan



established that the WLA for all NPDES-permitted dischargers shall not exceed the sum (S) of one (1) as defined below.”

$$S = \frac{C_D}{WQO_D} + \frac{C_C}{WQO_C} \leq 1.0$$

Where:

$C_D$  = diazinon effluent concentration in  $\mu\text{g/L}$

$C_C$  = chlorpyrifos effluent concentration in  $\mu\text{g/L}$

$WQO_D$  = acute or chronic diazinon water quality objective in  $\mu\text{g/L}$ .

$WQO_C$  = acute or chronic chlorpyrifos water quality objective in  $\mu\text{g/L}$ .

Average monthly effluent limits and maximum daily effluent limits have been calculated using the procedures in Section 1.4 of the SIP resulting in the following effluent limits for chlorpyrifos and diazinon:

#### Average Monthly Effluent Limit

$$S_{AMEL} = \frac{C_{D-avg}}{0.08} + \frac{C_{C-avg}}{0.012} \leq 1.0$$

$C_{D-avg}$  = average monthly diazinon effluent concentration in  $\mu\text{g/L}$

$C_{C-avg}$  = average monthly chlorpyrifos effluent concentration in  $\mu\text{g/L}$

#### Maximum Daily Effluent Limit

$$S_{MDEL} = \frac{C_{D-max}}{0.16} + \frac{C_{C-max}}{0.025} \leq 1.0$$

$C_{D-max}$  = maximum daily diazinon effluent concentration in  $\mu\text{g/L}$

$C_{C-max}$  = maximum daily chlorpyrifos effluent concentration in  $\mu\text{g/L}$

**(d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 0.039  $\mu\text{g/L}$  is greater than applicable WQBELs. Based on the sample results for the effluent, the limitations appear to put the Discharger in immediate non-compliance. New or modified control measures may be necessary in order to comply with the effluent limitations, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. Furthermore, the effluent limitations for chlorpyrifos are a new regulatory requirement within this permit, which becomes applicable to the waste discharge with the adoption of this Order, which was adopted after 1 July 2000. Therefore, a compliance time schedule for compliance with the chlorpyrifos effluent limitations is established in TSO No. R5-2010-0115 in accordance with

CWC section 13300, that requires preparation and implementation of a pollution prevention plan in compliance with CWC section 13263.3.

**xviii. Mercury**

- (a) **WQO.** The Central Valley Water Board adopted Resolution No. R5-2010-0043 on 22 April 2010, Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Methylmercury and total mercury in the Sacramento-San Joaquin Delta Estuary. The methylmercury amendment adopts an implementation plan for limiting methylmercury discharged by point sources, including the Discharger. Phase I of the amendments requires a performance limit based on the 99.9 percentile of 12-month running effluent inorganic (total) mercury loads (lbs/year). Additionally, the amendments assign wastewater methylmercury (MeHg) allocations, for the Discharger, the load allocation is 89 g/year as described in Table B – Municipal and Industrial Wastewater Methylmercury (MeHg) Allocations, Attachment 1 of the amendments.

The current NAWQC for protection of freshwater aquatic life, continuous concentration, for mercury is 0.77 µg/L (30-day average, chronic criteria). The CTR contains a human health criterion (based on a threshold dose level causing neurological effects in infants) of 0.050 µg/L for waters from which both water and aquatic organisms are consumed. Both values are controversial and subject to change. In 40 CFR Part 131, USEPA acknowledges that the human health criteria may not be protective of some aquatic or endangered species and that “...*more stringent mercury limits may be determined and implemented through use of the State’s narrative criterion.*” In the CTR, USEPA reserved the mercury criteria for freshwater and aquatic life and may adopt new criteria at a later date.

- (b) **RPA Results.** According to the April 2010 Delta methylmercury TMDL staff report, during water years 2000-2003 and the mercury TMDL staff, SRCSD contributed an annual average methylmercury load of 162 g/yr to the Delta. The March 2008 SRCSD Localized Bioaccumulation Study determined that SRCSD’s effluent contributes about the same amount of methylmercury to bioaccumulation in the Sacramento River as expected from effluent and river methylmercury load estimates. SRCSD’s discharge during the field work (July-November 2006, a low flow period during an overall wet year) represented about 1.5% of the flow and about 7% of the methylmercury load in the Sacramento River. Mercury in short-lived biosentinel fish (silversides and juvenile bass) increased 9 to 13% downstream of the outfall, but longer-lived fish (prickly sculpin) decreased by 9%. The Study report stated, “There was a measurable (i.e., statistically significant) effect of SRWTP effluent on most bio-indicator organisms downstream of the outfall during low-flow river conditions that provide the least amount of dilution. But, the evidence of localized

environmental risk is not so clear and convincing that a reasonable decision maker would conclude that some action must be taken locally.” The evidence presented in this report argues that an offset program “is acceptable for addressing the regional problem of mercury levels in fish.” SRCSD methylmercury loading to the Sacramento River has generally decreased during the last several years. However, SRCSD has contributed as much as 20 to 30% of loading to the river at peak times during drier periods when effluent methylmercury concentrations were higher, and could make similarly substantial contributions during future dry periods, especially if SRCSD increases its discharge.

The maximum observed effluent mercury concentration was 0.0106 µg/L. Mercury bioaccumulates in fish tissue and, therefore, the discharge of mercury to the receiving water may contribute to exceedances of the narrative toxicity objective and impact beneficial uses. The Sacramento-San Joaquin Delta has been listed as an impaired water body pursuant to CWA section 303(d) because of mercury and the discharge must not cause or contribute to increased mercury levels.

**(c) WQBELs.** This Order contains a performance-based mass effluent limitation of 2.3 lbs/year for total mercury for the effluent discharged to the receiving water. The mass limitation was derived in accordance with the Delta Methylmercury TMDL (The 99.9<sup>th</sup> percentile of running annual total mercury loading based on effluent data from January 2005 through April 2010.) Order No. 5-00-188 prescribed a mercury mass load limit and a mercury “credit” program. The Discharger discharged less than the prescribed load limit, so has accumulated mercury discharge credits. Since this permit establishes a performance-based mercury limit with which the discharger can comply, the accumulated credit is not applied against future discharges under this Order.

**(d) Plant Performance and Attainability.** The new effluent limitation for mercury is based on the performance of the Facility, therefore, immediate compliance can be achieved.

#### **xix. Nitrate and Nitrite**

**(a) WQO.** DPH has adopted Primary MCLs for the protection of human health for nitrite and nitrate that are equal to 1 mg/L and 10 mg/L (measured as nitrogen), respectively. DPH has also adopted a primary MCL of 10 mg/L for the sum of nitrate and nitrite, measured as nitrogen.

USEPA has developed a primary MCL and an MCL goal of 1 mg/L for nitrite (as nitrogen). For nitrate, USEPA has developed Drinking Water Standards (10 mg/L as Primary MCL) and NAWQC for protection of human health (10 mg/L for non-cancer health effects). Recent toxicity

studies have indicated a possibility that nitrate is toxic to aquatic organisms.

- (b) RPA Results.** Untreated domestic wastewater contains ammonia. Nitrification is a biological process that converts ammonia to nitrite and nitrite to nitrate. Denitrification is a process that converts nitrate to nitrite or nitric oxide and then to nitrous oxide or nitrogen gas, which is then released to the atmosphere. Nitrate and nitrite are known to cause adverse health effects in humans. Inadequate or incomplete denitrification may result in the discharge of nitrate and/or nitrite to the receiving stream. The conversion of ammonia to nitrites and the conversion of nitrites to nitrates present a reasonable potential for the discharge to cause or contribute to an in-stream excursion above the Primary MCLs for nitrite and nitrate.

Currently, the Discharger's effluent contains very low concentrations of nitrate, ranging from 0.016 to 1.4 mg/L with an average of 0.13 mg/L. However, this Order requires the Discharger fully nitrify its effluent, therefore, the ammonia will convert to nitrate and the nitrate concentrations will increase. Therefore, the discharge has reasonable potential to cause or contribute to an exceedance of the water quality objectives for nitrite and nitrate in the receiving water.

- (c) WQBELs.** As discussed in Section IV.C.2.d no dilution is allowed for nitrate. Therefore, this Order requires the wastewater is denitrified to meet the primary MCL at the end-of-pipe. An average monthly effluent limit of 10 mg/L for nitrate (as nitrogen) is included in this Order. This is based on the primary MCL of 10 mg/L (as N).

- (d) Plant Performance and Attainability.** Analysis of the effluent data demonstrates that the Facility can immediately comply with the new WQBELs for nitrate.

## **xx. Pathogens**

- (a) WQO.** DPH has developed reclamation criteria, CCR, Division 4, Chapter 3 (Title 22), for the reuse of wastewater. Title 22 requires that for spray irrigation of food crops, parks, playgrounds, schoolyards, and other areas of similar public access, wastewater be adequately disinfected, oxidized, coagulated, clarified, and filtered, and that the effluent total coliform levels not exceed 2.2 MPN/100 mL as a 7-day median. As coliform organisms are living and mobile, it is impracticable to quantify an exact number of coliform organisms and to establish weekly average limitations. Instead, coliform organisms are measured as a most probable number and regulated based on a 7-day median limitation.

Title 22 also requires that recycled water used as a source of water supply for non-restricted recreational impoundments be disinfected tertiary

recycled water that has been subjected to conventional treatment. A non-restricted recreational impoundment is defined as “...an impoundment of recycled water, in which no limitations are imposed on body-contact water recreational activities.” Title 22 is not directly applicable to surface waters; however, the Central Valley Water Board finds that it is appropriate to apply an equivalent level of treatment to that required by the Department of Public Health’s reclamation criteria because the receiving water is used for irrigation of agricultural land and for contact recreation purposes. The stringent disinfection criteria of Title 22 are appropriate since the partially diluted effluent may be used for the irrigation of food crops and/or for body-contact water recreation. Coliform organisms are intended as an indicator of the effectiveness of the entire treatment train and the effectiveness of removing other pathogens.

**(b) RPA Results.** The beneficial uses of the Sacramento-San Joaquin Delta include municipal and domestic supply, water contact recreation, and agricultural irrigation supply. To protect these beneficial uses, the Central Valley Water Board finds that the wastewater must be disinfected and adequately treated to prevent disease. The method of treatment is not prescribed by this Order; however, wastewater must be treated to a level equivalent to that recommended by DPH.

Pathogens include bacterium, viruses and protozoans, which exist in natural waters and wastewater. Pathogens are difficult to detect, because of the typically low abundance in most waters. Therefore, indicator bacteria (e.g., total coliform organisms) are used as a barometer of pathogen water quality. NPDES permits include total coliform limitations to measure the effectiveness of disinfection processes. Specific protozoans of concern for the Central Valley Drinking Water Group are *Giardia* and *Cryptosporidium* from human and animal fecal waste. Both protozoans are in municipal wastewater and can cause diarrhea, vomiting and cramps. For immune suppressed individuals, the illness can be very serious, including death.

The Sacramento River near the diffuser is a popular sport fishing area<sup>1</sup>. In addition, there are at least 20 agricultural diversions within 1 mile upstream and 2 miles downstream of the discharge<sup>2</sup>. Based upon information submitted by SRCSD, the typical construction of the agricultural irrigation water intakes in the vicinity of the outfall would draw water from near the bank of the river, below the water surface (deep enough to not go dry during low river levels, but far enough from the river

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<sup>1</sup> “Localized Mercury Bioaccumulation Study”, Larry Walker Associates, March 2008, Figure ES-1.

<sup>2</sup> NPDES Permit Renewal Issues – Drinking Water Supply and Public Health, SRWTP, 14 December 2009, CVRWQCB

bottom to not be impacted by bottom sediments). It appears that undiluted effluent will not be drawn into the agricultural intakes, but varying mixtures of effluent and river water will be diverted from the partially mixed discharge plume. The nearest drinking water intake is approximately one mile upstream at the new Freeport water intake. River flow modeling conducted by SRCSD concluded that the SRCSD discharge will not be carried far enough upriver during incoming tides to be captured by the Freeport intake, however an operating agreement between the East Bay Municipal Utility District and SRCSD will prevent diversion of river water possibly containing diluted treated wastewater at the Freeport water intake. The diffuser for the discharge to the Sacramento River is located in the vicinity of many agricultural water intakes and an area popular with fishermen.

The Central Valley Water Board generally follows a November 1980 general recommendations by the Department of Public Health (DPH) on the appropriate levels of disinfection for protection of body-contact recreation in waters downstream of a sewage treatment plant discharge. The general DPH recommendation allows a discharge of secondary treatment with chlorination when there is a minimum of 20-to-1 dilution (river to discharge), and suggests tertiary filtration when less than 20-to-1 dilution is available. The DPH recommendations are a “rule of thumb” and are not regulation. Site-specific disinfection recommendations are often sought from DPH in preparing NPDES permits.

Even when the 20-to-1 “rule of thumb” is followed, the available dilution often far exceeds a 20-to-1 river to discharge flow ratio. The dilution ratio for the District’s discharge is typically greater than 20-to-1, but can be at times less than 20:1. The following is a list of all municipal sewage treatment plant discharges to the Sacramento River downstream of Shasta Dam and the associated average dilution ratios (river-to-effluent). As noted, some of these treatment facilities have a tertiary filtration process preceding the disinfection process, which reduces the pathogen concentrations, although the filtration systems themselves are not designed and operated to produce a pathogen-free effluent (i.e. Title 22, or equivalent, filtration system).

<b>Facility</b>	<b>Permitted Flow</b>	<b>Average Dilution</b>
<b>Sacramento Regional CSD WWTP (no filtration)</b>	<b>181 mgd</b>	<b>50-to-1</b>
City of Redding Stillwater WWTP (filtered)	4 mgd	1200-to-1
City of Redding Clear Creek WWTP (filtered)	8.8 mgd	600-to-1
City of Corning WWTP (no filtration)	1.4 mgd	4100-to-1
City of Anderson WWTP (filtered)	1.4 mgd	2400-to-1
City of Rio Vista Beach WWTP (no filtration)	0.65 mgd	10,000-to-1
City of Chico WWTP (no filtration)	12 mgd	400-to-1
City of Red Bluff WWTP (filtered)	2.5 mgd	2600-to-1

Due to site-specific circumstances of the discharge to the Delta being a major drinking water supply and the high degree of direct public contact with the river at the point of discharge and downstream of the point of discharge, the Central Valley Water Board staff sought a recommendation of DPH rather than rely on the 1980 general recommendation. In a 11 May 2009 letter to the DPH, Central Valley Water Board staff requested guidance on the appropriate disinfection requirements for the removal of pathogens in the renewed NPDES permit for protection of beneficial uses for contact recreation and agricultural irrigation. Central Valley Water Board staff also requested DPH's advice on whether the Discharger's chlorine disinfection system would be expected to provide adequate disinfection to kill pathogenic organisms. Furthermore, Central Valley Water Board staff requested guidance on whether Dr. Robert Emerick's<sup>1</sup> research that the Discharger's effluent had high (20) percent of coliform associated particles could be under estimating the pathogenic risk of the discharge. This concern is due to the fact that the multiple-tube fermentation test used to measure the total coliform organisms in the effluent does not adequately enumerate target organisms that occur in a particle-associated state.

DPH requested a formal health risk assessment be conducted to determine the risk of *Giardia* cysts and *Cryptosporidium* oocysts might pose to persons engaging in body contact recreation in the portions of the Sacramento River affected by the discharge. DPH determined that if contact recreation is protected then agricultural irrigation and other Delta beneficial uses that could be impacted by pathogens would also be protected.

The Discharger engaged the professional services of Dr. Charles Gerba of the University of Arizona to conduct the human health risk assessment. The assessment determined the risk to pathogenic protozoans nearly quadruples from upstream of the discharge to downstream of the discharge. Dr. Gerba's risk assessment concluded that SRWTP discharge did not exceed the USEPA's water quality criteria for contact recreation. Based on Dr. Gerba's "Estimated Risk of Illness from Swimming in the Sacramento River", 23 February 2010, the DPH recommended in a letter dated, 15 June 2010, to Central Valley Water Board that the Discharger provide "additional treatment sufficient to reduce the additional risk of infection posed by exposure to its discharge to as close to 1 in 10,000 as can be achieved by a cost-effective combination of using filtration and/or a disinfection process that effectively inactivates *Giardia* cysts and *Cryptosporidium* oocysts". DPH concluded that providing additional treatment would also address the concerns with

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<sup>1</sup> Emerick, Robert W., Factors Influencing Ultraviolet Disinfection Performance Part II: Association of Coliform Bacteria with Wastewater Particles, Water Environment Research, Volume 71, Number 6, 2000.

the lack of a chlorine contact chamber as well as particle-associated coliform in the SRWTP's effluent.

The Discharger disagreed with the DPH in a letter to the Central Valley Water Board dated and 30 June 2010. The Discharger contended:

- (1) Risk levels due to Cryptosporidium and Giardia in the Sacramento River do not show a statistically significant difference between upstream of the discharge and immediately downstream of the discharge, however, minor statistically significant change in risk is determined 1.5 miles downstream of the discharge and may be due to other impacts.
- (2) DPH's risk of 1 in 10,000 is contrary to 1986 USEPA's national risk criteria of 8 illnesses in 1,000 exposures.
- (3) DPH's contention that the 1986 criteria for contact recreational use protection are outdated or did not consider human pathogens is incorrect.
- (4) Dr. Gerba's assumptions are very conservative and changing just one assumption would reduce the risk to less than 1 in 10,000.
- (5) DPH's recommendation is establishing a new unadopted standard that exceeds requirements for other NPDES permits.

SRCSO recommends, instead, that the USEPA Beach Standard<sup>1</sup> for freshwater recreational exposure of 8 illnesses per 1000 exposures, be used as the level of human health protection. SRCSO additionally states that the discharge does not create a health risk greater than the USEPA Beach Standard.

The USEPA Beach Standard is not an appropriate or applicable standard for the discharge of treated sewage, a controllable source of pathogens. In the Forward of the Beach Standards, the then Director of the USEPA Criteria and Standards Division states: "The bacteriological water quality criteria recommended in this document are based on an estimate of bacterial indicator counts and gastrointestinal illness rates that are currently being accepted, albeit unknowingly, in many circumstances, by the States." The Beach Standard of 8 illnesses for 1000 exposures is not a policy of USEPA nor does it state that this is an acceptable rate of illness. It is instead a recognition that there is a health risk associated with recreational use of freshwaters, even when those waters in and of themselves are considered to be free of health risk. Wildlife, non-point source discharges, and the recreationists themselves, all contribute pathogens to the freshwaters used for recreation. If a controllable sewage treatment plant discharge is allowed to add pathogens to a receiving water such that the health risk is at the USEPA Beach Standard, the uncontrollable sources and contribution of pathogens from wildlife, non-

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<sup>1</sup> "Ambient Water Quality Criteria for Bacteria – 1986" EPA 440/5-84-002, January 1986



point source pollution, and the recreationalists, will cause the overall health risk to exceed the 8 illness per 1000 exposures. If the Beach Standard is applied to the SRCSD discharge, under the most critical river conditions, the SRCSD discharge would cause nearly 1 of every 100 people ingesting river water during recreation to become ill from pathogens in the SRCSD discharge, which is in addition to any contribution of health risk from other sources.

Given the very high level of public contact with the receiving water, the use of the receiving water for irrigation which can result in human contact with pathogens, and extensive use of Delta waters as private and public water supplies, any increased risk of illness and infection from exposure to the wastewater is not protective of the municipal, agricultural or recreational beneficial use. This permit requires an essentially pathogen-free wastewater, which will incidentally implement DPH's recommendation to improve the level of disinfection to remove protozoa in addition to bacteria, enteric virus and other pathogens. Several technologies are available to achieve this, all essentially involving filtration to produce a very low-solids effluent, which is then dosed with a disinfectant (usually chlorine or UV light). The combination of filtration and disinfectant effectively removes all pathogens. Requirements of Title 22 will be adequate to meet the 1 in 10,000 risk and 1 log removal recommended by the DPH.

In addition to protecting the beneficial uses of agricultural irrigation and contact recreation, filtration will also reduce total organic carbon (TOC), a constituent of concern for the Drinking Water Advisory Group, and substantial reductions in effluent concentrations for copper, mercury, TSS and BOD. BOD is a concern due to its oxygen demand to the Sacramento River. Improved effluent treatment may also reduce concentrations of other constituents, such as Constituents of Emerging Concern (CECs), although whether or not reductions of these chemicals do occur, and the magnitude of any such reductions, is unknown at this time. Similar POTWs that implement tertiary treatment and discharge to the Sacramento-San Joaquin Delta or its tributaries include:

Community of El Dorado Hills	City of Roseville
City of Manteca	City of Woodland
City of Stockton	City of Placerville
City of Lodi	Community of Colfax
City of Galt	Live Oak
City of Tracy	Community of Mountain House
City of Rio Vista, Northwest Plant	Linda County Water District

The health risk study conducted by SRCSD focused on pathogen impacts from body contact recreation because that was determined, through consultation with DPH, that recreational contact with the Sacramento River has the highest degree of water contact and risk of illness. If contact

recreation is fully protected from pathogen risk, other beneficial uses will also be protected. There are other beneficial uses that can be impacted by pathogens in the SRCSD discharge.

- **Agricultural irrigation beneficial use.** Some crops, such as strawberries and carrots, can transmit pathogens in the irrigation water to human consumers. Irrigation water intakes in the immediate vicinity of the discharge are not an issue because the irrigation water is drawn from the sides of the river outside of the SRCSD mixing zone, so those agricultural irrigation diversions contain no SRCSD wastewater. Any agricultural diversion more than a mile or so downstream of the discharge point will contain some amount of SRCSD discharge and the pathogens in the discharge. For any agricultural irrigation with water containing SRCSD discharge, there is an increased pathogen loading onto the crops due the SRCSD discharge. No specific study was conducted to quantify this health risk. However, tertiary filtration to remove pathogens will eliminate this increased health risk.
- **Drinking Water (MUN) beneficial use.** The Sacramento River and Delta downstream of the SRCSD discharge are used extensively for municipal and domestic drinking water supply. The raw water supply for these drinking water systems contains increased concentrations of pathogens as the result of SRCSD's existing discharge, although the health risk caused by the increased pathogen concentrations has not been studied. Municipal drinking water intakes that provide full drinking water treatment required by State and Federal regulations should be able to remove the increased pathogens without a health risk to the consumers. However, there are small drinking water systems throughout the Delta that are not legally required to meet these State and Federal regulations, and so may not have treatment systems that can dependably remove the pathogens. Additionally, there can be incidental drinking of raw Delta water by the public.

**(c) WQBELs.** In accordance with the requirements of Title 22, this Order includes effluent limitations for total coliform organisms of 2.2 MPN/100 mL as a 7-day median; 23 MPN/100 mL, not to be exceeded more than once in a 30-day period; and 240 MPN/100 mL as an instantaneous maximum.

In addition to coliform limitations, a turbidity specification has been included as a second indicator of the effectiveness of the treatment process and to assure compliance with the required level of treatment. The tertiary treatment process, or equivalent, is capable of reliably meeting a turbidity of 2 nephelometric turbidity units (NTU) as a daily average. Failure of the filtration system such that virus removal is impaired would normally result in increased particles in the effluent, which

result in higher effluent turbidity. Turbidity has a major advantage for monitoring filter performance, allowing immediate detection of filter failure and rapid corrective action. Coliform testing, by comparison, is not conducted continuously and requires several hours, to days, to identify high coliform concentrations. To ensure compliance with the DPH Title 22 disinfection criteria, this Order contains operational turbidity specifications to be met prior to disinfection.

This Order contains effluent limitations and requires a tertiary level of treatment, or equivalent, necessary to protect the beneficial uses of the receiving water. The Regional Water Board has considered the following factors in CWC section 13241:

- (1) The past, present and probable future beneficial uses of the Sacramento River and Delta include municipal and domestic supply, agricultural irrigation, agricultural stock watering, industrial process water supply, industrial service supply, body contact water recreation, other non-body contact water recreation, warm freshwater aquatic habitat, cold freshwater aquatic habitat, warm fish migration habitat, cold fish migration habitat, warm spawning habitat, wildlife habitat, and navigation.
- (2) The environmental characteristics of the hydrographic unit, including the quality of the available water, will be improved by the requirement to provide tertiary treatment for this wastewater discharge. Tertiary treatment will allow for the reuse of the diluted wastewater for food crop irrigation and contact recreation activities that would otherwise be unsafe according to recommendations from DPH.
- (3) Fishable and swimmable water quality conditions can be reasonably achieved through the coordinated control of all factors that affect water quality in the area. These factors include regulation of point source municipal and industrial discharges with appropriate NPDES Permits, regulation of urban storm water runoff with Municipal Storm water NPDES Permits, and non-point source discharges such as timber harvesting and irrigated agriculture. All of these regulatory programs control the discharge of pollutants to surface waters to protect existing and potential beneficial uses.
- (4) The economic impact of requiring an increased level of treatment has been considered. The Discharger and others have estimated that the increased level of treatment will cost approximately between \$500 million to \$1.3 billion. The loss of beneficial uses within downstream waters, without the tertiary treatment requirement, which includes prohibiting the irrigation of food crops and prohibiting public access for contact recreational purposes, would have a detrimental economic impact. In addition to pathogen removal to protect irrigation and

recreation, tertiary treatment may also aid in meeting discharge limitations for other pollutants, such as heavy metals, reducing the need for advanced treatment specific for those pollutants.

- (5) The requirement to provide tertiary treatment for this discharge will not adversely impact the need for housing in the area any more than for other adjacent communities. The potential for developing housing in the area will be facilitated by improved water quality, which protects the contact recreation and irrigation uses of the receiving water. DPH recommends that, in order to protect the public health, diluted wastewater effluent must be treated to a tertiary level for contact recreational and food crop irrigation uses. Without tertiary treatment, the downstream waters could not be safely utilized for contact recreation or the irrigation of food crops.
- (6) It is the Regional Water Board's policy, (Basin Plan, page IV-12.00, Policy 2) to encourage the reuse of wastewater. The Regional Water Board requires dischargers to evaluate how reuse or land disposal of wastewater can be optimized. The need to develop and use recycled water is facilitated by providing a tertiary level of wastewater treatment that will allow for a greater variety of uses in accordance with CCR, Title 22.
- (7) The Regional Water Board has considered the factors specified in CWC section 13263, including considering the provisions in CWC section 13241, in adopting the disinfection and filtration requirements under Title 22 criteria. The Regional Water Board finds, on balance, that these requirements are necessary to protect the beneficial uses of the Sacramento River and Delta, including water contact recreation and irrigation uses.

**(d) Plant Performance and Attainability.** New or modified control measures will be necessary in order to comply with the effluent limitations for total coliform organisms, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. Furthermore, the effluent limitations for filtration are a new regulatory requirement within this permit, which becomes applicable to the waste discharge with the adoption of this Order, which was adopted after 1 July 2000. The Discharger submitted an infeasibility analysis dated August 2010 for compliance with these disinfection requirements. Therefore, a compliance time schedule for compliance with the total coliform organisms effluent limitations and a requirement to provide Title 22 (or equivalent) tertiary filtration is established in this Order.

**xxi. pH**

- (a) WQO.** The Basin Plan includes a water quality objective for surface waters (except for Goose Lake) that the "...pH shall not be depressed below 6.5 nor raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters with designated COLD or WARM beneficial uses."
- (b) RPA Results.** The discharge of domestic wastewater has a reasonable potential to cause or contribute to an excursion above the Basin Plan's numeric objectives for pH.
- (c) WQBELs.** Effluent limitations for pH of 6.0 as an instantaneous minimum and 8.0 as an instantaneous maximum are included in this Order. The instantaneous maximum effluent limit is more stringent than the Basin Plan objective and is based on Facility performance. Based on modeling performed by the Discharger, an instantaneous minimum effluent limit of 6.0 ensures compliance with the Basin Plan's minimum objective within the chronic mixing zone.
- (d) Plant Performance and Attainability.** Analysis of the effluent data demonstrates that the Facility can immediately comply with the effluent limitations for pH.

**xxii. Settleable Solids**

- (a) WQO.** For inland surface waters, the Basin Plan states that "[w]ater shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses."
- (b) RPA Results.** The discharge of domestic wastewater has a reasonable potential to cause or contribute to an excursion above the Basin Plan's narrative objective for settleable solids. The maximum effluent concentration (MEC) for settleable solids was 2.5 ml/L. Therefore, settleable solids in the discharge has reasonable potential to cause or contribute to an in-stream excursion above the narrative toxicity objective or Basin Plan numeric objectives and waste load allocation.
- (c) WQBELs.** This Order contains average monthly and average daily effluent limitations for settleable solids. Because the amount of settleable solids is measured in terms of volume per volume without a mass component, it is impracticable to calculate mass limitations for inclusion in this Order. A daily maximum effluent limitation for settleable solids is included in the Order, in lieu of a weekly average, to ensure that the treatment works operate in accordance with design capabilities.
- (d) Plant Performance and Attainability.** Only one violation of the settleable solids occurred since 2005. Therefore, based on existing

performance the Facility can immediately comply with the new final WQBELs for settleable solids.

**xxiii. Temperature**

**(a) WQO.** The Thermal Plan requires that, *“The maximum temperature shall not exceed the natural receiving water temperature by more than 20°F.”*

**(b) RPA Results.** The SRWTP discharges to the Sacramento River via a 400-foot outfall (300-foot diffuser with 74 ports) that is placed on the bottom of the river perpendicular to the river flow. The Sacramento River in the vicinity of the discharge is approximately 600 feet wide at the surface, about 400 feet wide at the bottom and 25 - 30 feet deep. The Sacramento River at the point of discharge experiences tidal flows that slow the river flow, and at times cause flow reversals. The existing NPDES permit adopted in 2000 (Order No. 5-00-188), prohibits river discharge when the flow ratio (Sacramento River: effluent) is less than 14:1. The existing permit also prohibits discharge when river flows are less than 1,300 cubic feet per second (cfs). These discharge prohibitions are based on the design of the outfall diffuser to ensure adequate mixing of effluent with river water. When either of these two conditions exists, the SRCSD ceases its surface water discharge and diverts treated effluent to storage basins.

The Lower Sacramento River and Delta serve as a migration corridor and/or provide other types of habitat (e.g., spawning, rearing) for many anadromous fish species. In addition, the lower Sacramento River supports numerous resident native and introduced fish species and diverse assemblage of BMLs, an important source for many adult and juvenile fishes. The following table lists those species of concern that may be impacted within the vicinity of the discharge:

Common Name	Scientific Name	Anadromous/ Resident	Status
Chinook salmon	<i>Onocorhynchus Ishawytscha</i>		
Fall-run	<i>Onocorhynchus Ishawytscha</i>	Anadromous	FSC
Late-fall run	<i>Onocorhynchus Ishawytscha</i>	Anadromous	CSC, FSC
Spring-run	<i>Onocorhynchus Ishawytscha</i>	Anadromous	ST, FT
Winter-run	<i>Onocorhynchus Ishawytscha</i>	Anadromous	SE, FE
Steelhead trout	<i>O. mykiss</i>	Anadromous	FT
Green sturgeon	<i>Acipenser medirostros</i>	Anadromous	FC, CSC/C1
Striped bass	<i>Morone saxatilis</i>	Anadromous	I
American shad	<i>Alsoa sapidissima</i>	Anadromous	I
White sturgeon	<i>A. transmontanus</i>	Anadromous	N
River lamprey	<i>Lampetra ayresi</i>	Anadromous	CSC/C2
Pacific lamprey	<i>L. tridentate</i>	Anadromous	FSC
Hardhead	<i>Mylopharidib conocephalus</i>	Resident	CSC/C2
Splittail	<i>Pogonichthys macrolepidotus</i>	Resident	CSC

Delta smelt	Hypomesus traspacificus	Resident	FT, SE
Status Codes	FE = Federally listed as endangered FT = Federally listed as threatened FSC = Federal Species of Concern SE = Listed as endangered by California N = Native species, no State or federal status	ST = Listed as threatened by California CSC= CA Species of Concern C1=Should be listed as threatened or endangered C2 = Declining, potentially threatened I= Introduced, no State or federal status	

As a condition of Waste Discharge Order No. 5-00-188, the Discharger completed and submitted a study assessing the thermal impacts of its discharge in the Sacramento River to the National Marine Fisheries Services (NMFS), titled “Thermal Effects of Sacramento Regional Wastewater Treatment Plant Discharges on Migrating Fishes of the Sacramento River, February 2005.” This thermal impact assessment recommended continuation of the existing thermal plan exemptions. The 2005 Thermal Study was previously reviewed by NMFS staff and they did not indicate any concerns with the proposed Thermal Plan exception. Since this time, however, conditions under which the evaluation was made have changed. There has been a significant pelagic organism decline in the Delta, new species are threatened and there has been a change in the diffuser configuration. In December 2009, the Discharger requested revised changes to their Thermal Plan exemption. In June 2010, the Discharger in a letter to the Central Valley Water Board withdrew its request for an expanded wastewater treatment plant. Due to these changes the Discharger prepared a new study, “Thermal Plan Exception Justification for the Sacramento Regional Wastewater Treatment Plant”, July 2010. With this revised July 2010 study, new thermal plan exemptions were requested.

Table F-16 below outlines the Thermal Plan requirements, the Thermal Plan exception allowed in the current NPDES permit, and the Discharger’s most recent proposed Thermal Plan exception request for the NPDES permit renewal.

**Table F-15. Existing and Proposed Thermal Plan Exception Requirements**

<b>Thermal Plan Requirements (Section 5.A.(1)a-c)</b>	<b>Existing NPDES Permit Requirements (181 mgd discharge)</b>	<b>SRCS D Proposed NPDES Requirements (181 mgd)</b>
<p><b>5.A.(1)a</b></p> <p>The maximum effluent temperature shall not exceed the natural receiving water temperature by more than 20°F</p>	<p>The maximum temperature of the discharge shall not exceed the natural receiving water temperature by more than:                      25° F from 1 October through 30 April;                      -or-                      20° F from 1 May through 30 September  <i>(meets Thermal Plan requirements)</i></p>	<p>The daily average temperature of the effluent shall not exceed the daily average natural receiving water temperature by more the 20°F 1 April through 30 September, or by more the 25°F 1 October through 31 March</p>
<p><b>5.A.(1)b</b></p> <p>Elevated temperature waste discharges either individually or combined with other discharges shall not create a zone, defined by water temperatures of more than 1°F above natural receiving water temperature, which exceeds 25 percent of the cross-sectional area of a main river channel at any point.</p>	<p>If the natural receiving water temperature is less than 65° F: The discharge shall not create a zone, defined by water temperature of more than 2° F above the natural receiving water temperature, which exceeds 25 percent of the cross sectional area of the River at any point outside the zone of initial dilution.                      If the natural receiving water temperature is 65° F or greater: Meets Thermal Plan requirements at any point outside the zone of initial dilution.</p>	<p>The discharge shall not create a zone, defined by water temperatures of more than 2.5°F above natural receiving water temperature, which exceeds 50 percent of the cross-sectional area of the river at any point, evaluated as a daily average.</p>
<p><b>5.A.(1)c</b></p> <p>No discharge shall cause a surface water temperature rise greater than 4°F above the natural temperature of the receiving waters at any time or place.</p>	<p>No Exception <i>(Meets Thermal Plan Requirements)</i></p>	<p>No Exception <i>(Meets Thermal Plan Requirements)</i></p>

The July 2010 thermal plan exception justification study is based on the dynamic model for temperature performed by Flow Science. The modeled temperature plumes show a zone of passage at the surface of the Sacramento River approximately 75-100 feet wide on the west bank and 175-200 feet wide on the east bank. The surface width of the river at the diffuser is 600 feet. The zone of passage at the bottom of the river is smaller due to the configuration of the west bank. The study concluded that both surface water swimming fish and bottom water swimming fish would avoid the heated plume by swimming around or on top of it.

According to the United States Fish and Wildlife Service, the range of delta smelt extends from San Pablo Bay upstream to about Verona on the Sacramento River, though the majority of the population occupies from western Suisun Bay to about the City of Sacramento. Delta smelt enter the Sacramento River and Deep Water Ship Channel year round and



specifically from late December to June to spawn in temperatures between about 12-18°C. Pre-spawning adults could be expected in the vicinity of the City of Sacramento from the latter part of December through June. Some larvae could be expected in the vicinity of the City of Sacramento during February through June. During the larval stage delta smelt are at their most vulnerable to zones of poor water quality or high water temperature due to their small size and limited mobility.

The Critical Thermal Maxima (CTM) is the temperature for a given species above which most individuals respond with unorganized locomotion and is considered to be the lethal temperature, for juvenile and adult delta smelt it is reported as 25.4°C (77.7°F)<sup>1</sup>. Delta smelt egg survival decreases at temperatures above 15-16°C (about 60°F) and is greatly reduced by 20°C (68°F)<sup>2</sup> Other ways to affect aquatic organisms include the rate of temperature change and the organism's ability to avoid or move to more favorable temperatures.

Central Valley Water Board staff requested the National Marine Fisheries Service (NMFS), the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Game evaluate the July 2010 study and make recommendations on the thermal plan exception request by the Discharger.

The USFWS expressed several concerns about the lack of knowledge on the synergistic effects of multiple pollutants, like chemical and thermal contamination. The concern that potential of thermal discharges may create winter refugia for non-native predator species and uncertainty about the near-field thermal conditions and delta smelt's migration behavior.

The USFWS recommends the exception from WDR No. 5-00-188 be retained and no further exception be permitted for protection of Delta smelt. Additionally, the USFWS recommends the Discharger initiate planning to address future increases in the discharge with consideration for changes in the Sacramento River as a result of climate change without the need for sequential Thermal Plan exceptions. To determine whether permitted conditions are protective of delta smelt and Sacramento River biota, the USFWS requests specific monitoring and studies be conducted and include the following:

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<sup>1</sup> Swanson, Christina, Turid Reid, Paciencia S. Young and Joseph J. Cech, Jr. 2000. Comparative environmental tolerances of threatened delta smelt (*Hypomesus transpacificus*) and introduced wakasagi (*H. nipponensis*) in an altered California estuary. *Oecologia* 123: 384-390.

<sup>2</sup> Bennett, WA. 2005. Critical assessment of the delta smelt population in the San Francisco Estuary, California. *San Francisco Estuary and Watershed Science* 3.

- (1) Continuous monitoring of the thermal discharge in coordination with mixing zone monitoring during December-June.
- (2) Study using hydroacoustic technology to determine if there are aggregations of large fish or schools of small fish in the zone of elevated water temperature that are atypical compared to other nearby mid-channel river reaches.
- (3) Acute and chronic testing with rainbow trout bi-weekly during December-June for two years with ambient water upstream of Freeport Bridge and 65 feet for acute and 360 feet for chronic downstream of the diffuser.

(c) **WQBELs.** The temperature effluent limitation is carried forward from the previous Order.

(d) **Plant Performance and Attainability.** The temperature effluent limitation is carried forward from the previous Order. The Discharger has demonstrated continuous compliance with the effluent limitation. Therefore, based on existing performance the Facility can immediately comply with the temperature effluent limit.

#### 4. WQBEL Calculations

a. This Order includes WQBELs for copper, ammonia, cyanide, carbon tetrachloride, chlorodibromomethane, dichlorobromomethane, methylene chloride, tetrachloroethylene, pentachlorophenol, bis(2-ethylhexyl) phthalate, dibenzon(ah)anthracene, N-nitrosodimethylamine, aluminum, nitrate, nitrite, manganese, MTBE, mercury, temperature, settleable solids, diazinon, and chlorpyrifos. As discussed above in Section IV.C.2.d, the Discharger developed a dynamic mathematical model to evaluate near-field dilution and a mixing zone for compliance with chronic aquatic life criteria has been granted. The Discharger's dynamic model has been used to calculate the WQBELs for cyanide. For the remaining constituents a steady-state approach has been used to calculate the WQBELs. The general steady-state methodology for calculating WQBELs based on the different criteria/objectives is described in subsections IV.C.4.b through e, below. See Attachment H for the WQBEL calculations. The methodology for calculating WQBELs using the dynamic model is discussed in subsection IV.C.4.f, below.

b. **Effluent Concentration Allowance.** For each water quality criterion/objective, the ECA is calculated using the following steady-state mass balance equation from Section 1.4 of the SIP:

$$\begin{aligned} ECA &= C + D(C - B) && \text{where } C > B, \text{ and} \\ ECA &= C && \text{where } C \leq B \end{aligned}$$

where:

ECA = effluent concentration allowance

- D = dilution credit
- C = the priority pollutant criterion/objective
- B = the ambient background concentration.

According to the SIP, the ambient background concentration (B) in the equation above shall be the observed maximum with the exception that an ECA calculated from a priority pollutant criterion/objective that is intended to protect human health from carcinogenic effects shall use the arithmetic mean concentration of the ambient background samples. For ECAs based on MCLs, which implement the Basin Plan’s chemical constituents objective and are applied as annual averages, an arithmetic mean is also used for B due to the long-term basis of the criteria.

- c. **Basin Plan Objectives and MCLs.** For WQBELs based on site-specific numeric Basin Plan objectives or MCLs, the effluent limitations are applied directly as the ECA as either an MDEL, AMEL, or average annual effluent limitations, depending on the averaging period of the objective.
- d. **Aquatic Toxicity Criteria.** WQBELs based on acute and chronic aquatic toxicity criteria are calculated in accordance with Section 1.4 of the SIP. The ECAs are converted to equivalent long-term averages (i.e.  $LTA_{acute}$  and  $LTA_{chronic}$ ) using statistical multipliers and the lowest LTA is used to calculate the AMEL and MDEL using additional statistical multipliers.
- e. **Human Health Criteria.** WQBELs based on human health criteria, are also calculated in accordance with Section 1.4 of the SIP. The ECAs are set equal to the AMEL and a statistical multiplier was used to calculate the MDEL.

$$AMEL = mult_{AMEL} \left[ \min \left( \overbrace{M_A ECA_{acute}, M_C ECA_{chronic}}^{LTA_{acute}} \right) \right]$$

$$MDEL = mult_{MDEL} \left[ \min \left( \underbrace{M_A ECA_{acute}, M_C ECA_{chronic}}_{LTA_{chronic}} \right) \right]$$

$$MDEL_{HH} = \left( \frac{mult_{MDEL}}{mult_{AMEL}} \right) AMEL_{HH}$$

where:

- $mult_{AMEL}$  = statistical multiplier converting minimum LTA to AMEL
- $mult_{MDEL}$  = statistical multiplier converting minimum LTA to MDEL
- $M_A$  = statistical multiplier converting acute ECA to  $LTA_{acute}$
- $M_C$  = statistical multiplier converting chronic ECA to  $LTA_{chronic}$

- f. **Dynamic Model.** Section 1.4.D. of the SIP allows the use of a dynamic model to calculate WQBELs. Chapter 5.4.1 of the TSD (see page 101) provides guidance

for deriving WQBELs using a dynamic model. A three step process has been used in this Order to derive WQBELs using the Discharger’s dynamic model<sup>1</sup>.

- (1) A point of compliance (edge of mixing zone) is selected. For acute aquatic life criteria the edge of the acute mixing zone is selected and for chronic aquatic life criteria the edge of the chronic mixing zone is selected.
- (2) An LTA is developed for both acute and chronic criteria (i.e., LTA<sub>acute</sub> and LTA<sub>chronic</sub>) by iteratively running the dynamic model with successively lower [or higher] LTAs until the model shows compliance with the water quality criteria at the edge of the mixing zone at the appropriate frequency of compliance and averaging period (e.g., acute criteria are typically based on a 1-hour average exposure and chronic criteria are based on a 4-day exposure).
- (3) The LTA and CV are used to derive MDELs and AMELs using the steady-state procedures described in Step 5 of Section 1.4 of the SIP. WQBELs are calculated using the LTA<sub>acute</sub> and LTA<sub>chronic</sub> and the more stringent WQBELs are applied.

**Summary of Final Effluent Limitations  
 Discharge Point No. EFF- 001**

**Table F-16. Summary of Final Effluent Limitations**

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
<b>Conventional Pollutants</b>						
Biochemical Oxygen Demand, 5-day @ 20°C	mg/L	10	15	20	--	--
	lbs/day <sup>1</sup>	15,100	22,700	30,200	--	--
	% Removal	85	--	--	--	--
Total Suspended Solids	mg/L	10	15	20	--	--
	lbs/day <sup>1</sup>	15,100	22,700	30,200	--	--
	% Removal	85	--	--	--	--
pH	standard units	--	--	--	6.0	8.5
<b>Priority Pollutants</b>						
Bis(2-ethylhexyl)phthalate	µg/L	--	--	13	--	--
Carbon Tetrachloride	µg/L	--	--	5.3	--	--
Chlorodibromomethane	µg/L	--	--	2.2	--	--
Copper, Total Recoverable	µg/L	7.3	--	9.3	--	--
Cyanide	µg/L	--	--	11	--	--
Dibenzo(ah)anthracene	µg/L	0.2	--	0.4	--	--
Dichlorobromomethane	µg/L	--	--	3.4	--	--
Methylene Chloride	µg/L	4.7	--	11	--	--

<sup>1</sup> These procedures are discussed in more detail in a Technical Memorandum from Larry Walker Associates to SRCSD titled, “Calculation of WQBEL via Output from a Dynamic Model – DRAFT”, 23 February 2009.

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
N-nitrosodimethylamine	µg/L	0.00069	--	0.0014	--	--
Pentachlorophenol	µg/L	--	--	18	--	--
Tetrachloroethylene	µg/L	--	--	4.4	--	--
<b>Non-Conventional Pollutants</b>						
Settleable Solids	ml/L	0.1	--	0.2	--	--
Aluminum, Total Recoverable <sup>2</sup>	µg/L	503	--	750	--	--
Ammonia Nitrogen, Total (as N)	mg/L	1.8	--	2.2	--	--
	lbs/day <sup>1</sup>	2720	--	3320	--	--
Nitrate, Total (as N)	mg/L	10	--	--	--	--
Manganese, Total Recoverable	µg/L	--	--	85	--	--
Methyl Tertiary Butyl Ether	µg/L	--	--	18	--	--
Electrical Conductivity	µmhos/cm	900 <sup>9</sup>				
Total Coliform Organisms <sup>3</sup>	MPN/100mL	--	--	--	--	240
Total Residual Chlorine <sup>4</sup>	mg/L	--	--	--	--	--
Acute Toxicity <sup>5</sup>	--	--	--	--	--	--
Chronic Toxicity <sup>6</sup>	--	--	--	--	--	--
Temperature <sup>7</sup>	°F	--	--	--	--	--
Average Dry Weather Flow <sup>8</sup>	mgd	--	--	--	--	--

1. Based on a design average dry weather flow of 181 MGD.
2. Shall not exceed 200 µg/L as an annual average.
3. Effluent total coliform organisms also shall not exceed i.) 2.2 MPN/100ml, as a 7-day median; and ii). 23 MPN/100ml, more than once in any 30-day period.
4. Effluent total residual chlorine shall not exceed i) 0.011 mg/L as a 4-day average; and ii) 0.019 mg/L as a 1-hour average.
5. Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than 70%, minimum for any one bioassay and no less than 90%, median for any three consecutive bioassays.
6. There shall be no chronic toxicity in the effluent discharge.
7. The maximum temperature of the discharge shall not exceed the natural receiving water temperature by more than 20°F from 1 May through 30 September and more than 25°F from 1 October through 30 April.
8. The average dry weather discharge flow shall not exceed 181 mgd.
9. Annual average effluent limit

## 5. Whole Effluent Toxicity (WET)

For compliance with the Basin Plan’s narrative toxicity objective, this Order requires the Discharger to conduct whole effluent toxicity testing for acute and chronic toxicity, as specified in the Monitoring and Reporting Program (Attachment E section V.). This Order also contains numeric effluent limitations for acute toxicity, a narrative effluent limitation for chronic toxicity, and requires the Discharger to implement best management practices to investigate the causes of, and identify corrective actions to reduce or eliminate effluent toxicity.

**a. Acute Aquatic Toxicity.** The Basin Plan contains a narrative toxicity objective that states, “*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*” (Basin Plan at page III-8.01). The Basin Plan also states that, “*...effluent limits based upon acute biotoxicity tests of effluents will be prescribed where appropriate...*”. USEPA Region 9 provided guidance for the development of acute toxicity effluent limitations in the absence of numeric water quality objectives for toxicity in its document titled "Guidance for NPDES Permit Issuance", dated February 1994. In section B.2. "Toxicity Requirements" (pgs. 14-15) it states that, "*In the absence of specific numeric water quality objectives for acute and chronic toxicity, the narrative criterion 'no toxics in toxic amounts' applies. Achievement of the narrative criterion, as applied herein, means that ambient waters shall not demonstrate for acute toxicity: 1) less than 90% survival, 50% of the time, based on the monthly median, or 2) less than 70% survival, 10% of the time, based on any monthly median. For chronic toxicity, ambient waters shall not demonstrate a test result of greater than 1 TUc.*" Accordingly, effluent limitations for acute toxicity have been included in this Order as follows:

**Acute Toxicity.** Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:

Minimum for any one bioassay-- -----	70%
Median for any three consecutive bioassays -----	90%

The previous permit required the acute bioassays be performed using 100% effluent and using fathead minnows (*Pimephales promelas*) as the test species. This order continues to require the acute bioassays be performed using 100% effluent and changes the test species to rainbow trout (*Oncorhynchus mykiss*) due to the presence of salmonids in the receiving water. The Discharger will need six months to modify its system to use rainbow trout and obtain ELAP certification. Therefore, this Order includes an effective date of 1 July 2011 to begin using rainbow trout. In the interim, this Order allows the testing be performed using fathead minnows.

**b. Chronic Aquatic Toxicity.** The Basin Plan contains a narrative toxicity objective that states, “*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*” (Basin Plan at page III-8.00. Since the Facility is a publicly-owned treatment works that is categorized as a major facility, the influent can be highly variable due to commercial, industrial, and other inputs. Therefore, it is assumed that the discharge has chronic whole effluent toxicity (WET) levels that have a reasonable potential to cause or contribute to an in-stream excursion above of the Basin Plan’s narrative toxicity objective. This Order includes a narrative effluent limitation for chronic toxicity, chronic WET monitoring requirements, and a provision that requires the Discharger to investigate the

causes of, and identify and implement corrective actions to reduce or eliminate effluent toxicity.

The Monitoring and Reporting Program of this Order requires quarterly chronic WET monitoring for demonstration of compliance with the narrative toxicity objective. In addition to WET monitoring, the Special Provision in section VI.C.2.a. of the Order requires the Discharger to submit to the Central Valley Water Board an updated TRE Workplan for approval by the Executive Officer. The provision also includes a numeric toxicity monitoring trigger, requirements for accelerated monitoring, and requirements for TRE initiation if toxicity is demonstrated.

## **D. Final Effluent Limitations**

### **1. Mass-based Effluent Limitations**

40 CFR 122.45(f)(1) requires effluent limitations be expressed in terms of mass, with some exceptions, and 40 CFR 122.45(f)(2) allows pollutants that are limited in terms of mass to additionally be limited in terms of other units of measurement. This Order includes effluent limitations expressed in terms of mass and concentration. In addition, pursuant to the exceptions to mass limitations provided in 40 CFR 122.45(f)(1), some effluent limitations are not expressed in terms of mass, such as pH and temperature, and when the applicable standards are expressed in terms of concentration (e.g., CTR criteria and MCLs) and mass limitations are not necessary to protect the beneficial uses of the receiving water.

Mass-based effluent limitations were calculated based upon the design flow (Average Dry Weather Flow) permitted in section IV.A.1.h. of this Order.

### **2. Averaging Periods for Effluent Limitations**

40 CFR 122.45 (d) requires average weekly and average monthly discharge limitations for publicly owned treatment works (POTWs) unless impracticable. However, for toxic pollutants and pollutant parameters in water quality permitting, USEPA recommends the use of a maximum daily effluent limitation in lieu of average weekly effluent limitations for two reasons. *“First, the basis for the 7-day average for POTWs derives from the secondary treatment requirements. This basis is not related to the need for assuring achievement of water quality standards. Second, a 7-day average, which could comprise up to seven or more daily samples, could average out peak toxic concentrations and therefore the discharge’s potential for causing acute toxic effects would be missed.”* (TSD, pg. 96) This Order utilizes maximum daily effluent limitations in lieu of average weekly effluent limitations for aluminum, ammonia, manganese, MTBE, bis(2-ethylhexyl)phthalate, carbon tetrachloride, chlorpyrifos, diazinon, copper, cyanide, chlorodibromomethane, dichlorobromomethane, dibenzon(a,h)anthracene, methylene chloride, N-nitrosodimethylamine, pentachlorophenol and tetrachloroethylene as recommended by the TSD for the achievement of water quality standards and for the protection of the beneficial uses of the receiving stream. Furthermore, for BOD<sub>5</sub>, TSS, pH,

chlorine residual, and total coliform organisms, weekly average effluent limitations have been replaced or supplemented with effluent limitations utilizing shorter averaging periods. The rationale for using shorter averaging periods for these constituents is discussed in section IV.C.3. of this Fact Sheet.

For effluent limitations based on Secondary MCLs, this Order includes annual average effluent limitations. The Secondary MCLs are drinking water standards contained in Title 22 of the California Code of Regulations. Title 22 requires compliance with these standards on an annual average basis, when sampling at least quarterly. Since it is necessary to determine compliance on an annual average basis, it is impracticable to calculate average weekly and average monthly effluent limitations.

### **3. Satisfaction of Anti-Backsliding Requirements**

The effluent limitations in this Order are at least as stringent as the effluent limitations in the existing Order, with the exception of effluent limitations for chloroform, lindane, silver, lead, zinc and cyanide. The effluent limitations for these pollutants are less stringent than those in Order No. 5-00-188. This relaxation of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations.

Order No. 5-00-188 included effluent limitations for chloroform, lindane, silver, lead, zinc and cyanide. Based on monitoring data collected from June 2005 – July 2008, the discharge does not indicate reasonable potential to exceed water quality objectives for chloroform, lindane, silver, lead and zinc. Therefore, effluent limitations for these parameters were not included in this Order. The lack of effluent limitations in this Order does not constitute backsliding.

Order No. 5-00-188 established effluent limitations for cyanide of 10.8 µg/L as a daily average with a trigger of 6.1 µg/L. The cyanide limitation of 10.8 µg/L was based on the MEC of 9.0 µg/L times a safety factor of 1.2 (which was proposed by the Discharger and accepted by the Central Valley Water Board). A trigger concentration exceedance results in an investigation and Central Valley Water Board notification with the Central Valley Water Board may require an action plan to address the cause of the exceedance. The Central Valley Water Board found that the trigger concentration would be protective and appropriate if established as the 95th percentile value assuming that historical data follows a lognormal probability distribution which was 6.1 mg/L. The Discharger performed a dynamic model for cyanide which resulted in a chronic LTA of 13.9 mg/L. The calculated limit is 11.0 mg/L as an AMEL with a MDEL of 22.0 mg/L. As discussed in Section IV.C.2.d, the dynamic model represents a more accurate picture of the mixing zone concentrations. This Order relaxes the effluent limitation for cyanide from Order No. 5-00-188. The dynamic model data submitted by the Discharger is considered new information by the Central Valley Water Board.



Order No. 5-00-188 established effluent limitations for oil and grease. As discussed further in section IV.C.3, monitoring data over the term of Order No. 5-00-188 indicated that the discharge no longer exhibits reasonable potential to exceed water quality objectives for oil and grease. Therefore, the effluent limitation is not retained in this Order. The monitoring data submitted by the Discharger is considered new information by the Central Valley Water Board.

The revision of the cyanide limitation and the removal of effluent limitations for oil and grease, chloroform, lindane, silver, lead and zinc are consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Board Resolution No. 68-16. Any impact on existing water quality will be insignificant.

#### **4. Satisfaction of Antidegradation Policy**

This Order does not allow for an increase in flow or mass of pollutants to the receiving water with the exception of cyanide as discussed in section D.3 of the Fact Sheet. Antidegradation analyses were completed prior to adoption of the existing NPDES permits that grants a discharge capacity of 181 mgd. However, conditions in the Sacramento River and Delta downstream of the discharge have significantly changed since prior antidegradation analyses were conducted, so it is required that a new antidegradation analysis be conducted for the existing discharge.

A complete antidegradation analysis “Antidegradation Analysis for Proposed Wastewater Treatment Plant discharge Modification” was submitted by the Discharger with the Report of Waste Discharge in February 2005. The Discharger’s antidegradation analysis was based on the incremental increase of the SRWTP capacity expansion from 181 mgd to 218 mgd. This antidegradation analysis was updated and revised based on the Central Valley Water Board staff’s comments and more recent water quality data in the Discharger’s “Antidegradation Analysis for Proposed Discharge Modification for the Sacramento Regional Wastewater Treatment Plant” dated 20 May 2009. Along with the 37 mgd increase in capacity, the antidegradation analysis also modeled the worst-case concentrations at the discharge of 181 mgd and for 154 mgd (baseline data for the EIR).

The Discharger’s Antidegradation Analysis (ADA) identified the constituents of concern and categorized them as Category 1, Category 2, and Category 3 pollutants (see Table F-18). Category 1 pollutants are of concern regionally and have potential impacts on the Delta ecosystem and its water quality. Category 2 pollutants are constituents that may cause localized impacts, but negligible impacts in far-field receiving waters. Category 3 pollutants are constituents that were detected in the discharge, but have no history of contributing adverse impacts in the Sacramento River.

The Discharger evaluated background river concentrations and effluent concentrations and determined which constituents were of concern for impacting beneficial uses or of concern by stakeholders. Those constituents were placed into three categories. The first category includes constituents that are of regional

concern and could impact the beneficial uses both locally (near field) and in farther reaches of the Delta (far field). Those constituents are: ammonia, total nitrogen, nitrate plus nitrite, total Kjeldahl nitrogen (TKN), total phosphorus, electrical conductivity (EC), total dissolved solids (TDS), chloride, total organic carbon, mercury, and dissolved oxygen.

The second category includes constituents that may impact within 700 feet downstream of the diffuser or the near field. These constituents include: aluminum, cadmium, copper, zinc, total coliform organisms and temperature.

The third category includes constituents of concern that generally had no history of impacts to the Sacramento River. The constituents evaluated in the ADA are shown in Table F-18, below.

The Near Field and Far Field models previously described were used to determine reasonable worst-case impacts on the receiving waters. In the ADA, the focus was on the incremental increase from an average dry weather discharge flow of 181 mgd to 218 mgd. However, due to a legal challenge of the Discharger's EIR and due to an overall slow down in the economy and growth in the Sacramento area, the Discharger withdrew its request for an expansion of discharge flow. Therefore, the information provided in the ADA was used by Central Valley Water Board staff to evaluate the impacts of the discharge at the permitted discharge flow of 181 mgd. For each pollutant the amount of reduced assimilative capacity was calculated to determine whether the increased pollutant loading was significant. Table F-18, below, summarizes the antidegradation impacts for the constituents of concern. The constituents with the largest impacts include ammonia, salinity (e.g., electrical conductivity, total dissolved solids, and chloride), copper, cyanide, bis(2-ethylhexyl)phthalate, bromodichloromethane, chloroform, and chlorpyrifos.

As shown in Table F-18, the existing permitted discharge is degrading the receiving water. Therefore, the Discharger must use best practicable treatment or control (BPTC) of the discharge in accordance with State Water Board Resolution 68-16. The Sacramento River and Sacramento-San Joaquin Delta are high quality waters of exceptional recreation, economical, and ecological significance to the people of the State of California. As discussed below, the Central Valley Water Board finds that in order to maintain and enhance the water quality of the Sacramento River and Sacramento-San Joaquin Delta, the Discharger must implement BPTC. For the following reasons, BPTC for this facility includes implementation of nitrification, denitrification, and the equivalent of Title 22 filtration with ultraviolet light, ozone or chlorine disinfection treatment.

- The Sacramento River and Sacramento-San Joaquin Delta at the vicinity of the outfall are home to at least nine state and federally protected threatened or endangered species<sup>1</sup>.

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<sup>1</sup> Comment letter from USFWS to Kathy Harder dated 15 June 2010.

- The Sacramento River and Sacramento-San Joaquin Delta support a trillion dollar economy with \$27 billion economy for agriculture.<sup>1</sup>
- The Sacramento River and Sacramento-San Joaquin Delta provide drinking water to 25 million people of the State.<sup>2</sup>
- The Sacramento River and Sacramento-San Joaquin Delta support 12 million recreational user days per year, including 290 shoreline recreational areas, 300 marinas and half a million boaters.<sup>3</sup>
- Ammonia, along with BOD, from the SRWTP reduces the dissolved oxygen in the Sacramento River and Sacramento-San Joaquin Delta for nearly 40 miles below its discharge<sup>4</sup>. The oxygen depleting constituents from the SRWTP use or will use all the assimilative capacity of the River and Delta leaving no assimilative capacity available to other communities that currently reduce oxygen demanding constituents by implementing advanced treatment processes.
- The ammonia from the SRWTP contributes to the water quality problems in the Suisun Bay<sup>5</sup>.
- The ammonia from the SRWTP is acutely and chronically toxic to species, including copepods<sup>6</sup> and freshwater mussels that reside in the Sacramento River and Sacramento-San Joaquin Delta.
- Ammonia in the SRWTP effluent combined with chlorine disinfection creates nitrosoamines at levels 100 times greater than the primary MCL. Nitrosoamines are highly mutagenic and potentially carcinogenic.
- At times the risk of illness or infection from pathogenic protozoans nearly quadruples between upstream and downstream of the SRWTP discharge<sup>7</sup>.
- Filtration of disinfected SRWTP effluent will result in reduction of total organic carbon, copper, mercury, phosphorus, TSS, BOD<sub>5</sub> and possibly Constituents of Emerging Concern (CECs)<sup>8</sup>.
- Reduction or elimination of ammonia, nitrate and protozoans will reduce impacts to the beneficial uses of the Sacramento River and Sacramento-San Joaquin Delta from the SRWTP discharge.

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<sup>1</sup> [http://www.delta.ca.gov/res/docs/Sacto-SanJoaquin\\_fact.pdf](http://www.delta.ca.gov/res/docs/Sacto-SanJoaquin_fact.pdf)

<sup>2</sup> Id.

<sup>3</sup> Id.

<sup>4</sup> Memorandum from Mitchell J. Mysliwiec (LWA) to Bob Seyfried, SRCSD "Response to Tetra Tech Comments on the LDOPA", 26 August 2010.

<sup>5</sup> Letter from Bruce Wolfe, SFRWQCB to Kathy Harder, dated 4 June 2010.

<sup>6</sup> Swee Teh, Presentation at Contaminants Workshop, July 6, 2010

<sup>7</sup> Gerba, Charles P., "Estimated Risk of Illness from Swimming in the Sacramento River", 23 February 2010.

<sup>8</sup> Technical Memorandum: Analysis of Costs and Benefits of Advanced Treatment Alternatives for the Sacramento Regional Wastewater Treatment Plant, LWA, May 2010.

- Other existing wastewater treatment plants that discharge directly or indirectly to the Sacramento River and Sacramento-San Joaquin Delta are or will be implementing advanced treatment processes to reduce or eliminate ammonia, nitrate and pathogens.
- The costs per capita to implement advanced treatment processes at other POTWs are similar to the projected costs per capita for advanced treatment at the SRWTP. Project costs can vary greatly depending on how much existing treatment facilities can be incorporated into the advanced treatment process. In some cases, the cost is for a new treatment facility, differing treatment processes and/or the costs are based on construction completed several years ago.

**Table F-17. Per Capita Costs for Tertiary Upgrades<sup>1</sup>**

Discharger	Population (July 2008) <small>www.city-data.com</small>	Upgrade and Expansion Costs	Approximate per capita cost (\$)
Ironhouse Sanitary District	30,000	\$54,500,000	\$1,800
City of Roseville – Dry Creek WWTP	56,330	\$95,000,000	\$1,700
City of Roseville – Pleasant Grove WWTP	56,330	\$120,000,000	\$2,100
City of Manteca	65,028	\$22,800,000	\$350
City of Lodi	61,301	\$60,000,000	\$1000
City of Woodland	54,567	\$17,000,000	\$300
City of Tracy	79,196	\$40,000,000	\$500
City of Vacaville	92,219	\$150,000,000	\$1,600
Sacramento Regional County Sanitation District	1,300,000	\$2,066,000,000	\$1,600

This Order requires compliance with applicable federal technology-based standards and with WQBELs where the discharge could have the reasonable potential to cause or contribute to an exceedance of water quality standards.

Various alternative measures, including those alternatives provided as part of the proposed waste discharge requirements, have been considered. After considering the alternatives, these waste discharge requirements which implement Title 22 (or equivalent) tertiary filtration, nitrification and denitrification will result in the best practicable treatment or control of the discharge necessary to assure that a pollution or nuisance will not occur and the highest water quality consistent with maximum benefit to the people of the State will be maintained.

<sup>1</sup> Telephone Survey by Elizabeth Lee, CVWQCB

Economic and socioeconomic studies provided by the Sacramento Regional County Sanitation District, various water agencies, the North State Building Industry Association, and the University of Pacific have been considered. The purported costs vary widely depending on the study with the Sacramento Regional County Sanitation District's proposed costs of upgrades to be approximately \$2 billion as the highest purported cost. Even if the approximately \$2 billion costs projected by the Sacramento Regional County Sanitation District are correct, the increased sewage treatment rate of \$60 per month is reasonable because (1) many communities discharging to surface waters pay substantially more for sewer service; and (2) the increased sewage treatment rate of \$60 per month may be overestimated given that other large communities in the Sacramento/Delta area that have already upgraded their treatment facilities to advanced treatment also similar to that proposed in these waste discharge requirements have sewer fees substantially less than the monthly fees projected by the Sacramento Regional County Sanitation District, including the Cities of Stockton, Roseville, Tracy, and Lodi.

The action to adopt these waste discharge requirements is justified by socioeconomic considerations because (1) all large wastewater treatment plants in the Delta (namely, the Cities of Lodi, Manteca, Stockton, and Tracy) already provide tertiary filtration treatment; (2) the effluent discharged by the Cities of Lodi, Manteca, Stockton, and Tracy is much cleaner than the SRCSD effluent by significantly reducing the pathogens discharged to Delta waters, reducing the oxygen demand on Delta waters, reducing the loading of heavy metals and mercury to the Delta; and reducing aquatic toxicity caused by ammonia, (3) the Cities of Lodi, Manteca, Stockton, and Tracy have constructed and are operating similar advanced treatment systems and have not suffered significant adverse economic impacts as a result of these upgrades, and (4) the Sacramento Regional County Sanitation District's failure to implement tertiary filtration, nitrification, and denitrification may result or will likely result in an adverse impact to the REC-1, municipal and domestic water supply, aquatic life, and agricultural beneficial uses. Consequently, these waste discharge requirements will result in the best practicable treatment or control of the discharge necessary to assure that pollution or nuisance will not occur and the highest water quality consistent with maximum benefit to the people of the State will be maintained.

The permitted discharge is consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Board Resolution No. 68-16. Compliance with these requirements will result in the use of best practicable treatment or control of the discharge.

**Table F-18. Antidegradation Analysis**

Constituent	Units	Mean Effluent Conc. <sup>1</sup>	Mean R-1 Conc. <sup>1</sup>	Median 181 mgd Conc @ Hood <sup>2</sup>	Mean 181 mgd Conc @ 700 ft <sup>2</sup>	Applicable Water Quality Objective	Percent Assimilative Capacity Used
<b>Category 1 Pollutants</b>							
Ammonia (summer)	mg/L	24	0.1	0.25	0.64	1.55-6.7	2.3%-10.3%
Ammonia (winter)	mg/L	24	0.1	0.31	0.85	1.55-6.7	3.2%-14.5%
Total Nitrogen (summer)	mg/L	24	0.39	0.64	0.94	--	--
Total Nitrogen (winter)	mg/L	24	0.39	0.7	1.15	--	--
Nitrate plus nitrite	mg/L	0.13	0.16	0.12	0.16	10	0.0%
TKN	mg/L	26	0.35	0.57	0.95	--	--
Total Phosphorus	mg/L	2.34	0.11	0.08	0.18	--	--
EC	µmhos/cm	764	163	157	182	700	3.5%
TDS	mg/L	410	98	--	108	450	2.8%
Chloride	mg/L	91	5.1	5.7	7.81	106	2.7%
TOC	mg/L	17.5	2.34	2.3	2.82	--	--
Mercury	ng/L	4.1	5.6	--	5.54	--	--
<b>Category 2 Pollutants</b>							
Aluminum	µg/L	23.3	969	--	327.3	200	--
Cadmium	µg/L	0.023	0.0081	--	0.009	1.5	0.1%
Copper	µg/L	4.31	1.47	--	1.56	5.62	2.2%
Zinc	µg/L	21.2	0.57	--	1.22	74.5	0.9%
Temperature		23	15.5	--	--	--	--
Total Coliform		7.8	1983	--	--	--	--
<b>Category 3 Pollutants</b>							
Antimony	µg/L	0.32	0.066	--	0.074	6	0.1%
Arsenic	µg/L	1.64	1.35	--	1.36	10	0.1%
Chromium	µg/L	0.69	0.15	--	0.176	--	--
Lead	µg/L	0.25	0.03	--	0.037	1.38	0.5%
Molybdenum	µg/L	2.83	0.51	--	0.584	10	0.8%
Nickel	µg/L	2.37	0.67	--	0.72	32.8	0.2%
Selenium	µg/L	0.79	0.21	--	0.23	5	0.4%
Silver	µg/L	0.063	0.014	--	0.016	1.35	0.1%
BOD	mg/L	7.59	<2.13	--	--	--	--
Manganese	µg/L	64.2	3.7	--	---	50	
Cyanide	µg/L	5.12	3.92	--	3.95	5.2	2.3%
TSS	mg/L	6.68	29.4	--	28.6	--	--
1,4-Dichlorobenzene	µg/L	0.68	<0.27	--	0.28	5	0.2%
Bis(2-ethylhexyl)phthalate	µg/L	2.6	0.11	--	0.19	1.8	4.7%
Bromodichloromethane	µg/L	0.95	<0.37	--	0.39	0.56	10.5%
Chloroethane	µg/L	0.28	<0.42	--	0.42	75	0.0%
Chloroform	µg/L	15	0.93	--	1.38	80	0.6%
Diethyl Phthalate	µg/L	1.46	0.047	--	0.095	23000	0.0%
Di-n-butyl Phthalate	µg/L	1.35	0.072	--	0.21	2700	0.0%
Methyl Chloride	µg/L	0.73	0.47	--	0.48	3	0.4%

Constituent	Units	Mean Effluent Conc. <sup>1</sup>	Mean R-1 Conc. <sup>1</sup>	Median 181 mgd Conc @ Hood <sup>2</sup>	Mean 181 mgd Conc @ 700 ft <sup>2</sup>	Applicable Water Quality Objective	Percent Assimilative Capacity Used
Methylene Chloride	µg/L	1	<0.69	--	0.7	4.7	0.2%
Tetrachloroethylene	µg/L	0.13	0.38	--	0.37	0.8	--
Toluene	µg/L	0.25	0.36	--	0.36	150	0.0%
Chlorpyrifos	µg/L	0.015	0.006	--	0.01	0.015	44.4%
Dibromochloromethane	µg/L	0.14	<0.42	--	--	0.41	--
n-Nitrosodimethylamine	µg/L	0.72	<2.69	--	--	0.00069	--

<sup>1</sup> Table 5-2, "Antidegradation Analysis for Proposed Discharge Modification for the Sacramento Regional Wastewater Treatment Plant" 20 May 2009

<sup>2</sup> Chapter 5, *ibid.* The constituent concentrations at Hood are representative of the completely mixed conditions, whereas, the constituent concentrations at 700 feet downstream of the outfall is representative of the average concentration of the plume.

### 5. Stringency of Requirements for Individual Pollutants

This Order contains both technology-based effluent limitations and WQBELs for individual pollutants. The technology-based effluent limitations consist of restrictions on flow and percent removal requirements for BOD<sub>5</sub> and TSS. The WQBELs consist of restrictions on ammonia, copper, cyanide, chlorpyrifos, diazinon, aluminum, carbon tetrachloride, dichlorobromomethane, chlorodibromomethane, bis(2-ethylhexyl) phthalate, methylene chloride, tetrachlorethylene, pentachlorophenol, dibenzo(ah)anthracene, N-nitrosodimethylamine, manganese, methyl-tertiary-butyl-ether, nitrite, nitrate, chlorine residual, settleable solids, mercury and electrical conductivity. This Order's technology-based pollutant restrictions implement the minimum, applicable federal technology-based requirements. In addition, this Order includes new effluent limitations for BOD<sub>5</sub>, total coliform and TSS to meet numeric objectives or protect beneficial uses. The rationale for including these limitations is explained in the Fact Sheet. In addition, the Regional Water Board has considered the factors in CWC section 13241 in establishing these requirements.

WQBELs have been scientifically derived to implement water quality objectives that protect beneficial uses. Both the beneficial uses and the water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards. To the extent that toxic pollutant WQBELs were derived from the CTR, the CTR is the applicable standard pursuant to 40 CFR 131.38. The scientific procedures for calculating the individual WQBELs for priority pollutants are based on the CTR-SIP, which was approved by USEPA on 18 May 2000. All beneficial uses and water quality objectives contained in the Basin Plan were approved under state law and submitted to and approved by USEPA prior to 30 May 2000. Any water quality objectives and beneficial uses submitted to USEPA prior to 30 May 2000, but not approved by USEPA before that date, are nonetheless "applicable water quality standards for purposes of the CWA" pursuant to 40 CFR 131.21(c)(1). Collectively, this Order's restrictions on individual pollutants are no more stringent than required to implement the requirements of the CWA.

This Order contains pollutant restrictions that are more stringent than applicable federal requirements and standards. Specifically, this Order includes effluent limitations for BOD<sub>5</sub> 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-20, 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).

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”<sup>1</sup>. This technique is often used with water quality data and is a useful tool

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



for evaluating data sets with at least 40% detected data<sup>1</sup>. 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) method<sup>2</sup>. 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 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 99.9<sup>th</sup> 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 <sup>1,2</sup>	mg/L	45	513	100	24.2	3.70	45
Copper	µg/L	6.34	114	100	4.16	0.803	6.8
Cyanide <sup>3</sup>	µg/L	10	176	58.5	4.85	1.89	11.1
Aluminum <sup>3</sup>	µg/L	35.2	61	93.4	17.6	5.39	35.4
Carbon Tetrachloride <sup>4</sup>	µg/L	1.7	101	5.9	--	--	5.3
Dibromochloromethane <sup>4</sup>	µg/L	0.7	101	16.8	--	--	2.2
Bromodichloromethane	µg/L	3.4	101	91.1	1.10	0.583	3.4
Bis(2-ethylhexyl) phthalate <sup>5</sup>	µg/L	8.1	115	99.1	0.854	0.506	12.5
Methylene Chloride <sup>1,3</sup>	µg/L	5.4	101	91.1	1.18	0.901	5.4
Tetrachloroethylene <sup>4</sup>	µg/L	1.4	101	13.9	--	--	4.4
Pentachlorophenol <sup>4</sup>	µg/L	5.7	115	0.9	--	--	17.7
Dibenzo(ah)anthracene <sup>4</sup>	µg/L	0.51	145	0.7	--	--	1.6
n-Nitrosodimethylamine <sup>4</sup>	µg/L	0.082	125	16.8	--	--	0.26
Manganese <sup>5,6</sup>	µg/L	82	34	100	4.16	0.0869	85.3
Methyl Tertiary Butyl Ether <sup>4</sup> (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.

- <sup>1</sup> Performance-based effluent limitation set to MEC.
- <sup>2</sup> Data set ranges from 15 June 2005 to 28 April 2010.
- <sup>3</sup> Regression on order statistics (ROS) method used.
- <sup>4</sup> Performance-based effluent limit estimated as 3.11 times the MEC because the amount of detected data is less than 20%
- <sup>5</sup> Mean and standard deviation are expressed as natural logarithms because the log-normal distribution is the best fit for the dataset.
- <sup>6</sup> Data set ranges from 19 April 2009 to 4 June 2009.

<sup>1</sup> 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.

<sup>2</sup> Dennis R. Helsel, "More Than Obvious: Better Methods for Interpreting Nondetect Data," *Environmental Science and Technology* (15 October 2005): 420A

<sup>7</sup> Data set ranges from 11 June 2005 to 8 October 2008.

<sup>8</sup> Data set ranges from 5 June 2005 to 6 October 2009.

## E. Interim Effluent Limitations

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

**Requirements.** The permit limitations for ammonia, BOD<sub>5</sub>, TSS, and total coliform organisms are more stringent than the limitations previously imposed. These new limitations are based on effluent sampling and the California Department of Public Health's recommendations.

The establishment of Title 22 (or equivalent) and ammonia requirements has not been previously required for this discharge. This Order requires the Discharger to meet Title 22 (or equivalent) and ammonia requirements for all flows, which represents a newly interpreted water quality objective that results in a permit limitation more stringent than the limitation previously imposed.

The Discharger has complied with the application requirements in paragraph 4 of the State Water Board's Compliance Schedule Policy, and the Discharger's application demonstrates the need for additional time to implement actions to comply with the new limitations, as described below. Based on the sample results for the effluent, it appears that the Discharger may be in immediate non-compliance with effluent limitations for ammonia, BOD<sub>5</sub>, TSS, and total coliform organisms upon issuance of the permit. New or modified control measures may be necessary in order to comply with the effluent limitations, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. The Basin Plan for the Sacramento and San Joaquin River Basins includes a provision that authorizes the use of compliance schedules in NPDES permits for water quality objectives adopted after 25 September 1995 (see Basin Plan at page IV-16). The WQBELs for ammonia, BOD<sub>5</sub>, TSS, and total coliform organisms are based on a new interpretation of the narrative standard for protection of receiving water beneficial uses. Therefore, a compliance schedule for compliance with the effluent limitations for ammonia, BOD<sub>5</sub>, TSS, and total coliform organisms is established in the Order.

- a. **Demonstration that the Discharger needs time to implement actions to comply with a more stringent permit limitation specified to implement a new, revised, or newly interpreted water quality objective or criterion in a water quality standard.** Table 2.2 of the Infeasibility Report identifies constituents with the potential to exceed effluent limitations in the proposed NPDES Permit based on monitoring data collected between June 2005 and July 2008, including ammonia, chlorpyrifos, BOD<sub>5</sub>, total coliform organisms, and TSS. The Discharger states that the requested compliance schedules are driven primarily by the need to construct treatment plant upgrades.
- b. **Diligent efforts have been made to quantify pollutant levels in the discharge and the sources of the pollutant in the waste stream, and the results of those efforts.** The Infeasibility Report states that the Discharger has

- pretreatment program that regulates industrial discharges and an active source control program. The discharger issues permits to significant and non-significant users which require monitoring of pollutants of concern and implementation of limits where deemed necessary to control a point source. Table 2-3 of the Infeasibility Report identifies 33 categorical industrial users, 27 significant industrial users and 306 non-significant users. Potential sources of ammonia, chlorpyrifos, BOD<sub>5</sub>, TSS and total coliform organisms include domestic and non-domestic sources.
- c. Source control efforts are currently underway or completed, including compliance with any pollution prevention programs that have been established.** The Discharger has active source reduction programs targeting mercury, pesticides (including chlorpyrifos, diazinon and lindane) and waste medications.
  - d. A proposed schedule for additional source control measures or waste treatment.** Table 2-4 of the Infeasibility Report provided a proposed compliance schedules, which includes source control for chlorpyrifos with achieving compliance with final effluent limits 6 years after the permit effective date. For ammonia pilot testing, design of improvements and construction to be achieved 10 years from the permit effective date and full compliance with effluent limitations by 1 December 2020. For BOD<sub>5</sub>, TSS, and total coliform organisms, pilot testing, design and construction to be achieved 9 years from the permit effective date and full compliance with effluent limitations by 1 December 2019.
  - e. Data demonstrating current treatment facility performance to compare against existing permit effluent limits, as necessary to determine which is the more stringent interim permit effluent limit to apply if a schedule of compliance is granted.** Interim effluent limitations must be based on current treatment plant performance or existing permit limitations, whichever is more stringent. The Discharger can consistently comply with the effluent limitations for BOD<sub>5</sub>, total coliform organisms, and TSS required by Order No. 5-00-188. Therefore, the proposed NPDES Permit requires compliance with interim effluent limitations based on the effluent limitations required by Order No. 5-00-188. There are no existing permit effluent limitations for ammonia, so the interim limits have been calculated based on facility performance (see Table F-20).
  - f. The highest discharge quality that can reasonably be achieved until final compliance is attained.** Compliance with the interim effluent limitations will ensure that the Discharger maintains the discharge at levels that can reasonably be achieved until final compliance is attained.
  - g. The proposed compliance schedule is as short as possible,** given the type of facilities being constructed or programs being implemented, and industry experience with the time typically required to construct similar facilities or implement similar programs. The Discharger determined in the Infeasibility Report that the compliance schedule is as short as possible. The estimated

durations for each task and estimated completion dates were included in Table 2-4 of the Infeasibility Report. Interim performance-based MDELs have been established in this Order. The interim limitations were determined as described in section IV.A.2. above, and are in effect through 1 December 2020 until the final limitations take effect. As part of the compliance schedule, this Order requires the Discharger to submit a corrective action plan and implementation schedule to assure compliance with the final effluent limitations for ammonia, BOD<sub>5</sub>, TSS, and total coliform organisms. In addition, the Discharger shall update prepare and implement the existing a pollution prevention plan that is in compliance with CWC section 13263.3(d)(3). The interim numeric effluent limitations and source control measures will result in the highest discharge quality that can reasonably be achieved until final compliance is attained.

## **2. Interim Limitations for Ammonia and Title 22 (or Equivalent) Requirements.**

The SIP, section 2.2.1, The Compliance Schedule Policy requires that if a compliance schedule is granted for a CTR or NTR constituent, the Central Valley Water Board shall establish interim requirements and dates for their achievement in the NPDES permit. Interim numeric effluent limitations are required for compliance schedules longer than 1 year. The interim effluent limitations must be based on current treatment plant performance or existing permit limitations, whichever is more stringent. The State Water Board has held that the SIP may be used as guidance for non-CTR constituents. Therefore, the SIP requirement for interim effluent limitations has been applied to both CTR and non-CTR constituents in this Order.

The interim limitations for ammonia in this Order are based on the current treatment plant performance and were developed as discussed in section IV.D.6, above.

Interim limitations for Title 22 (or equivalent) requirements (i.e., for BOD<sub>5</sub>, total coliform organisms, and TSS) are established at the levels recommended by DPH for secondary treatment-level disinfection.

The Central Valley Water Board finds that the Discharger can undertake source control and treatment plant measures to maintain compliance with the interim limitations included in this Order. Interim limitations are established when compliance with final effluent limitations cannot be achieved by the existing discharge. Discharge of constituents in concentrations in excess of the final effluent limitations, but in compliance with the interim effluent limitations, can significantly degrade water quality and adversely affect the beneficial uses of the receiving stream on a long-term basis. The interim limitations, however, establish an enforceable ceiling concentration until compliance with the effluent limitation can be achieved. The limited, short-term degradation associated with the compliance schedule is consistent with State and federal policies and is authorized by 40 CFR 122.47 and the Compliance Schedule Policy.

## **F. Land Discharge Specifications – Not Applicable**

## **G. Reclamation Specifications – Not Applicable**

Treated wastewater discharged for reclamation is regulated under separate waste discharge requirements and must meet the requirements of CCR, Title 22.

## **V. RATIONALE FOR RECEIVING WATER LIMITATIONS**

Basin Plan water quality objectives to protect the beneficial uses of surface water and groundwater include numeric objectives and narrative objectives, including objectives for chemical constituents, toxicity, and tastes and odors. The toxicity objective requires that surface water and groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in humans, plants, animals, or aquatic life. The chemical constituent objective requires that surface water and groundwater shall not contain chemical constituents in concentrations that adversely affect any beneficial use or that exceed the maximum contaminant levels (MCLs) in Title 22, CCR. The tastes and odors objective states that surface water and groundwater shall not contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses. The Basin Plan requires the application of the most stringent objective necessary to ensure that surface water and groundwater do not contain chemical constituents, toxic substances, radionuclides, or taste and odor producing substances in concentrations that adversely affect domestic drinking water supply, agricultural supply, or any other beneficial use.

### **A. Surface Water**

1. CWA section 303(a-c), requires states to adopt water quality standards, including criteria where they are necessary to protect beneficial uses. The Central Valley Water Board adopted water quality criteria as water quality objectives in the Basin Plan. The Basin Plan states that “[t]he numerical and narrative water quality objectives define the least stringent standards that the Regional Water Board will apply to regional waters in order to protect the beneficial uses.” The Basin Plan includes numeric and narrative water quality objectives for various beneficial uses and water bodies. This Order contains receiving surface water limitations based on the Basin Plan numerical and narrative water quality objectives for bacteria, biostimulatory substances, color, chemical constituents, dissolved oxygen, floating material, oil and grease, pH, pesticides, radioactivity, suspended sediment, settleable substances, suspended material, tastes and odors, temperature, toxicity, and turbidity.

### **B. Groundwater**

1. The beneficial uses of the underlying ground water are municipal and domestic supply, industrial service supply, industrial process supply, and agricultural supply.
2. Basin Plan water quality objectives include narrative objectives for chemical constituents, tastes and odors, and toxicity of groundwater. The toxicity objective

requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in humans, plants, animals, or aquatic life. The chemical constituent objective states groundwater shall not contain chemical constituents in concentrations that adversely affect any beneficial use. The tastes and odors objective prohibits taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses. The Basin Plan also establishes numerical water quality objectives for chemical constituents and radioactivity in groundwaters designated as municipal supply. These include, at a minimum, compliance with MCLs in Title 22 of the CCR. The bacteria objective prohibits coliform organisms at or above 2.2 MPN/100 mL. The Basin Plan requires the application of the most stringent objective necessary to ensure that waters do not contain chemical constituents, toxic substances, radionuclides, taste- or odor-producing substances, or bacteria in concentrations that adversely affect municipal or domestic supply, agricultural supply, industrial supply or some other beneficial use.

## **VI. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS**

40 CFR 122.48 requires that all NPDES permits specify requirements for recording and reporting monitoring results. Water Code sections 13267 and 13383 authorizes the Central Valley Water Board to require technical and monitoring reports. The Monitoring and Reporting Program (Attachment E) of this Order, establishes monitoring and reporting requirements to implement federal and state requirements. The following provides the rationale for the monitoring and reporting requirements contained in the Monitoring and Reporting Program for the Facility.

### **A. Influent Monitoring**

1. Influent monitoring is required to collect data on the characteristics of the wastewater and to assess compliance with effluent limitations (e.g., BOD<sub>5</sub> and TSS reduction requirements). The monitoring frequencies for flow (continuous), BOD<sub>5</sub> and Total Suspended Solids (once per day) have been retained from Order No. 5-00-188. In addition, pH (continuous), electrical conductivity (once per week) and total dissolved solids (once per month) are monitored for a more complete characterization of the influent.
2. Influent monitoring is required to collect data on the characteristics of the Groundwater Corrective Action Program (CAP) Discharge Monitoring. The monitoring frequencies for flow (once per month), priority pollutants, total dissolved solids, electrical conductivity and nitrates (twice per year) have been retained from Order No. 5-00-188. .

### **B. Effluent Monitoring**

1. Pursuant to the requirements of 40 CFR 122.44(i)(2) effluent monitoring is required for all constituents with effluent limitations. Effluent monitoring is necessary to assess compliance with effluent limitations, assess the effectiveness of the

treatment process, and to assess the impacts of the discharge on the receiving stream and groundwater.

2. Effluent monitoring frequencies and sample types for flow, chlorine residual, sulfur dioxide, temperature, pH, BOD, TSS, total coliforms, ammonia, settleable solids, electrical conductivity, total dissolved solids, total organic carbon, cyanide, arsenic, mercury, copper, silver, methylene chloride, lead, tetrachloroethylene, bis(2-ethylhexyl) phthalate, chlorodibromomethane, dichlorobromomethane, carbon tetrachloride, MTBE, hardness, alkalinity, standard minerals, and priority pollutants have been retained from Order No. 5-00-188 to determine compliance with effluent limitations for these parameters.
3. Monitoring data collected over the existing permit term for lindane, lead, zinc, silver and arsenic did not demonstrate reasonable potential to exceed water quality objectives/criteria. Thus, specific monitoring requirements for these parameters have not been retained from Order No. 5-00-188.
4. This Order specifies lower reporting limits sufficient for comparison with the applicable water quality objectives as follows:

Pentachlorophenol	µg/L	EPA method 625 w/ MDL 0.05 µg/L
Dibenzo(a,h)anthracene	µg/L	EPA method 625 w/MDL 0.001-0.005 µg/L
N-nitrosodimethylamine	ng/L	EPA Method 521
Chlorpyrifos	µg/L	EPA Method 625M; Method 8141 or equivalent
Diazinon	µg/L	EPA Method 625M; Method 8141 or equivalent

5. In addition to priority pollutant data for the effluent, non-priority pollutants also need to be monitored to conduct a meaningful reasonable potential analysis. Similar to priority pollutant monitoring, periodic monitoring for non-priority pollutants is needed to provide the data necessary for determining the reasonable potential for those pollutants for which no WQBELs were established. Thus, monitoring for non-priority pollutants include pyrethroids, nitrosoamines, dioxin and congeners, furans, persistent chlorinated hydrocarbon pesticides and other constituents of concern as described in Table E-4.
6. In order to determine compliance with the effluent limitations, aluminum, methylmercury, manganese, pentachlorophenol, dibenzo(ah)anthracene, chlorpyrifos, diazinon, and N-nitrosodimethylamine are include in the effluent monitoring at minimum frequencies .

7. In addition to the constituents addressed above, perchlorate and 1,2-diphenyl hydrazine in the effluent may have reasonable potential to impact municipal beneficial uses. Perchlorate was detected in the effluent 11 out of 81 samples above the water quality criteria, however, the analytical method was not appropriate for wastewater and could give false positive detections due to salt interferences. 1,2- diphenyl hydrazine wa detected by two J-flagged samples. Therefore, to determine if perchlorate has reasonable potential this Order requires the Discharge conduct a special study for perchlorate and for 1,2-diphenyl hydrazine.
8. The California Department of Public Health (DPH) recommends a 1 in 10,000 risk and a 1 log removal of *cryptosporidium* and *giardia*. Therefore, weekly monitoring for these pathogenic protozoans is required to meet the recommendations.
9. Timing, duration and purpose of wastewater diversions, effluent or influent, is a measure of proper operation of the wastewater treatment plant and is required to be reported on a monthly basis.

### C. Whole Effluent Toxicity Testing Requirements

1. **Acute Toxicity.** Flow through 96-hour bioassay testing is required to demonstrate compliance with the effluent limitation for acute toxicity. The test species have changed from fathead minnow (*Pimephales promela*) to rainbow trout (*Oncorhynchus mykiss*) because rainbow trout are salmonids similar to resident species and are more sensitive than fathead minnows to wastewater effluent. Using fathead minnows may underestimate effluent toxicity.
2. **Chronic Toxicity.** Monthly chronic whole effluent toxicity testing is required in order to demonstrate compliance with the Basin Plan's narrative toxicity objective. Order No. 5-00-188 included chronic toxicity testing quarterly, the TSD recommends monthly chronic toxicity testing for major wastewater treatment facilities.

### D. Receiving Water Monitoring

#### 1. Surface Water

Receiving water monitoring is necessary to assess compliance with receiving water limitations and to assess the impacts of the discharge on the receiving stream. New monitoring locations have been added at River Mile 44 and River Mile 43, RSWD-004 and RSWD-005, respectively, to better evaluate impacts in the receiving water.



## **2. Groundwater (Not Applicable)**

### **E. Other Monitoring Requirements**

#### **1. Biosolids Monitoring**

Biosolids monitoring is required to ensure compliance with the biosolids disposal requirements contained in the Special Provision contained in section VI.C.6.a. of this Order. Biosolids disposal requirements are imposed pursuant to 40 CFR Part 503 to protect public health and prevent groundwater degradation.

#### **2. Water Supply Monitoring**

Water supply monitoring is required to evaluate the source of constituents in the wastewater.

## **VII. RATIONALE FOR PROVISIONS**

### **A. Standard Provisions**

Standard Provisions, which apply to all NPDES permits in accordance with 40 CFR 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 CFR 122.42, are provided in Attachment D. The discharger must comply with all standard provisions and with those additional conditions that are applicable under 40 CFR 122.42.

40 CFR 122.41(a)(1) and (b) through (n) establish conditions that apply to all State-issued NPDES permits. These conditions must be incorporated into the permits either expressly or by reference. If incorporated by reference, a specific citation to the regulations must be included in the Order. 40 CFR 123.25(a)(12) allows the state to omit or modify conditions to impose more stringent requirements. In accordance with 40 CFR 123.25, this Order omits federal conditions that address enforcement authority specified in 40 CFR 122.41(j)(5) and (k)(2) because the enforcement authority under the CWC is more stringent. In lieu of these conditions, this Order incorporates by reference CWC section 13387(e).

### **B. Special Provisions**

#### **1. Reopener Provisions**

- a. Temperature Study.** There are uncertainties that the discharge may impact aquatic life in the vicinity of the discharge as regulated under the existing thermal exemption conditions. This Order requires the Discharger to complete a study of temperature's potential effect in the receiving water. This reopener provision allows the Central Valley Water Board to reopen this Order for modification of effluent limitations and receiving water limitations and requirements for temperature if after review of the study results it is determined that the discharge impacts beneficial uses.

- b. Pollution Prevention.** This Order requires the Discharger prepare pollution prevention plans following CWC section 13263.3(d)(3) for ammonia and mercury. This reopener provision allows the Central Valley Water Board to reopen this Order for addition and/or modification of effluent limitations and requirements for these constituents based on a review of the pollution prevention plans.
- c. Whole Effluent Toxicity.** This Order requires the Discharger to investigate the causes of, and identify corrective actions to reduce or eliminate effluent toxicity through a Toxicity Reduction Evaluation (TRE). This Order may be reopened to include a numeric chronic toxicity limitation, a new acute toxicity limitation, and/or a limitation for a specific toxicant identified in the TRE. Additionally, if a numeric chronic toxicity water quality objective is adopted by the State Water Board, this Order may be reopened to include a numeric chronic toxicity limitation based on that objective.
- d. Water Effects Ratio (WER) and Metal Translators.** A default WER of 1.0 has been used in this Order for calculating CTR criteria for applicable priority pollutant inorganic constituents. In addition, default dissolved-to-total metal translators have been used to convert water quality objectives from dissolved to total recoverable when developing effluent limitations for copper. If the Discharger performs studies to determine site-specific WERs and/or site-specific dissolved-to-total metal translators, this Order may be reopened to modify the effluent limitations for the applicable inorganic constituents.
- e. Perchlorate and 1,2-diphenyl hydrazine Studies.** There are indications that the discharge may contain constituents that have a reasonable potential to cause or contribute to an exceedance of water quality objectives. This Order requires the Discharger to complete a study of these constituents' potential effect in the receiving water. This reopener provision allows the Central Valley Water Board to reopen this Order for addition of effluent limitations and requirements for these constituents if after review of the study results it is determined that the discharge has reasonable potential to cause or contribute to an exceedance of a water quality objective.
- f. Central Valley Drinking Water Policy.** If water quality objectives are adopted for organic carbon, nutrients, salinity, bromide, or pathogens to protect drinking water supplies in the Central Valley Region, this Order may be reopened for addition and/or modification of effluent limitations and requirements, as appropriate, to require compliance with the applicable water quality objectives.
- g. Ammonia Studies.** The ammonia effluent limitations in this Order are based on USEPA's recommended National Ambient Water Quality Criteria for protection of aquatic life. However, studies are ongoing to evaluate the effect of ammonia on the inhibition of growth of diatoms in the Bay-Delta, studies to evaluate the sensitivity of delta smelt to ammonia toxicity, and studies of the technological feasibility of ammonia removal processes. Based on the result of these studies,

this Order may be reopened to modify the ammonia effluent limitations, as appropriate.

- h. *Hyalella azteca* Study.** There are indications that the discharge may contain constituents that are toxic to native species at very low levels.<sup>1</sup> *Hyalella azteca* is a native species in the Sacramento-San Joaquin Delta, it is sensitive to pyrethroids and it is an interface organism between sediment and the water column. Although testing with *Hyalella azteca* is not commonly used for wastewater effluent, it is a common species for determining toxicity in the Delta. Researchers are using a modified version of Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates, USEPA Method #600-R-99-064. A study is needed to determine if a 4 or 10 water column test for growth or 10 day survival or both growth and survival is best for determining toxicity.
- i. Regional Monitoring Program.** The State and Regional Water Boards are committed to creation of a coordinated Regional Monitoring Program to address receiving water monitoring in the Delta for all Water Board regulatory and research programs. When a Regional Monitoring Program becomes functional, this permit may be reopened to make appropriate adjustments in permit-specific monitoring to coordinate with the Regional Monitoring Program.”
- j. The Bay-Delta Plan.** The South Delta salinity standards are currently under review by the State Water Board in accordance with implementation provisions contained in the Bay-Delta Water Quality Control Plan. This review in process includes an updated independent scientific investigation of irrigation salinity needs in the southern Delta. If applicable water quality objectives of the Bay-Delta Plan are adopted, this Order may be reopened for addition and/or modification of effluent limitations and requirements, as appropriate.

## 2. Special Studies and Additional Monitoring Requirements

- a. Chronic Whole Effluent Toxicity Requirements.** The Basin Plan contains a narrative toxicity objective that states, “*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*” (Basin Plan at page III-8.00). The discharge may contain chronic WET that has reasonable potential to cause or contribute to an in-stream excursion above of the Basin Plan’s narrative toxicity objective.

This provision requires the Discharger to update its TRE Workplan in accordance with USEPA guidance. In addition, the provision provides a numeric toxicity

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<sup>1</sup> Weston, Donald P., “Urban and Agricultural Sources of Pyrethroid Insecticides to the Sacramento-San Joaquin Delta of California”, Environmental Science & Technology, Vol. 44, No. 5, 2010.

monitoring trigger and requirements for accelerated monitoring, as well as, requirements for TRE initiation if toxicity has been demonstrated.

**Monitoring Trigger.** As discussed in Section IV.C.2.d, above, this Order allows a chronic aquatic toxicity mixing zone. The chronic toxicity mixing zone extends 350 feet downstream of the outfall. A numeric toxicity monitoring trigger of **8** TUc (where TUc = 100/NOEC) is applied in the provision, allowing for the dilution granted within the mixing zone. Therefore, a TRE is triggered when the effluent exhibits toxicity at 12.5% effluent. The numeric monitoring trigger represents the in-stream waste concentration at the edge of the chronic mixing zone. The in-stream waste concentration is the concentration of the effluent in the receiving water after mixing (i.e., inverse of the dilution factor). The Discharger has conducted extensive modeling of the discharge and has estimated the 4-day average dilution at the edge of the chronic mixing zone. Table F-20, below, shows modeling results for the percent effluent 350 feet from the diffuser that was provided by the Discharger as part of its comments on the Tentative Order.

**Table F-20. Dyntox Model Results for Percent Effluent 350 Feet from the SRWTP Diffuser at 181 mgd**

Statistic	4-Day Average 350 Feet from Diffuser	
	Percent Effluent	Dilution
<i>Mean</i>	3.93	25.5
<i>Median</i>	3.94	25.4
<i>95%-ile</i>	6.35	15.8
<i>99.91%-ile</i>	7.50	13.3
<i>5%-ile</i>	1.91	52.4

Based on the results of the modeling shown in Table F-20, above, the 4-day average effluent concentration at the edge of the chronic mixing zone, with a one-in-three year exceedance (i.e., 99.91 percentile), is 7.5 percent. This corresponds to a toxicity trigger of 13.3 TUc. Although the modeling demonstrates a chronic toxicity trigger of 13.3 TUc at the edge of the chronic mixing zone, the toxicity trigger has been set at 8 TUc, which is the toxicity trigger in Order 5-00-188 (previous Order). The Discharger has shown consistent compliance with this trigger and it will require proactive efforts to evaluate effluent toxicity before chronic toxicity is experienced outside the chronic toxicity mixing zone.

**Accelerated Monitoring.** The provision requires accelerated WET testing when a regular WET test result exceeds the monitoring trigger. The purpose of accelerated monitoring is to determine, in an expedient manner, whether there is toxicity before requiring the implementation of a TRE. Due to possible seasonality of the toxicity, the accelerated monitoring should be performed in a timely manner, preferably taking no more than 2 to 3 months to complete.

The provision requires accelerated monitoring consisting of four chronic toxicity tests in a six-week period (i.e., one test every two weeks) using the species that exhibited toxicity. Guidance regarding accelerated monitoring and TRE initiation is provided in the *Technical Support Document for Water Quality-based Toxics Control*, EPA/505/2-90-001, March 1991 (TSD). The TSD at page 118 states, “EPA recommends if toxicity is repeatedly or periodically present at levels above effluent limits more than 20 percent of the time, a TRE should be required.” Therefore, four accelerated monitoring tests are required in this provision. If no toxicity is demonstrated in the four accelerated tests, then it demonstrates that toxicity is not present at levels above the monitoring trigger more than 20 percent of the time (only 1 of 5 tests are toxic, including the initial test). However, notwithstanding the accelerated monitoring results, if there is adequate evidence of effluent toxicity (i.e. toxicity present exceeding the monitoring trigger more than 20 percent of the time), the Executive Officer may require that the Discharger initiate a TRE.

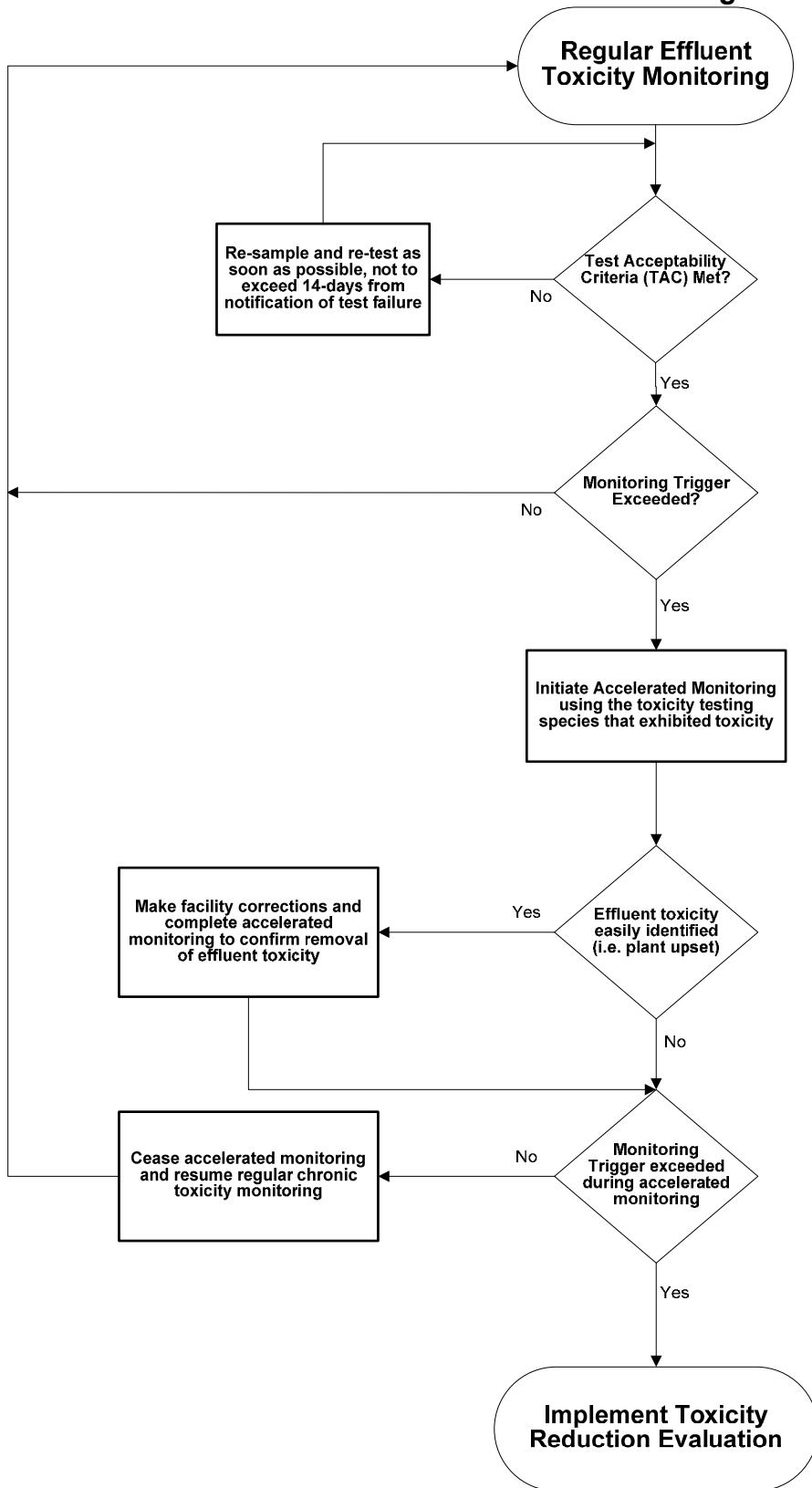
See the WET Accelerated Monitoring Flow Chart (Figure F-2), below, for further clarification of the accelerated monitoring requirements and for the decision points for determining the need for TRE initiation.

**TRE Guidance.** The Discharger is required to prepare a TRE Workplan in accordance with USEPA guidance. Numerous guidance documents are available, as identified below:

- Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants, EPA/833-B-99/002, August 1999.
- Generalized Methodology for Conducting Industrial Toxicity Reduction Evaluations (TREs), EPA/600/2-88/070, April 1989.
- Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures, Second Edition, EPA 600/6-91/003, February 1991.
- Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I, EPA/600/6-91/005F, May 1992.
- Methods for Aquatic Toxicity Identification Evaluations: Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity, Second Edition, EPA/600/R-92/080, September 1993.
- Methods for Aquatic Toxicity Identification Evaluations: Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity, Second Edition, EPA 600/R-92/081, September 1993.
- Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition, EPA-821-R-02-012, October 2002.

- Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition, EPA-821-R-02-013, October 2002.
- Technical Support Document for Water Quality-based Toxics Control, EPA/505/2-90-001, March 1991.

**Figure F-2**  
**WET Accelerated Monitoring Flow Chart**



- b. Temperature Study.** The Discharger shall submit a workplan and time schedule for Executive Officer approval for determining whether permitted conditions are protective of aquatic life beneficial uses in the Sacramento River. This Order requires the Discharger to submit a workplan and time schedule for Executive Officer approval for determining whether permitted conditions are protective of the aquatic life beneficial uses of the Sacramento River. The work plan shall be implemented upon approval by the Executive Officer. The study will include an evaluation of: (1) the existing Thermal Plan Exception and its effects on aquatic life, and (2) any proposed request for new Thermal Plan Exception(s). The Discharger must consult with the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the California Department of Fish and Game, to consider additional issues (such as fish attractively to mixing zone areas) in development of the workplan for the Study.

### **3. Best Management Practices and Pollution Prevention**

- a. Salinity Evaluation and Minimization Plan.** An Evaluation and Minimization Plan for salinity is required in this Order to ensure adequate measures are developed and implemented by the Discharger to reduce the discharge of salinity to Sacramento River.
- b. 2,3,7,8-TCDD and Other Dioxin and Furan Congeners Source Evaluation and Minimization Plan.** The Discharger will be required to prepare a 2,3,7,8-TCDD and other dioxin and furan congeners evaluation and minimization plan to address sources of detectable dioxins (OCDD and 1,2,3,4,6,7,8-HpCDD) and furans (OCDF) from the Facility. The plan is required in this Order to ensure adequate measures are developed and implemented by the Discharger to reduce the discharge of dioxin and furan congeners to the receiving water.

### **4. Construction, Operation, and Maintenance Specifications**

- a. Emergency Storage Basin Operating Requirements.** The operation and maintenance specifications for the emergency storage basin are necessary to ensure proper operation of the emergency storage basin and minimize the potential for impacts to groundwater quality.
- b. Turbidity.** Operations specifications for turbidity are included as an indicator of the effectiveness of the treatment process and to assure compliance with effluent limitations for total coliform organisms. The tertiary treatment process is capable of reliably meeting a turbidity limitation of 2 nephelometric turbidity units (NTU) as a daily average. Failure of the treatment system such that virus removal is impaired would normally result in increased particles in the effluent, which result in higher effluent turbidity. Turbidity has a major advantage for monitoring filter performance, allowing immediate detection of filter failure and rapid corrective action. The operational specification requires that turbidity shall not exceed 2 NTU as a daily average; 5 NTU, more than 5 percent of the time within a 24-hour period; and an instantaneous maximum of 10 NTU.



## 5. Special Provisions for Municipal Facilities (POTWs Only)

- a. **Pretreatment Requirements.** The federal CWA section 307(b), and federal regulations, 40 CFR Part 403, require publicly owned treatment works to develop an acceptable industrial pretreatment program. A pretreatment program is required to prevent the introduction of pollutants, which will interfere with treatment plant operations or sludge disposal, and prevent pass through of pollutants that exceed water quality objectives, standards or permit limitations. Pretreatment requirements are imposed pursuant to 40 CFR Part 403.

The Discharger shall implement and enforce its approved pretreatment program and is an enforceable condition of this Order. If the Discharger fails to perform the pretreatment functions, the Central Valley Water Board, the State Water Board or USEPA may take enforcement actions against the Discharger as authorized by the CWA.

- b. The State Water Board issued General Waste Discharge Requirements for Sanitary Sewer Systems, Water Quality Order No. 2006-0003-DWQ (General Order) on 2 May 2006. The General Order requires public agencies that own or operate sanitary sewer systems with greater than one mile of pipes or sewer lines to enroll for coverage under the General Order. The General Order requires agencies to develop sanitary sewer management plans (SSMPs) and report all sanitary sewer overflows (SSOs), among other requirements and prohibitions.

Furthermore, the General Order contains requirements for operation and maintenance of collection systems and for reporting and mitigating sanitary sewer overflows. Inasmuch that the Discharger's collection system is part of the system that is subject to this Order, certain standard provisions are applicable as specified in Provisions, section VI.C.5. For instance, the 24-hour reporting requirements in this Order are not included in the General Order. The Discharger must comply with both the General Order and this Order. The Discharger and public agencies that are discharging wastewater into the facility were required to obtain enrollment for regulation under the General Order by 1 December 2006.

## 6. Other Special Provisions

- a. **Ownership Change.** To maintain the accountability of the operation of the Facility, the Discharger is required to notify the succeeding owner or operator of the existence of this Order by letter if, and when, there is any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger.

## 7. Compliance Schedules

- a. The Discharger submitted a request, and justification (dated 20 August 2010), for a compliance schedule for BOD<sub>5</sub>, TSS, ammonia, and total coliform organisms.

The compliance schedule justification included all items specified in Paragraph 3, items (a) through (d), of section 2.1 of the SIP. This Order establishes a compliance schedule for the new, final WQBELs for BOD<sub>5</sub>, TSS, ammonia, and total coliform organisms and requires full compliance by 1 December 2020.

- b.** A pollution prevention plan for ammonia and for mercury is required in this Order per CWC section 13263.3(d)(1)(C). In accordance with CWC section 13263.3(d)(3), the pollution prevention plans for ammonia and mercury shall, at a minimum, meet the following requirements:
- (1)** An estimate of all of the sources of a pollutant contributing, or potentially contributing, to the loadings of a pollutant in the treatment plant influent.
  - (2)** An analysis of the methods that could be used to prevent the discharge of the pollutants into the Facility, including application of local limits to industrial or commercial dischargers regarding pollution prevention techniques, public education and outreach, or other innovative and alternative approaches to reduce discharges of the pollutant to the Facility. The analysis also shall identify sources, or potential sources, not within the ability or authority of the Discharger to control, such as pollutants in the potable water supply, airborne pollutants, pharmaceuticals, or pesticides, and estimate the magnitude of those sources, to the extent feasible.
  - (3)** An estimate of load reductions that may be attained through the methods identified in subparagraph ii.
  - (4)** A plan for monitoring the results of the pollution prevention program.
  - (5)** A description of the tasks, cost, and time required to investigate and implement various elements in the pollution prevention plan.
  - (6)** A statement of the Discharger's pollution prevention goals and strategies, including priorities for short-term and long-term action, and a description of the Discharger's intended pollution prevention activities for the immediate future.
  - (7)** A description of the Discharger's existing pollution prevention programs.
  - (8)** An analysis, to the extent feasible, of any adverse environmental impacts, including cross-media impacts or substitute chemicals that may result from the implementation of the pollution prevention program.
  - (9)** An analysis, to the extent feasible, of the costs and benefits that may be incurred to implement the pollution prevention program.

## VIII. PUBLIC PARTICIPATION

The Central Valley Water Board is considering the issuance of WDRs that will serve as an NPDES permit for the Facility. As a step in the WDR adoption process, the Central Valley Water Board staff has developed tentative WDRs. The Central Valley Water Board encourages public participation in the WDR adoption process.

### A. Notification of Interested Parties

The Central Valley Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Notification was provided through publication of a Notice of Public Hearing in the Sacramento Bee. The Notice was also posted at the Sacramento City Hall and at the entrance to the Facility.

### B. Written Comments

The staff determinations are tentative. Interested persons are invited to submit written comments concerning these tentative WDRs. Comments must be submitted either in person or by mail to the Executive Office at the Central Valley Water Board at the address above on the cover page of this Order.

To be fully responded to by staff and considered by the Central Valley Water Board, written comments must be received at the Central Valley Water Board offices by 5:00 p.m. on **8 October 2010**.

### C. Public Hearing

The Central Valley Water Board will hold a public hearing on the tentative WDRs during its regular Board meeting on the following date and time and at the following location:

Date: 9 December 2010  
Time: 8:30 a.m.  
Location: Regional Water Quality Control Board, Central Valley Region  
11020 Sun Center Dr., Suite #200  
Rancho Cordova, CA 95670

Interested persons are invited to attend. At the public hearing, the Central Valley Water Board will hear testimony, if any, pertinent to the discharge, WDRs, and permit. Oral testimony will be heard; however, for accuracy of the record, important testimony should be in writing.

Please be aware that dates and venues may change. Our Web address is [www.waterboards.ca.gov/centralvalley](http://www.waterboards.ca.gov/centralvalley) where you can access the current agenda for changes in dates and locations.

#### **D. Waste Discharge Requirements Petitions**

Any aggrieved person may petition the State Water Board to review the decision of the Central Valley Water Board regarding the final WDRs. The petition must be received by the State Water Resources Control Board within 30 days of the Central Valley Water Board's action to the following address:

State Water Resources Control Board  
Office of Chief Counsel  
P.O. Box 100, 1001 I Street  
Sacramento, CA 95812-0100

#### **E. Information and Copying**

The Report of Waste Discharge, related documents, tentative effluent limitations and special provisions, comments received, and other information are on file and may be inspected at the address above at any time between 8:30 a.m. and 4:45 p.m., Monday through Friday. Copying of documents may be arranged through the Central Valley Water Board by calling (916) 464-3291.

#### **F. Register of Interested Persons**

Any person interested in being placed on the mailing list for information regarding the WDRs and NPDES permit should contact the Central Valley Water Board, reference this Facility, and provide a name, address, and phone number.

#### **G. Additional Information**

Requests for additional information or questions regarding this order should be directed to Ms. Kathy Harder at (916) 464-4778 or [kharder@waterboards.ca.gov](mailto:kharder@waterboards.ca.gov).

**ATTACHMENT G – SUMMARY OF REASONABLE POTENTIAL ANALYSIS**

Constituent	Applicable Water Quality Objective/Criteria {Basis} (C)	Maximum Effluent Concentration (MEC)	Receiving Water Concentration (Sacramento River @ Freeport) (B)	Reason for Reasonable Potential
Copper	7.7/3.0 <sup>1</sup> {CTR Aquatic Life}	6.34	20.4	B > C
Mercury <sup>2</sup>	0.05 {CTR Human Health}	0.01	0.0892	B > C
Cyanide	5.2 {CTR Aquatic Life}	10	5	MEC > C
Carbon Tetrachloride	0.25 {CTR Human Health}	0.5	<0.1	MEC > C
Chlorodibromomethane	0.41 {CTR Human Health}	0.7	<0.18	MEC > C
Dichlorobromomethane	0.56 {CTR Human Health}	2.5	<0.14	MEC > C
Methylene Chloride	4.7 {CTR Human Health}	5.4	<0.35	MEC > C
Tetrachloroethylene	0.8 {CTR Human Health}	0.9	0.21	MEC > C
Pentachlorophenol	0.28 {CTR Human Health}	5.7	0.026	MEC > C
Bis(2-Ethylhexyl) Phthalate	1.8 {CTR Human Health}	8.1	0.57	MEC > C
Dibenzo(ah) anthracene	0.0044 {CTR Human Health}	0.51	0.0026	MEC > C
N-nitrosodimethylamine	0.00069 {CTR Human Health}	0.044	<0.01	MEC > C
Aluminum	200 {Secondary MCL}	44.4	8800	B > C
Ammonia (mg/L)	1.23 <sup>3</sup> {USEPA NAWQC}	45	1.3	B > C & MEC > C
Manganese	50 {Basin Plan}	65	130	B > C & MEC > C
MTBE	5 {Secondary MCL}	5.8	1.9	MEC > C
Chlorpyrifos	0.025 (Basin Plan)	0.039	0.0058	MEC>C

<sup>1</sup> Effluent copper criteria is 7.7 µg/L based on a minimum effluent hardness of 80 mg/L (as CaCO<sub>3</sub>) and background copper criteria is 3.0 µg/L based on a minimum upstream receiving water hardness of 26 mg/L (as CaCO<sub>3</sub>). Default EPA translators were used.  
<sup>2</sup> Receiving Water concentration from Coordinated Monitoring Program (CMP) @ Freeport Summary 1992-2008  
<sup>3</sup> Water quality criteria (chronic criterion) calculated using the maximum upstream receiving water pH of 8.8 and corresponding temperature of 15.1C° that occurred on 10/21/1998

General Notes:

- Effluent data from June 2005-July 2008 from discharger self-monitoring reports (SMRs); Receiving water data from 1992-2008 from SMRs & CMP
- All units in µg/L unless specified
- All metals criteria is expressed as total recoverable
- MCL = Maximum Contaminant Level
- NAWQC = National Ambient Water Quality Criteria
- CTR = California Toxics Rule



**ATTACHMENT I – DIOXIN AND FURAN SAMPLING**

The CTR includes criteria for 2,3,7,8-tetrachlorodibenzo-pdioxin (2,3,7,8-TCDD). In addition to this compound, there are many congeners of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) that exhibit toxic effects similar to those of 2,3,7,8-TCDD. The USEPA has published toxic equivalency factors (TEFs) for 17 of the congeners. The TEFs express the relative toxicities of the congeners compared to 2,3,7,8-TCDD (whose TEF equals 1.0). In June 1997, participants in a World Health Organization (WHO) expert meeting revised TEF values for 1,2,3,7,8-PentaCDD, OctaCDD, and OctaCDF. The current TEFs for the 17 congeners, which include the three revised values, are shown below:

**Toxic Equivalency Factors (TEFs) for 2,3,7,8-TCDD Equivalents**

<b>Congener</b>	<b>TEF</b>
2,3,7,8-TetraCDD	1
1,2,3,7,8-PentaCDD	1.0
1,2,3,4,7,8-HexaCDD	0.1
1,2,3,6,7,8-HexaCDD	0.1
1,2,3,7,8,9-HexaCDD	0.1
1,2,3,4,6,7,8-HeptaCDD	0.01
OctaCDD	0.0001
2,3,7,8-TetraCDF	0.1
1,2,3,7,8-PentaCDF	0.05
2,3,4,7,8-PentaCDF	0.5
1,2,3,4,7,8-HexaCDF	0.1
1,2,3,6,7,8-HexaCDF	0.1
1,2,3,7,8,9-HexaCDF	0.1
2,3,4,6,7,8-HexaCDF	0.1
1,2,3,4,6,7,8-HeptaCDF	0.01
1,2,3,4,7,8,9-HeptaCDF	0.01
OctaCDF	0.0001

Pursuant to Section 13267 of the California Water Code, the Discharger shall conduct effluent and receiving water monitoring, at EFF-001 and RSWU-001, respectively, for the 2,3,7,8-TCDD congeners listed above to assess the presence and amounts of the congeners being discharged and present in the receiving water. For the 2013 calendar year and every other calendar year thereafter, the effluent and upstream receiving water shall be monitored for the presence of the 17 congeners once during dry weather and once during wet weather. The semi-annual monitoring results shall be submitted by **1 February** of the year following the calendar year of monitoring, and shall be submitted with the effluent and receiving water monitoring report containing the monitoring results as required by section IV.B. and section VIII.A.2. of the MRP.

The Discharger shall report, for each congener, the analytical results of the effluent and receiving water monitoring, including the quantifiable limit and the method detection limit, and the measured or estimated concentration.

In addition, the Discharger shall multiply each measured or estimated congener concentration by its respective TEF value and report the sum of these values.

## ATTACHMENT J – AMMONIA-RELATED ISSUES

### Ammonia-Related Issues

The Discharger's undiluted effluent contains ammonia and other chemicals in toxic concentrations. The SRWTP discharges approximately 14 tons of ammonia daily to the Sacramento River at Freeport. The ammonia toxicity is demonstrated by the numerous acute toxicity violations<sup>1</sup>, and ammonia studies by Dr. Werner<sup>2</sup> and by Dr. Teh<sup>3</sup>. Recent Pelagic Organism Decline (POD) has been documented in Sommer, T., C. Armor, R. Baxter, L. Brown, M. Chotkowski, S. Culberson, F. Feyrer, M. Gingras, B. Herbold, W. Kimmerer, A. Mueller-Solger, M. Nobriga, and K. Souza. 2007. The collapse of pelagic fishes in the upper San Francisco Estuary. *Fisheries* 32(6):270-277.

POD related hypotheses include that ammonia from the SRWTP maybe; (1) inhibiting diatom primary production in the Sacramento River downstream of the discharge point, in Suisun Bay and in the Delta, (2) causing acute and/or chronic toxicity to delta smelt and *Pseudodiaptomus forbesi*, an important food organism for larval and juvenile fish, and (3) causing a shift in the algal community from nutritious species of diatoms to less desirable forms like *Microcystis* (*blue green algae*).

Ammonia Toxicity Criteria – Ammonia is toxic to aquatic life with the toxicity varying with the species and with the pH and temperature of the water. Numeric water quality criteria to address both acute and chronic toxicity have been developed by USEPA in its "1999 Update of Ambient Water Quality Criteria for Ammonia" (September 1999). In the USEPA ammonia criteria, acute ammonia toxicity is represented by the effect on salmonids with acute ammonia toxicity increasing with increasing pH. Acute toxicity is represented by the death of the salmonid indicator species. Chronic ammonia toxicity is represented by the effects on fish early life stages, with chronic ammonia toxicity increasing with increasing pH and temperature. Chronic toxicity is represented by the end points: growth, reproduction and survival of the indicator fish early life stages. The discharge, when the approved mixing zones are considered, is in compliance with current USEPA acute and chronic ammonia criteria.

Acute Ammonia Toxicity -Recent studies show Delta smelt are as acutely sensitive to ammonia as salmonids<sup>4</sup> are. Thus the USEPA acute ammonia criteria are protective of the

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<sup>1</sup> 1 July 2009 and 12 January 2010 Notices of Violations to Ms. Mary Snyder from Mr. Victor R. Vasquez, Senior Engineer for the NPDES Compliance and Enforcement Unit, Central Valley Regional Water Quality Control Board

<sup>2</sup> Werner, I, "Effects of Ammonia/um and Other Wastewater Effluent Associated Contaminants on Delta Smelt", presented at the 18-19 August 2009 Ammonia Summit at the Central Valley Regional Water Quality Control Board.

<sup>3</sup> Teh, S.J., "Acute Toxicity of Ammonia, Copper, and Pesticides to Key Copepods, *Pseudodiaptomus forbesi* and *Eurytemora affinis*, of the San Francisco Estuary", presented at the 18-19 August 2009 Ammonia Summit at the Central Valley Regional Water Quality Control Board.

<sup>4</sup> Werner, I, L Deanovic, M. Stillway, D. Markiewicz 2008. The effects of wastewater treatment effluent associated contaminants on delta smelt. Final Report to the State Water Resources Control Board, p 60 and Werner, I, L



Delta smelt. However, recent studies on ammonia and the POD of the Delta indicate USEPA's criteria may not be adequately protective of some other sensitive resident Delta species.<sup>1,2</sup> Dr. Swee Teh from the U.C. Davis School of Veterinary Medicine reported at the Ammonia Summit on the results of acute toxicity testing with two copepods, *Eurytemora affinis* and *Pseudodiaptomus forbesi*. Both invertebrate species are important forage organisms for larval fish, including Delta Smelt, in the Delta. Ten percent mortality occurred to both invertebrate species at ambient ammonia concentrations present in the river below the SRWTP.

Chronic Ammonia Toxicity – Research shows varied results for chronic toxicity from the Discharger's ammonia. There is currently no method for assessing chronic toxicity to delta smelt. Where no method exists, acute to chronic ratios (ACRs) for other freshwater fish species are often used to predict potential chronic toxicological endpoints. ACRs are calculated by dividing the 96-hour LC<sub>50</sub> by the lowest chronic NOEC value. The USEPA (1999) has reported ACR ammonia ratios for six species that ranged between 2 and 21<sup>3</sup>. The lowest reported 96-hour LC<sub>50</sub> for smelt was >0.116 mg/l un-ionized ammonia (Werner *et al.*, 2009). For smelt, dividing 0.116 by 21 results in an estimated chronic NOEC for smelt of 0.0055 mg/l un-ionized ammonia.

During a Central Valley Water Board study, "Draft Nutrient Concentrations and Biological Effects in the Sacramento-San Joaquin Delta"<sup>4</sup>, none of the upper 95 percent confidence limits of un-ionized ammonia in the Delta exceeded 0.0055 mg/l suggesting that chronic smelt toxicity is unlikely to have occurred. This conclusion is different from that of Werner *et al.* (2008, 2009). Werner *et al.* concluded that chronic smelt toxicity was possible because of the higher pH values measured in summer in their study. According to Werner, repeated excursions above a pH value of 8.0 would indicate the potential for chronic smelt toxicity.

Dr. Swee Teh also used an ACR analysis and concluded that ambient ammonia concentrations downstream of the SRWTP discharge point might be causing chronic toxicity to both *Eurytemora affinis* and *Pseudodiaptomus forbesi* species. Dr. Teh recommended follow up chronic toxicity studies with invertebrate species. Thirty-day full-life cycle tests were conducted with *P. forbesi* to evaluate the possibility of chronic instream ammonia toxicity. Preliminary testing has now been completed and Dr. Teh reported at 6 July 2010 IEP Contaminant Work Team meeting that *P. forbesi* reproduction and survival was negatively effected by ammonia concentrations as low as 0.36 mg N/L. Ammonia concentrations of this magnitude were measured by the Central Valley Water Board staff in 2009 and 2010 between

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Deanovic, M. Stillway, D. Markiewicz 2009. Acute toxicity of ammonia/um and wastewater treatment effluent-associated contaminants on delta smelt—2009. Final Report to the State Water Resources Control Board, p 63.

<sup>1</sup> Johnson, M. L. "Species Sensitivity Distributions and Exposure Concentrations; Placing Recent Results in Context", presented at the 18-19 August 2009 Ammonia Summit at the Central Valley Regional Water Quality Control Board.

<sup>2</sup> Teh, S.J., "Acute Toxicity of Ammonia, Copper, and Pesticides to Key Copepods, *Pseudodiaptomus forbesi* and *Eurytemora affinis*, of the San Francisco Estuary", presented at the 18-19 August 2009 Ammonia Summit at the Central Valley Regional Water Quality Control Board.

<sup>3</sup> The ACR of 21 was from a full life cycle test with fathead minnows (Thurston *et al.*, 1986). The chronic NOEC endpoint was the highest ammonia concentrations not causing any detrimental histopathological effect.

<sup>4</sup> Foe, Chris, "Nutrient Concentrations and Biological Effects in the Sacramento-San Joaquin Delta", May 2010.

the SRWTP and for about 30 miles downstream of the SRWTP<sup>3</sup>. Dr. Teh completed additional experiments and confirmed the *P. forbesi* findings. Dr. Teh concluded *P. forbesi* is more sensitive to total ammonia nitrogen at lower pH and the ionized fraction is more toxic than unionized fraction of ammonia to *P. forbesi*. The Low Observed Effect Concentration (LOEC) of 0.36 mg/L from chronic 31-day study indicated total ammonia at environmentally relevant concentrations of 0.3 to 0.6 mg/L as seen in the Cache Slough regions may pose significant effect on the survival and population of *P. forbesi*. Reproduction performance, i.e., time for female to be gravid and surviving of newborn to the juvenile stages, of *P. forbesi* is affected by ammonia at concentration  $\geq 0.36$  mg/L<sup>1</sup>.

Proposed 2009 USEPA Ammonia Criteria – USEPA is in the process of updating its ammonia criteria. USEPA released the “Draft 2009 Update Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater” in December 2009. These criteria would update the 1999 Ammonia criteria currently used by the Central Valley Water Board to develop ammonia effluent limitations to implement the Basin Plan’s narrative toxicity objective. The major change to the criteria is the addition of more stringent ammonia chronic criteria specific to freshwater mussels. The criteria are revised to protect freshwater Unionid mussels. Unionid mussels are more sensitive than larval fish to ammonia. The proposed chronic ammonia criteria with freshwater mussels present is about five to ten times lower than the 1999 chronic criteria for juvenile fish. Table K-1 below compares the most stringent 1999 criteria (fish early life stages present) to the proposed 2009 chronic ammonia criteria for freshwater mussels.

**TABLE K-1 TEMPERATURE AND PH-DEPENDENT VALUES - AMMONIA CHRONIC CRITERION: USEPA AMMONIA CRITERIA 1999 FISH EARLY LIFE STAGES PRESENT TO PROPOSED 2009**

Species	pH @ 7.5	Temperature, °C					
		14	16	18	20	22	24
<b>Fish early life stages present</b>	<b>1999</b>	<b>4.36</b>	<b>3.97</b>	<b>3.49</b>	<b>3.06</b>	<b>2.69</b>	<b>2.37</b>
<b>Freshwater mussels</b>	<b>2009</b>	<b>0.933</b>	<b>0.82</b>	<b>0.721</b>	<b>0.634</b>	<b>0.577</b>	<b>0.49</b>

The freshwater Unionid mussel *Anadonata* sp. is present in the Sacramento watershed above the City of Sacramento and in the Delta (personal communication, Jeanette Howard)<sup>2</sup>. It is not known whether the mussel is in the lower Sacramento River near the SRWTP. However, *Anadonata* disperses during a larval stage in which it attaches to passing fish. *Anadonata* is present above the SRWTP, therefore, it is likely that *Anadonata* is present in the lower River. If so, then the new draft ammonia criteria for protection of mussels would apply.

A site-specific chronic mussel criterion was calculated for each field sample collected by Central Valley Water Board staff. The USEPA (2009) formula was used to calculate each criterion and then was compared to ambient ammonia levels in the Delta collected during the year long CVRWQB nutrient study. Ambient concentrations never exceeded the criteria. A safety factor was calculated by dividing ambient ammonia concentrations by the estimated site

<sup>1</sup> November 10, 2010 letter from Dr. Swee Teh, University of California, Davis to Dr. Chris Foe, CVRWQCB.

<sup>2</sup> Personal Communications with Dr. Jeanette Howard, March 10, 2010 with Chris Foe, CVWQCB and 17 & 18 March with Kathy Harder, CVWQCB.

specific chronic mussel criteria. The margin of safety for the Sacramento River above the SRWTP (Tower Bridge and at Garcia Bend) was the highest observed in the system. The safety factor decreased to the lowest level at Hood. Many of the calculated monthly safety factor values for Hood were between one and two indicating a very small margin of safety. Values increased downstream of Hood. About 20 miles downstream of Hood, the average safety factor for Rio Vista was about six<sup>1</sup>.

The Central Valley Water Board results from the nutrient study are consistent with the conclusions of Dr. Diana Engle of Larry Walker Associates who compared ambient ammonia concentrations collected in the Sacramento River and Delta by the Interagency Ecological Program between 1974 and 2000<sup>2</sup>. Dr. Engle's evaluation had only one exceedance of the chronic 1999 criteria was reported in nearly 12,000 measurements. However the Central Valley Water Board evaluation did not include the ammonia, temperature and pH data for R-3, at Cliff's Marina about 4200 feet downstream of the SWRTP discharge point and outside of the Discharger's requested mixing zone. Analysis of the R-3 data concluded USEPA 1999 acute criteria was never exceeded. The State Water Contractors compared ambient ammonia levels immediately outside the SRWTP mixing zone with the draft 2009 USEPA ammonia criteria. The 2009 criteria were exceeded 21 percent of the time between 2007 and 2008 and 41 percent of the time in 2009<sup>3</sup>.

Additive and Synergistic Toxicity – In 2008, Dr. Teh conducted tests on Sacramento River water at Hood, about 8 miles downstream of the SRWTP discharge point. His results showed 95% mortality to *Eurytemora affinis*, a Delta copepod and food for Delta smelt. Further studies<sup>4</sup> completed by Dr. Teh, indicate the Delta copepods, *Pseudodiaptomus forbesi* and *E. affinis* are very sensitive to combined concentrations of ammonia and copper.

Additionally, a study conducted by Dr. Inge Werner<sup>5</sup> evaluated parallel toxicity tests using Sacramento River water seeded with ammonium chloride and another seeded with SRWTP effluent to match the same ammonia concentrations. Dr. Werner's study showed that the test performed with SRWTP effluent was statistically 30-40% more toxic than the test performed with river water seeded with ammonium chloride. This may be an indication that there are additional toxicants present in the SRWTP effluent that are resulting in chronic toxicity to aquatic species.

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<sup>1</sup> Foe, Chris, "Nutrient Concentrations and Biological Effects in the Sacramento-San Joaquin Delta", May 2010.

<sup>2</sup> Engle, D.L., & G. Lau (2010) Does Ammonia Exceed Toxicity Thresholds in the Upper San Francisco Estuary? A comparison of Ambient Data and Toxicity Thresholds for 1974-2010. Interagency Ecological Program (IEP) Annual Workshop, Sacramento, CA.

<sup>3</sup> State Water Contractors, Comments on Aquatic Life and Wildlife Preservation Issues Concerning the Sacramento Regional Wastewater Treatment Plant NPDES Permit Renewal, 1 June 2010.

<sup>4</sup> Teh, S.J., "Acute Toxicity of Ammonia, Copper, and Pesticides to Key Copepods, *Pseudodiaptomus forbesi* and *Eurytemora affinis*, of the San Francisco Estuary", presented at the 18-19 August 2009 Ammonia Summit at the Central Valley Regional Water Quality Control Board.

<sup>5</sup> Werner, I, "Effects of Ammonia/um and Other Wastewater Effluent Associated Contaminants on Delta Smelt", presented at the 18-19 August 2009 Ammonia Summit at the Central Valley Regional Water Quality Control Board.

Inhibition of Diatom Primary Production. – In the Delta, low primary production rates and standing chlorophyll levels may be one factor contributing to the POD including the decline in diatom populations<sup>1</sup>. The causes of low primary production are not understood. Some areas with low primary production are not influenced by the discharger. Dr. Richard Dugdale from the San Francisco State University Romberg Tiburon Center presented evidence that an ammonia concentration greater than 0.056 mg N/l inhibited nitrate uptake by diatoms in Suisun Bay<sup>2</sup>. Ammonia-induced inhibition of nitrate uptake prevents spring algal blooms from developing when conditions are otherwise favorable<sup>3</sup>. High diatom filtration rates by the introduced clam *Corbula* and high turbidity levels are additional factors responsible for reducing diatom production and standing biomass in Suisun Bay. A combination of the above three factors (ammonia inhibition of nitrate uptake, depletion due to filtration by clams, and high turbidity levels due to standing chlorophyll) may contribute to the low diatom abundance now present in the Bay.

The San Francisco Regional Water Quality Control Board is responsible for conducting regulatory activities of water quality in Suisun Bay (part of the Delta system). The Executive Officer from the San Francisco Water Board has informed staff from the Central Valley Water Board that ammonia levels in Suisun Bay may be impairing the aquatic life beneficial uses in Suisun Bay by having a detrimental effect on primary production and phytoplankton species composition<sup>4</sup>. Staff from the San Francisco Regional Board monitored ammonia concentrations and algal species composition in Suisun Bay in the spring of 2010 to determine ammonia concentrations and the response of the diatom community. A written report is **soon**.

Nutrient monitoring by Central Valley Water Board staff have confirmed that the Central Valley watershed is an ammonia source to Suisun Bay<sup>8</sup>. Annual average ammonia concentrations increased 11.5-fold in the Sacramento River downstream of the SRWTP. More than three quarters of this ammonia (NH<sub>3</sub>) is nitrified to nitrite (NO<sub>2</sub>) and nitrate (NO<sub>3</sub>) before the water reaches Chipps Island 40 miles downstream of SRWTP. The channel off Chipps Island is considered here to be the entrance to Suisun Bay. Total dissolved nitrogen (TDN) concentrations (NH<sub>3</sub>+NO<sub>2</sub>+NO<sub>3</sub>) were constant between the SRWTP and Chipps Island. A stable concentration of TDN implies that there are no additional large sources or sinks of nitrogen in the Sacramento River channel between the SRWTP and Suisun Bay. The annual average ammonia concentration at Chipps Island was 0.1 mg N/l in 2009 and 2010<sup>3</sup>. The Dr. Richard Dugdale laboratory reports that ammonia begins to suppress nitrate assimilation in Suisun Bay at about 0.014 mg N/l with a complete shutdown at 0.056 mg-N/l<sup>10</sup>.

Recent studies by the Dugdale laboratory at the Romberg Tiburon Center demonstrate that ammonia concentrations are suppressing nitrogen uptake and algal primary production in both

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<sup>1</sup> Sommer, T., C. Armor, R. Baxter, L. Brown, M. Chotkowski, S. Culberson, F. Feyrer, M. Gingras, B. Herbold, W. Kimmerer, A. Mueller-Solger, M. Nobriga, and K. Souza. 2007. The collapse of pelagic fishes in the upper San Francisco Estuary. *Fisheries* 32(6):270-277.

<sup>2</sup> Dugdale, R. f. Wilkerson, V. Hogue, and A. Marchi. 2007. The role of ammonium and nitrate in spring bloom development in San Francisco Bay. *Estuarine, Coastal and Shelf Science*, 73:17-29

<sup>3</sup> Wilkerson, F. R. Dugdale, V. Hogue, and A. Marchi, 2006. Phytoplankton blooms and nitrogen productivity in San Francisco Bay. *Estuaries and Coasts* 29(3):401-416.

<sup>4</sup> June 4, 2010 letter from Mr. Bruce Wolfe, Region 2 to Ms. Kathy Harder, CVWQCB.

Suisun Bay and the Delta<sup>1</sup>. The San Francisco Regional Water Quality Control Board is responsible for regulating water quality in Suisun Bay. The Executive Officer from the San Francisco Water Board has informed staff from the Central Valley Water Board that ammonia levels in Suisun Bay may be impairing aquatic life beneficial uses by having a detrimental effect on primary production and algal species composition and request that the Central Valley Regional Board take all reasonable and feasible measures to reduce ammonia loads as soon as possible<sup>2</sup>. Evidence for ammonia impairment of algal primary production in the Delta was reported for the first time at the 6<sup>th</sup> Biennial Bay-Delta Science Conference by Dr Parker<sup>3</sup>. Dr Parker stated that “a U-shaped pattern of primary production and chlorophyll was observed ...with a maximum in the river above the SRWTP and again to the west in San Pablo Bay, essentially a mirror image of the distribution of ammonia concentrations”. These results are consistent with the earlier observations for Suisun Bay that ammonia concentrations suppress algal primary production and standing chlorophyll levels and extend the findings to the freshwater Delta. Dr. Dugdale’s laboratory report that ammonia begins to suppress nitrate assimilation and primary production rates at 0.014 mg-N/l with complete shutdown by 0.056 mg-N/l<sup>4</sup>. Regional Board staff monitored ammonia concentrations monthly at Chipps Island, about 2 miles upstream of Suisun Bay, and at multiple locations in the Delta for a year between March 2009 and February 2010<sup>2</sup>. Ambient ammonia concentrations in 2009 and 2010 would need to be reduced by a factor of 2 to 7 at Chipps Island and by a factor of 1 to 21 in the main channel of the Sacramento River between Rio Vista and Chipps Island to eliminate the suppression of nitrogen uptake and primary production (See Table J-2). For comparison, the proposed ammonia permit limits would reduce the maximum daily concentration 20-fold (45<sup>4</sup> to 2.2 mg N/L) and the average monthly value 13-fold (24<sup>5</sup> to 1.8 mg N/L). These values are comparable to the decreases needed for the Delta and for Suisun Bay to eliminate the ammonia impairment of nitrogen uptake and primary production by the phytoplankton community.

Ammonia concentrations are higher in the Sacramento River downstream of the SRWTP than in Suisun Bay. Two studies have been undertaken to determine the effect of ammonia on phytoplankton primary production in the Sacramento River and Delta. Both studies have found that ambient ammonia concentrations reduce nitrate uptake<sup>6</sup>. An additional complicating factor is that chlorophyll *a* concentrations decrease as the Sacramento River flows toward the Delta. The decrease in chlorophyll appears to commence above the SRWTP. The average

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<sup>1</sup>Wilkerson, F. R. Dugdale, V. Hogue, and A. Marchi, 2006. Phytoplankton blooms and nitrogen productivity in San Francisco Bay. *Estuaries and Coasts* 29(3):401-416.  
Dugdale, R. f. Wilkerson, V. Hogue, and A. Marchi. 2007. The role of ammonium and nitrate in spring bloom development in San Francisco Bay. *Estuarine, Coastal and Shelf Science*, 73:17-29  
Machi, A. 2010. Spring 2010 Phytoplankton Blooms in Northern San Francisco Estuary: Influences of Climate and Nutrients. Presented at the 6<sup>th</sup> Biennial Bay-Delta Science Conference held in Sacramento California on 27-29 September 2010.

<sup>2</sup> June 4, 2010 letter from Mr. Bruce Wolfe to Ms. Kathy Harder

<sup>3</sup> A. Parker, R. Dugdale, F. Wilkerson, A. Marchi, 2010. Biogeochemical Processing of Anthropogenic Ammonium in the Sacramento River and the northern San Francisco Estuary: Consequences for Pelagic Organism Decline Species. Presented at the 6<sup>th</sup> Biennial Bay-Delta Science Conference held in Sacramento California on 27-29 September 2010

<sup>4</sup> 5-year daily maximum value.

<sup>5</sup> 5-year monthly average value

<sup>6</sup> Parker, A., R. Dugdale, and F. Wilkerson. 2010. Biochemical processing of anthropogenic ammonium in river and estuarine water columns.

annual decline in pigment between Tower Bridge in the City of Sacramento and Isleton is about 60 percent. The cause of the decline is not known, but has been variously attributed to algal settling, toxicity from an unknown chemical in the SRWTP effluent, or from ammonia. The SRWTP discharge cannot be cause of pigment decline upstream of the discharge point, and may not be contributing to the decline downstream of the discharge point.

**Table J-2 SUMMARY OF REPORTED AMMONIA EFFECT CONCENTRATIONS AND THE ASSOCIATED AMMONIA EXCEEDANCE FACTORS FOR VARIOUS LOCATIONS IN THE SACRAMENTO-SAN JOAQUIN RIVER DELTA.**

Organism	Location	NH <sub>3</sub> Effect (mg N/L)	Ambient NH <sub>3</sub> (mg N/L) <sup>1/</sup>		Exceedance Factor <sup>2/</sup>		Reference
			Max	Mean	Max	Mean	
<i>Pseudodiatomus forbesi</i>	Sacramento R @ Hood	Reduce Reproduction and Nauplii survival <sup>3/</sup>	0.71	0.46	2X	1.3X	Dr Swee Teh
Diatoms	Sacramento R @ Chipps Is	Reduces nitrate uptake <sup>4/</sup>	0.16	0.10	11X	7X	Dugdale <i>et al.</i> , 2007; Wilkerson <i>et al.</i> , 2006
		Shutdown nitrate uptake <sup>5/</sup>	0.16	0.10	3X	2X	
Diatoms	Sacramento R between RioVista & Pt Sacramento	Reduces nitrate uptake <sup>4/</sup>	0.01-0.32	0.08-0.19	1-21X	5X-13X	
		Shutdown nitrate uptake <sup>5/</sup>	0.01-0.32	0.08-0.19	1-6X	1-3X	

<sup>1</sup> The maximum and mean ambient ammonia concentration is the highest monthly and annual average value measured at the site between March 2009 and February 2010 by Regional Board staff (Foe *et al.*, 2010)

<sup>2</sup> Calculated by dividing the measured ambient ammonia concentration by the reported effect level

<sup>3</sup> 0.36 mg N/l

<sup>4</sup> 0.015 mg N/l

<sup>5</sup> 0.056 mg N/l

Shift in Algal Communities. - Dugdale *et al* hypothesize that larger algal cells (diatoms) are favored and grow faster in the nitrate-dominated river above the SRWTP while smaller phytoplankton species (flagellates and bluegreen algae) are competitively superior and grow faster at the higher ammonia levels present downstream of the SRWTP<sup>1</sup>. A higher growth rate should cause the smaller sized cells to gradually replace any diatom-dominated community downstream of the SRWTP.

In addition, Dr. Patricia Glibert hypothesizes that a change in ambient nitrogen to phosphorus ratios and in the oxidation state of the nitrogen species can also alter algal species composition<sup>2</sup>. According to Dr. Glibert, ambient nitrogen to phosphorus ratios in the Delta now favors blue-green algae and flagellates.

Dr. Peggy Lehman and T. Brown have documented that the algal community in the Delta has changed from a diatom to a flagellate/blue-green algal dominated community consistent with

<sup>1</sup> *ib.*

<sup>2</sup> P. Glibert, 2010. Long-term changes in nutrient loading and stoichiometry and their relationships with change in the food web and dominant pelagic fish species in the San Francisco Estuary, California. Review in Fisheries Science (accepted).

the predictions of Dugdale *et al.* and Glibert<sup>1</sup>. Whether this is the result of changes in nutrient concentrations and/or ratio is not known. Diatoms are assumed to be more nutritious to primary consumers like zooplankton than flagellates and bluegreen algae. Changes in algal food availability and its quality or a “bottom up” effect is one factor hypothesized to contribute to the POD<sup>9</sup>. Follow up studies are needed to determine the ecological effect of the change in nutrient concentrations and ratios on the phytoplankton community and whether nutrient control might cause the community to revert back to a diatom-based system.

Dissolved Oxygen - The Basin Plan includes a water quality objective for dissolved oxygen of not less than 7.0 mg/L at any time for portions of the Delta, including the Sacramento River in the vicinity and downstream of the SRWTP discharge. Oxygen demanding substances, including carbon and nitrogen compounds, present in receiving waters are oxidized by microorganisms (bacteria and algae) resulting in the consumption of oxygen from the water column. If sufficient quantities of oxygen demanding substances are present in the water column, the rate of oxygen consumption may be greater than the reaeration of oxygen from the atmosphere and the dissolved oxygen levels drop in the water column. As the oxygen demanding compounds are oxidized and their concentrations are reduced, the rate of oxygen consumption falls and the reaeration acts to increase the dissolved oxygen levels in the water column. Because the typical response of the dissolved oxygen downstream from a discharge containing oxygen-demanding substances is to first decrease and then increase some distance downstream, the dissolved oxygen plot forms a characteristic “sag” curve.

The SRWTP discharges oxygen demanding substances, including biochemical oxygen demand (BOD) and ammonia. Current SRWTP BOD concentrations average 7.5 mg/L and the average effluent ammonia is 24 mg/L (as Nitrogen). The Discharger evaluated and modeled the dissolved oxygen demand from its discharge and reported the results in the “Low Dissolved Oxygen Prevention Assessment”, May 2010. The analysis was based on the Streeter-Phelps Oxygen Sag Curve equation and includes oxygen depletion of carbonaceous oxygen demanding compounds and ammonia present in the water column. Additionally, the decay of organic nitrogen into ammonia is included in an expanded Streeter-Phelps model. The low dissolved oxygen prevention assessment (LDOPA)<sup>2</sup> model calculates daily averaged dissolved oxygen in the Sacramento River from the discharge of the SRWTP at Freeport, to the confluence of the Sacramento and San Joaquin Rivers (the Delta). The model uses river flow rate and temperatures input data developed for the Discharger’s SRCSD DYNTOX model (SRCSD 2009) providing a 70-year period of record as a basis for the model simulations. The LDOPA model uses 7.0 mg/L, the Basin Plan water quality objective as the target to be achieved and calculates the maximum Ultimate Oxygen Demand (UOD) that can be

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<sup>1</sup> Lehman, P. 1998. Phytoplankton species composition, size structure, and biomass and their possible effect on copepod food availability in the low salinity zone of the San Francisco Bay/Delta and Suisun Bay. IEP technical report No. 62. August 1998.  
Lehman, P. 2000A The influence of climate on phytoplankton community biomass in San Francisco Bay Estuary. *Limn and Ocean* 45(3):580-590  
Lehman, P. 2000B. Phytoplankton biomass, cell diameter, and species composition in the low salinity zone of northern San Francisco Bay Estuary. *Estuaries* 23 (2):216-230.  
Brown, T. 2010. Phytoplankton community composition: the rise of the flagellates. IEP Newsletter.

<sup>2</sup> More detailed information can be found in “Low Dissolved Oxygen Prevention Assessment”, Larry Walker Associates, May 2010

discharged. The UOD is made of the combination of the primary oxygen demand substances in the effluent, BOD and ammonia.

The model was run for both 181 mgd (current design flow) and 218 mgd (previously proposed future flow). The model predicts the bottom of the dissolved oxygen curve is between Rio Vista and Emmaton (about 35 miles downstream of the discharge point) and the beneficial use impacts from the Discharger are felt nearly 40 miles downstream. However, data collected for the Central Valley’s Nutrient report showed the lowest dissolved reading at Hood (8 miles downstream) and Isleton (25 miles downstream). The Discharger will need to reduce oxygen demanding constituents in order to comply with the Basin Plan water quality objective. The LDOPA model showed a seasonal difference in the dissolved oxygen assessment because temperature and flow velocity are important factors in the rate of decay of oxygen. The Discharger proposes seasonal limits and the use of UOD in terms of pounds per day as the permit limit. The LDOPA model calculated the maximum UOD before the Basin Plan objective of 7.0 mg/L is exceeded. Based on a design flow of 181 mgd with a 99.9885% compliance (that is, compliance for all but one hour per year) the UOD would be as follows:

Flow (Q <sub>eff</sub> )	Percent Compliance (%)	Dry Season UOD (lbs/day)		Wet Season UOD (lbs/day)	
		AMEL	MDEL	AMEL	MDEL
181 mgd	99.9885	169,000	234,000	275,000	438,000

$$\text{Ultimate Oxygen Demand} = 8.34 \times [1.5(\text{BOD}_5) + 4.6(\text{Ammonia})] \times Q_{\text{eff}}$$

In addition to the UOD, BOD limits would be technology based limits for secondary treatment and ammonia limits would be based on the DYNTOX modeled mixing zones for acute and chronic toxicity and are as follows:

Parameter	Units	Effluent Limitations		
		Average Monthly	Average Weekly	Maximum Daily
BOD	mg/L	30	45	60
Ammonia <sup>1</sup>	mg/L as N	37	----	47

<sup>1</sup> Based on acute mixing zone of 60 feet & chronic mixing zone of 350 feet as evaluated with DYNTOX dynamic model

The LDOPA model is based on limited ambient dissolved oxygen sampling conducted by the Discharger. The Discharger’s 2009 ambient dissolved data at Hood did not show the dissolved oxygen concentrations less than the water quality objective of 7.0 mg/L 8 miles downstream of the discharge, at Hood. However, the Municipal Water Quality Investigations (MWQI) unit from the Department of Water Resources (DWR), the California Data Exchange Center (CDEC) managed by DWR, the Central Valley Water Board, and the City of Rio Vista have all collected dissolved oxygen data that shows at times, the dissolved oxygen concentration below 7.0 mg/L at various locations on the Sacramento River between the discharge point at Freeport and Rio Vista, 40 miles downstream. Because of this discrepancy



in data, the Discharger expanded its monitoring from April to June 2010 for dissolved oxygen under rigorous quality assurance and quality control (QA/QC). Again none of the Discharger's collected dissolved oxygen concentrations dropped below 7.0 mg/L and compared with the continuous dissolved oxygen monitoring data collected by DWR at Hood, the Discharger's data shows an upward bias in the data, that is, the Discharger's data generally reports higher dissolved oxygen concentrations than data from other sources. At Central Valley Water Board staff's request, DWR checked their data collected at Hood from June 2008 through December 2009, for quality assurance and control and found in many instances the dissolved oxygen concentrations at Hood were below 7.0 mg/L.

The treatment processes or source control are required to reduce Dry Season ammonia and will be in place, therefore, Central Valley Water Board staff believes the Wet Season ammonia should be reduced by the same amount as the Dry Season. The Discharger did not offer compelling arguments to not reducing wet season ammonia limits. Therefore, Discharger's request for seasonal UOD requirements is not included in the permit.

Since conflicting data exist for dissolved oxygen concentrations in the Sacramento River, the Central Valley Water Board concluded that to protect beneficial uses it must be assumed that the River at times, is less than the water quality objective of 7.0 mg/L and the Discharger is currently using all the assimilative capacity in the Sacramento River from Freeport to Rio Vista for oxygen demanding constituents. This results in no assimilative capacity for any other cities and communities to discharge oxygen demanding constituents which is needed for them to grow. In contrast to the Discharger, most of the other cities and communities are implementing Best Practicable Treatment or Control (BPTC) for their own facilities. The following communities have either constructed BPTC processes, will construct BPTC processes, or construct infrastructure to regionalize to BPTC facilities and would be affected by the lack of assimilative capacity for oxygen demanding constituents:

City of Roseville	City of Davis
City of Woodland	Community of El Dorado Hills
City of Placerville	City of Manteca
City of Stockton	City of Lodi
City of Galt	Community of Ironhouse
City of Tracy	City of Lincoln
City of Yuba City	Community of Olivehurst/Marysville
City of Live Oak	City of Auburn
City of Colfax	City of Vacaville
Community of North Auburn	Community of Granite Bay

Nitrosodimethylamines (NDMA) - Nitrosamines, mainly N-nitrosodimethylamine (NDMA), N-nitrosomethylethylamine (NMEA) and N-nitrosodiethylamine (NDEA) are highly mutagenic compounds that are suspected of carcinogenic activity to the human body.<sup>1</sup> NDMA is formed as a disinfection by-product from wastewater containing ammonia and/or nitrogen and chlorination. Historically, NDMA was used to make rocket fuel until contamination was found

<sup>1</sup> Abdrzejewski, P. "N-Nitrosomethylethylamine (NMEA) and N-Nitrosodiethylamine (NDEA), Two New Potential Disinfection Byproducts; Formation During Water Disinfection with Chlorine", Global NEST Journal, Vol. 7, No 1, pp 17-26, 2005.

in air, soil and water. NDMA is produced currently only a research chemical. Laboratory detection levels for NDMA are greater than the water quality criteria and can range from 0.002 µg/L to 30 µg/L. From June 2005 to July 2008, 15 percent of effluent samples detected NDMA at levels greater than the water criterion with the maximum concentration over 100 times the primary MCL. The detection levels for sampling effluent are often too high to detect low concentrations of NDMA, therefore, this detection percentage may be underestimated. Similarly, the receiving water showed no detectable concentrations for NDMA, but the detection limits are too high to detect low concentrations. The California Department of Water Resources (DWR) is currently studying NDMA in the Sacramento-San Joaquin Delta. Preliminary data shows NDMA has not been detected at Hood, eight miles downstream of the discharge on the Sacramento River. However, DWR did find the NDMA precursors significantly greater (3-4 times) below the discharge compared with above the discharge<sup>1</sup> point.

Formation of NMEA and NDEA is a result of the reaction of methylethylamine (MEA) or diethylamine (DEA) respectively with chlorine in the presence of ammonia ions<sup>2</sup>. New studies indicate that NMEA and NDEA are also disinfection byproducts from treatment of wastewater and thus need to be monitored in the Monitoring and Reporting Program. Because the laboratory analysis EPA Method 521 identifies all three nitrosoamines, no additional costs are incurred with monitoring for NMEA and NDEA.

Best Practical Treatment and Control – In order to reduce or eliminate ammonia and nitrogen from its effluent, nitrification and denitrification treatment processes are required. According to the “Technical Memorandum: Analysis of Costs and Benefits of Advanced Treatment Alternatives for the Sacramento Regional Wastewater Treatment Plant”, May 2010, the capitol costs to nitrify and denitrify would be approximately \$3.0 million/mgd or for the 181 mgd WWTP a cost of \$760 million if a 1.4 maximum average month peaking factor is used.

State Water Resources Control Board Resolution No. 68-16 “Statement of Policy with Respect to Maintaining High Quality of Waters in California” requires:

*“Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.”*

Best Practical Treatment and Control (BPTC) is not defined in Resolution No. 68-16. However, in its “Questions and Answers” for Resolution No. 68-16, BPTC is interpreted as

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<sup>1</sup> “Investigation into the sources of nitrosamines and their precursors in the Sacramento-San Joaquin Delta, California”, Carol L DiGiorgio, California Department of Water Resources, Municipal Water Quality Investigations Unit. Poster presented from 9-11 August 2009.

<sup>2</sup> Abdrzejewski, P. “N-Nitrosomethyl ethylamine (NMEA) and N-Nitrosodiethylamine (NDEA), Two New Potential Disinfection Byproducts; Formation During Water Disinfection with Chlorine”, Global NEST Journal, Vol. 7, No 1, pp 17-26, 2005.

“best efforts” In State Water Board Order WQ 2000-07, the Board stated the “one factor to be considered in determining best practicable treatment and control would be the water quality achieved by other similarly situated dischargers and the methods used to achieve water quality”. The Discharger argues that they are not similar to other dischargers in that the Sacramento River provides adequate dilution to allow their discharge at treatment levels less than the majority of dischargers that discharge to the Delta directly or indirectly (by the tributary rule). However, as described above, the ammonia discharged by the Discharger is impacting beneficial uses of the Sacramento River, Delta and the Suisun Bay. Therefore, BPTC in the form of nitrification and denitrification is required to assure that a pollution or nuisance will not occur and the highest water quality consistent with maximum benefit to the people of the State will be maintained.