

STAFF REPORT

**SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT
SACRAMENTO REGIONAL WASTEWATER TREATMENT PLANT
PROPOSED NPDES PERMIT RENEWAL
AND TIME SCHEDULE ORDER
SACRAMENTO COUNTY**

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I. INTRODUCTION

Two items are being considered for adoption: 1) issuance of a renewed National Pollutant Discharge Elimination System (NPDES) permit to regulate the surface water discharge from the Sacramento Regional County Sanitation Wastewater Treatment Plant and 2) a Time Schedule Order (TSO) that accompanies the proposed NPDES permit.

The Sacramento Regional County Sanitation District (Discharger or SRCSD) owns and operates the Sacramento Regional Wastewater Treatment Plant (Facility or SRWTP). The Facility was constructed in 1982 and provides “secondary” level treatment. 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, as well as, portions of the unincorporated areas of Sacramento County. The population served is approximately 1.3 million people. The Facility discharges disinfected secondary treated wastewater to the Sacramento River, located within the Sacramento-San Joaquin Delta (Delta), a water of the United States. The discharge is currently regulated by Order No. 5-00-188, which was adopted on 4 August 2000 and expired on 4 August 2005. The terms of Order No. 5-00-188 have administratively continued in effect after the permit expiration date.

The discharge is to the Sacramento River within the Delta. The Delta 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.

The Central Valley Water Board adopted the Basin Plan with designated uses for the Sacramento River and the Delta. The beneficial uses of the Sacramento River and the Delta that most influence the permit requirements of the proposed permit include:

- Municipal and domestic supply (MUN);
- Agricultural supply, including irrigation and stock watering (AGR);
- 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);

II. FACILITY DESCRIPTION

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 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 influent flows. Odors are controlled through stripping towers.

Solids are thickened by dissolved air floatation and gravity belt thickeners. Primary and secondary sludge is mixed and sent to anaerobic digesters for fifteen days, 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 a disposal option. Separate Waste Discharge Requirements (Order No. R5-2003-0076) in conformance with Title 27, California Code of Regulations, Division 2, Subdivision 1 cover 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).

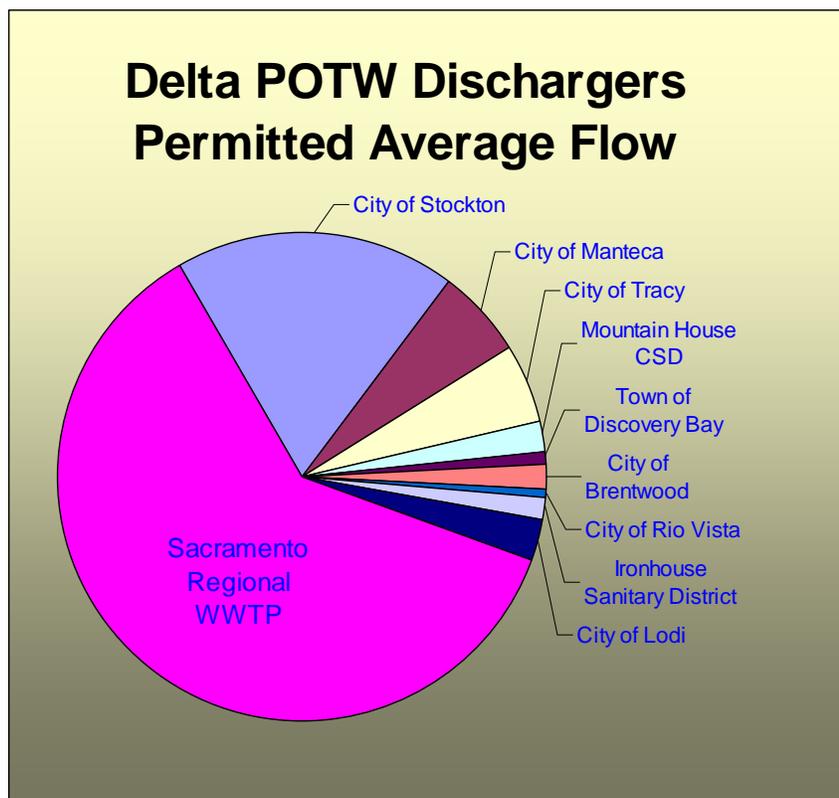
The Facility discharges to the Sacramento River just downstream of the Freeport Bridge via an outfall diffuser. The outfall diffuser is approximately 300 feet long with 74 ports and is placed perpendicular to the river flow.

The current average dry weather flow (ADWF) is 141 mgd and the Facility has a design ADWF capacity of 181 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 for the wastewater treatment plant expansion was successfully challenged by the Contra Costa Water District.

On 11 June 2010, the Discharger withdrew its request 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.

The Facility is a regional wastewater treatment plant. The Facility's current permitted discharge of 181 mgd represents nearly 60% of all publicly-owned treatment works (POTW) discharges to the Delta as shown in Figure 1, below.

Figure 1 – Delta POTW Dischargers based on permitted capacity Average Dry Weather Flow (CVWQCB)



Most wastewater treatment facilities that discharge within the Central Valley Region have upgraded their facilities to tertiary filtration and nitrification/denitrification (i.e., ammonia/nitrogen removal). Sacramento Regional Wastewater Treatment Plant, the largest facility, is one of a few facilities that have remained at secondary treatment. The SRCSD NPDES permit has not changed significantly since first adopted nearly three decades ago, yet there have been many negative changes to the Delta's overall health.

III. PERMITTING ISSUES

There are several complex permitting issues. The main issues include mixing zones/dilution, ammonia, nitrate, and disinfection. Permitting alternatives regarding these issues have been developed and were provided for public comment. The permitting issues, comments received, and alternative permitting options are discussed below.

A. Mixing Zones and Dilution

State and Federal regulations allow consideration of dilution in establishing effluent limits. If dilution is allowed, the discharge does not have to meet water quality standards at the point of discharge, but water quality standards must be

met in the river after some mixing of effluent and river water has occurred. The part of the river where mixing occurs and water quality objectives are not met is termed the “mixing zone”. Within the mixing zone water quality standards are not met, so there could be an impact to organisms if the organisms stayed in the mixing zone long enough. Effluent limitations and the size and shape of the mixing zone are set to prevent impacts on aquatic life and other beneficial uses. There are several criteria that must be met before a mixing zone can be granted, as described in the Fact Sheet.

The Facility discharges via an outfall diffuser that is 300 feet long with 74 ports, and is placed perpendicular to the river flow. The SRCSD has requested mixing zones and dilution credits for compliance with acute and chronic aquatic life water quality criteria, and human health water quality criteria. The allowance of mixing zones and dilution credits results in higher effluent limitations for some constituents, which allows less expensive levels of wastewater treatment.

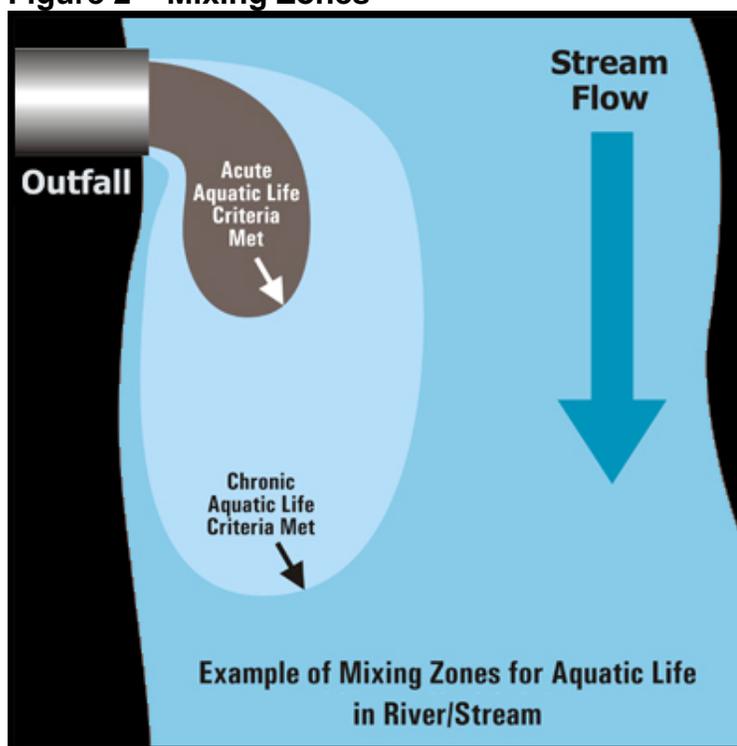
USEPA’s Technical Support Document for Water Quality-based Toxics Control (TSD) (USEPA, 1991) defines a mixing zone as follows:

“...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.”

The State Water Resources Control Board’s (State Water Board) Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, 2005, (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 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).

Figure 2, below, depicts mixing zones for acute and chronic aquatic life criteria. Within the shaded area water quality standards may be exceeded. Figure 2 shows a very simple mixing zone case. This is not a depiction of the SRCSD mixing zone, which is more complex.

Figure 2 – Mixing Zones



Both federal and state guidance include similar mixing zone conditions as follows:

A mixing zone shall not:

- (1) compromise the integrity of the entire water body;
- (2) cause acutely toxic conditions to aquatic life passing through mixing zone;
- (3) restrict the passage of aquatic life;
- (4) adversely impact biologically sensitive or critical habitats;
- (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 water body or overlap a mixing zone from different outfalls;
- (11) be allowed at or near any drinking water intake.

The Discharger has conducted extensive studies of dilution available in the Sacramento River and the size and shape of the possible mixing zones. Central Valley Water Board staff believe the alternative mixing zones being considered in this permit renewal meet the required technical criteria, however, granting of mixing zones is discretionary and need not be granted even if all technical criteria are met.

The proposed permit grants dilution credits for the majority of constituents that were requested by the Discharger. When dilution credits were not granted, the proposed permit adequately justifies the denial of dilution in Section IV.C.2.d of the Fact Sheet (Attachment F). Table 1, below, shows the constituents for which the Discharger requested dilution credits and the basis for the denial of dilution credits. In most cases when dilution credits were denied, the Board does not have discretion to allow the dilution, because dilution credits are not allowed by the SIP or Basin Plan. Dilution credits were not allowed for ammonia, nitrate, copper and cyanide (acute dilution credits), even though it was demonstrated that assimilative capacity is available. For copper and cyanide, dilution credits were not allowed, because based on Facility performance the Discharger can meet end-of-pipe effluent limits. For ammonia and nitrate, dilution credits were not allowed due to aquatic toxicity issues and the antidegradation requirement to meet BPTC.

Table 1: Dilution Decisions

Constituents	Dilution Granted (Y/N)	Basis for Denial of Dilution	Regulatory Requirement
Human Health Constituents			
Bis(2-ethylhexyl)phthalate	Y		
Carbon tetrachloride	Y		
Dibromochloromethane	Y		
Dichlorobromomethane	Y		
Dibenzo(ah)anthracene	Y		
Methylene chloride	N	No Assimilative Capacity	No dilution allowed by SIP
N-nitrosodimethylamine (NDMA)	N	No Assimilative Capacity	No dilution allowed by SIP
Pentachlorohehenol	Y		
Tetrachlorethylene	Y		
Manganese	Y		
Methyl tertiary butyl ether (MTBE)	Y		
Nitrate	N	Mixing zone for nitrate does not meet all requirements of SIP	Board has discretion ²
Aquatic Life Constituents			
Aluminum	N	No Assimilative Capacity	No dilution allowed by SIP
Ammonia	N	Mixing zone for ammonia does not meet all requirements of SIP	Board has discretion ²
Chlorpyrifos	N	Limits based on TMDL	No dilution allowed by Basin Plan
Cyanide	Y ¹	Acute dilution credits not needed based on Facility Performance	Board has discretion ²
Copper	N	Dilution credits not needed based on Facility Performance	Board has discretion ²

¹ Chronic aquatic life dilution credits allowed. Acute dilution credits requested, but are not needed based on current Facility performance.

² See pollutant-by-pollutant evaluation below for more details.

Pollutant-by-Pollutant Dilution Evaluations

Nitrate. The allowance of a human health mixing zone for nitrate does not meet the SIP's mixing zone 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 comprise the integrity of the entire water body, adversely impact biologically sensitive or critical habitats, and produce undesirable or nuisance aquatic life. Based on the above discussion staff is not recommending dilution for nitrate; however, the Board may choose to exercise its discretion and grant dilution provided findings regarding the impacts of nitrogen on the Delta are changed to find and support that a mixing zone for nitrate meets the SIP's requirements. See Section III.C for more details regarding nitrate.

Ammonia. The allowance of acute or chronic mixing zones for ammonia do not meet the SIP's mixing zone 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. Based on the above discussion staff is not recommending dilution for ammonia; however, the Board may choose to exercise its discretion and grant dilution provided findings regarding the impacts of ammonia on the Delta are changed to find and support that a mixing zone for ammonia meets the SIP's requirements. See Section III.B for more details regarding ammonia.

Cyanide. 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. Therefore, the WQBELs for cyanide have been developed considering the allowance of chronic aquatic life dilution. Allowing the an acute dilution credit would allow the Discharger to increase its effluent cyanide discharge and would not be consistent with the State Water Board's Antidegradation Policy, which requires that the Facility meet best practicable treatment or control (BPTC). Based on the above discussion staff is not recommending an acute mixing zone for cyanide; however, the Board may choose to exercise its discretion and grant an acute mixing zone provided findings are changed to find and support that allowance of an acute mixing zone for cyanide meets BPTC and allows WQBELs for cyanide to be calculated with acute dilution credits.

Copper. Assimilative capacity is available for copper in the receiving water. However, based on facility performance, the Facility can meet more stringent

end-of-pipe effluent limits, therefore, dilution credits have not been allowed for copper. Allowing dilution credits for copper would allow the Discharger to increase its effluent copper discharge and would not be consistent with the State Water Board's Antidegradation Policy, which requires that the Facility meet BPTC. Based on the above discussion staff is not recommending acute or chronic mixing zones for copper; however, the Board may choose to exercise its discretion and grant acute and/or chronic mixing zones for copper provided findings are changed to find and support that allowance of acute and/or chronic mixing zones for copper meets BPTC and allows WQBELs for copper to be calculated with dilution credits.

1. Permitting Alternatives for Mixing Zones/Dilution

Staff Recommendation – The proposed permit allows mixing zones for chronic aquatic life criteria and human health criteria. The chronic aquatic life mixing zone is 400 feet wide and extends 350 feet downstream of the diffuser. The human health mixing zone extends bank-to-bank and is 3 miles long. The Discharger also requested a mixing zone for acute aquatic life criteria that is 400 feet wide and extends 60 feet downstream of the diffuser. 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 proposed permit does not include an acute mixing zone. 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, Central Valley Water Board staff determined that the allowance of an acute aquatic life mixing zone is not acceptable for this discharge. Regardless, as discussed below, based on Facility performance and a pollutant-by-pollutant evaluation, an acute mixing zone is either not needed for the constituents requested by the Discharger or not allowed by the Basin Plan.

Three dilution alternatives were issued for public review and comment. Table 2, below, shows the dilution alternative proposed by Staff (shaded area) and the three alternatives.

Mixing Zones/Dilution Alternative #1 – In this alternative no mixing zones are allowed. This results in the most stringent water quality-based effluent limits being considered and in the lowest discharge of waste materials to the river. However, because of the increased levels of treatment needed to achieve these effluent limits, the costs of treatment, usage of chemicals and power, and generation of sludge is greatest for this alternative. Based on the above discussion staff is recommending the allowance of mixing zones for chronic aquatic life criteria and human health criteria for some constituents, where appropriate. However, the Board may choose to exercise its discretion

and deny all mixing zones provided findings are made that, based on the site-specific conditions for this discharge, mixing zones are not acceptable. Section 1.4.2 of the SIP provides the Board this discretion.

This is the only dilution alternative that does not allow human health dilution. This alternative would result in significant compliance issues for the SRCSD, because most of the constituents needing dilution are human health constituents. There are a number of chemicals in the effluent that are considered to be human carcinogens, including chemicals that are formed during the chlorine disinfection process. Water quality criteria for these chemicals protect against a one-in-one-million risk of developing cancer if a person consumes two liters of water per day containing that concentration of the chemical for 70 years. Not granting this dilution would require the SRCSD to change from chlorine disinfection to another disinfection technology – probably disinfection with Ultraviolet light (UV), which may also require installation of tertiary filtration to ensure the effluent turbidity is low enough to allow the UV disinfection process to work properly. The mixing zone for human carcinogens is approximately three miles long, but there are no drinking water intakes within the mixing zone, so there are no expected human health impacts from granting this dilution.

Mixing Zones/Dilution Alternative 2 – In this alternative, dilution is granted for human health criteria only. No dilution is granted for aquatic life criteria (acute or chronic). Based on the above discussion, staff is recommending allowance of a chronic aquatic life mixing zone for some constituents, where appropriate. However, the Board may choose to exercise its discretion and deny mixing zones for all aquatic life criteria, both chronic and acute, due to concerns with the health of the Delta ecosystem (e.g., the pelagic organism decline). Section 1.4.2 of the SIP provides the Board this discretion.

Under this alternative, no dilution is allowed for constituents that could impact aquatic life. State and Federal fishery and water quality agencies have provided comments on the tentative permit regarding the allowance of mixing zones for acute and chronic aquatic life criteria. Comments received from the United States Fish and Wildlife Service, National Marine Fisheries Service, California Department of Fish and Game, and United States Environmental Protection Agency, Region IX, have all recommend that the Central Valley Water Board not grant mixing zones for aquatic life criteria.

As shown in Table 1, below, this alternative only results in changes to the effluent limitations for cyanide. All other effluent limitations remain the same as in the proposed permit.

Mixing Zones/Dilution Alternative 3 – In this alternative dilution granted for human health criteria, chronic aquatic life criteria, and acute aquatic life criteria. This alternative adds the allowance of a mixing zone for acute

aquatic life criteria to the option presented in the proposed NPDES permit. This is the Discharger-preferred option. Based on the above discussion staff is not recommending an acute aquatic life mixing zone. However, the Board may choose to exercise its discretion and grant the mixing zone provided findings regarding the impacts to the Delta are changed to find and support that an acute aquatic life mixing zone is acceptable.

As shown in Table 2, below, this alternative does not result in any changes to the effluent limitations as proposed. This is because based on the pollutant-by-pollutant evaluation it was determined that either the acute dilution credit is not needed or not allowed by the Basin Plan (see Section IV.C.2.d.vi of the Fact Sheet).

Table 2: Mixing Zones/Dilution Alternatives

CONSTITUENTS		MIXING ZONES/DILUTION ALTERNATIVES							
		Staff Recommendation HH and Chronic		Alternative #1 No Dilution		Alternative #2 HH Only		Alternative #3 HH, Chronic, and Acute	
		Monthly	Daily	Monthly	Daily	Monthly	Daily	Monthly	Daily
HH Constituents									
Bis(2-ethylhexyl)phthalate	µg/L	--	13	1.8	3.4	(1)	(1)	(1)	(1)
Carbon tetrachloride	µg/L	--	5.3	0.25	0.46	(1)	(1)	(1)	(1)
Dibromochloromethane	µg/L	--	2.2	0.41	0.85	(1)	(1)	(1)	(1)
Dichlorobromomethane	µg/L	--	3.4	0.56	1.1	(1)	(1)	(1)	(1)
Dibenzo(ah)anthracene	µg/L	0.2	0.4	0.004	0.01	(1)	(1)	(1)	(1)
Methylene chloride	µg/L	4.7	11	(1)	(1)	(1)	(1)	(1)	(1)
N-nitrosodimethylamine (NDMA)	µg/L	0.00069	0.0019	(1)	(1)	(1)	(1)	(1)	(1)
Pentachlorohenol	µg/L	--	18	6	--	(1)	(1)	(1)	(1)
Tetrachlorethylene	µg/L	--	4.4	0.8	1.7	(1)	(1)	(1)	(1)
1,2-diphenyl hydrazine	µg/L	0.04	0.08	(1)	(1)	(1)	(1)	(1)	(1)
Manganese	µg/L	--	85	50 ⁽²⁾	--	(1)	(1)	(1)	(1)
Methyl tertiary butyl ether (MTBE)	µg/L	--	18	5 ⁽²⁾	--	(1)	(1)	(1)	(1)
Nitrate (as N) ⁽³⁾	mg/L	10	--	(1)	(1)	(1)	(1)	(1)	(1)
Aquatic Life Constituents									
Aluminum	µg/L	503	750	(1)	(1)	(1)	(1)	(1)	(1)
Chlorpyrifos	µg/L	0.012	0.025	(1)	(1)	(1)	(1)	(1)	(1)
Cyanide	µg/L	--	11	4.3	8.3	4.3	8.3	(1)	(1)
Copper	µg/L	7.3	9.3	(1)	(1)	(1)	(1)	(1)	(1)
Ammonia (as N) ⁽⁴⁾	mg/L	1.8	2.2	(1)	(1)	(1)	(1)	(1)	(1)

(1) No change from Staff Recommendation
(2) Annual average effluent limitation
(3) Nitrate removal alternatives shown in Table 6.
(4) Ammonia removal alternatives shown in Table 4.

2. Comments regarding Mixing Zones/Dilution

The major comments and responses for mixing zones/dilution are summarized in Table 3, below. A full listing of comments and complete responses are included in the Response to Comments document in the agenda package.

Table 3: Major Comments/Responses for Mixing Zones/Dilution

Commenter	Comment/Staff Response
<p>SRCSA, California Association of Sanitation Agencies and Tri-Tac, Central Contra Costa Sanitary District, Delta Diablo Sanitation District</p>	<p>Denial of acute mixing zone is inappropriate. Proposed permit fails to provide proper justification for the denial of an acute mixing zone. Board has allowed acute mixing zones for other dischargers, so denial is not fair and equitable.</p> <p>Denying dilution deviates from the SIP and the proposed Order does not offer a fact based decision for denying acute mixing zone.</p> <p>The SIP is intended to establish statewide consistency for permitting and dilution credits have been granted to other dischargers.</p> <p>Staff Response: 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." The determination for allowing mixing zones is site-specific. In this case, the Delta is impaired for unknown toxicity and has experienced a significant pelagic organism decline. Therefore, Central Valley Water Board staff determined that the allowance of an acute aquatic life mixing zone is not acceptable for this discharge. Regardless, if an acute mixing zone was allowed it would have not impact on the effluent limits in the permit (see Mixing Zones/Dilution Alternative 3 in Table 2). This is due to a pollutant-by-pollutant evaluation where it was determined that acute dilution credits were either not needed or would allow unacceptably high constituent concentrations that would impact the beneficial uses of the Delta (see Section IV.C.2.d.vi of the Fact Sheet).</p> <p>The denial of the acute mixing zone is within the discretion of the Regional Board and must be considered on a discharge-by-discharge basis. The fact that another discharger receives a dilution credit is not a factor in evaluating the acceptability of a mixing zone for the Sacramento Regional Wastewater Treatment Plant. The proposed permit includes sufficient rationale in the Fact Sheet to support the decisions regarding mixing zones.</p>
<p>California Department of Fish and Game, US Fish and Wildlife Service, and Water Agencies</p>	<p>Because the Sacramento River and Delta is a unique and critical habitat upon which the mixing zone would impinge, the Order must be protective of beneficial uses. Therefore, DFG supports the exclusion of mixing zones and dilution.</p> <p>The USFWS recommends that compliance with water quality criteria be met at the "end-of-pipe" and that no dilution or mixing zones be permitted.</p> <p>The Water Agencies contend the zone of passage for critical habitat is unacceptably small near the bottom of the river, fish attraction near the outfall should be considered, and the Delta is 303(d) listed for unknown toxicity. Due to these concerns the Final Order should prohibit a chronic mixing zone.</p> <p>Staff Response: The SIP and Basin Plan authorize mixing zones. The proposed chronic mixing zone meets the requirements of the SIP and Basin Plan. The chronic</p>

Commenter	Comment/Staff Response
	<p>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 the proposed Order for development of the WQBELs for cyanide.</p> <p>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 an adequate zone of passage for aquatic life, and was verified through dye testing.</p> <p>Fish attraction at the effluent diffuser is an issue that must be addressed. Issues regarding fish attraction will be addressed in the Thermal Impacts study.</p>
<p>United States Bureau of Reclamation</p>	<p>The use of PROSIM and an outdated version of Reclamation’s temperature model results in an inadequate analysis that does not properly reflect current conditions. Furthermore, the period of record does not represent current conditions in the project area.</p> <p>Staff Response: The modeling work for the SRCSD discharge began nearly a decade ago, at which time the PROSIM model was the best representation of Sacramento River flows. Modeling of Central Valley flows has evolved and PROSIM is no longer in general use. For the purposes of this modeling, however, it was judged that the differences between PROSIM and current models in predicted flow in the Sacramento River at Freeport is minor, and redoing an extensive modeling effort is not warranted.</p>
<p>California Sportfishing Protection Alliance</p>	<p>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.</p> <p>Staff Response: The SRCSD conducted an Antidegradation Analysis that demonstrates any degradation is in the best interest of the people of the state. The proposed Order requires the Discharger provide BPTC (e.g., dilution credits for ammonia and nitrate were not allowed, because nitrogen removal is considered BPTC).</p>

3. Changes to Tentative Permit regarding Mixing Zones/Dilution

Some clarifications in the Fact Sheet have been made regarding the pollutant-by-pollutant dilution evaluation for ammonia, based on comments received.

B. Ammonia

The Facility currently discharges 14 tons of ammonia per day, on average, and is the major source of ammonia to the Sacramento River and the Delta. The average annual ammonia concentration in the River increased 11.5-fold downstream of the discharge, compared to upstream concentrations. If the Facility discharge increases to the permitted flow rate of 181 MGD, about 18 tons per day of ammonia would be discharged to the Sacramento River if the effluent ammonia concentration remains the same. Almost all the ammonia in the Delta is from the SRWTP discharge because all other large wastewater treatment plants in the Delta have been required to remove ammonia from their discharges. Wastewater treatment technologies are available and commonly used for ammonia removal (i.e., nitrification). Ammonia is a concern for wastewater discharges to surface water, because it is toxic to aquatic life, affects the nutrient balance in the river, reduces dissolved oxygen, affects aquatic ecosystem food supply, and is a precursor for the formation of nitrosoamines. These ammonia issues are discussed below.

Aquatic Toxicity – Fish and other aquatic organisms are harmed or killed by ammonia at sufficient concentrations. USEPA has developed recommended water quality criteria for ammonia that is used to develop water quality-based effluent limitations for ammonia. The Delta has been listed as an impaired waterbody for unknown toxicity and the discharge is within designated critical habitat of the Sacramento River for several federally-listed fish species including winter and spring-run Chinook salmon, Delta Smelt, and green sturgeon. Scientific experts have expressed concern that ammonia levels in the Sacramento River and Delta could be chronically toxic to smelt. Recent experiments found that the ammonia in the District's discharge is causing chronic toxicity in the Sacramento River for about 30 miles downstream of the discharge to *Eurytemora affinis* and *Pseudodiaptomus forbesi*, both invertebrate species that are important forage organisms for larval fish. Existing concentrations of ammonia are also stopping the growth of diatoms (a type of algae) as far downstream as Suisun Bay, which reduces the food supply for the aquatic ecosystem.

The SRWTP discharge contains levels of ammonia that exceed USEPA's recommended water quality criteria. The river upstream of the discharge has little or no ammonia, therefore, the SRCSD has requested acute and chronic mixing zones and dilution for meeting the water quality criteria (see discussion above regarding mixing zones/dilution). If only USEPA's recommended water quality criteria for ammonia are considered, there is sufficient flow and assimilative capacity to allow mixing zones for compliance. However, other significant ammonia related issues must be considered when determining the level of ammonia removal necessary to protect the beneficial uses of the receiving water. The two main issues are nutrients and dissolved oxygen depletion.

Nutrients – Nitrogen is an essential nutrient to plant life. Nitrogen in ammonia is readily available for use by plants. However, excessive nitrogen can contribute to excessive or changed growth in a water body, changing the ecology of the water body. The District's discharge changes the predominant form of nitrogen in the Sacramento River from nitrate to ammonia, which is a stressor that contributes to changing the phytoplankton population in the River from Diatoms to smaller, less nutritious flagellates and bluegreen algae, which negatively impacts fish populations. Staff has determined that based on various studies conducted by the Interagency Ecological Program (IEP) and others (see Attachment J of the proposed NPDES Permit), the District's discharge is a significant source of the ammonia in the Sacramento River and is suppressing Diatom production in the Sacramento River, Delta, and Suisun Bay, reducing a significant part of the food supply for Delta Smelt and other fish. Based on field studies conducted by staff, the total dissolved nitrogen concentrations between the District's discharge and an area two-miles upstream of Suisun Bay are stable, indicating there are no large nitrogen or ammonia sources or sinks between the two locations.

Studies conducted by Dr. Richard Dugdale, Dr. Frances Wilkerson, Dr. Alex Parker, and Dr. Al Marchi have found that elevated concentrations of ammonia in the Delta are causing a nitrate uptake inhibition in diatoms. The overall impact of the nitrate uptake inhibition, particularly on Delta Smelt food, is not completely understood. However, studies have clearly demonstrated it is occurring and impacting the Delta. The District's discharge is within the natural habitat area of the Delta smelt and is, therefore, a significant contributor of ammonia to the Delta that is a stressor contributing to decline in water quality and Delta smelt in the Delta. Delta smelt populations have significantly declined since the early 1980's resulting in the smelt being listed by the U.S. Fish and Wildlife Service as an endangered species in 2010.

Dissolved Oxygen Depletion – As ammonia is consumed by organisms, and is oxidized to nitrite and nitrate, oxygen is consumed. If the oxygen consumption rate exceeds the oxygen resources of the water body, oxygen levels can drop below receiving water objectives and adversely affect aquatic life beneficial uses. Initial SRCSD studies conclude that ammonia discharge levels may cause unacceptably low levels of dissolved oxygen in the Sacramento River downstream of the discharge. The SRCSD is in agreement that ammonia reduction is needed to ensure compliance with the Basin Plan's dissolved oxygen water quality objective (i.e., 7 mg/L). At minimum, the NPDES permit must address the dissolved oxygen depletion issues, which SRCSD studies indicate that the ammonia levels must be reduced by at least one half during the dry season. All Ammonia Removal Alternatives address the dissolved oxygen issue.

In May 2010, SRCSD submitted a study titled, "Low Dissolved Oxygen Prevention Assessment". The Study indicated that at current discharge flows (141 million gallons per day on average), the discharge is not causing the dissolved oxygen in the river to fall below the Basin Plan water quality objective.

However, at the full permitted flow of 181 million gallons per day, modeling indicated that some removal of oxygen-demanding substances (primarily ammonia) would be required to prevent violations of the objective. The Study was reviewed by modeling experts with Tetra Tech on behalf of the Central Valley Water Board. The modeling experts found that the model was technically sound¹. However, Staff have concerns that SRCSD omitted data from the study that showed oxygen concentrations in the Sacramento River below the Basin Plan dissolved oxygen objective. Including the lower dissolved oxygen data in the study would have resulted in a lower allowable oxygen demand in the SRCSD effluent than the study recommends. Staff believe there is a dissolved oxygen problem now and ammonia reduction is needed to resolve the issue. The SRCSD does not concur and have stated that the low dissolved oxygen ambient data is inaccurate. Due to time constraints, the Tetra Tech experts were unable to evaluate the issue of the appropriate data inputs used in the modeling.

Dissolved oxygen ambient monitoring data downstream of the SRWTP discharge has demonstrated that at times the Sacramento River is not in compliance with the Basin Plan objective. The Department of Water Resources (DWR) maintains several water quality databases for locations in the Delta. DWR operates a water quality monitoring station downstream of the discharge at Hood (eight miles below the SRWTP discharge). DWR conducts continuous monitoring for dissolved oxygen on 15 minute intervals at the Hood station. The station is checked every two weeks for accuracy and is calibrated, as needed. Since 2008, at times the dissolved oxygen concentrations have been recorded below 7.0 mg/L at the Hood monitoring station. The Municipal Water Quality Investigations (MWQI) a separate unit at DWR, also collects discrete dissolved oxygen water quality data at Hood. The MWQI database also shows dissolved oxygen concentrations below 7.0 mg/L. Furthermore, Central Valley Water Board staff conducted a nutrient study for the last year and also recorded dissolved oxygen concentrations below 7.0 mg/L at several locations downstream of the SRWTP discharge, including Hood. This information suggests that the Facility is causing or contributing to violations of the objective now.

Nitrosoamines – Another consideration is the formation of N-nitrosodimethylamine (NDMA), which is a potent mutagen and possible carcinogen that is created when nitrogenous constituents are chlorinated. The SRWTP effluent contains elevated concentrations of ammonia and chlorine is used for disinfection. Consequently, the SRWTP effluent contains NDMA at levels 100 times the California Toxics Rule human health criterion (drinking water standard) and the proposed Order includes water quality-based effluent limits for NDMA. Ammonia removal may be necessary to comply with the final effluent limits for NDMA.

¹ Memorandum from Tetra Tech to Central Valley Water Board, dated 29 June 2010.

1. Permitting Alternatives for Ammonia

Staff Recommendation - The staff recommendation includes effluent limitations for ammonia based on USEPA's recommended criteria, without the allowance for dilution. The proposed permit allows a chronic toxicity mixing zone, but in the case of ammonia, a chronic mixing zone does not comply with the SIP mixing zone requirements, therefore, dilution has not been allowed for ammonia. 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 (see discussion above regarding nutrients). The allowance of the requested mixing zones for ammonia would compromise the integrity of the entire water body, adversely impact biologically sensitive or critical habitats, and produce undesirable or nuisance aquatic life.

The discharge of ammonia is degrading the Sacramento River and the Delta. To be in compliance with the State Water Board's Antidegradation Policy (Resolution 68-16) best practicable treatment or control (BPTC) of the discharge is required. Wastewater treatment technologies are available and commonly used for ammonia removal. In the proposed permit it was determined that full nitrification of the wastewater to remove ammonia is BPTC for this discharge.

Opponents of the Staff Recommendation claim that the science regarding ammonia effects in the Delta is too uncertain to make regulatory decisions at this time. They also contend that although nitrification technologies are available and commonly used by other municipalities, the SRWTP is not a similarly situated discharger due to the large dilution in the river. Two ammonia removal alternatives have been provided for Board consideration.

Ammonia Removal Alternative #1 – For this alternative the water quality-based effluent limits for ammonia have been calculated considering a chronic dilution credit, which increases the effluent limitations for ammonia (as N) to an AMEL and MDEL of 11 mg/L and 13 mg/L, respectively. Based on the above discussion staff is not recommending dilution for ammonia; however, the Board may choose to exercise its discretion and grant dilution provided

findings regarding the impacts of ammonia on the Delta are changed to find and support that a mixing zone for ammonia meets the SIP's requirements.

SRCSO's dissolved oxygen study concluded that these effluent limitations would be protective of the Basin Plan's dissolved oxygen water quality objective. However, SRCSD's study does not recognize the low dissolved oxygen at Hood, so Staff believe the effluent limits in Ammonia Removal Alternative #1 are not protective of beneficial uses.

To adopt this ammonia removal alternative, the Board must adopt a mixing zone/dilution option that allow a chronic mixing zone.

Ammonia Removal Alternative #2 – A second ammonia removal alternative is provided for consideration by the Board, which is the Discharger-preferred option. For this alternative the water quality-based effluent limits for ammonia have been calculated considering both acute and chronic dilution credits. Based on the above discussion staff is not recommending dilution for ammonia; however, the Board may choose to exercise its discretion and grant dilution provided findings regarding the impacts of ammonia on the Delta are changed to find and support that a mixing zone for ammonia meets the SIP's requirements.

The Discharger and Staff concur that the ammonia effluent limitations under this alternative are not protective of the Basin Plan's dissolved oxygen water quality objective. Therefore, additional effluent limitations for the ultimate oxygen demand (UOD) are proposed. The SRCSD conducted a study to evaluate the dissolved oxygen reduction affects of the discharge. It was determined that some ammonia removal is necessary to ensure compliance with the Basin Plan objective for dissolved oxygen at the permitted flow of 181 million gallons per day. Thus, UOD effluent limits were proposed by the Discharger (see Table 4, below). UOD effluent limits were advanced as a way to provide flexibility to the SRCSD, which maintains several different control options to effect changes in downstream dissolved oxygen, including reductions in effluent carbonaceous biochemical oxygen demand (BOD), reductions in ammonia loadings, and limiting discharge volume seasonally. As discussed above in the discussion regarding dissolved oxygen depletion, Central Valley Water Board staff is not in full agreement with the Discharger's dissolved oxygen model results. Therefore, this alternative may result in non-compliance with the Basin Plan dissolved oxygen objective. Furthermore, the implementation of effluent limitations based on the ultimate oxygen demand has not been used in any NPDES permits adopted by the Board and there is uncertainty whether they would ensure compliance with the Basin Plan dissolved oxygen objective.

To adopt Ammonia Removal Alternative #2, the Board must also allow an acute mixing zone for ammonia.

Table 4: Ammonia Removal Alternatives

CONSTITUENTS		AMMONIA REMOVAL ALTERNATIVES					
		Staff Recommendation		Ammonia Removal Alternative #1		Ammonia Removal Alternative #2	
		Monthly	Daily	Monthly	Daily	Monthly	Daily
Ammonia (as N)	mg/L	1.8	2.2	11	13	37	47
UOD ⁽¹⁾ (dry season)	lbs/day	--	--	--	--	169,000	234,000
UOD ⁽¹⁾ (wet season) ⁽²⁾	lbs/day	--	--	--	--	275,000	438,000

⁽¹⁾ Ultimate Oxygen Demand (UOD) = 8.34 * (1.5*BOD₅+4.6*ammonia)*Q_{eff}; BOD₅ in mg/L, ammonia in mg/L, and effluent flow (Q_{eff}) in million gallons per day.

⁽²⁾ Wet season UOD set to current performance.

2. Comments regarding Ammonia

The major comments and responses for ammonia are summarized in Table 5, below. A full listing of comments and complete responses are included in the Response to Comments document in the agenda package.

Table 5: Major Comments/Responses for Ammonia

Commenter	Comment/Staff Response
<p>SRCSD, California Association of Sanitation Agencies and Tri-Tac, Central Contra Costa Sanitary District, Partnership for Sound Science, City of Folsom, and City of West Sacramento</p>	<p>Proposed permit offers 3 potential connections between ammonia in SRWTP effluent and the pelagic organism decline (POD): (1) inhibition of diatom primary production in the Sacramento River, Suisun Bay, and the Delta; (2) causation of acute and/or chronic toxicity to delta smelt and <i>P. forbesi</i>, an important food organism for larval and juvenile fish; and (3) contribution to a shift in the algal community from “nutritious species of diatoms” to “less desirable forms like <i>Microcystis</i> (blue-green algae).” None of the studies completed on these topics justify full nitrification at the SRWTP.</p> <p>The studies cited in the proposed Permit do not provide a complete understanding of the impact of ammonia/nitrate and nitrite discharges on the aquatic system. We support the ongoing efforts to develop a more comprehensive understanding of these impacts, taken in context with all of the other stressors in the Delta and the Suisun Bay. These other stressors include, but are not limited to, variations in salinity caused by seasonal flow fluctuations and water exports, and seasonal changes in turbidity and clarity. The Regional Board should evaluate this issue holistically and be convinced that the significant resources required for nitrification to the level proposed are justified in light of the expected water quality improvements.</p> <p>Staff Response: We agree there is not a complete understanding of the impacts of ammonia and nitrate on the Delta ecosystem. Full understanding is not needed. Study results, while not fully complete, clearly demonstrate the impact of SRCSD’s discharge on the Delta. The Board must adopt effluent limits when a discharge is causing or contributing to a violation of numeric or narrative water quality objectives.</p>

Commenter	Comment/Staff Response
Water Agencies	<p>The Tentative Order correctly finds the discharge of ammonia/um and other nutrients is adversely affecting beneficial uses. The data and scientific literature establish that the Treatment Plant’s nitrogen load, particularly in the form of ammonia/um is both having direct toxic effects on aquatic species in the Sacramento River and Bay-Delta and altering the aquatic food web—the foundation of the Sacramento River and Bay-Delta ecosystem.</p> <p>Staff Response: Staff concurs.</p>
CSPA	<p>Nitrification and denitrification are BPTC based on the large number of local wastewater treatment plants providing such.</p> <p>Staff Response: BPTC is not established just because other treatment plants have implemented a particular technology. However, staff concurs that nitrification and denitrification are BPTC for SRCSD.</p>
USEPA	<p>We strongly object to the ammonia and nitrate removal alternatives, which significantly relax the effluent limitations for those proposed in the tentative order. Based on the discharger’s antidegradation analysis, at current performance, the discharge is using up to 15% of the assimilative capacity of the Sacramento River for ammonia.</p> <p>Staff Response: Staff concurs.</p>
Department of Water Resources	<p>Elevated levels of ammonium and dissolved organic nitrogen in receiving waters can lead to the formation of nitrosamines during the treatment of drinking water. Over the last year and a half, water quality monitoring downstream of SRCSD’s discharge has detected elevated levels of precursors associated with NDMA.</p> <p>Staff Response: Staff concurs.</p>
Delta Stewardship Council	<p>The suggestion by the discharger that there is sufficient assimilative capacity in the Sacramento River to absorb 14 tons of ammonia per day runs counter to the mounting chemical and biological evidence downstream of the discharge. Science supports the concept that there are multiple stressors affecting the Delta ecosystem but science also shows that the current nutrient loading (especially total ammonia) may be one of the most important of these stressors.</p> <p>Staff Response: Staff concurs.</p>

3. Changes to Tentative Permit regarding Ammonia

Some clarifications in the Fact Sheet have been made regarding ammonia based on comments received. No substantial changes have been made regarding ammonia.

C. Nitrate

Nitrate is formed when chemicals containing nitrogen, such as ammonia, are oxidized. The SRCSD discharge currently contains very low concentrations of nitrate, however, ammonia and other nitrogen compounds will generally oxidize to nitrate in the river. If ammonia reduction is required, nitrates will be formed when the ammonia is oxidized (nitrified). Nitrates can be removed through a further wastewater treatment process (denitrification). Nitrates have two primary water quality concerns:

- **Drinking water** – excessive nitrates in drinking water can harm human fetuses and infants. If most of the ammonia is required to be removed, the resultant effluent will likely contain nitrates in excess of the State Drinking Water Standard (Primary MCL: 10 mg/L nitrate as N). There is sufficient dilution available in the Sacramento River that the river after mixing will not exceed the nitrate drinking water standard.
- **Nutrients** – Nitrogen is an essential nutrient to life. Nitrogen in nitrates is readily available for use by plants. As with ammonia, excessive nitrogen can contribute to excessive or changed growth in a water body, changing the ecology of the water body. Changing the type of nitrogen, increasing the concentration of nitrogen, or changing the nitrogen-to-phosphorus ratio can change the ecology of a waterbody. Several biologic impacts in the Delta and export waters from nitrogen in the SRCSD discharge have been asserted, but none have been clearly demonstrated. The overall impact of the nitrogen on the Delta is not fully understood, but reduction of nitrogen in the SRCSD discharge will reduce or eliminate any nitrogen impacts.

1. Permitting Alternatives for Nitrate

Staff Recommendation – The proposed NPDES permit requires compliance with the State Drinking Water Standard for nitrate at the end-of-pipe (i.e., no dilution), resulting in an average monthly effluent limit of 10 mg/L (nitrate as N). This is a change from the Tentative Permit circulated for public review and comment.

After review of comments it was determined that the effluent limit for nitrate in the Tentative Permit (0.26 mg/L as a monthly average) is not achievable by reasonable denitrification technologies. Therefore, the final average monthly effluent limits for nitrate have been modified to be based on the State Drinking Water Standard for the protection of human health, as proposed in the tentative Order package as Nitrate Removal Alternative #1. The proposed permit allows a human health mixing zone for some human health constituents but not for nitrates. Mixing zones allow increased pollutant loads and must be considered on a pollutant-by-pollutant basis. Staff is not recommending a mixing zone for nitrates due to many concerns regarding the

impacts of nitrates may have on the Delta, including affects to the nitrogen-to-phosphorous ratio in the Delta and impacts nitrogen may have on aquatic life. More importantly, 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 studies have demonstrated that elevated nitrogen discharges can negatively impact the receiving water far downstream of the discharge within the Delta, not just the areas defined by the requested mixing zone (see discussion regarding nutrients, above). 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.

Opponents of the Staff Recommendation claim that the science regarding the nitrogen-to-phosphorous ratio effects in the Delta is too uncertain to make regulatory decisions at this time. They also contend that although de-nitrification technologies are available and commonly used by other municipalities, the SRWTP is not a similarly situated discharger due to the large dilution in the river. Based on discussion provided above, staff is not recommending a mixing zone for nitrates; however, the Board may choose to exercise its discretion to allow a mixing zone. One nitrate removal alternative has been provided for Board consideration.

Nitrate Removal Alternative #1 – This alternative establishes the water quality-based effluent limits for nitrate based on the State Drinking Water Standard with the consideration of human health dilution credits. This alternative must be adopted with the Mixing Zones/Dilution alternatives that allow a human health mixing zone.

Table 6: Nitrate Removal Alternatives

CONSTITUENTS		NITRATE REMOVAL ALTERNATIVES			
		Staff Recommendation ¹		Nitrate Removal Alternative #1	
		Monthly	Daily	Monthly	Daily
Nitrate (as N)	mg/L	10	--	127	--

¹ The Tentative Order included an Average Monthly Effluent Limit of 0.26 mg/L. However, based on comments received it has been determined that this level is not achievable by reasonable denitrification technologies (see Staff Recommendation discussion, above).

2. Comments regarding Nitrate

The major comments and responses for nitrate are summarized in Table 7, below. A full listing of comments and complete responses are included in the Response to Comments document in the agenda package.

Table 7: Major Comments/Responses for Ammonia

Commenter	Comment/Staff Response
SRCSA, California Association of Sanitation Agencies and Tri-Tac, Delta Diablo Sanitation District, Central Contra Costa Sanitary District, Partnership for Sound Science,	<p>Scientific Evidence Has Not Been Presented in the Tentative Permit to Justify the Proposed Denitrification Requirements on the Basis of Protecting Aquatic Life Uses in the Delta. The cost full nitrification is \$780 million. No information was presented or referenced regarding the positive or negative impact of reducing nitrate. Denitrification of SRWTP effluent would reduce existing N:P ratios in the Sacramento River and Suisun Bay, with unknown consequences. Assertions that current N:P ratios in the SFE have driven observed changes in phytoplankton composition are pure speculation.</p> <p>Staff Response: The cost to denitrify is \$170 million after full nitrification of the effluent. Fourteen tons of ammonia will convert to approximately 14 tons for nitrate. Nitrate is a biostimulatory substance which causes excessive algal growth. Excessive algal growth imparts undesirable tastes and odors thereby impacts the drinking water beneficial uses. The taste and odor problems are mitigated with the addition of tons of copper sulfate to waters of the state which turn creates toxicity problems. Excessive algae also creates water treatment plant operation problems. Excessive algae increases total organic carbon (TOC). TOC with chlorination of drinking water creates disinfection by products, such the carcinogens, trihalomethanes.</p>
Department of Water Resources	<p>Increased nutrient loading can lead to eutrophication of source waters, which can lead to increased levels of organic carbon, objectionable taste and odor producing compounds, and toxic microcystins. When nutrient enriched waters enter the State Water Project (SWP), the eutrophication effect can be amplified as hydraulic residence time increases.</p> <p>Staff Response: Staff concurs.</p>

Commenter	Comment/Staff Response
CSPA	<p>Nitrate removal must be implemented to protect the drinking water beneficial use, to prevent biostimulation and to provide BPTC.</p> <p>Staff Response: Staff concurs.</p>

3. Changes to Tentative Permit regarding Nitrate

The Tentative Order included an average monthly effluent limit for nitrate of 0.26 mg/L, which was based on a technical report submitted by the Discharger that indicated this limitation was possible given the level of nitrate removal that could feasibly be attained using reasonable nitrate removal technologies. However, based on comments from the Discharger and other interested parties staff has determined that the proposed average monthly effluent limits cannot feasibly be met; therefore, Central Valley Water Board staff re-evaluated the limits. Staff agrees that current nitrate removal technologies are not capable of nitrate removal to the level that would ensure compliance with the proposed effluent limit in the Tentative Order. Therefore, the final average monthly effluent limits for nitrate have been modified to be based on the USEPA Primary Maximum Contaminant Level (MCL) of 10 mg/L (nitrate as N) for the protection of human health. There are standard nitrate removal technologies in use today that are capable of maintaining compliance with this effluent limit.

D. Disinfection

The Central Valley Water Board generally follows a November 1980 general recommendation 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. Whether using a site-specific recommendation or the general recommendation from DPH, the Central Valley Water Board must make its own determination of the level of disinfection. The Board evaluates each facility independently based on site specific characteristics and conditions. The Board has adopted permits that are more stringent than DPH’s recommendations. For example, the following are recent Board-adopted NPDES permits in which tertiary filtration and upgraded coliform effluent limitations are required in addition to a 20-to-1 dilution that must be available to discharge:

- Ironhouse Sanitary District Wastewater Treatment Plant (WWTP) (Order R5-2008-0057)
- City of Angels WWTP (Order R5-2007-0031 and R5-2009-0074)
- City of Jackson WWTP (Order R5-2007-0133), and
- Bear Valley Water District (Order No. R5-2005-0139).

The Board has also adopted some permits with less stringent requirements than DPH recommendations when appropriate. For example, following site-specific studies and site-specific recommendations from DPH, the NPDES permit for the City of Vacaville Wastewater Treatment Plant (Order R5-2008-0055-01) seasonally allows secondary treatment with chlorination discharge with essentially no dilution.

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-to-1. The Discharger claims the Board must consider DPH recommendations and the Board cannot arbitrarily decide to not follow their recommendations for the proposed Permit. This is not true. While staff considers DPH recommendations for all permits it develops, each permit is developed based on site specific conditions including the nature and character of the discharge and receiving water. To demonstrate how implementation of the recommendations may vary depending on site specific conditions, the following is a list of all municipal sewage treatment plants with NPDES regulated discharges to the Sacramento River downstream of Shasta Dam. The list identifies the facility, if the facility provides filtration or not and the associated average dilution ratios (river-to-effluent).

<u>Facility</u>	<u>Permitted Flow</u>	<u>Average Dilution</u>
Sacramento Regional CSD WWTP (no filtration)	181 mgd	50-to-1
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 a high number of direct contact at point of discharge and downstream, Central Valley Water Board staff sought a recommendation of DPH rather than rely on the 1980 recommendation. DPH recommended that the SRCSD conduct a health risk assessment study for its discharge. The SRCSD contracted with Dr. Charles Gerba from the University of Arizona to conduct a health risk assessment. The Study concluded that there is an increase in

Cryptosporidium and *Giardia* concentrations as a result of the wastewater discharge, with (under conservative conditions) an increased risk of illness of downstream water recreationists from *Cryptosporidium* and *Giardia* of 1.6 to 3.7 times. In its 15 June 2010 letter, DPH recommends that the Discharger provide additional treatment sufficient to reduce the additional risk of infection posed by exposure to the discharge, and that the pathogen concentrations be reduced until the level of health risk is no more than 1 infection per 10,000 exposures to the river water. SRCSD argues that the DPH recommendation is overly stringent, and that most natural waters do not meet this level of protection of infection. SRCSD recommends, instead, that the USEPA Beach Standard² for freshwater recreational exposure of 8 illnesses per 1000 exposures, be used as the level of human health protection. SRCSD 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-point source pollution, and the recreationists, 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.

The health risk study conducted by SRCSD focused on pathogen impacts from body contact recreation after consultation with DPH. Given all the potential uses for waters downstream of the discharge DPH determined recreational contact with the Sacramento River has the highest degree of water contact and risk of illness. Therefore, for pathogens recreational contact is considered the most sensitive of all the uses downstream of the discharge. When developing pathogen removal requirements for the proposed Permit, staff presumed that if the District fully complied with the removal requirements to protect the most

² "Ambient Water Quality Criteria for Bacteria – 1986" EPA 440/5-84-002, January 1986

sensitive use, all other uses would be protected. This approach is typical in the development of permits by staff to avoid a discharger from having to conduct additional studies at considerable costs to evaluate impacts to uses that are not the most sensitive when such studies are not warranted. This was the case for the proposed Permit. Other beneficial uses that can be impacted by pathogens in the SRCSD discharge include.

- **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. Staff does not recommend a specific study be 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 may not have treatment systems that can dependably remove the pathogens. In cases such as this the Board has traditionally required full tertiary treatment plus 20:1 dilution (see previous discussion above regarding Ironhouse Sanitation, City of Angels, etc.).

1. Permitting Alternatives for Disinfection

Staff Recommendation – The proposed Permit requires an upgrade of the wastewater disinfection process, from the current secondary treatment (no filtration) with chlorination that meets a median total coliform organisms concentration of 23 most probable number (MPN) per 100 ml (maximum concentration of 500 MPN/100 ml) to tertiary treatment (in accordance with Title 22, Health and Safety Code, or equivalent) a level that produces an essentially pathogen-free effluent achieving the following levels for total coliform organisms:

- i. 2.2 MPN/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.

The purpose of the disinfection standards upgrade is to address the increased health risk to the public contacting Sacramento River water downstream of the discharge by reducing the actual measured increase of Giardia and Cryptosporidium concentrations in the discharge. Giardia and Cryptosporidium are protozoans in human and animal fecal waste. Tertiary filtration will remove solids so that disinfection of protozoans is effective, as well as remove other pollutants that are attached to solids, such as metals, methyl mercury, some pesticides, pharmaceuticals and some constituents of emerging concern (CECs)³.

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, UV light or ozone/peroxide). The combination of filtration and disinfectant effectively removes virtually all pathogens. This alternative would require construction of new filtration facilities, and likely new disinfection facilities, and ongoing increased use of chemicals and/or power to provide the higher level of disinfection. The SRCSD estimated the cost for this alternative would be \$1.3 billion, however other interested parties have commented that this estimate is too high.

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 an impact to the Sacramento River's beneficial use. This alternative produces an essentially pathogen-free wastewater, and is required by the Board in numerous situations with the similar health risk. The proposed disinfection requirements are not more stringent than required of other similarly situated NPDES dischargers. This Staff recommendation is based on the following factors:

- (1) Discharge is to Sacramento River, which has a high level of public contact, is used extensively for agricultural irrigation, and is a major drinking water source;
- (2) Actual monitoring data shows an increase in Cryptosporidium and Giardia in the District's discharge;

³ "Treating Contaminants of Emerging Concern, A Literature Review Database" USEPA August 2010 (EPA -820-R-10-002)

- (3) Site-specific studies conducted by the District confirms that an increase in *Cryptosporidium* and *Giardia* increases human health risk,
- (4) An increased health risk impacts the beneficial uses of the Sacramento River, specifically the direct contact recreation and agricultural water supply uses;
- (5) DPH recommends a reduced health risk of no more than 1 infection per 10,000 exposures to the river water;
- (6) Tertiary treatment is a proven technology used to decrease *Cryptosporidium* and *Giardia* from municipal wastewater; and
- (7) Tertiary treatment provides valuable treatment benefits of additionally removing heavy metals, total organic carbon, BOD, TSS, phosphorus, and emerging constituents of concern such as pharmaceuticals.

Opponents of the Staff Recommendation contend that the requirement to meet Title 22 (or equivalent) tertiary filtration is overprotective and unnecessary to protect the beneficial uses. As discussed above, staff believe the proposed disinfection requirements are reasonable and necessary to protect the beneficial uses of the receiving water.

Disinfection Alternative 1 – This alternative would require the same level of disinfection requirements as the existing NPDES permit. Chlorine is currently added to the wastewater as a disinfectant. Chlorine is effective at reducing threats from bacteria and enteric viruses, but has little impact on protozoa such as *Giardia* and *Cryptosporidium*. Under contract with SRCSD, Dr. Gerba concluded that the risks from the SRWTP discharge do not exceed the 1986 USEPA's Acceptable Risk Level in its Recreational Water Quality Criteria, thus no change in disinfection-related effluent limitations should be required. The District disagrees with DPH's recommendation as being necessary to protect beneficial uses. Based on the District's health risk study the current disinfection facilities are not adequate to meet the 1 in 10,000 risk level. However, the District claims that conservative assumptions were used in the health risk assessment and that if the study was refined it may conclude that the current disinfection facilities can meet the 1 in 10,000 risk of illness recommended by DPH. Staff does not agree with this approach. The District and its contractor developed and proposed the assumptions used in their study. These were not dictated or required by Board staff or DPH. However, after review both Board staff and DPH agreed the proposed assumptions were reasonable. It is inappropriate for the District to now request they be provided an opportunity to revisit their assumptions because they do not agree with the regulatory actions being recommended as a result of their study. The District submitted their report in support of the NPDES Permit Application. The District presumably believed the report to be

accurate at the time of submission, since knowingly submitting any false statement or representation would violate the Clean Water Act. To suggest now it was wrong is inappropriate and not supported by staff.

The following table demonstrates the comparison between the staff recommendation and Disinfection Alternative #1, followed by a summary of public comments corresponding to the proposed disinfection requirements. The Staff Response to Comments document in the agenda package provides further detailed comments and staff responses.

Table 8: Disinfection Alternatives

CONSTITUENTS		Staff Recommendation			Disinfection Alternative #1		
		Title 22 (or equivalent) Tertiary Req'ts			Secondary Req'ts ⁽¹⁾		
		Monthly	Weekly	Daily	Monthly	Weekly	Daily
5-day Biochemical Oxygen Demand	mg/L	10	15	20	30	45	60
Total Suspended Solids	mg/L	10	15	20	30	45	60
Total Coliform Organisms	MPN/100 mL	2.2 (7-day median) 23 (once per month) 240 (instantaneous max.)			23 (7-day median) 240 (once per month) 500 (instantaneous max.)		

⁽¹⁾ Turbidity specifications would be removed under Disinfection Alternative #1.

2. Comments regarding Disinfection

The major comments and responses for disinfection are summarized in Table 9, below. A full listing of comments and complete responses are included in the Response to Comments document in the agenda package.

Table 9: Major Comments/Responses for Disinfection

Commenter	Comment/Staff Response
SRCSD, California Association of Sanitation Agencies and Tri-Tac, Delta Diablo Sanitation District, Central Contra Costa Sanitary District, Partnership for Sound Science,	<p>Regional Board failed to conduct a CWC Section 13241 analysis for requiring Title 22 (or equivalent) tertiary filtration requirements. The Proposed permit ignores the DPH 20:1 guideline and historic permitting practice. Filtration is not BPTC for the Facility.</p> <p>Staff Response: A CWC 13241 analysis is not necessary because the level of treatment is water quality-based and needed to protect beneficial uses. Regardless, the Regional Board conducted an equivalent 13241 analysis to be consistent with other permits adopted by the Board that include this equivalent analysis when requiring tertiary standards and the proposed permit has been updated accordingly.</p> <p>Unprecedented health risk standard imposed. DPH provided no support for its proposed risk level, therefore, the Regional Board's reliance on this level in any way has no basis or evidentiary support.</p> <p>Staff Response: The staff recommendation does not solely base the proposed</p>

Commenter	Comment/Staff Response
	<p>requirements on the DPH recommendation of a reduced health risk of no more than 1 infection per 10,000 exposures to the river water. The proposed disinfection requirements implement proven tertiary treatment technology, or equivalent, to address the increase in protozoa in the discharge, and to protect the beneficial uses involving public contact of the Sacramento River and Delta.</p>
<p>Assemblymember Yamada, Assemblymember Huber, and Assemblymember Niello</p>	<p>Since 2007 the Regional Board has issued 18 permits to other municipal treatment plants that provide the same ratio of dilution, but did not require tertiary filtration. Regional Board issued permit recently to City of Rio Vista that does not require tertiary filtration, despite the fact that both treatment plants discharge to the Sacramento River where dilution is at least 20-to-1.</p> <p>Staff Response: A “rule of thumb” of a 20-to-1 dilution ratio is often used by the Regional Board when determining whether tertiary filtration is necessary to protect beneficial uses, based on a recommendation by DPH. The DPH “rule of thumb” recommendation was used for the City of Rio Vista discharge. Comparing the City of Rio Vista to the SRWTP discharge is not appropriate. The City of Rio Vista has an average dilution ratio of 10,000-to-1, whereas, the average dilution for the SRWTP discharge is only 50-to-1. Since the dilution ratio for the SRWTP discharge is close to the 20-to-1 “rule of thumb” and due to the uncertainty on health risk, the Regional Board requested a site-specific recommendation from DPH on the appropriate level of treatment. In this case, due to the large magnitude of this discharge, and elevated levels of Giardia and Cryptosporidium in the discharge, the Regional Board requested a health risk assessment study by SRCSD and a recommendation from DPH. The proposed Order requires Title 22 (or equivalent) tertiary filtration to eliminate the pathogen health risk caused by the SRCSD discharge. The disinfection requirements are no more stringent than required of many other NPDES dischargers that pose similar health risks. The proposed requirements provide additional benefits of removing heavy metals, pharmaceuticals, and other serious pollutants from the largest municipal wastewater discharge into the Sacramento River and Delta.</p> <p>The Regional Board or DPH have not been able to demonstrate that there is a risk to recreational users downstream of the discharge.</p> <p>Staff Response: The Board’s findings are based on a health risk assessment conducted by SRCSD. SRCSD’s health risk assessment study for its discharge concluded that there is an increase in Cryptosporidium and Giardia concentrations as a result of the wastewater discharge, with an increased risk of illness of downstream water recreationists from Cryptosporidium and Giardia of 1.6 to 3.7 times. In its 15 June 2010 letter, DPH recommends that the Discharger provide additional treatment sufficient to reduce the additional risk of infection posed by exposure to the discharge. The proposed disinfection requirements implement proven tertiary treatment technology (or equivalent) to address the increased risk to human health due to increased protozoa in the discharge, and to protect the human health-related beneficial uses of the Sacramento River and Delta.</p>
<p>Water Agencies</p>	<p>Regional Board properly found that discharge of pathogens poses an unacceptable human health risk. High quality source water is an essential component of the multi-barrier approach to protecting public health. Pathogen free wastewater is needed to protect drinking water quality.</p> <p>Staff Response: Staff concurs.</p>

Commenter	Comment/Staff Response
DWR	<p>DWR supports the imposition of Title 22 (or equivalent) tertiary filtration requirements in the proposed permit, as well as, the proposed monthly monitoring for Cryptosporidium and Giardia.</p> <p>Staff Response: Staff concurs.</p>
CSPA	<p>Filtration and increased disinfection is required to protect the contact recreation beneficial use of the receiving stream and to provide best practicable treatment and control (BPTC) of the discharge. Secondary disinfected wastewater is not fit for contact recreation uses as confirmed by comparison to the unrestricted recreational requirements contained in CCR Title 22. While Title 22 is not applicable to wastewater discharges; the science generated in developing Title 22 requirements is applicable and critical in protecting the public health. An illness rate of 8 swimmers out of each 1,000, the rate established in the bacteria criteria, is an unacceptable risk to those using the Sacramento River for recreation. The conversion of most local wastewater treatment plants to filtration establishes BPTC in accordance with the Antidegradation Policy and is applicable to this discharge.</p> <p>Staff Response: Staff concurs.</p>

3. Changes to Tentative Permit regarding Disinfection

Some clarifications in the Fact Sheet have been made regarding disinfection based on comments received. Comments were received by the Discharger that a CWC section 13241 economic analysis is necessary, because the proposed permit requires Title 22 (or equivalent) tertiary filtration. Effluent limits recommend in the proposed Permit for tertiary treatment are water quality based effluent limits that do not require a 13241 analysis; however, to be consistent with other permits adopted by the Board, an equivalent 13241 analysis has been added to the Fact Sheet. No other changes have been made regarding disinfection.

E. Other Issues

1. Whole Effluent Toxicity

State and federal law and the Basin Plan prohibit toxicity to aquatic life in our waterbodies. However, due to contaminants from point and non-point sources, complex mixes of contaminants and other stressors, Delta waterways are impaired for unknown toxicity.

In NPDES permits toxicity is regulated and prevented through chemical-specific and whole effluent toxicity methods. The chemical-specific method includes effluent limits for toxic pollutants (e.g., copper and ammonia). The whole effluent toxicity method regulates the toxicity of the effluent as a whole. Whole Effluent Toxicity testing is used, which measures the toxicity of the

whole wastewater sample, with all the chemicals and physical conditions combined together. This is different from looking at the toxicity of a single chemical at a time. We look at two major types of toxicity – acute toxicity which is the death of organisms, and chronic toxicity, which can include reduced growth, lower reproduction, slow swimming so the organism is more easily eaten by something else, and many other impacts that can reduce the chances of organism survival.

There are three issues associated with the WET requirements in the proposed permit; (1) WET testing using *Hyalella azteca*, (2) the numeric toxicity trigger for chronic toxicity testing, and (3) whether ammonia should be removed prior to acute and chronic WET testing.

- a. **WET Testing with *Hyalella azteca*.** The proposed Order requires the Discharger begin WET testing using *Hyalella azteca* in addition to the standard acute and chronic WET testing. *Hyalella azteca* is sensitive to pyrethroid pesticides that have been measured in the Facility effluent. The issue is that there are no standard methods for testing wastewater effluents using *Hyalella azteca*. The testing methods are currently only established for ambient testing. The Discharger contends that *H. azteca* does not reside in the water column, so water-only testing may not be ecologically relevant. The Discharger also contends that the testing protocol for wastewater effluents would require extensive research and development.

Although there are no standard methods for wastewater effluents, the ambient testing methods can be modified and effectively used for wastewater. Since *H. azteca* does not reside in the water column, the water column method most labs are using is based off of EPA's reference toxicant test method that uses a substrate substitute. This allows the test organisms something to hold on to and is more representative of actual instream conditions. Although there is uncertainty in testing methods for *H. azteca*, USEPA, USFWS, and DFG have commented that the *H. azteca* testing is appropriate and has recommended inclusion in the NPDES permit.

- b. **Numeric Chronic Toxicity Trigger.** The tentative Order included a numeric chronic toxicity trigger of 6 chronic toxicity units (TUc) based on the Dischargers Dynamic Model and the allowance of a chronic toxicity mixing zone. The toxicity trigger is the threshold at which the Discharger is required to conduct accelerated toxicity testing and a toxicity reduction evaluation when the effluent exhibits toxicity.

Comments. The Discharger provided comments that included additional modeling using its Dynamic Model and has demonstrated that the 4-day average effluent concentration at the edge of the chronic

mixing zone is 7.5 percent, which corresponds to a toxicity trigger of 13.3 TUc. Central Valley Water Board staff agrees that the additional modeling results provided by the Discharger can be used to develop the toxicity trigger.

Changes to Tentative Permit. Although the modeling demonstrates a chronic toxicity trigger of 13.3 TUc at the edge of the chronic mixing zone, Staff recommends the toxicity trigger be set at 8 TUc, which is the toxicity trigger in the current permit. 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.

- c. **Removal of Ammonia for WET Testing.** The tentative Order allowed the removal of ammonia from effluent samples prior to conducting acute and chronic WET testing. This was allowed, because the permit does not allow a mixing zone for ammonia and includes a compliance schedule for meeting the final end-of-pipe ammonia limits.

Comments. Comments were received from several agencies, including USEPA, USFWS, and DFG that recommended the acute and chronic WET testing be performed with the effluent samples without modifications to remove ammonia. Central Valley Water Board staff agrees. The current permit does not allow modification of effluent samples for WET testing, so the tentative Order is less stringent and does not meet federal anti-backsliding regulations.

Changes to Tentative Permit. Staff has modified the proposed permit to require unmodified effluent samples for acute and chronic WET testing. Ammonia removal is not allowed for WET testing.

2. Compliance Schedules

The proposed Order includes compliance schedules for meeting the final effluent limits for ammonia and for constructing Title 22 (or equivalent) tertiary filtration. The Discharger provided a compliance schedule justification that meets the requirements of the State Water Board's Compliance Schedule Policy. The compliance schedule allows 10 years for compliance, which is the maximum time allowed by the State Water Board's Compliance Schedule Policy.

Comments. Several interested parties provided comments contending that the compliance schedules were too long or that they should be included in a cease and desist order. Central Valley Water Board staff disagrees. As stated above, the Discharger provided sufficient

justification for the compliance schedules, the State Water Board's Compliance Schedule Policy allows the compliance schedules in the permit, and due to the size and complexity of the Facility upgrades, 10 years is justified.

Other comments received regarding the ammonia compliance schedule were that the interim effluent limits were too high and immediate reductions in ammonia should be required as discussed in the Discharger's Low Dissolved Oxygen Prevention Assessment study. The interim effluent limits for ammonia have been statistically calculated based on Facility performance in the same manner as other permits adopted by the Board and are designed to keep the discharge of ammonia from increasing. The Discharger has recently implemented process changes that resulted in some ammonia reduction. However, the changes have only been implemented for a very short period so there is insufficient data to adjust the interim effluent limits based on the new process changes. Central Valley Water Board staff agrees that the Discharger should continue the new process changes to reduce ammonia and have modified the proposed permit to require continued implementation of the current ammonia reduction efforts, and an evaluation of further reductions as part of the pollution prevention plan for ammonia.

Changes to Tentative Permit. Pollution prevention plan requirements for ammonia have been changed to require the Discharger continue implementation of ammonia reduction, and evaluate and implement further reductions of ammonia. In addition, more detailed interim requirements have been included in the compliance schedule.

3. Thermal Plan Exception

The existing NPDES permit allows for an exception to the thermal conditions required by the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan). The SRCSD has requested another Thermal Plan exception with this permit renewal.

The SRCSD 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." 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.

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.

Table 10 below outlines the Thermal Plan requirements, the Thermal Plan exception recommended in the proposed permit, and the Discharger's requested Thermal Plan exception requirements.

Table 10: Thermal Plan Comparisons

Thermal Plan Requirements (Section 5.A.(1)a-c)	Staff Recommendation (no change from current permit)	SRCS D Request)
<p>5.A.(1)a</p> <p>The maximum effluent temperature shall not exceed the natural receiving water temperature by more than 20°F</p>	<p><u>1 October through 30 April</u></p> <p>The maximum temperature of the discharge shall not exceed the natural receiving water temperature by more than 25° F.</p> <p><u>1 May through 30 September</u></p> <p>No Exception</p>	<p><u>1 October through 31 March</u></p> <p>The daily average temperature of the effluent shall not exceed the daily average natural receiving water temperature by more the 25°F.</p> <p><u>1 April through 30 September</u></p> <p>The daily average temperature of the effluent shall not exceed the daily average natural receiving water temperature by more the 20°F.</p>
<p>5.A.(1)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.</p> <p>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>5.A.(1)c</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</p>	<p>No Exception</p>

The Central Valley Water Board typically requires that exceptions to the Thermal Plan are approved by the USFWS and NMFS. The District has not received approval by these agencies for its newly proposed Thermal Plan exception. As recommend by USFWS, the proposed Order carries forward the existing Thermal Plan exception and requires a temperature study to evaluate whether permitted conditions are protective of delta smelt and the Sacramento biota and will increase the level of certainty regarding the determination.

Comments. The Discharger provided comments that contend the new Thermal Plan exception request is justified and should be allowed. USFWS and DFG provided comments supporting the existing thermal requirements and study requirements in the tentative permit. The

Water Agencies commented that a Thermal Plan exception is not justified and is impacting delta smelt.

Changes to Tentative Permit. Some minor clarifying changes to the Thermal Study requirements were made.

4. Salinity

The SRWTP discharge contains total dissolved solids (TDS), chloride, sulfate, and electrical conductivity (EC). These are water quality parameters that are indicative of the salinity of the water. Their presence in water can be growth limiting to certain agricultural crops and can affect the taste of water for human consumption. The Basin Plan contains a chemical constituent objective that incorporates State Drinking Water Standards, contains a narrative objective, and contains numeric water quality objectives for EC, TDS, sulfate, and chloride. Table 11 below summarizes salinity water quality objectives/criteria, and effluent and receiving water salinity concentrations.

Table 11. Salinity Water Quality Criteria/Objectives and Effluent/Receiving Water Salinity Concentrations

Parameter	Bay Delta Plan Compliance Standards (lowest)	Agricultural WQ Goal ¹	Secondary MCL ²	Background Receiving Water		Effluent		Critical Downstream Salinity Conc. ⁵
				Ave	Max	Ave	Max	
EC (µmhos/cm)	450 Sac River @ Emmaton	Varies ³	900, 1600, 2200	160	260	763	960	283
TDS (mg/L)	--	Varies	500, 1000, 1500	98	180	416	540	192
Sulfate (mg/L)	--	Varies	250, 500, 600	--	--	96	110	--
Chloride (mg/L)	150 CCC#1	Varies	250, 500, 600	5.2	11	91	100	--

- 1 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)
- 2 The secondary maximum contaminant levels (MCLs) are stated as a recommended level, upper level, and a short-term maximum level.
- 3 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.
- 4 USEPA's National Ambient Water Quality Criteria for the protection of freshwater aquatic life.
- 5 Calculated using USEPA recommended mass-balance approach and is the expected critical downstream receiving water concentration using a steady-state approach⁴

⁴ USEPA NPDES Permit Writers' Course (EPA 833-B-97-001 rev. October 2009)

Based on the relatively low effluent salinity concentrations, the discharge does not have reasonable potential to cause or contribute to an in-stream excursion of the applicable water quality objectives for salinity⁵. However, the loading of salts to the Delta from the SRWTP is significant and a concern to our Board. The Sacramento River is a significant source of salt to the Delta and San Joaquin Valley. Allowing the Discharger to increase its current salt loading would be contrary to the Region-wide effort to address salinity in the Central Valley. Therefore, the proposed Order includes a performance-based effluent limitation of 900 µmhos/cm for EC to be applied as an annual average to limit the discharge at current levels. This performance-based effluent limitation was calculated as the 99.9th 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, the proposed 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.

Comments. The Discharger provided comments that contend the performance-based effluent limits for EC do not allow for consideration of water conservation, which could increase salinity concentrations. The Discharger requested an annual average effluent limit of 1000 µmhos/cm for EC. Central Valley Water Board staff agree that water conservation can result in increased concentrations of EC in the effluent. The EC effluent limit has been increased slightly, but not up to the limit requested by the Discharger. The Discharger is required to prepare and implement a salinity evaluation and minimization plan to ensure the concentrations of salinity in its discharge does not increase.

Changes to Tentative Permit. A slight increase in the EC effluent limit has been made in the proposed Order, increasing the limit from 840 µmhos/cm to 900 µmhos/cm.

5. Cost of Compliance vs Cost of Not Complying

The Discharger has estimated the costs to comply with the tentative permit to be \$2 billion. A USEPA engineering contractor reviewed the District's cost estimates for the Central Valley Water Board and concluded that some modifications to the treatment system evaluated by SRCSD could potentially

⁵ Table 11 identifies the applicable water quality objectives for salinity for the Sacramento River and Delta. The SRWTP discharge does not have reasonable potential to cause or contribute to an exceedance of any of the water quality objectives in the receiving water. The Critical Downstream Salinity Concentrations are less than all applicable water quality objectives.

achieve the same effluent quality goals for \$1.3 billion. Another engineering consultant hired by the State Water Contractors provided a cost estimate of \$1.2 billion.

The University of the Pacific (UOP), School of Business Forecasting, through funding provided by the SRCSD, completed an analysis of the impact of the cost of nutrient removal to Sacramento area income and employment. Based on only nutrient reduction, the authors assumed “increased wastewater treatment rates will not be significant enough to affect the location, operation or investment decisions of businesses, and that lost corporate income flows outside the region”. The Building Industry and large local industries estimated much more significant economic problems including new construction would cease, wastewater rates would increase, wastewater intensive businesses would close or relocate, air quality goals would not be met other ripple impacts to local governments and adjacent communities.

While many parties have provided their estimates or evaluations on the cost to the District and its community to fully comply with the proposed Permit, there has not been a full analysis on the costs to the Delta and downstream users of Delta waters if the District were to receive a permit that provided less stringent requirements. Establishing or determining these costs are more difficult to place in terms of dollars. Specific studies have not been conducted to determine the loss of recreational days, loss of recreational and commercial fishing, loss of work or school days due to gastric intestinal illness or increased costs to water treatment agencies for dealing with poorer quality source water. The impact of the discharge to beneficial uses is difficult to partial out when there are many stressors to the Delta. While difficult to assess, the UOP study provided some analysis on this matter. It estimated reduced agricultural water supplies due to Delta pumping restrictions to protect endangered species result in an income loss of \$150 million and 2,000 jobs in the San Joaquin Valley⁶. UOP also estimated that the closure of the salmon fishery in 2008 and 2009 created an annual loss in California of about 1,800 jobs and \$120 million in income⁷.” Although, the SRWTP discharge has not been directly tied to the cause of the decline of aquatic life in the Delta, current studies provide adequate evidence that the discharge is a significant stressor that contributes to the decline.

Central Valley Water Board staff has reviewed the relative per capita costs of upgrades by other communities compared to SRCSD’s cost estimate. Such cost comparisons are not exact because not all upgrade projects are

⁶ “Employment Impacts of Reduced Water Supplies to San Joaquin Valley Agriculture,” December 10, 2009. <http://forecast.pacific.edu/water-jobs/Pacific-BFC-Water-Jobs.pdf>. We will soon release an update of this estimate using new data that shows actual losses were 40% to 50% lower than this estimate. Check our website at <http://forecast.pacific.edu> for an updated report.

⁷ “Employment Impacts of California Salmon Fishery Closures in 2008 and 2009.” April 1, 2010. <http://forecast.pacific.edu/BFC%20salmon%20jobs.pdf>.

equivalent, but the comparison showed that SRCSD's estimate was in the mid-range of per capita costs, and that these other communities that have completed the plant upgrades and are operating the upgraded systems, without irreparable economic harm. Even if the \$2 billion costs projected by SRCSD are correct, the increased sewage treatment rate to \$60 per month for each household is not significantly different from sewer rates charged by other communities discharging to surface waters, some pay substantially more for sewer service. For example, households in the Folsom Lake Service Area pay approximately \$100 per month for sewage treatment and households in the North Auburn Service Area pay \$67 per month for sewage treatment. Residents in Cascade Shores, a remote community in Nevada County that serves about 84 households, pay \$166.25 per month to cover the costs of their NPDES discharge that is treated through a newly constructed advanced treatment facility to meet requirements similar to those proposed for SRCSD. On the other hand, larger communities in the Sacramento/Delta area that have already upgraded their treatment facilities to advanced treatment also similar to that in the proposed NPDES Permit have sewer fees substantially less than the monthly fees projected by SRCSD, including Stockton (\$22.75/month), Roseville (\$27.90/month), Tracy (\$31.00/month), and Lodi (\$38.84/month).

6. Antidegradation

The proposed 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 appropriate to conduct a new antidegradation analysis for the existing discharge.

Comments. The District comments that it is not the Regional Board's practice to subject existing permitted discharges to a complete antidegradation analysis and cites an example of the recent NPDES permit renewal for the City of Rio Vista's Northwest Wastewater Treatment Plant. The need to conduct a complete antidegradation analysis is a site-specific determination. The discharge from the City of Rio Vista can not be compared to the Sacramento Regional Wastewater Treatment Plant discharge. First, the City of Rio Vista Northwest Facility provides a very high level of treatment, including tertiary filtration and nitrification/denitrification. The SRCSD only provides secondary treatment with no ammonia removal. Second, the City of Rio Vista's Northwest Facility discharge is insignificant in comparison to the SRCSD discharge, especially in comparison to the

Sacramento River flow. The average dilution for Rio Vista is 10,000-to-1, while the average dilution is 50-to-1 for the SRCSD. The impact that the SRCSD discharge can have on the Sacramento River and Delta is many times greater, thus requiring a different determination on the need to conduct a complete antidegradation analysis.

Changes to Tentative Permit. Clarifying language has been added to the Fact Sheet regarding the antidegradation analysis.

IV. SUMMARY OF PERMIT ALTERNATIVES

MIXING ZONE DILUTION ALTERNATIVES

		MIXING ZONES/DILUTION ALTERNATIVES Tentative Order included same Staff Recommendation							
CONSTITUENTS		Staff Recommendation Human Health and Chronic		Alternative #1 No Dilution		Alternative #2 Human Health Only		Alternative #3 Human Health, Chronic, and Acute	
		Monthly	Daily	Monthly	Daily	Monthly	Daily	Monthly	Daily
Human Health Constituents									
Bis(2-ethylhexyl)phthalate	µg/L	--	13	1.8	3.4	(1)	(1)	(1)	(1)
Carbon tetrachloride	µg/L	--	5.3	0.25	0.46	(1)	(1)	(1)	(1)
Dibromochloromethane	µg/L	--	2.2	0.41	0.85	(1)	(1)	(1)	(1)
Dichlorobromomethane	µg/L	--	3.4	0.56	1.1	(1)	(1)	(1)	(1)
Dibenzo(ah)anthracene	µg/L	0.2	0.4	0.004	0.01	(1)	(1)	(1)	(1)
Methylene chloride	µg/L	4.7-	11	(1)	(1)	(1)	(1)	(1)	(1)
N-nitrosodimethylamine (NDMA)	µg/L	0.00069	0.0019	(1)	(1)	(1)	(1)	(1)	(1)
Pentachlorohenol	µg/L	--	18	6	--	(1)	(1)	(1)	(1)
Tetrachlorethylene	µg/L	--	4.4	0.8	1.7	(1)	(1)	(1)	(1)
1,2-diphenyl hydrazine	µg/L	0.04	0.08	(1)	(1)	(1)	(1)	(1)	(1)
Manganese	µg/L	--	85	50 ⁽²⁾	--	(1)	(1)	(1)	(1)
Methyl tertiary butyl ether (MTBE)	µg/L	--	18	5 ⁽²⁾	--	(1)	(1)	(1)	(1)
Aquatic Life Constituents									
Aluminum	µg/L	503	750	(1)	(1)	(1)	(1)	(1)	(1)
Chlorpyrifos	µg/L	0.012	0.025	(1)	(1)	(1)	(1)	(1)	(1)
Cyanide	µg/L	--	11	4.3	8.3	4.3	8.3	(1)	(1)
Copper	µg/L	7.3	9.3	(1)	(1)	(1)	(1)	(1)	(1)

⁽¹⁾ No change from Staff Recommendation

⁽²⁾ Annual average effluent limitation

AMMONIA REMOVAL ALTERNATIVES

		AMMONIA REMOVAL ALTERNATIVES Tentative Order included same Staff Recommendation					
CONSTITUENTS		Staff Recommendation		Ammonia Removal Alternative #1		Ammonia Removal Alternative #2	
		Monthly	Daily	Monthly	Daily	Monthly	Daily
Ammonia (as N)	mg/L	1.8	2.2	11	13	37	47
UOD ⁽¹⁾ (dry season)	lbs/day	--	--	--	--	169,000	234,000
UOD ⁽¹⁾ (wet season) ⁽²⁾	lbs/day	--	--	--	--	275,000	438,000

⁽¹⁾ Ultimate Oxygen Demand (UOD) = 8.34 * (1.5*BOD₅+4.6*ammonia)*Q_{eff}; BOD₅ in mg/L, ammonia in mg/L, and effluent flow (Q_{eff}) in million gallons per day.

⁽²⁾ Wet season UOD set to current performance.

NITRATE REMOVAL ALTERNATIVES

CONSTITUENTS		NITRATE REMOVAL ALTERNATIVES Staff Recommendation changed from Tentative Order (see Nitrate discussion)			
		Staff Recommendation		Nitrate Removal Alternative #1	
		Monthly	Daily	Monthly	Daily
Nitrate (as N)	mg/L	10	--	127	--

DISINFECTION ALTERNATIVES

CONSTITUENTS		DISINFECTION ALTERNATIVES Tentative Order included same Staff Recommendation					
		Staff Recommendation			Disinfection Alternative #1		
		Title 22 (or equivalent) Tertiary Req'ts			Secondary Req'ts ⁽¹⁾		
		Monthly	Weekly	Daily	Monthly	Weekly	Daily
5-day Biochemical Oxygen Demand	mg/L	10	15	20	30	45	60
Total Suspended Solids	mg/L	10	15	20	30	45	60
Total Coliform Organisms	MPN/ 100 mL	2.2 (7-day median) 23 (once per month) 240 (instantaneous max.)			23 (7-day median) 240 (once per month) 500 (instantaneous max.)		

⁽¹⁾ Turbidity specifications would be removed under Disinfection Alternative #1.

V. COMMENTS

Written comments on the proposed Orders were required to be received by the Central Valley Water Board by 8 September 2010 in order to receive full consideration. Due to 8 September 2010 being a furlough day, comments were allowed to be received by 11 September 2010. Numerous comments were received by the deadline (see Table 12). In addition to comments from the Discharger, comments were received by state and federal legislators, state and federal agencies, water agencies, cities, counties, sanitation districts and other discharger groups, farmers and farmer associations, individual businesses, environmental groups, tax payer groups, and 90 letters were received from individual rate payers within the SRCSD service area.

The major issues discussed in the public comments are summarized, by permitting issue, in Section III "Permitting Issues", above. A complete response to comments is provided in the agenda package.

Table 12: Commentors

Legislators

United States Senator Feinstein
United States Congresswoman Matsui
United States Congressman Lungren
California Senator Darrell Steinberg
California Senator Alex Padilla
California Senator Tom Harman
California Senator Bob Huff
California Senator Mimi Walters
California Senator Jeff Denham
California Senator Mark Wyland
California Senator Ron Calderon
California Senator Bill Emmerson
California Senator Dennis Hollingsworth
California Senator Roy Ashburn
California Senator Tony Strickland
California Senator Bob Dutton
California Senator Carol Liu
California Senator Gloria Negrete McLeod
California Senator Bob Cedillo
California Senator Roderick D. Wright
California Senator Curren Price
California Senator Alan Lowenthal
California Senator Fran Pavley
Assembly Member Gaines
Assembly Members Fuller and Caballero
Assembly Member Yamada
Assembly Member Buchanan
Assembly Member Niello
Assembly Member Huber

State and Federal Agencies

Delta Stewardship Council
California Department of Fish and Game
California Department of Water Resources
United States Environmental Protection Agency, Region IX
United States Fish and Wildlife Services
United States Bureau of Reclamation

Water Agencies

The Water Agencies – Alameda County Water District,
Alameda County Flood Control and Water
Conservation District, Zone 7, Contra Costa Water
District, Kern County Water Agency, Metropolitan
Water District of Southern California, San Luis & Delta
Mendota Water Authority, Santa Clara Valley Water
District, State & Federal Contractors Water Agency,
State Water Contractors & Westlands Water District
Calleguas Water District
Cucamonga Valley Water District
Irvine Ranch Water District
Las Virgenes Water District
Municipal Water District of Orange County
San Luis Obispo-Mendota Water Authority
Westland Water District
Santa Ana Watershed Project Authority
Three Valleys Municipal Water District
Western Municipal Water District
Association of California Water Agencies
Southern California Water Committees

Cities, Counties, Sanitation Districts, and Discharger Groups

Central Contra Costa Sanitary District
City of Davis
City of Folsom
City of Rancho Cordova
City of Roseville
City of Sacramento
City of Vacaville
City of West Sacramento
County of Sacramento
Delta Diablo Sanitation District
Ironhouse Sanitation District
Tri-Tac
Central Valley Clean Water Association

Individual Businesses

Agrium
Alta Plating/The Metalfinishing Group
American River Dental
Brookfield Land
Building Industry Association
Cambridge Management Company
Campbell Soup Supply Company
Carson Development Company, Inc.
Coca-Cola Bottling Co., Inc.
Cordova Hills
Downtown Sacramento Partnership
Dr. Pepper Snapple Group, Inc.
Folsom Chamber of Commerce
FPI Management, Inc.
Granite Construction Incorporated
Guardian Entities, Inc.
G.W. Williams Co.
HP Hood, LLC
JPB Properties, LLC
Los Rios Community College District
Magnolia Suites
Mission Linen Supply
Nor-Cal Beverage Co., Inc.
P & G
Pinsetters Inc.
Ray Stone Incorporated, AMO
Sacramento Metro Chamber of Commerce
Sacramento Regional Builders Exchange
Signature Homes, Inc.
Silgan Containers Mfg. Corp.
The River District
Woodmount Real Estate Services

Farmers and Associations

Agricultural Council of California
California Cotton Ginners and Growers Associations
California Farm Bureau Federation
California Poultry Federation
Western Growers Association
Western United Dairymen
Waymire Family Farms
California Farm Water Coalition
Doug Anderson Farms

Others

California Sportfishing Protection Alliance
California-Nevada Chapter, American Fisheries Society
Coalition for a Sustainable Delta
Rancho Cordova Chamber of Commerce
Atlantic Consultants
Sacramento County Tax Payers League
Sacramento Hispanic Chamber of Commerce
Sacramento County Engineering
Sacramento Area Council of Governments
VICA