Discharge Requirements. At the time of the inspection the Facility was found to be operating improperly. As a result a Notice of Violation was issued on 3 January 2002. In response to the Notice of Violation, the Facility submitted a Summary Report on 1 February 2002 detailing corrective measures taken.

2. Based on data contained in self-monitoring reports from July 2001 through September 2006, the Facility exceeded total coliform effluent limitations numerous times. The highest recorded exceedance for total coliform monthly median was 1260 MPN/100 mL (the monthly median limitation was 23 MPN/100 mL), and several times the highest recorded daily maximum for total coliform was reported as >1600 MPN/100 mL (the daily maximum limitation was 500 MPN/100 mL).

E. Planned Changes

According to a letter to the Regional Water Board from Mr. Brent Salmi of the City of Rio Vista on 13 March 2006 regarding Rio Vista Main WWTF NPDES Permit Renewal Forms, the City is considering whether it can implement either of the following two long-term plans:

1. Redirect the Facility influent flow to the new Northwest Wastewater Treatment Facility (WWTF) site and discharge effluent to the Sacramento River at that location.

2. Add effluent filters to the existing Facility, and begin the process of attempting to stabilize the Facility site to reduce the risk of site liquefaction in the event of a major earthquake.

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in this Order are based on the applicable plans, policies, and regulations identified in section II of the Limitations and Discharge Requirements (Findings). This section provides supplemental information, where appropriate, for the plans, policies, and regulations relevant to the discharge.

A. Legal Authority

See Limitations and Discharge Requirements - Findings, Section II.C.

B. California Environmental Quality Act (CEQA)

See Limitations and Discharge Requirements - Findings, Section II.E.

C. State and Federal Regulations, Policies, and Plans

1. **Water Quality Control Plans.** The Regional Water Board adopted a *Water Quality Control Plan, Fourth Edition (Revised February 2007), for the Sacramento and San Joaquin River Basins Lake Basin* (Basin Plan) that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. In addition, State Water Board Resolution No. 88-63 requires that, with certain exceptions, the Regional Water Board assign the municipal and domestic supply use

to water bodies that do not have beneficial uses listed in the Basin Plan. The beneficial uses of the Sacramento River within the Sacramento-San Joaquin Delta downstream of the discharge are municipal and domestic supply, agricultural irrigation, agricultural stock watering, industrial process supply, industrial service supply, water contact recreation, other non-contact water recreation, warm freshwater habitat, cold freshwater habitat, migration of aquatic organisms (cold and warm), warm spawning habitat, wildlife habitat, and navigation.

The Basin Plan on page II-1.00 states: "*Protection and enhancement of existing and potential beneficial uses are primary goals of water quality planning...*" and with respect to disposal of wastewaters states that "*...disposal of wastewaters is [not] a prohibited use of waters of the State; it is merely a use which cannot be satisfied to the detriment of beneficial uses.*"

The federal CWA section 101(a)(2), states: "*it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and for recreation in and on the water be achieved by July 1, 1983.*" Federal Regulations, developed to implement the requirements of the CWA, create a rebuttable presumption that all waters be designated as fishable and swimmable. Federal Regulations, 40 CFR 131.2 and 131.10, require that all waters of the State regulated to protect the beneficial uses of public water supply, protection and propagation of fish, shell fish and wildlife, recreation in and on the water, agricultural, industrial and other purposes including navigation. Section 131.3(e), 40 CFR, defines existing beneficial uses as those uses actually attained after November 28, 1975, whether or not they are included in the water quality standards. Federal Regulation, 40 CFR 131.10 requires that uses be obtained by implementing effluent limitations, requires that all downstream uses be protected and states that in no case shall a state adopt waste transport or waste assimilation as a beneficial use for any waters of the United States.

2. **Thermal Plan.** The State Water Board adopted a *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Water and Enclosed Bays and Estuaries of California* (Thermal Plan) on 18 May 1972, and amended this plan on 18 September 1975. This plan contains temperature objectives for surface waters. Since the Facility discharges to the Sacramento-San Joaquin Delta, the Thermal Plan is applicable to the discharge. Requirements of this Order implement the Thermal Plan.

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

   The Bay-Delta Plan attempts to create a management plan that is acceptable to the stakeholders while at the same time is protective of beneficial uses of the Sacramento-San Joaquin Delta. The State Water Board adopted Decision 1641 (D-1641) on 29 December 1999. D-1641 implements flow objectives for the Bay-Delta

Estuary, approves a petition to change points of diversion of the Central Valley Project and the State Water Project in the Southern Delta, and approves a petition to change places of use and purposes of use of the Central Valley Project. The water quality objectives of the Bay-Delta Plan are implemented as part of this Order.

4. **Antidegradation Policy.** Section 131.12 requires that the state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing water quality be maintained unless degradation is justified based on specific findings. The Regional Water Board's Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies. As discussed in detail in the Fact Sheet (Attachment F, Section IV.D.4.) the discharge is consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Board Resolution 68-16.

5. **Anti-Backsliding Requirements.** Sections 402(o)(2) and 303(d)(4) of the CWA and federal regulations at title 40 CFR 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require that effluent limitations in a reissued permit must be as stringent as those in the previous permit, with some exceptions in which limitations may be relaxed. Compliance with the anti-backsliding requirements is discussed in Section IV.D.3.

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

   The most recent toxic chemical data report does not indicate any reportable off-site releases or discharges to the collection system for this Facility. Therefore, a reasonable potential analysis based on information from Emergency Planning and Community Right to Know Act (EPCRA) cannot be conducted. Based on information from EPCRA, there is no reasonable potential to cause or contribute to an excursion above any numeric water quality objectives included within the Basin Plan or in any State Water Board plan, so no effluent limitations are included in this permit pursuant to CWC section 13263.6(a).

   However, as detailed elsewhere in this Order, available effluent data indicate that there are constituents present in the effluent that have a reasonable potential to

cause or contribute to exceedances of water quality standards and require inclusion of effluent limitations based on federal and state laws and regulations.

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

D. Impaired Water Bodies on CWA 303(d) List

1. Under Section 303(d) of the 1972 Clean Water Act, states, territories and authorized tribes are required to develop lists of water quality limited segments. The waters on these lists do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. On 30 November 2006 USEPA gave final approval to California's 2006 Section 303(d) List of Water Quality Limited Segments. The Basin Plan references this list of Water Quality Limited Segments (WQLSs), which are defined as "*...those sections of lakes, streams, rivers or other fresh water bodies where water quality does not meet (or is not expected to meet) water quality standards even after the application of appropriate limitations for point sources (40 CFR 130, et seq.).*" The Basin Plan also states, "*Additional treatment beyond minimum federal standards will be imposed on dischargers to [WQLSs]. Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment.*" The listing for Delta Waterways (western portion) includes: chlorpyrifos, DDT, diazinon, electrical conductivity, exotic species, group A pesticides, mercury, and unknown toxicity.

2. **Total Maximum Daily Loads.** The USEPA requires the Regional Water Board to develop total maximum daily loads (TMDLs) for each 303(d) listed pollutant and water body combination. TMDLs for the Sacramento – San Joaquin Delta are currently being developed for diazinon, chlorpyrifos, and mercury. This Order may be reopened to apply applicable water quality-based effluent limitations upon the completion of these TMDLs.

E. Other Plans, Policies and Regulations

1. The discharge authorized herein and the treatment and storage facilities associated with the discharge of treated municipal wastewater, except for discharges of residual sludge and solid waste, are exempt from the requirements of Title 27, California Code of Regulations (CCR), section 20005 *et seq.* (hereafter Title 27). The exemption, pursuant to Title 27 CCR section 20090(a), is based on the following:

   a. The waste consists primarily of domestic sewage and treated effluent;

b. The waste discharge requirements are consistent with water quality objectives; and

c. The treatment and storage facilities described herein are associated with a municipal wastewater treatment plant.

IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

Effluent limitations and toxic and pretreatment effluent standards established pursuant to Sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 304 (Information and Guidelines), and 307 (Toxic and Pretreatment Effluent Standards) of the Clean Water Act (CWA) and amendments thereto are applicable to the discharge.

The Federal CWA mandates the implementation of effluent limitations that are as stringent as necessary to meet water quality standards established pursuant to state or federal law [33 U.S.C., § 1311(b)(1)(C); 40 CFR 122.44(d)(1)]. NPDES permits must incorporate discharge limits necessary to ensure that water quality standards are met. This requirement applies to narrative criteria as well as to criteria specifying maximum amounts of particular pollutants. Pursuant to Federal Regulations, 40 CFR 122.44(d)(1)(i), NPDES permits must contain limits that control all pollutants that "*are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality.*" Federal Regulations, 40 CFR 122.44(d)(1)(vi), further provide that "[w]*here a state has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits.*"

The CWA requires point source discharges to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. There are two principal bases for effluent limitations: 40 CFR 122.44(a) requires that permits include applicable technology-based limitations and standards, and 40 CFR 122.44(d) requires that permits include water quality-based effluent limitations to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water where numeric water quality objectives have not been established. The Regional Water Board's Basin Plan, page IV-17.00, contains an implementation policy ("Policy for Application of Water Quality Objectives") that specifies that the Regional Water Board "*will, on a case-by-case basis, adopt numerical limitations in orders which will implement the narrative objectives.*" This Policy complies with 40 CFR 122.44(d)(1). With respect to narrative objectives, the Regional Water Board must establish effluent limitations using one or more of three specified sources, including (1) USEPA's published water quality criteria, (2) a proposed state criterion (*i.e.*, water quality objective) or an explicit state policy interpreting its narrative water quality criteria (*i.e.*, the Regional Water Board's "Policy for Application of Water Quality Objectives")(40 CFR 122.44(d)(1) (vi) (A), (B) or (C)), or (3) an indicator parameter. The Basin Plan contains a narrative objective requiring that: "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental*

physiological responses in human, plant, animal, or aquatic life" (narrative toxicity objective). The Basin Plan requires the application of the most stringent objective necessary to ensure that surface water and groundwater do not contain chemical constituents, discoloration, toxic substances, radionuclides, or taste and odor producing substances that adversely affect beneficial uses. The Basin Plan states that material and relevant information, including numeric criteria, and recommendations from other agencies and scientific literature will be utilized in evaluating compliance with the narrative toxicity objective. The Basin Plan also limits chemical constituents in concentrations that adversely affect surface water beneficial uses. For waters designated as municipal, the Basin Plan specifies that, at a minimum, waters shall not contain concentrations of constituents that exceed Maximum Contaminant Levels (MCL) of CCR Title 22. The Basin Plan further states that, to protect all beneficial uses, the Regional Water Board may apply limits more stringent than MCLs.

A. Discharge Prohibitions

1. As stated in section I.G of Attachment D, Standard Provisions, this Order prohibits bypass from any portion of the treatment facility. Federal Regulations, 40 CFR 122.41 (m), define "bypass" as the intentional diversion of waste streams from any portion of a treatment facility. This section of the Federal Regulations, 40 CFR 122.41 (m)(4), prohibits bypass unless it is unavoidable to prevent loss of life, personal injury, or severe property damage. In considering the Regional Water Board's prohibition of bypasses, the State Water Board adopted a precedential decision, Order No. WQO 2002-0015, which cites the Federal Regulations, 40 CFR 122.41(m), as allowing bypass only for essential maintenance to assure efficient operation.

B. Technology-Based Effluent Limitations

1. Scope and Authority

Regulations promulgated in section 125.3(a)(1) require technology-based effluent limitations for municipal dischargers to be placed in NPDES permits based on Secondary Treatment Standards or Equivalent to Secondary Treatment Standards.

The Federal Water Pollution Control Act Amendments of 1972 (PL 92-500) established the minimum performance requirements for POTWs [defined in section 304(d)(1)]. Section 301(b)(1)(B) of that Act requires that such treatment works must, as a minimum, meet effluent limitations based on secondary treatment as defined by the USEPA Administrator.

Based on this statutory requirement, USEPA developed secondary treatment regulations, which are specified in Part 133. These technology-based regulations apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by secondary treatment in terms of biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH.

2. Applicable Technology-Based Effluent Limitations

a. **BOD_5 and TSS.** Federal Regulations, 40 CFR Part 133, establish the minimum weekly and monthly average level of effluent quality attainable by secondary treatment for BOD_5 and TSS. A daily maximum effluent limitation for BOD_5 and TSS is also included in the Order to ensure that the treatment works are not organically overloaded and operate in accordance with design capabilities. In addition, 40 CFR 133.102, in describing the minimum level of effluent quality attainable by secondary treatment, states that the 30-day average percent removal shall not be less than 85 percent. This Order contains a limitation requiring an average of 85 percent removal of BOD_5 and TSS over each calendar month.

In Order No. 5-01-178 mass loading limitations for BOD_5 and TSS were calculated using an average daily discharge flow of 0.65 mgd (applicable May through October) and a peak wet weather flow (PWWF) of 2.3 mgd (applicable November through April). This Order retains these mass loading limits.

b. **pH.** Federal Regulations, 40 CFR Part 133, also establish technology-based effluent limitations for pH. The secondary treatment standards require the pH of the effluent to be no lower than 6.0 and no greater than 9.0 standard units.

c. **Flow.** The Facility was designed to provide a secondary level of treatment for an average dry weather flow of 0.65 mgd and a peak wet weather flow of 2.3 mgd. Therefore, this Order contains an average daily discharge flow limitation of 0.65 mgd that is applicable May-October and an average daily discharge flow limitation of 2.3 mgd that is applicable November-April.

Summary of Technology-based Effluent Limitations
Discharge Point No. 001

Table F-4. Summary of Technology-based Effluent Limitations

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow	mgd	--	--	0.65[2]	--	--
Flow	mgd	--	--	2.3[3]	--	--
Biochemical Oxygen Demand, 5-day @ 20°C (BOD_5)[1]	mg/L	30	45	60	--	--
	lbs/day[2]	163	244	326	--	--
	lbs/day[3]	575	863	1151	--	--
Total Suspended Solids (TSS)[1]	mg/L	30	45	60	--	--
	lbs/day[2]	163	244	326	--	--
	lbs/day[3]	575	863	1151	--	--
pH	SU	--	--	--	6.0[4]	9.0[4]

[1] The average monthly percent removal of BOD 5-day 20°C and total suspended solids shall not be less than 85 percent.
[2] Based on a design average dry weather flow capacity of 0.65 mgd (applicable May-Oct).

[3] Based on a design peak wet weather flow capacity of 2.3 mgd (applicable Nov-Apr).
[4] More stringent water quality-based effluent limitations for pH are applied in this Order.

C. Water Quality-Based Effluent Limitations (WQBELs)

1. Scope and Authority

As specified in section 122.44(d)(1)(i), permits are required to include WQBELs for pollutants (including toxicity) that are or may be discharged at levels that cause, have reasonable potential to cause, or contribute to an in-stream excursion above any state water quality standard. The process for determining reasonable potential and calculating WQBELs when necessary is intended to protect the designated uses of the receiving water as specified in the Basin Plan, and achieve applicable water quality objectives and criteria that are contained in other state plans and policies, or any applicable water quality criteria contained in the CTR and NTR.

2. Applicable Beneficial Uses and Water Quality Criteria and Objectives

a. **Receiving Water.** The Discharger discharges to the Sacramento River within the Sacramento-San Joaquin Delta. The beneficial uses of the Sacramento-San Joaquin Delta are summarized in Section III of this Fact Sheet.

b. **Hardness.** While no effluent limitation for hardness is necessary in this Order, hardness is critical to the assessment of the need for, and the development of, effluent limitations for certain metals. The *California Toxics Rule* and the *National Toxics Rule* contain water quality criteria for seven metals that vary as a function of hardness, the lower the hardness, the lower the water quality criteria. The hardness-dependent metal criteria include cadmium, copper, chromium III, lead, nickel, silver, and zinc.

Effluent limitations for the discharge must be set to protect the beneficial uses of the receiving water for all discharge conditions. In the absence of the option of including condition-dependent, "floating" effluent limitations that are reflective of actual hardness conditions at the time of discharge, effluent limitations must be set using a reasonable worst-case condition in order to protect beneficial uses for all discharge conditions. The SIP does not address how to determine hardness for application to the equations for the protection of aquatic life when using hardness-dependent metals criteria. It simply states, in Section 1.2, that the criteria shall be properly adjusted for hardness using the hardness of the receiving water. The CTR requires that, for waters with a hardness of 400 mg/L (as $CaCO_3$), or less, the actual ambient hardness of the surface water must be used. It further requires that the hardness values used must be consistent with the design discharge conditions for design flows and mixing zones.[1] The CTR does not define whether the term "ambient," as applied in the regulations, necessarily requires the consideration of upstream as opposed to downstream hardness conditions.

[1] See 40 CFR 131.38(c)(4)(i)

The point in the receiving water affected by the discharge is downstream of the discharge. As the effluent mixes with the receiving water, the hardness of the receiving water can change. Therefore, it is appropriate to use the ambient hardness downstream of the discharge that is a mixture of the effluent and receiving water for the determination of the CTR hardness-dependent metals criteria. Recent studies indicate that using the lowest recorded receiving water hardness for establishing water quality criteria is not always protective of the receiving water under various mixing conditions (e.g. when the effluent hardness is less than the receiving water hardness). The studies evaluated the relationships between hardness and the CTR metals criterion that is calculated using the CTR metals equation. The equation describing the total recoverable regulatory criterion, as established in the CTR, is as follows:

$$\text{CTR Criterion} = e^{m[\ln(H)]+b} \qquad \text{(Equation 1)}$$

Where:

H = Hardness
b = metal- and criterion-specific constant
m = metal- and criterion-specific constant

The constants "m" and "b" are specific to both the metal under consideration, and the type of total recoverable criterion (i.e. acute or chronic). The metal-specific values for these constants are provided in the CTR at paragraph (b)(2), Table 1.

The relationship between hardness and the resulting criterion in Equation 1 can exhibit either a downward-facing (i.e., concave downward) or an upward-facing (i.e., concave upward) curve depending on the values of the criterion-specific constants. The curve shapes for acute and chronic criteria for the metals are as follows:

Concave Downward: cadmium (chronic), chromium (III), copper, nickel, and zinc

Concave Upward: cadmium (acute), lead, and silver (acute)

For those contaminants where the regulatory criteria exhibit a concave downward relationship as a function of hardness, use of the lowest recorded effluent hardness for establishment of water quality objectives is fully protective of all beneficial uses regardless of whether the effluent or receiving water hardness is higher. Use of the lowest recorded effluent hardness is also protective under all possible mixing conditions between the effluent and the receiving water (i.e., from high dilution to no dilution). Therefore, for cadmium (chronic), chromium (III), copper, nickel, and zinc, the reasonable worst-case ambient hardness can be estimated by using the lowest effluent hardness. The water quality criteria for these metals were calculated for this Order using Equation 1 and a reported

minimum effluent hardness of 78 mg/L as $CaCO_3$, based on six samples taken between January 2002 and January 2007.

For those metals where the regulatory criteria exhibit a concave upward relationship as a function of hardness, a water quality objective based on either the effluent hardness or the receiving water hardness alone, would not be protective under all mixing scenarios. Instead, both the hardness of the receiving water and the effluent is required to determine the reasonable worst-case ambient hardness. The following equation provides fully protective water quality criteria for those metals that exhibit a concave upward relationship.

$$\text{CTR Criterion} = \left[\frac{m}{H_{rw}} \cdot \left(H_{eff} - H_{rw}\right) + 1\right] \cdot e^{m \cdot \ln(H_{rw}) + b} \qquad \text{(Equation 2)}$$

Where:

H_{eff} = Effluent hardness
H_{rw} = Receiving water hardness
b = metal- and criterion-specific constant
m = metal- and criterion-specific constant

Therefore, for cadmium (acute), lead, and silver (acute) water quality criteria were calculated using Equation 2 with a lowest reported effluent hardness of 78 mg/L as $CaCO_3$ and a highest reported receiving water hardness of 100 mg/L as $CaCO_3$, based on four samples taken between January 2002 and December 2002.

c. **Assimilative Capacity/Mixing Zone.** The CWA directs states to adopt water quality standards to protect the quality of its waters. USEPA's current water quality standards regulation authorizes states to adopt general policies, such as mixing zones, to implement state water quality standards (40 CFR 122.44 and 122.45). The USEPA allows states to have broad flexibility in designing its mixing zone policies. Primary policy and guidance on determining mixing zone and dilution credits is provided by the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California* (State Implementation Policy or SIP) and the Basin Plan. If no procedure applies in the SIP or the Basin Plan, then the Regional Water Board may use the USEPA *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001) (TSD).

The allowance of mixing zones by the Regional Water Board is discussed in the Basin Plan, Policy for Application of Water Quality Objectives, which states in part, "*In conjunction with the issuance of NPDES and storm water permits, the Regional Board may designate mixing zones within which water quality objectives will not apply provided the discharger has demonstrated to the satisfaction of the Regional Board that the mixing zone will not adversely impact beneficial uses. If allowed, different mixing zones may be designated for different*

types of objectives, including, but not limited to, acute aquatic life objectives, chronic aquatic life objectives, human health objectives, and acute and chronic whole effluent toxicity objectives, depending in part on the averaging period over which the objectives apply. In determining the size of such mixing zones, the Regional Board will consider the applicable procedures and guidelines in the EPA's Water Quality Standards Handbook and the [TSD]. Pursuant to EPA guidelines, mixing zones designated for acute aquatic life objectives will generally be limited to a small zone of initial dilution in the immediate vicinity of the discharge."

Section 1.4.2 of the SIP states, in part, "*...with the exception of effluent limitations derived from TMDLs, in establishing and determining compliance with effluent limitations for applicable human health, acute aquatic life, or chronic aquatic life priority pollutant criteria/objectives or the toxicity objective for aquatic life protection in a basin plan, the Regional Board may grant mixing zones and dilution credits to dischargers ... The applicable priority pollutant criteria and objectives are to be met throughout a water body except within any mixing zone granted by the Regional Board. The allowance of mixing zones is discretionary and shall be determined on a discharge-by-discharge basis. The Regional Board may consider allowing mixing zones and dilution credits only for discharges with a physically identifiable point of discharge that is regulated through an NPDES permit issued by the Regional Board.*"

For completely-mixed discharges, the Regional Water Board may grant a mixing zone and apply a dilution credit in accordance with Section 1.4.2.1 of the SIP. For incompletely-mixed discharges, the Discharger must perform a mixing zone study to demonstrate to the Regional Water Board that a dilution credit is appropriate. In granting a mixing zone, the SIP states that a mixing zone shall be as small as practicable, and meet the conditions provided in Section 1.4.2.2 as follows:

"*A mixing zone shall be as small as practicable. The following conditions must be met in allowing a mixing zone:*

A: A mixing zone shall not:

(1) compromise the integrity of the entire water body;
(2) cause acutely toxic conditions to aquatic life passing through the mixing zone;
(3) restrict the passage of aquatic life;
(4) adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws;
(5) produce undesirable or nuisance aquatic life;
(6) result in floating debris, oil, or scum;
(7) produce objectionable color, odor, taste, or turbidity;
(8) cause objectionable bottom deposits;
(9) cause nuisance;

(10) dominate the receiving water body or overlap a mixing zone from different outfalls; or

(11) be allowed at or near any drinking water intake. A mixing zone is not a source of drinking water. To the extent of any conflict between this determination and the Sources of Drinking Water Policy (Resolution No. 88-63), this SIP supersedes the provisions of that policy."

In Order No. 5-01-178, based on flow data at Rio Vista from the Department of Water Resources Delta Modeling Section, the worst case conditions for dilution were considered at the flow of the Sacramento River of 1,000 cfs. At the permitted design flow of 0.65 mgd (1.0 cfs), a minimum dilution was considered to be equal to 1,000 to 1. Although the 1,000 to 1 dilution was used to perform the reasonable potential analysis and to derive effluent limitations for several constituents, the previous Order states that "*...a dilution study that accurately defines the 30-day average dilution ratio that takes into account the tidal and seasonal dynamics of the area has not been conducted*". Therefore, Order No. 5-01-178 required the Discharger to conduct "*...a dilution/mixing zone study to address, but not limited to, whether the discharge is completely or incompletely mixed and mixing zone conditions*". A Dilution/Mixing Zone Study Workplan was prepared and subsequently approved by the Regional Water Board on 26 February 2002. Effluent mixing was to be evaluated using hydrodynamic computer modeling and dye tracer studies.

The outfall consists of an 18-inch diameter pipe, which discharges 77 feet from shore at an average depth of 18.5 feet. The Sacramento River at the point of discharge is approximately 2,300 feet wide. ECO:LOGIC Engineering conducted a dilution study using CORMIX computer modeling and developed a report titled *City of Rio Vista Main Wastewater Treatment Plant Dilution/Mixing Zone Study, Hydrodynamic Model of Wastwater Effluent Plume in the Sacramento River*, dated 1 April 2004. The study demonstrated that within a mixing zone 250 feet (upstream and downstream) x 40 feet, the maximum effluent concentration was 4.76% (i.e. > 20:1 dilution). The plume is estimated to never get closer than 57 feet to the shoreline. This area has been established as the acute and chronic mixing zone. This is a small mixing zone as compared to the entire river width of 2,300 feet. To better monitor compliance at the edge of the mixing zone, the location of the upstream and downstream monitoring locations are located 250 feet from the discharge point.

The Sacramento River in the vicinity of the discharge is tidally influenced, resulting in flow reversals. With flow reversals, some volume of river water is multiple dosed with the effluent as the river flows downstream past the discharge, reverses moving upstream past the discharge a second time, then again reverses direction and passes the discharge point a third time as it moves down the river. A particular volume of river water may move back and forth, past the discharge point many times due to tidal action, each time receiving an additional load of wastewater. CORMIX was not developed to account for multiple dosing that may occur in tidal zones. Therefore, a very conservative approach was

employed by ECO:LOGIC Engineering to account for the multiple dosing affects. The study states the following:

> "Cormix is intended primarily for the modeling of steady-state operational conditions and one-time flow reversals. However, in the case of the Rio Vista Main WWTP discharge into the Sacramento River, it is estimated that under critical low river flow conditions a parcel of water could pass over the outfall up to about 13 times (over the course of about three days). This is because of the large magnitude of the tidally-induced flows compared to the net downstream river flows under critical low river flow conditions. Therefore, some accounting for these additional does of effluent beyond the "one-time" flow reversal capabilities of the Cormix model was necessary to allow for proper modeling.
>
> "Because of the timing, turbulence, and traverse of these multiple tidal flows, the earlier does of effluent become dispersed over much of the river width while the last two does at the final flow reversal will have dispersed very little beyond the river's area (cross-sectional) over the outfall. It is assumed that the 11 earlier doses preceding the final two effluent does will have dispersed to a net/average effect of those earlier doses being uniformly dispersed in roughly one-third of the river cross section that includes the outfall. In other words, 11 does of effluent (at effluent flows commensurate with low river flows) are diluted into on-third of the river flow, and this constitutes a "background percentage" of effluent already in the river water at the time of the most critical two effluent doses occurring at the final tidally induced flow reversal. This "background percentage" of effluent in the river flow from the first 11 doses of effluent is estimated to be 1.3 percent. An effluent concentration of 1.3 percent was, therefore, added to the results obtained from the Cormix model for the outfall."

This approach to account for multiple dosing is very conservative and likely over estimates the effluent concentrations in the river.

Based on the results of the study, a dilution credit of 20:1 is allowed for compliance with acute and chronic aquatic life criteria. For long-term human health criteria, the dilution credit of 1000:1 allowed in the previous Order has been carried forward and is allowed for compliance with human health criteria. This is appropriate, because for long-term human health criteria, the environmental effects are expected to occur far downstream of the discharge point where the discharge is completely mixed. The minimum Sacramento River flow during critical conditions is 1000 cfs. Since the effluent flow limit is 0.65 mgd (~1 cfs), a dilution credit of 1000:1 for human health criteria is appropriate.

The mixing zone is as small as practicable, will not compromise the integrity of the entire water body, restrict the passage of aquatic life, dominate the waterbody or overlap existing mixing zones from different outfalls. The mixing zone is very small relative to the large size or the receiving water (less than 2% of the river width, only 40 feet wide by 250 feet in length). The mixing zone is

approximately 9 miles from the nearest drinking water intake and does not overlap a mixing zone from a different outfall.

The discharge will not cause acutely toxic conditions to aquatic life passing through the mixing zone, because the proposed Order requires compliance with an acute toxicity effluent limitation and requires acute bioassays using 100% effluent. Compliance with the acute toxicity effluent limitation assures the effluent is not acutely toxic.

The discharge will not adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws, because the mixing zone is very small and acutely toxic conditions will not occur in the mixing zone.

The discharge will not produce undesirable or nuisance aquatic life, result in floating debris, oil, or scum, produce objectionable color, odor, taste, or turbidity, cause objectionable bottom deposits, or cause nuisance, because the proposed Order requires end-of-pipe effluent limitations (e.g. for biochemical oxygen demand, total suspended solids, and settleable solids) and discharge prohibitions to prevent these conditions from occurring.

As suggested by the SIP, in determining the extent of or whether to allow a mixing zone and dilution credit, the Regional Water Board has considered the presence of pollutants in the discharge that are carcinogenic, mutagenic, teratogenic, persistent, bioaccumulative, or attractive to aquatic organisms, and concluded that the allowance of the mixing zone and dilution credit is adequately protective of the beneficial uses of the receiving water.

The mixing zone therefore complies with the SIP. The mixing zone also complies with the Basin Plan, which requires that the mixing zone not adversely impact beneficial uses. Beneficial uses will not be adversely affected for the same reasons discussed above. In determining the size of the mixing zone, the Regional Water Board has considered the procedures and guidelines in the EPA's Water Quality Standards Handbook, 2d Edition (updated July 2007), Section 5.1, and Section 2.2.2 of the Technical Support Document for Water Quality-based Toxics Control (TSD). The SIP incorporates the same guidelines. The mixing zone is limited to a small zone of initial dilution in the immediate vicinity of the discharge. The TSD indicates that this limitation achieves the objectives of preventing lethality to passing organisms and preventing significant human health risks.

3. Determining the Need for WQBELs

a. CWA section 301 (b)(1) requires NPDES permits to include effluent limitations that achieve technology-based standards and any more stringent limitations necessary to meet water quality standards. Water quality standards include Regional Water Board Basin Plan beneficial uses and narrative and numeric water quality objectives, State Water Board-adopted standards, and federal

standards, including the CTR and NTR. The Basin Plan includes numeric site-specific water quality objectives and narrative objectives for toxicity, chemical constituents, and tastes and odors. The narrative toxicity objective states: "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*" (Basin Plan at III-8.00.) With regards to the narrative chemical constituents objective, the Basin Plan states that waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. At minimum, "*...water designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs)*" in Title 22 of CCR. The narrative tastes and odors objective states: "*Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses.*"

b. Federal regulations require effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numerical water quality standard. Based on information submitted as part of the application, in studies, and as directed by monitoring and reporting programs, the Regional Water Board finds that the discharge has a reasonable potential to cause or contribute to an in-stream excursion above a water quality standard for aluminum, ammonia, arsenic, chlorine residual, coliform, copper, dibromochloromethane, dichlorobromomethane, salinity (including chloride, electrical conductivity, and total dissolved solids), iron, lead, manganese, nitrate, nitrite, and pH. Water quality-based effluent limitations (WQBELs) for these constituents are included in this Order. A summary of the reasonable potential analysis (RPA) is provided in Attachment G, and a detailed discussion of the RPA for each constituent is provided below.

c. The Regional Water Board conducted the RPA in accordance with Section 1.3 of the SIP. Although the SIP applies directly to the control of CTR priority pollutants, the State Water Board has held that the Regional Water Board may use the SIP as guidance for water quality-based toxics control. The SIP states in the introduction "*The goal of this Policy is to establish a standardized approach for permitting discharges of toxic pollutants to non-ocean surface waters in a manner that promotes statewide consistency.*" Therefore, in this Order the RPA procedures from the SIP were used to evaluate reasonable potential for both CTR and non-CTR constituents.

d. WQBELs were calculated in accordance with section 1.4 of the SIP, as described in Attachment F, Section IV.C.4. All calculations for the final effluent limitations are detailed in Attachment G.

e. **Aluminum.** For protection of freshwater aquatic life, the Regional Water Board in the past has used USEPA's criteria for prevention of acute and chronic toxicity to implement the Basin Plan's narrative toxicity objective for aluminum. The

recommended four-day average (chronic) and one-hour average (acute) criteria for aluminum are 87 µg/L and 750 µg/L, respectively, for waters with a pH of 6.5 to 9.0. The most stringent of these criteria is the chronic criterion of 87 ug/L. This criterion is based on studies conducted on waters with low pH (6.5 to 6.8 pH units) and hardness (<10 mg/L as $CaCO_3$), conditions not commonly observed in Central Valley receiving waters like the Sacramento River. Thus, the criterion is likely overly protective for this application. For similar reasons, the Utah Department of Environmental Quality (Department) only applies the 87 µg/L chronic criterion for aluminum where the pH is less than 7.0 and the hardness is less than 50 mg/L as $CaCO_3$ in the receiving water after mixing. For conditions where the pH equals or exceeds 7.0 and the hardness is equal to or exceeds 50 mg/L as CaCO3, the Department regulates aluminum based on the 750 µg/L acute criterion. Therefore, in the case of the Sacramento River where the pH is greater than 7 standard units and the hardness is greater than 50 mg/L as $CaCO_3$, it is unlikely that application of the stringent chronic criteria (87µg/L) is necessary to protect aquatic life. Therefore, based on best professional judgment, only the acute criterion (750 µg/L) has been applied in this Order.

The MEC for aluminum was 98 µg/L, based on 34 samples collected between October 2005 and March 2008, while the maximum observed upstream receiving water aluminum concentration was 800 µg/L, based on three samples collected between January 2002 and September 2002. The receiving water exceeds the recommended one-hour average (acute) NAWQC criteria for aluminum of 750 µg/L, indicating there is no assimilative capacity. Therefore, this Order includes an average monthly effluent limitation (AMEL) and maximum daily effluent limitation (MDEL) for aluminum of 411 µg/L and 750 µg/L, respectively.

The Basin Plan also includes a chemical constituent objective that states:
At a minimum, water designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs) specified in the provisions of Title 22, Table 64449-A of the California Code of Regulations.

Criteria for aluminum include the following:

Source	Criteria (ug/L)
California Primary MCL	1000
California Secondary MCL	200

The Sacramento River has the designated beneficial use of MUN. Based on this, the lack of available dilution information, and the above effluent data, the discharge has the reasonable potential to cause an exceedence of the Basin Plan chemical constituent objective for aluminum of 200 µg/L. This permit, therefore, includes a final average annual effluent limit of 200 µg/L for aluminum based on the MCL.

Based on the sample results in the effluent, it appears that the Discharger can immediately comply with the new effluent limitations.

f. **Ammonia.** Untreated domestic wastewater contains ammonia. Nitrification is a biological process that converts ammonia to nitrite and nitrite to nitrate. Denitrification is a process that converts nitrate to nitrite or nitric oxide and then to nitrous oxide or nitrogen gas, which is then released to the atmosphere. The Discharger does not currently use nitrification to remove ammonia from the waste stream. Inadequate or incomplete nitrification may result in the discharge of ammonia to the receiving stream. Ammonia is known to cause toxicity to aquatic organisms in surface waters. Discharges of ammonia would violate the Basin Plan narrative toxicity objective. Applying 40 CFR 122.44(d)(1)(vi)(B), it is appropriate to use USEPA's Ambient National Water Quality Criteria for the Protection of Freshwater Aquatic Life for ammonia, which was developed to be protective of aquatic organisms.

USEPA's *Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life*, for total ammonia, recommends acute (1-hour average; criteria maximum concentration or CMC) standards based on pH and chronic (30-day average, criteria continuous concentration or CCC) standards based on pH and temperature. It also recommends a maximum 4-day average concentration of 2.5 times the criteria continuous concentration. USEPA found that as pH increased, both the acute and chronic toxicity of ammonia increased. Salmonids were more sensitive to acute toxicity effects than other species. However, while the acute toxicity of ammonia was not influenced by temperature, it was found that invertebrates and young fish experienced increasing chronic toxicity effects with increasing temperature. Because the Sacramento River within the Sacramento-San Joaquin Delta has a beneficial use of cold freshwater habitat and the presence of salmonids and early fish life stages is well-documented, the recommended criteria for waters where salmonids and early life stages are present were used. USEPA's recommended criteria are shown below:

$$CCC_{30-day} = \left(\frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}} \right) \times MIN\left(2.85, 1.45 \cdot 10^{0.028(25-T)}\right), \text{ and}$$

$$CMC = \left(\frac{0.275}{1+10^{7.204-pH}} + \frac{39.0}{1+10^{pH-7.204}} \right),$$

where T is in degrees Celsius.

The maximum permitted effluent pH is 8.1. In order to protect against the worst-case short-term exposure of an organism, a pH value of 8.1 was used to derive the acute criterion. The resulting acute criterion is 4.64 mg/L, calculated with salmonids present.

There is not enough representative receiving water monitoring data to determine the chronic criterion based on the receiving water. Therefore, the maximum running 30-day average effluent temperature of 24°C (based on temperature

data from January 2003 – August 2006) and the maximum 30-day effluent pH of 7.8 (based on pH data from June 2006 – March 2008) were used to calculate the 30-day CCC. The resulting 30-day CCC is 1.73 mg/L (as N), calculated with fishes early life stages present. The 4-day average concentration is derived in accordance with the USEPA criterion as 2.5 times the 30-day CCC. Based on a 30-day CCC of 1.73 mg/L (as N), the 4-day average concentration, that should not be exceeded, is 4.33 mg/L.

The MEC for ammonia was 30 mg/L, based on 31 samples collected between August 2003 and August 2006, while the maximum observed upstream receiving water ammonia concentration was 0.3 mg/L, based on four samples collected between January 2002 and December 2002. Therefore, ammonia in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above a level necessary to protect aquatic life resulting in a violation of the Basin Plan's narrative toxicity objective.

The Regional Water Board calculates WQBELs in accordance with SIP procedures for non-CTR constituents, and ammonia is a non-CTR constituent. The SIP procedure assumes a 4-day averaging period for calculating the long-term average discharge condition (LTA). However, USEPA recommends modifying the procedure for calculating permit limits for ammonia using a 30-day averaging period for the calculation of the LTA corresponding to the 30-day chronic criteria. Therefore, while the LTAs corresponding to the acute and 4-day chronic criteria were calculated according to SIP procedures, the LTA corresponding to the 30-day chronic criteria was calculated assuming a 30-day averaging period. The lowest LTA representing the acute, 4-day, and 30-day chronic criteria is then selected as the basis for deriving the AMEL and the MDEL. The remainder of the WQBEL calculation for ammonia was performed according to the SIP procedures.

The previous Order included an interim daily maximum effluent limitation (applicable until a dilution/mixing zone study was completed) for ammonia of 89.3 mg N/L, 484 lbs/day (based on a design flow of 0.65 mgd in May through October), and 1,713 lbs/day (based on a design wet weather flow of 2.3 in November through April). Since the maximum ambient background ammonia concentration is less than the applicable criteria, the receiving water has assimilative capacity for ammonia. As discussed in Section IV.C.2.c., above, the Discharger completed a dilution/mixing zone study and a 20:1 dilution credit has been allowed for acute and chronic aquatic life criteria. Therefore, this Order contains a final AMEL and MDEL for ammonia of 35 mg/L and 91 mg/L, respectively, based on USEPA's National Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life and to assure the treatment process adequately nitrifies the waste stream to protect the aquatic habitat beneficial uses. Since ammonia is an oxygen demanding substances, this Order also contains mass effluent limitations based on the concentration-based effluent limitations.

g. **Arsenic.** The Basin Plan (Table III-1) contains a water quality objective of 10 µg/L for dissolved arsenic, which is a site-specific numeric objective applicable to the Delta. USEPA recommends conversion factors to translate dissolved concentrations to total concentrations. Since there is no dissolved-to-total metal translator available for arsenic, it was assumed that the translator is equal to 1. The MEC for total arsenic was 14 µg/L, based on 30 samples collected between October 2005 and March 2008, while the maximum observed upstream receiving water arsenic concentration was 3.1 µg/L, based on four samples collected between January 2002 and December 2002. Therefore, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the Basin Plan's site-specific water quality objective for arsenic.

The previous Order contained monthly average effluent limitations of 6.36 mg/L, 34.5 lbs/day (based on a design flow 0.65 mgd), and 122 lbs/day (based on a wet weather flow of 2.3 mgd), and daily maximum effluent limitations of 12.8 mg/L, 69.4 lbs/day (based on a flow of 0.65 mgd), and 246 lbs/day (based on a flow of 2.3 mgd). Previous limits were based on a dilution of 1,000 to 1 in the Sacramento River. Since the maximum ambient background arsenic concentration is less than the applicable criteria, the receiving water has assimilative capacity for arsenic. As discussed in Section IV.C.2.c., above, a dilution credit of 1000:1 has been allowed. Therefore, a MDEL for arsenic of 6,910 µg/L was calculated, based on the Basin Plan's site-specific objective for the Delta. However, the Regional Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilative capacity for arsenic and could violate the Antidegradation Policy. For this reason, a more stringent performance-based effluent limitation is included in this order that is calculated in the same way that interim limits are calculated (see Section IV.E.1 below). A MDEL for total arsenic of 16 µg/L is included in this Order.

h. **Bis (2-chloroethyl) ether.** The CTR includes a bis (2-chloroethyl) ether criterion of 0.031 µg/L for the protection of human health and is based on a one-in-a-million cancer risk for waters from which both water and organisms are consumed. Bis (2-chloroethyl) ether was detected, but not quantified (DNQ), in the effluent at an analytical method detection level of 0.12 µg/L, in one of four samples collected between January 2002 and December 2002, while the upstream receiving water bis (2-chloroethyl) ether concentration was not detected based on four samples collected during the same period. Since the effluent data was DNQ, there is insufficient information to determine whether the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for bis (2-chloroethyl) ether. This Order requires the Discharger to monitor the effluent quarterly to gather additional data for the RPA.

i. **Boron.** The California State Action Level for drinking water for boron is 1,000 µg/L. The MEC for boron was 1,200 µg/L, based on one sample collected on 18 August 2004, while no upstream receiving water boron data was available. Since there was not enough representative monitoring data in order to determine

reasonable potential for boron, and limiting electrical conductivity (EC) in the effluent will in part control boron, an effluent limitation will not be established for boron in this Order. However, the Facility will be required to monitor boron in the effluent and receiving water in order to collect data to determine reasonable potential for boron in the effluent to exceed water quality objectives.

j. **Chlorine Residual.** The Discharger uses chlorine for disinfection, which is extremely toxic to aquatic organisms. The Discharger dechlorinates the effluent prior to discharge to the Sacramento River. Due to the existing chlorine use and the potential for chlorine to be discharged, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the Basin Plan's narrative toxicity objective.

The USEPA *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001) contains statistical methods for converting chronic (4-day) and acute (1-hour) aquatic life criteria to average monthly and maximum daily effluent limitations based on the variability of the existing data and the expected frequency of monitoring. However, because chlorine is an acutely toxic constituent that can and will be monitored continuously, an average 1-hour limitation is considered more appropriate than an average daily limitation. Average 1-hour (0.011 mg/L) and 4-day (0.019 mg/L) limitations for chlorine, based on these criteria, are included in this Order. Based on evaluation of effluent data, the Discharger can immediately comply with these new effluent limitations for chlorine residual.

The chlorine residual limitations required in this Order are protective of aquatic organisms in the undiluted discharge. If compliance is maintained, the Regional Water Board does not anticipate residual chlorine impacts to benthic organisms.

k. **Copper.** The Basin Plan (Table III-1) contains a water quality objective of 10 µg/L for dissolved copper. The CTR includes hardness-dependent criteria for the protection of freshwater aquatic life for copper. The criteria for copper are presented in dissolved concentrations. USEPA recommends conversion factors to translate dissolved concentrations to total concentrations. The USEPA default conversion factors for copper in freshwater are 0.96 for both the acute and the chronic criteria. Using the lowest recorded hardness of the effluent (78 mg/L as $CaCO_3$) and the USEPA recommended dissolved-to-total translator, the applicable chronic criterion (maximum 4-day average concentration) is 7.5 µg/L and the applicable acute criterion (maximum 1-hour average concentration) is 11.1 µg/L, as total recoverable.

The MEC for total copper was 41 µg/L, based on five samples collected between January 2002 and December 2003, while the maximum observed upstream receiving water total copper concentration was 4.4 µg/L, based on three samples collected between January 2002 and September 2002. Therefore, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criteria and the Delta Basin Plan objective for copper. Since the maximum ambient background copper concentration is less than the applicable

criteria, the receiving water has assimilative capacity for copper. As discussed in Section IV.C.2.c., above, the Discharger completed a dilution/mixing zone study and a 20:1 dilution credit has been allowed for acute and chronic aquatic life criteria. Therefore, an AMEL and MDEL for total copper of 58 µg/L and 116 µg/L, respectively, were calculated based on CTR criteria for the protection of freshwater aquatic life.

l. **Diazinon.** The Basin Plan requires the Regional Water Board to consider relevant numerical criteria and guidelines developed by other agencies in determining compliance with the narrative toxicity objective (Basin Plan, IV-17.00). In March 2000, the California Department of Fish and Game (DFG) established acute and chronic criteria for diazinon to protect fresh water aquatic life. The acute (1-hour average) and chronic (4-day average) criteria are 0.08 µg/L and 0.05 µg/L, respectively.

From January 2002 through April 2004, the Discharger submitted the results for 15 analysis performed for diazinon. Thirteen of the 15 were reported as below analytical detection levels; of the remaining samples, one was reported detected at 0.23 µg/L and the other was reported as detected but not quantified (DNQ). The previous Order required the use of the most sensitive analytical methods for diazinon, which is EPA Method 507. The analytical methods used for the two detected values were EPA Methods 8141A and 3520C, with method detection and reporting levels higher than Method 507, and not approved for use in analyzing for diazinon. Therefore, due to the uncertainty regarding the data provided by the Discharger and the analytical methods used, no effluent limitation is being established at this time. However, due to the fact that diazinon is a 303(d) listed pollutant for the Delta waters, quarterly effluent monitoring will be required to determine if diazinon is present in the discharge, and whether controls are required prior to establishment of an applicable TMDL.

m. **Dibromochloromethane.** The CTR includes a dibromochloromethane criterion of 0.41 µg/L for the protection of human health and is based on a one-in-a-million cancer risk for waters from which both water and organisms are consumed. The MEC for dibromochloromethane was 29 µg/L, based on ten samples collected between September 2008 and January 2009, while the upstream receiving water dibromochloromethane concentration was not detected based on four samples collected between January 2002 and December 2002. Therefore, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for dibromochloromethane.

The maximum ambient background dibromochloromethane concentration is less than the applicable criteria, therefore, the receiving water has assimilative capacity for dibromochloromethane. As described in Section IV.C.2.c. of this Fact Sheet, a dilution credit of up to 1000:1 may be allowed for CTR human health criteria, which results in an AMEL and MDEL for dibromochloromethane of 230 µg/L and 463 µg/L, respectively. However, the Regional Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilative capacity for dibromochloromethane and could

violate the Antidegradation Policy. For this reason, a more stringent performance-based effluent limitation is included in this order that is calculated in the same way that interim limits are calculated (see Section IV.E.1 below). A MDEL for dibromochloromethane of 41 µg/L is included in this Order.

n. **Dichlorobromomethane.** The CTR includes a dichlorobromomethane criterion of 0.56 µg/L for the protection of human health and is based on a one-in-a-million cancer risk for waters from which both water and organisms are consumed. The MEC for dichlorobromomethane was 29 µg/L, based on ten samples collected between September 2008 and January 2009, while the upstream receiving water dichlorobromomethane concentration was not detected based on four samples collected between January 2002 and December 2002. Therefore, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for dichlorobromomethane.

The maximum ambient background dichlorobromomethane concentration is less than the applicable criteria, therefore, the receiving water has assimilative capacity for dichlorobromomethane. As described in Section IV.C.2.c. of this Fact Sheet, a dilution credit of up to 1000:1 may be allowed for CTR human health criteria, which results in an AMEL and MDEL for dichlorobromomethane of 360 µg/L and 724 µg/L, respectively. However, the Regional Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilative capacity for dichlorobromomethane and could violate the Antidegradation Policy. For this reason, a more stringent performance-based effluent limitation is included in this order that is calculated in the same way that interim limits are calculated (see Section IV.E.1 below). A MDEL for dichlorobromomethane of 38 µg/L is included in this Order.

o. **Electrical Conductivity (see Subsection for Salinity)**

p. **Iron.** The Basin Plan (Table III-1) contains a water quality objective of 300 µg/L for dissolved iron as a site-specific objective for the Delta. USEPA recommends conversion factors to translate dissolved concentrations to total concentrations. Since there is no dissolved-to-total metal translator available for iron, it was assumed that the translator is equal to 1. The MEC for iron was 1,800 µg/L, based on four samples collected between January 2002 and December 2002, while the maximum observed upstream receiving water iron concentration was 1,600 µg/L, based on four samples collected between January 2002 and December 2002. Therefore, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the Basin Plan's water quality objective for iron. Since no assimilative capacity exists, a MDEL of 300 µg/L for iron is included in this Order based on the Basin Plan's site-specific objective for the Delta.

Based on the sample results for the effluent, the limitations appear to put the Discharger in immediate non-compliance. New or modified control measures may be necessary in order to comply with the effluent limitations, and the new or modified control measures cannot be designed, installed and put into operation

within 30 calendar days. Furthermore, the effluent limitations for iron are a new regulatory requirement within this permit, which becomes applicable to the waste discharge with the adoption of this Order, which was adopted after 1 July 2000. Therefore, a compliance time schedule for compliance with the iron effluent limitations is established in TSO No. R5-2008-0109 in accordance with CWC section 13300, that requires preparation and implementation of a pollution prevention plan in compliance with CWC section 13263.3.

q. **Lead**. The CTR includes hardness-dependent standards for the protection of freshwater aquatic life for lead. The standards for metals are presented in dissolved concentrations. USEPA recommends conversion factors to translate dissolved concentrations to total concentrations. The conversion factors for lead in freshwater are 1.46203-[0.145712 X ln(hardness)] for both the acute and the chronic criteria. Using the lowest recorded hardness of the effluent (78 mg/L) and the highest recorded hardness of the receiving water (100 mg/L), the applicable chronic criterion (maximum 4-day average concentration) is 2.3 µg/L and the applicable acute criterion (maximum 1-hour average concentration) is 58.8 µg/L, as total recoverable.

The MEC for total lead was 2.3 µg/L, based on five samples collected between January 2002 and December 2003, while the maximum observed upstream receiving water total lead concentration was 0.52 µg/L, based on three samples collected between January 2002 and September 2002. Therefore, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criteria for lead.

Since the maximum ambient background lead concentration is less than the applicable criteria, the receiving water has assimilative capacity for lead. As discussed in Section IV.C.2.c., above, the Discharger completed a dilution/mixing zone study and a 20:1 dilution credit has been allowed for acute and chronic aquatic life criteria. Therefore, an AMEL and MDEL for total lead of 49 µg/L and 98 µg/L, respectively, were calculated based on CTR criteria for the protection of freshwater aquatic life. However, the Regional Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilative capacity for the CTR aquatic life criteria for lead and could violate the Antidegradation Policy. For this reason, a more stringent performance-based effluent limitation is included in this order that is calculated in the same way that interim limits are calculated (see Section IV.E.1 below). A MDEL for total lead of 7.2 µg/L is included in this Order.

r. **Manganese.** The Basin Plan (Table III-1) contains a water quality objective of 50 µg/L for dissolved manganese which is a site-specific numeric objective applicable to the Delta. USEPA recommends conversion factors to translate dissolved concentrations to total concentrations. Since there is no dissolved-to-total metal translator available for manganese, it was assumed that the translator is equal to 1. The MEC for manganese was 150 µg/L, based on five samples collected between January 2002 and December 2002, while the maximum observed upstream receiving water manganese concentration was 33 µg/L,

based on three samples collected between January 2002 and September 2002. Therefore, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the Basin Plan's water quality objective for manganese.

The maximum ambient background manganese concentration is less than the applicable criteria, therefore, the receiving water has assimilative capacity for manganese. As described in Section IV.C.2.c. of this Fact Sheet, a dilution credit of up to 1000:1 may be allowed, which results in a MDEL for manganese of 1,750 µg/L, based on the Basin Plan's Delta site specific water quality objective for manganese. However, the Regional Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilative capacity for manganese and could violate the Antidegradation Policy. For this reason, a more stringent performance-based effluent limitation is included in this order that is calculated in the same way that interim limits are calculated (see Section IV.E.1 below). A MDEL for total manganese of 467 µg/L is included in this Order.

s. **Mercury.** The current USEPA Ambient Water Quality Criteria for Protection of Freshwater Aquatic Life, criteria continuous concentration, for mercury is 0.77 µg/L (30-day average, chronic criteria). The CTR contains a human health criterion of 0.050 µg/L for waters from which both water and aquatic organisms are consumed. Both values are controversial and subject to change. In 40 CFR Part 131, USEPA acknowledges that the human health criteria may not be protective of some aquatic or endangered species and that "*...more stringent mercury limits may be determined and implemented through use of the State's narrative criterion.*" In the CTR, USEPA reserved the mercury criteria for freshwater and aquatic life and may adopt new criteria at a later date.

The MEC for mercury was 0.043 µg/L based on 16 samples collected between August 2003 and August 2006, while the maximum observed upstream receiving water concentration was 0.026 µg/L, based on four samples collected between 30 January 2002 and 18 December 2002. Therefore, no reasonable potential exists to exceed the CTR criterion.

The Sacramento River within the Sacramento-San Joaquin Delta Waterways (western portion) has been listed as an impaired water body pursuant to Section 303(d) of the Clean Water Act because of mercury. Mercury bioaccumulates in fish tissue and, therefore, the discharge of mercury to the receiving water is likely to contribute to exceedances of the narrative toxicity objective and impacts on beneficial uses. Because the Facility discharges to an impaired water body for mercury, the discharge must not cause or contribute to increased mercury levels.

Due to the concern with bioaccumulation and the impaired condition of the Delta, the previous Order recommended an interim performance-based loading limit for mercury to keep the discharge at current levels. However, there was insufficient data to calculate the limit. The Discharger has been collecting total mercury effluent data and this Order contains an interim performance-based mass effluent

limitation of 0.0071 lbs/month for mercury. This limitation is based on maintaining the mercury loading at the current level until a total maximum daily load (TMDL) can be established and USEPA develops mercury standards that are protective of human health. The mass limitation was derived using the maximum observed effluent mercury concentration of 0.043 ug/L (0.000043 mg/L) and the average daily discharge flow rate of 0.65 mgd as follows:

(0.000043 mg/L)x(0.65 mgd)x(8.34 lbs/day conversion factor) x (365 days/12 months) = 0.0071 pounds/month

If USEPA develops new water quality standards for mercury or a TMDL for the Sacramento-San Joaquin Delta is adopted, this permit may be reopened and the effluent limitations adjusted.

t. **Nitrite and Nitrate.** Untreated domestic wastewater contains ammonia. Nitrification is a biological process that converts ammonia to nitrite to nitrate. Denitrification is a process that converts nitrate to nitrite or nitric oxide and then to nitrous oxide or nitrogen gas, which is then released to the atmosphere. Nitrate and nitrite are known to cause adverse health effects in humans. The California DHS has adopted Primary MCLs at Title 22 of the California Code of Regulations (CCR), Table 64431-A, for the protection of human health for nitrite and nitrate that are equal to 1 mg/L and 10 mg/L (measured as nitrogen), respectively. Title 22 CCR, Table 64431-A, also includes a primary MCL of 10,000 µg/L for the sum of nitrate and nitrite, measured as nitrogen.

USEPA has developed a primary MCL and an MCL goal of 1,000 µg/L for nitrite (as nitrogen). For nitrate, USEPA has developed Drinking Water Standards (10,000 µg/L as Primary MCL) and Ambient Water Quality Criteria for protection of human health (10,000 µg/L for non-cancer health effects). Recent toxicity studies have indicated a possibility that nitrate is toxic to aquatic organisms.

The MEC for nitrate was 21 mg/L, based on five samples collected between January 2002 and August 2004, while the maximum observed upstream receiving water nitrate concentration was 2.2 mg/l based on four samples collected between January 2002 and December 2002. The MEC for nitrite was 1 mg/L, based on four samples collected between January 2002 and December 2002, while the maximum observed upstream receiving water nitrite concentration was 0.029 mg/L based on four samples collected between January 2002 and December 2002. Therefore, there is a reasonable potential for the discharge to cause or contribute to an in-stream excursion above the Primary MCLs for nitrite and nitrate.

Since the maximum ambient background nitrate and nitrite concentrations are less than the applicable criteria, the receiving water has assimilative capacity for these constituents. As described in Section IV.C.2.c. of this Fact Sheet, a dilution credit of up to 1000:1 may be allowed for long-term human health criteria, which results in an AMEL of 7,810 mg/L for nitrate (as N) and an AMEL of 972 mg/L for nitrite (as N). However, the Regional Water Board finds that granting of

this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilative capacity for the Basin Plan's chemical constituents objective for nitrate plus nitrite and could violate the Antidegradation Policy. For this reason, a more stringent performance-based effluent limitation is included in this order that is calculated in the same way that interim limits are calculated (see Section IV.E.1 below). A MDEL for nitrate (as N) of 65 mg/L, and a MDEL for nitrite (as N) of 3.1 mg/L are included in this Order.

u. **Oil and Grease.** The previous Order included numeric monthly average and daily maximum effluent limitations of 10 mg/L and 15 mg/L, respectively. The monitoring data collected during the previous Order term indicated that there is no reasonable potential to violate water quality for oil and grease. Therefore, oil and grease effluent limitations will not be included in this Order. However, the Facility will be required to continue to sample in order to monitor oil and grease in the effluent.

v. **Persistent Chlorinated Hydrocarbon Pesticides.** The Basin Plan requires that no individual pesticides shall be present in concentrations that adversely affect beneficial uses; discharges shall not result in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses; persistent chlorinated hydrocarbon pesticides shall not be present in the water column at detectable concentrations; and pesticide concentrations shall not exceed those allowable by applicable antidegradation policies. Order No. 5-01-178 contained an effluent limitation of no detectable concentrations for organochlorine pesticides, based on the 303(d) listing in the Delta and due to prior monitoring of these pesticides with detection levels greater than the minimum levels recommended in the SIP. Order No. 5-01-178 required the Discharger to use detection levels no greater than the minimum levels. Effluent monitoring data from February 2003 to September 2006, at detection levels less than or equal to the SIP minimum levels, indicate no detectable concentrations for pesticides. . Therefore, effluent limitations for pesticides are not carried over from the previous Order.

w. **Pathogens**. Municipal and domestic supply, agricultural irrigation, and body contact water recreation are beneficial uses of the receiving stream and there is at all times at least 20:1 dilution in the receiving water. Coliform limits are imposed to protect the beneficial uses of the receiving water, including public health through contact recreation and drinking water pathways. In a letter to the Regional Water Board dated 8 April 1999, the California Department of Health Services (recently changed to Department of Public Health or DPH) indicated that DPH would consider wastewater discharged to water bodies with identified beneficial uses of irrigation or contact recreation and where the wastewater receives dilution of more than 20:1 to be adequately disinfected if the effluent coliform concentration does not exceed 23 MPN/100 mL as a 7-day median and if the effluent coliform concentration does not exceed 240 MPN/100 mL more than once in any 30 day period. The previous Order contained an effluent total coliform monthly median limitation of 23 MPN/100 mL and a daily maximum limitation of 500 MPN/100 mL. The effluent limitations for total coliform have

been modified in this Order to be consistent with DPH recommendations. This Order includes effluent limitations for total coliform of 23 MPN/100 mL as a 7-day median, and 240 MPN/100 ml, that should not be exceeded more than once in any 30 day period.

x. **pH.** The Basin Plan includes a water quality objective for surface waters (except for Goose Lake) that the "*...pH shall not be depressed below 6.5 nor raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters with designated COLD or WARM beneficial uses.*" Effluent Limitations for pH are included in this Order based on the Basin Plan objectives for pH. A more stringent instantaneous maximum pH effluent limitation of 8.1 has been applied based on the performance of the Facility. The more stringent instantaneous maximum pH limitation allows less stringent ammonia (as N) effluent limitations that are protective of the WARM and COLD beneficial uses of the receiving water.

y. **Salinity.** The 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. There are no USEPA water quality criteria for the protection of aquatic organisms for these constituents. The Basin Plan contains a chemical constituent objective that incorporates State MCLs, contains a narrative objective, and contains numeric water quality objectives for EC, TDS, sulfate, and chloride.

Table F-5. Salinity Water Quality Criteria/Objectives & Plant Effluent Data

Parameter	Agricultural WQ Goal[1]	Secondary MCL[2]	Basin Plan/ Bay-Delta Plan[4]	Effluent	
				Average	Maximum
EC (µmhos/cm)	Varies[3]	900, 1600, 2200	450-2,780[5]	1,148	1,400
TDS (mg/L)	Varies	500, 1000, 1500	N/A	657	760
Sulfate (mg/L)	Varies	250, 500, 600	N/A	85	120
Chloride (mg/L)	Varies	250, 500, 600	N/A	106	135

[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 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 µmhos/cm is generally considered to present no risk of salinity impacts to crops. However, many crops are grown successfully with higher salinities.

[4] The water quality objective applies to the Sacramento River at Emmaton in the Western Delta.

[5] The water quality objective can vary based on the Sacramento Valley Water Year Hydrologic Classification (see Table F-6).

Table F-6. Basin Plan Water Quality Objectives for EC Sacramento River at Emmaton, Based on Water Year Type (maximum 14- day running average of mean daily EC in µmhos/cm)

Date	Water Year Type				
	Wet	Above Normal	Below Normal	Dry	Critical
1 April – 14 June	450	450	450	450	2780
15June – 19 June	450	450	450	1670	2780
20 June – 30 June	450	450	1140	1670	2780
1 July – 15 August	450	630	1140	1670	2780

Table F-7. Historical Compliance with EC objectives at Emmaton (Water Years 1999-2007)

Water Year Type	# of years this type	Number of Years with Exceedances	Year w/ Exceedances (# of Days)	Applicable Objectives (µmhos/cm)
Wet	2	0	NA	450
Above Normal	3	0	NA	450/650
Below Normal	1	1	2004 (13)[1]	450/1140
Dry	3	0	NA	450/1670
Critically Dry	0	0	NA	2780

[1] Jones Track levee break June 3-June 30; exceedances 6/7 - 6/19

i. **Chloride**. The secondary MCL for chloride is 250 mg/L, as recommended level, 500 mg/L as an upper level, and 600 mg/L as a short-term maximum. The recommended agricultural water quality goal for chloride, that would apply the narrative chemical constituent objective, is 106 mg/L as a long-term average 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). The 106 mg/L water quality goal is intended to protect against adverse effects on sensitive crops when irrigated via sprinklers.

Chloride concentrations in the effluent ranged from 96 mg/L to 135 mg/L, with an average of 106 mg/L, for five samples collected by the Discharger from January 2002 through August 2004. Background concentrations in the Sacramento River ranged from 7 mg/L to 20 mg/L, with an average of 12.8 mg/L, for four samples collected by the Discharger from January 2002 through December 2002. The effluent concentration exceeds the agricultural water quality goal of 106 mg/L.

ii. **Electrical Conductivity (EC).** The secondary MCL for EC is 900 µmhos/cm as a recommended level, 1,600 µmhos/cm as an upper level, and

2,200 µmhos/cm as a short-term maximum. The agricultural water quality goal, that would apply the narrative chemical constituents objective, is 700 µmhos/cm as a long-term average 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). The 700 µmhos/cm agricultural water quality goal is intended to prevent reduction in crop yield, i.e., a restriction on use of water, for salt-sensitive crops, such as beans, carrots, turnips, and strawberries. These crops are either currently grown in the area or may be grown in the future. Most other crops can tolerate higher EC concentrations without harm, however, as the salinity of the irrigation water increases, more crops are potentially harmed by the EC, or extra measures must be taken by the farmer to minimize or eliminate any harmful impacts. A water quality objective for EC for agricultural beneficial uses (for the Sacramento River at Emmaton in the Western Delta) is included in the *Water Quality Control Plan for the Bay-Delta Plan.* The objective varies accordingly to the water year hydrologic classifications ranging from 450 µmhos/cm to 2,780 µmhos/cm (see Table F-6, above).

A review of the Discharger's monitoring reports from January 2002 through September 2006 shows an average effluent EC of 1148 µmhos/cm, with a range from 676 µmhos/cm to 1,400 µmhos/cm for 49 samples. Background concentrations in the Sacramento River ranged from 180 µmhos/cm to 280 µmhos/cm from January 2002 through December 2002. The levels in the effluent have the potential to exceed the applicable objectives.

iii. **Sulfate**. The secondary MCL for sulfate is 250 mg/L as recommended level, 500 mg/L as an upper level, and 600 mg/L as a short-term maximum. Sulfate concentrations in the effluent ranged from 56 mg/L to 120 mg/L, with an average of 85 mg/L, for five samples collected by the Discharger from 30 January 2002 through 18 August 2004. Background concentrations in the Sacramento River ranged from 7.9 mg/L to 15 mg/L, with an average of 11 mg/L, for four samples collected by the Discharger from 30 January 2002 through 18 December 2002. The effluent does not exceed the secondary MCL recommended level of 250 mg/L.

iv. **Total Dissolved Solids (TDS).** The secondary MCL for TDS is 500 mg/L as a recommended level, 1,000 mg/L as an upper level, and 1,500 mg/L as a short-term maximum. The recommended agricultural water quality goal for TDS, that would apply the narrative chemical constituent objective, is 450 mg/L as a long-term average 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). Water Quality for Agriculture evaluates the impacts of salinity levels on crop tolerance and yield reduction, and establishes water quality goals that are protective of the agricultural uses. The 450 mg/L water quality goal is intended to prevent reduction in crop yield, i.e. a restriction on use of water, for salt-sensitive crops. Only the most salt sensitive crops require irrigation

water of 450 mg/L or less to prevent loss of yield. Most other crops can tolerate higher TDS concentrations without harm, however, as the salinity of the irrigation water increases, more crops are potentially harmed by the TDS, or extra measures must be taken by the farmer to minimize or eliminate any harmful impacts.

The average TDS effluent concentration was 657 mg/L; concentrations ranged from 360 mg/L to 760 mg/L for seven samples collected by the Discharger from January 2002 through January 2007. These concentrations exceed the applicable water quality objectives. The background receiving water TDS ranged from 130 mg/L to 640 mg/L, with an average of 265 mg/L in four sampling events performed by the Discharger from January 2002 through December 2002. These data indicate that the receiving water exceeds water quality objectives.

v. **Salinity Effluent Limitations.** The Regional Water Board, with cooperation of the State Water Board, has begun the process to develop a new policy for the regulation of salinity in the Central Valley. In a statement issued at the 16 March 2006, Regional Water Board meeting, board member Dr. Karl Longley recommended that the Board continue to exercise its authority to regulate discharges of salt to minimize salinity increases within the Central Valley. Dr. Longley stated, "*The process of developing new salinity control policies does not, therefore, mean that we should stop regulating salt discharges until a salinity Policy is developed. In the meantime, the Board should consider all possible interim approaches to continue controlling and regulating salts in a reasonable manner, and encourage all stakeholder groups that may be affected by the Regional Board's policy to actively participate in policy development.*"

Based on daily EC data for the Sacramento River at Emmaton from August 1999 through April 2008, the Basin Plan water quality objectives were only exceeded during the Jones Tract levee break in June 2004. At all other times, the EC of the river was always in compliance with the objectives. Table F-7, above, displays a summary of compliance with the Basin Plan water quality objectives. This demonstrates that there is assimilative capacity for EC in the receiving water. As discussed in Section IV.C.2.c., above, the long-term dilution for the discharge is 1000:1. However, the Regional Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilative capacity for salinity and could violate the Antidegradation Policy. For this reason, a more stringent performance-based effluent limitation is included in this order. The performance-based effluent limit was calculated based on monthly effluent EC data from January 2003 – March 2008. A running 12-month average was calculated for each month data was collected and the annual average effluent limit was projected as the 95th percentile of this dataset (i.e. Mean + 1.645 x Standard Deviation [1152 + 1.645 x 94.33]). An annual average effluent limitation for EC of 1,300 µmhos/cm is included in this Order. Annual average effluent limitations are appropriate, due to fluctuations that can occur in the