CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

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ORDER R5-2016-XXXX
NPDES NO. CA0077682

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

The following Discharger is subject to waste discharge requirements (WDR's) set forth in this Order:

Table 1. Discharger Information

Discharger	Sacramento Regional County Sanitation District
Name of Facility	Sacramento Regional Wastewater Treatment Plant
Facility Address	8521 Laguna Station Road
	Elk Grove, CA 95758
	Sacramento County

Table 2. Discharge Location

Discharge Point	Effluent Description	Discharge Point Latitude (North)	Discharge Point Longitude (West)	Receiving Water
001	Treated Municipal Wastewater	38° 27' 15"	121° 30' 00"	Sacramento River

Table 3. Administrative Information

This Order was adopted on:	**<Adoption Date>**
This Order shall become effective on:	**<Effective Date>**
This Order shall expire on:	**<Expiration Date>**
The Discharger shall file a Report of Waste Discharge as an application for reissuance of WDR's in accordance with title 23, California Code of Regulations, and an application for reissuance of a National Pollutant Discharge Elimination System (NPDES) permit no later than:	**[Choose: 180 days prior to the Order expiration date OR <insert date>]**
The U.S. Environmental Protection Agency (U.S. EPA) and the California Regional Water Quality Control Board, Central Valley Region have classified this discharge as follows:	Major

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

_____
PAMELA C. CREEDON, Executive Officer

CONTENTS

I. Facility Information 3
II. Findings 3
III. Discharge Prohibitions 4
IV. Effluent Limitations and Discharge Specifications 5
A. Effluent Limitations – Discharge Point 001 5
1. Final Effluent Limitations – Discharge Point 001 5
2. Interim Effluent Limitations 7
B. Land Discharge Specifications – Not Applicable 8
C. Recycling Specifications – Not Applicable 8
V. Receiving Water Limitations 8
A. Surface Water Limitations 8
B. Groundwater Limitations 10
VI. Provisions 11
A. Standard Provisions 11
B. Monitoring and Reporting Program (MRP) Requirements 14
C. Special Provisions 14
1. Reopener Provisions 14
2. Special Studies, Technical Reports and Additional Monitoring Requirements 15
3. Best Management Practices and Pollution Prevention 18
4. Construction, Operation and Maintenance Specifications 19
5. Special Provisions for Municipal Facilities (POTW's Only) 19
6. Other Special Provisions 21
7. Compliance Schedules 21
VII. Compliance Determination 23

TABLES

Table 1. Discharger Information 1
Table 2. Discharge Location 1
Table 3. Administrative Information 1
Table 4. Effluent Limitations 5
Table 5. Interim Effluent Limitations – BOD_5 and TSS 7
Table 6. Interim Effluent Limitations – Ammonia 8

ATTACHMENTS

Attachment A – Definitions A-1
Attachment B – Map B-1
Attachment C – Flow Schematic C-1
Attachment D – Standard Provisions D-1
Attachment E – Monitoring and Reporting Program E-1
Attachment F – Fact Sheet F-1
Attachment G – Summary Of Reasonable Potential Analysis G-1
Attachment H – Calculation of WQBEL'S H-1
Attachment I – Thermal Plan Exceptions I-1

I. FACILITY INFORMATION

Information describing the Sacramento Regional County Sanitation District, Sacramento Regional Wastewater Treatment Plant (Facility) is summarized in Table 1 and in sections I and II of the Fact Sheet (Attachment F). Section I of the Fact Sheet also includes information regarding the Facility's permit application.

II. FINDINGS

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

A. Legal Authorities. This Order serves as WDR's pursuant to article 4, chapter 4, division 7 of the California Water Code (commencing with section 13260).This Order is also issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations adopted by the U.S. EPA and chapter 5.5, division 7 of the Water Code (commencing with section 13370). It shall serve as an NPDES permit for point source discharges from this Facility to surface waters.

B. Background and Rationale for Requirements. The Central Valley Water Board developed the requirements in this Order based on information submitted as part of the application, through monitoring and reporting programs, and other available information. The Fact Sheet (Attachment F), which contains background information and rationale for the requirements in this Order, is hereby incorporated into and constitutes Findings for this Order. Attachments A through E and G through I are also incorporated into this Order.

C. Provisions and Requirements Implementing State Law. The provisions/requirements in subsections III.A (pertaining to recycled water use), IV.B, IV.C, VI. C.5.b, and V.B are included to implement state law only. These provisions/requirements are not required or authorized under the federal CWA; consequently, violations of these provisions/requirements are not subject to the enforcement remedies that are available for NPDES violations.

D. Monitoring and Reporting. 40 C.F.R. section 122.48 requires that all NPDES permits specify requirements for recording and reporting monitoring results. Water Code sections 13267 and 13383 authorize the Central Valley Water Board to require technical and monitoring reports. The Monitoring and Reporting Program establishes monitoring and reporting requirements to implement federal and State requirements. The Monitoring and Reporting Program is provided in Attachment E.

The technical and monitoring reports in this Order are required in accordance with Water Code section 13267, which states the following in subsection (b)(1), *"In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports."*

The Discharger owns and operates the Facility subject to this Order. The monitoring reports required by this Order are necessary to determine compliance with this Order. The need for the monitoring reports is discussed in the Fact Sheet.

E. Notification of Interested Parties. The Central Valley Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe WDR's for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Details of the notification are provided in the Fact Sheet.

F. Consideration of Public Comment. The Central Valley Water Board, in a public meeting, heard and considered all comments pertaining to the discharge. Details of the Public Hearing are provided in the Fact Sheet.

THEREFORE, IT IS HEREBY ORDERED that Waste Discharge Requirements Order R5-2010-0114-04 and Time Schedule Order R5-2010-0115 are rescinded upon the effective date of this Order except for enforcement purposes, and, in order to meet the provisions contained in division 7 of the Water Code (commencing with section 13000) and regulations adopted thereunder, and the provisions of the CWA and regulations and guidelines adopted thereunder, the Discharger shall comply with the requirements in this Order. This action in no way prevents the Central Valley Water Board from taking enforcement action for past violations of the previous Order.

III. DISCHARGE PROHIBITIONS

A. Discharge of wastewater from the Facility, as the Facility is specifically described in the Fact Sheet in section II.B, in a manner different from that described in this Order is prohibited, with the exception of the disinfected secondary effluent that may be reclaimed for dust control and compaction on construction projects, landscape irrigation, wash down water, vehicle washing and grounds maintenance within the Facility boundaries, and for flushing of pipelines within the sewer collection system. It may also be used for in-plant process water and fire protection and used in the tertiary treatment plant and distribution system. Any use of reclaimed disinfected secondary effluent must meet the requirements of California Code of Regulations, title 22, section 60301, et seq. and the associated State Water Resources Control Board (State Water Board), Division of Drinking Water (DDW) guidelines as applicable. Runoff of disinfected secondary effluent is prohibited except as regulated by Master Reclamation Permit No. 97-146.

B. The by-pass or overflow of wastes to surface waters is prohibited, except as allowed by Federal Standard Provisions I.G. and I.H. (Attachment D) and as described in section II of the Fact Sheet (Attachment F) for the groundwater Corrective Action Program (CAP).

C. Neither the discharge nor its treatment shall create a nuisance as defined in section 13050 of the Water Code.

D. The Discharger shall not allow pollutant-free wastewater to be discharged into the treatment or disposal system in amounts that significantly diminish the system's capability to comply with this Order. Pollutant-free wastewater means rainfall, groundwater, cooling waters, and condensates that are essentially free of pollutants.

E. Discharge to the Sacramento River is prohibited when the Sacramento River instantaneous flow is less than 1,300 cubic feet per second (cfs) at Monitoring Location RSWU-001.

F. Discharge to the Sacramento River is prohibited when there is less than a 14:1 (river:effluent) flow ratio over a rolling one-hour period available in the Sacramento River at RSWU-001.

IV. EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

A. Effluent Limitations – Discharge Point 001

1. Final Effluent Limitations – Discharge Point 001

The Discharger shall maintain compliance with the following effluent limitations at Discharge Point 001, with compliance measured at Monitoring Locations TER-001 and EFF-001 as described in the Monitoring and Reporting Program, Attachment E:

a. The Discharger shall maintain compliance with the effluent limitations specified in Table 4:

Table 4. Effluent Limitations

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Conventional Pollutants						
Biochemical Oxygen Demand (5-day @ 20°C)[1,3]	mg/L	10	15	20	--	--
	lbs/day[2]	15,100	22,700	30,200	--	--
pH	standard units	--	--	--	6.0	8.0
Total Suspended Solids[1,3]	mg/L	10	15	20	--	--
	lbs/day[2]	15,100	22,700	30,200	--	--
Priority Pollutants						
Bis (2-Ethylhexyl) Phthalate	µg/L	8.9	--	20	--	--
Carbon Tetrachloride	µg/L	2.9	--	5.3	--	--
Chlorodibromomethane	µg/L	14	--	27	--	--
Copper, Total Recoverable	µg/L	8.6	--	12	--	--
Cyanide, Total (as CN)	µg/L	13	--	22	--	--
Dichlorobromomethane	µg/L	23	--	36	--	--
Methylene Chloride	µg/L	4.7	--	11	--	--
Non-Conventional Pollutants						
Ammonia Nitrogen, Total (as N)[1] 1 April – 31 October	mg/L	1.5	1.7	--	--	--
	lbs/day[2]	2,264	2,566	--	--	--
Ammonia Nitrogen, Total (as N)[1] 1 November – 31 March	mg/L	2.4	3.0	--	--	--
	lbs/day[2]	3,622	4,529	--	--	--
Nitrate Plus Nitrite (as N)	mg/L	10	22	--	--	--
Settleable Solids	mL/L	0.1	0.2	--	--	--

[1] This Order includes interim effluent limitations for 5-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and total ammonia nitrogen in section IV.A.2. Effective immediately, the interim effluent limitations shall apply in lieu of final effluent limitations for these constituents. The final effluent limitations for BOD_5 and TSS become effective 9 May 2023 and the final effluent limitations for total ammonia nitrogen become effective 11 May 2021.

[2] Based on an average dry weather flow of 181 million gallons per day (MGD).

[3] Effective 9 May 2023 <u>and</u> upon written Executive Officer approval per Special Provisions VI.C.2.d, compliance with final effluent limitations for BOD_5 and TSS shall be measured at Monitoring Location TER-001. Otherwise, compliance shall be measured at Monitoring Location EFF-001.

b. **Percent Removal:** The average monthly percent removal of 5-day biochemical oxygen demand (BOD_5) and total suspended solids (TSS) shall not be less than 85 percent. [1]

c. **Acute Whole Effluent Toxicity.** Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:

   i. 70%, minimum for any one bioassay; and
   ii. 90%, median for any three consecutive bioassays.

d. **Chronic Whole Effluent Toxicity.** There shall be no chronic toxicity in the effluent discharge.

e. **Temperature.**

   i. **Effective immediately,** the maximum temperature of the discharge shall not exceed the natural receiving water temperature at Monitoring Location RSWU-001 by more than 20°F.

   ii. **If the Central Valley Water Board receives concurrence from the State Water Board regarding the Thermal Plan exceptions[2], the following effluent limitation applies in lieu of the effluent limitation in section IV.A.1.e.i,** the maximum temperature of the discharge shall not exceed the natural receiving water temperature at Monitoring Location RSWU-001 by more than 20°F from 1 May through 30 September and more than 25°F from 1 October through 30 April.

f. **Total Residual Chlorine[3].** Effluent total residual chlorine shall not exceed:

   i. 0.011 mg/L, as a 4-day average; and
   ii. 0.019 mg/L, as a 1-hour average.

g. **Total Coliform Organisms [4].** Effluent total coliform organisms shall not exceed:

   i. **May – October**

      (a) 2.2 most probable number (MPN) per 100 mL, as a 7-day median;
      (b) 23 MPN/100 mL, more than once in any 30-day period; and
      (c) 240 MPN/100 mL, at any time.

   ii. **November – April**

      (a) 2.2 most probable number (MPN) per 100 mL, as a monthly median;
      (b) 23 MPN/100 mL, as a weekly median; and
      (c) 240 MPN/100 mL, at any time.

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[1] Effective 9 May 2023 <u>and</u> upon written Executive Officer approval per Special Provisions VI.C.2.d, compliance with final effluent limitations for the percent removal of BOD_5 and TSS (IV.A.1.b) shall be measured at Monitoring Location TER-001. Otherwise, compliance shall be measured at Monitoring Location EFF-001.

[2] See Attachment F, Section III.C.1.c for details regarding the Thermal Plan exceptions.

[3] This Order includes interim effluent limitations for total residual chlorine in section IV.A.2.c. Effective immediately, the interim effluent limitations shall apply in lieu of final effluent limitations for these constituents. The final effluent limitations for total residual chlorine become effective 1 December 2020.

[4] This Order includes interim effluent limitations for total coliform organisms in section IV.A.2.d. Effective immediately, the interim effluent limitations shall apply in lieu of final effluent limitations. The final effluent limitations for total coliform organisms become effective 9 May 2023. Upon written Executive Officer approval per Special Provisions VI.C.2.d, the monitoring for total coliform organisms shall be discontinued at Monitoring Location EFF-001 and shall be conducted at Monitoring Location TER-001.

h. **Average Dry Weather Flow.** The average dry weather discharge flow shall not exceed 181 MGD.

i. **Diazinon and Chlorpyrifos.** Effluent diazinon and chlorpyrifos concentrations shall not exceed the sum of one (1.0) as identified below:

i. **Average Monthly Effluent Limitation**

$$S_{AMEL} = \frac{C_{D\,M-avg}}{0.079} + \frac{C_{C\,M-avg}}{0.012} \leq 1.0$$

$C_{D\,M\text{-}avg}$ = average monthly diazinon effluent concentration in µg/L.
$C_{C\,M\text{-}avg}$ = average monthly chlorpyrifos effluent concentration in µg/L.

ii. **Average Weekly Effluent Limitation**

$$S_{AWEL} = \frac{C_{D\,W-avg}}{0.14} + \frac{C_{C\,W-avg}}{0.021} \leq 1.0$$

$C_{D\,W\text{-}avg}$ = average weekly diazinon effluent concentration in µg/L.
$C_{C\,W\text{-}avg}$ = average weekly chlorpyrifos effluent concentration in µg/L.

j. **Methylmercury. Effective 31 December 2030,** the effluent calendar year annual methylmercury load shall not exceed 89 grams, in accordance with the Delta Mercury Control Program.

k. **Electrical Conductivity.** The effluent calendar year annual average electrical conductivity shall not exceed 1,139 µmhos/cm.

2. Interim Effluent Limitations

The Discharger shall maintain compliance with the following interim effluent limitations at Discharge Point 001, with compliance measured at Monitoring Location EFF-001 as described in the Monitoring and Reporting Program, Attachment E. These interim effluent limitations shall apply in lieu of the corresponding final effluent limitations specified for the same parameters during the time period indicated in this provision.

a. **BOD_5 and TSS. Effective immediately and until 8 May 2023**, the Discharger shall maintain compliance with the effluent limitations specified in Table 5.

Table 5. Interim Effluent Limitations – BOD_5 and TSS

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	30	45	60	--	--
	lbs/day[1]	45,286	67,929	90,572	--	--
Total Suspended Solids	mg/L	30	45	60	--	--
	lbs/day[1]	45,286	67,929	90,572	--	--

[1] Based on an average dry weather flow of 181 MGD.

b. **Ammonia. Effective immediately and until 10 May 2021**, the Discharger shall maintain compliance with the effluent limitations specified in Table 6.

Table 6. Interim Effluent Limitations – Ammonia

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

c. **Total Residual Chlorine. Effective immediately and until 30 November 2020**, effluent total residual chlorine shall not exceed:

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

d. **Total Coliform Organisms. Effective immediately and until 8 May 2023**, effluent total coliform organisms shall not exceed:

i. 23 MPN/100 mL, as a weekly median; and
ii. 500 MPN/100 mL, in any 2 consecutive days as a daily maximum.

e. **Mercury, total. Effective immediately and until 30 December 2030,** the effluent calendar year annual total mercury load shall not exceed 1,043 grams/year. This interim effluent limitation shall apply in lieu of the final effluent limitation for methylmercury (Section IV.A.1.j).

B. Land Discharge Specifications – Not Applicable

C. Recycling Specifications – Not Applicable

V. RECEIVING WATER LIMITATIONS

A. Surface Water Limitations

The discharge shall not cause the following in the Sacramento River and the Sacramento-San Joaquin Delta:

1. **Bacteria.** The fecal coliform concentration, based on a minimum of not less than five samples for any 30-day period, to exceed a geometric mean of 200 MPN/100 mL, nor more than 10 percent of the total number of fecal coliform samples taken during any 30-day period to exceed 400 MPN/100 mL.
2. **Biostimulatory Substances.** Water to contain biostimulatory substances which promote aquatic growths in concentrations that cause nuisance or adversely affect beneficial uses.
3. **Chemical Constituents.** Chemical constituents to be present in concentrations that adversely affect beneficial uses.
4. **Color.** Discoloration that causes nuisance or adversely affects beneficial uses.
5. **Dissolved Oxygen.** The dissolved oxygen concentration to be reduced below 7.0 mg/L at any time.
6. **Floating Material.** Floating material to be present in amounts that cause nuisance or adversely affect beneficial uses.

7. **Oil and Grease.** Oils, greases, waxes, or other materials to be present in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.

8. **pH.** The pH to be depressed below 6.5 nor raised above 8.5.

9. **Pesticides:**

   a. Pesticides to be present, individually or in combination, in concentrations that adversely affect beneficial uses;

   b. Pesticides to be present in bottom sediments or aquatic life in concentrations that adversely affect beneficial uses;

   c. Total identifiable persistent chlorinated hydrocarbon pesticides to be present in the water column at concentrations detectable within the accuracy of analytical methods approved by U.S. EPA or the Executive Officer;

   d. Pesticide concentrations to exceed those allowable by applicable antidegradation policies (see State Water Board Resolution No. 68-16 and 40 C.F.R. 131.12.);

   e. Pesticide concentrations to exceed the lowest levels technically and economically achievable;

   f. Pesticides to be present in concentration in excess of the maximum contaminant levels (MCL's) set forth in CCR, Title 22, division 4, chapter 15; nor

   g. Thiobencarb to be present in excess of 1.0 µg/L.

10. **Radioactivity:**

    a. Radionuclides to be present in concentrations that are harmful to human, plant, animal, or aquatic life nor that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.

    b. Radionuclides to be present in excess of the MCL's specified in Table 64442 of section 64442 and Table 64443 of section 64443 of Title 22 of the California Code of Regulations.

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

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

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

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

15. **Temperature:**

    a. **Effective immediately,**

        i. The discharge shall not create a zone, defined by a water temperature of 1°F or more above natural receiving water temperature which exceeds 25 percent of the cross sectional area of the river.

    b. **If the Central Valley Water Board receives concurrence from the State Water Board regarding the Thermal Plan exceptions[1], the following limitations will apply in lieu of the limitations in section V.A.15.a,**

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

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

    c. **Effective immediately,** the discharge shall not cause the receiving water surface temperature to increase more than 4°F above the ambient temperature of the receiving water at any time or place.

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

17. **Turbidity:**

    a. Shall not exceed 2 Nephelometric Turbidity Units (NTU) where natural turbidity is less than 1 NTU;

    b. Shall not increase more than 1 NTU where natural turbidity is between 1 and 5 NTUs;

    c. Shall not increase more than 20 percent where natural turbidity is between 5 and 50 NTUs;

    d. Shall not increase more than 10 NTU where natural turbidity is between 50 and 100 NTUs; nor

    e. Shall not increase more than 10 percent where natural turbidity is greater than 100 NTUs.

B. Groundwater Limitations

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

[1] See Attachment F, Section III.C.1.c for details regarding the Thermal Plan exceptions.

VI. PROVISIONS

A. Standard Provisions

1. The Discharger shall comply with all Standard Provisions included in Attachment D.
2. The Discharger shall comply with the following provisions. In the event that there is any conflict, duplication, or overlap between provisions specified by this Order, the more stringent provision shall apply:

   a. If the Discharger's wastewater treatment plant is publicly owned or subject to regulation by California Public Utilities Commission, it shall be supervised and operated by persons possessing certificates of appropriate grade according to Title 23, CCR, division 3, chapter 26.

   b. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to:

      i. violation of any term or condition contained in this Order;

      ii. obtaining this Order by misrepresentation or by failing to disclose fully all relevant facts;

      iii. a change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge; and

      iv. a material change in the character, location, or volume of discharge.

      The causes for modification include:

      i. *New regulations.* New regulations have been promulgated under section 405(d) of the CWA, or the standards or regulations on which the permit was based have been changed by promulgation of amended standards or regulations or by judicial decision after the permit was issued.

      ii. *Land application plans.* When required by a permit condition to incorporate a land application plan for beneficial reuse of sewage sludge, to revise an existing land application plan, or to add a land application plan.

      iii. *Change in sludge use or disposal practice.* Under 40 C.F.R. section 122.62(a)(1), a change in the Discharger's sludge use or disposal practice is a cause for modification of the permit. It is cause for revocation and reissuance if the Discharger requests or agrees.

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

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

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

   d. This Order shall be modified, or alternately revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under sections

301(b)(2)(C) and (D), 304(b)(2), and 307(a)(2) of the CWA, if the effluent standard or limitation so issued or approved:

i. Contains different conditions or is otherwise more stringent than any effluent limitation in the Order; or

ii. Controls any pollutant limited in the Order.

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

e. The provisions of this Order are severable. If any provision of this Order is found invalid, the remainder of this Order shall not be affected.

f. The Discharger shall take all reasonable steps to minimize any adverse effects to waters of the State or users of those waters resulting from any discharge or sludge use or disposal in violation of this Order. Reasonable steps shall include such accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge or sludge use or disposal.

g. The Discharger shall ensure compliance with any existing or future pretreatment standard promulgated by U.S. EPA under section 307 of the CWA, or amendment thereto, for any discharge to the municipal system.

h. A copy of this Order shall be maintained at the discharge facility and be available at all times to operating personnel. Key operating personnel shall be familiar with its content.

i. Safeguard to electric power failure:

i. The Discharger shall provide safeguards to assure that, should there be reduction, loss, or failure of electric power, the discharge shall comply with the terms and conditions of this Order.

ii. Upon written request by the Central Valley Water Board, the Discharger shall submit a written description of safeguards. Such safeguards may include alternate power sources, standby generators, retention capacity, operating procedures, or other means. A description of the safeguards provided shall include an analysis of the frequency, duration, and impact of power failures experienced over the past 5 years on effluent quality and on the capability of the Discharger to comply with the terms and conditions of the Order. The adequacy of the safeguards is subject to the approval of the Central Valley Water Board.

iii. Should the treatment works not include safeguards against reduction, loss, or failure of electric power, or should the Central Valley Water Board not approve the existing safeguards, the Discharger shall, within 90 days of having been advised in writing by the Central Valley Water Board that the existing safeguards are inadequate, provide to the Central Valley Water Board and U.S. EPA a schedule of compliance for providing safeguards such that in the event of reduction, loss, or failure of electric power, the Discharger shall comply with the terms and conditions of this Order. The schedule of compliance shall, upon approval of the Central Valley Water Board, become a condition of this Order.

j. The Discharger, upon written request of the Central Valley Water Board, shall file with the Board a technical report on its preventive (failsafe) and contingency (cleanup) plans for controlling accidental discharges, and for minimizing the effect of

such events. This report may be combined with that required under the Central Valley Water Board Standard Provision contained in section VI.A.2.i of this Order.

The technical report shall:

i. Identify the possible sources of spills, leaks, untreated waste by-pass, and contaminated drainage. Loading and storage areas, power outage, waste treatment unit outage, and failure of process equipment, tanks and pipes should be considered.

ii. Evaluate the effectiveness of present facilities and procedures and state when they became operational.

iii. Predict the effectiveness of the proposed facilities and procedures and provide an implementation schedule containing interim and final dates when they will be constructed, implemented, or operational.

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

k. A publicly owned treatment works whose waste flow has been increasing, or is projected to increase, shall estimate when flows will reach hydraulic and treatment capacities of its treatment and disposal facilities. The projections shall be made in January, based on the last 3 years' average dry weather flows, peak wet weather flows and total annual flows, as appropriate. When any projection shows that capacity of any part of the facilities may be exceeded in 4 years, the Discharger shall notify the Central Valley Water Board by 31 January. A copy of the notification shall be sent to appropriate local elected officials, local permitting agencies and the press. Within 120 days of the notification, the Discharger shall submit a technical report showing how it will prevent flow volumes from exceeding capacity or how it will increase capacity to handle the larger flows. The Central Valley Water Board may extend the time for submitting the report.

l. The Discharger shall submit technical reports as directed by the Executive Officer. All technical reports required herein that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code, sections 6735, 7835, and 7835.1. To demonstrate compliance with Title 16, CCR, sections 415 and 3065, all technical reports must contain a statement of the qualifications of the responsible registered professional(s). As required by these laws, completed technical reports must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work.

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

n. Prior to making any change in the point of discharge, place of use, or purpose of use of treated wastewater that results in a permanent decrease of flow in any portion of a watercourse, the Discharger must file a petition with the State Water Board, Division of Water Rights, and receive approval for such a change. (Water Code section 1211).

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

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

p. Failure to comply with provisions or requirements of this Order, or violation of other applicable laws or regulations governing discharges from this facility, may subject the Discharger to administrative or civil liabilities, criminal penalties, and/or other enforcement remedies to ensure compliance. Additionally, certain violations may subject the Discharger to civil or criminal enforcement from appropriate local, state, or federal law enforcement entities.

q. In the event the Discharger does not comply or will be unable to comply for any reason, with any prohibition, effluent limitation, or receiving water limitation of this Order, the Discharger shall notify the Central Valley Water Board by telephone (916) 464-3291 within 24 hours of having knowledge of such noncompliance, and shall confirm this notification in writing within five days, unless the Central Valley Water Board waives confirmation. The written notification shall state the nature, time, duration, and cause of noncompliance, and shall describe the measures being taken to remedy the current noncompliance and prevent recurrence including, where applicable, a schedule of implementation. Other noncompliance requires written notification as above at the time of the normal monitoring report.

B. Monitoring and Reporting Program (MRP) Requirements

The Discharger shall comply with the MRP, and future revisions thereto, in Attachment E.

C. Special Provisions

1. Reopener Provisions

a. Conditions that necessitate a major modification of a permit are described in 40 C.F.R. section 122.62, including, but not limited to:

i. If new or amended applicable water quality standards are promulgated or approved pursuant to section 303 of the CWA, or amendments thereto, this permit may be reopened and modified in accordance with the new or amended standards.

ii. When new information, that was not available at the time of permit issuance, would have justified different permit conditions at the time of issuance.

b. This Order may be reopened for modification, or revocation and reissuance, as a result of the detection of a reportable priority pollutant generated by special conditions included in this Order. These special conditions may be, but are not

limited to, fish tissue sampling, whole effluent toxicity, monitoring requirements on internal waste stream(s), and monitoring for surrogate parameters. Additional requirements may be included in this Order as a result of the special condition monitoring data.

c. **Mercury.** The Basin Plan's Delta Mercury Control Program was designed to proceed in two phases. After Phase 1, the Central Valley Water Board will conduct a Phase 1 Delta Mercury Control Program Review that considers modification to the Delta Mercury Control Program. This Order may be reopened to address changes to the Delta Mercury Control Program.

d. **Whole Effluent Toxicity.** As a result of a Toxicity Reduction Evaluation (TRE), this Order may be reopened to include a numeric chronic toxicity limitation, a new acute toxicity limitation, and/or a limitation for a specific toxicant identified in the TRE. Additionally, if the State Water Board revises the SIP's toxicity control provisions that would require the establishment of numeric chronic toxicity effluent limitations, this Order may be reopened to include a numeric chronic toxicity effluent limitation based on the new provisions.

e. **Water Effects Ratios (WER's) and Metal Translators.** A default WER of 1.0 has been used in this Order for calculating criteria for applicable inorganic constituents. In addition, default dissolved-to-total metal translators have been used to convert water quality objectives from dissolved to total recoverable when developing effluent limitations for copper. If the Discharger performs studies to determine site-specific WER's and/or site-specific dissolved-to-total metal translators, this Order may be reopened to modify the effluent limitations for the applicable inorganic constituents.

f. **Drinking Water Policy.** On 26 July 2013 the Central Valley Water Board adopted Resolution No. R5-2013-0098 amending the Basin Plan and establishing a Drinking Water Policy. The State Water Board approved the Drinking Water Policy on 3 December 2013. This Order may be reopened to incorporate monitoring of drinking water constituents to implement the Drinking Water Policy.

g. **Electrical Conductivity (EC) Effluent Limits and Other Limits Based on Facility Performance.** This Order may be reopened to revise interim and/or final effluent limitations where Facility performance was considered in the development of the limitations (e.g., performance-based effluent limitations for EC) should the Discharger provide new information demonstrating the increase in discharge concentrations have been caused by water conservation efforts, drought conditions, and/or the change in disinfection chemicals.

2. Special Studies, Technical Reports and Additional Monitoring Requirements

a. **Toxicity Reduction Evaluation Requirements.** For compliance with the Basin Plan's narrative toxicity objective, this Order requires the Discharger to conduct chronic whole effluent toxicity (WET) testing, as specified in MRP section V. Furthermore, this Provision requires the Discharger to investigate the causes of, and identify corrective actions to reduce or eliminate effluent toxicity. If the discharge exceeds the numeric toxicity monitoring trigger during accelerated monitoring established in this Provision, the Discharger is required to initiate a TRE in accordance with an approved TRE Work Plan, and take actions to mitigate the impact of the discharge and prevent recurrence of toxicity. A TRE is a site-specific study conducted in a stepwise process to identify the source(s) of toxicity and the effective control measures for effluent toxicity. TRE's are designed to identify the causative agents and sources of whole effluent toxicity, evaluate the effectiveness

of the toxicity control options, and confirm the reduction in effluent toxicity. This Provision includes procedures for accelerated chronic toxicity monitoring and TRE initiation.

i. **Accelerated Monitoring and TRE Initiation.** When the numeric toxicity monitoring trigger is exceeded during regular chronic toxicity monitoring, and the testing meets all test acceptability criteria, the Discharger shall initiate accelerated monitoring as required in the Accelerated Monitoring Specifications. The Discharger shall initiate a TRE to address effluent toxicity if any WET testing results exceed the numeric toxicity monitoring trigger during accelerated monitoring.

ii. **Numeric Toxicity Monitoring Trigger.** The numeric toxicity monitoring trigger to initiate a TRE is 8 TUc (where TUc = 100/NOEC). The monitoring trigger is not an effluent limitation; it is the toxicity threshold at which the Discharger is required to begin accelerated monitoring and initiate a TRE.

iii. **Accelerated Monitoring Specifications.** If the numeric toxicity monitoring trigger is exceeded during regular chronic toxicity testing, the Discharger shall initiate accelerated monitoring within 14-days of notification by the laboratory of the exceedance. Accelerated monitoring shall consist of four chronic toxicity tests conducted once every two weeks using the species that exhibited toxicity. The following protocol shall be used for accelerated monitoring and TRE initiation:

(a) If the results of four consecutive accelerated monitoring tests do not exceed the monitoring trigger, the Discharger may cease accelerated monitoring and resume regular chronic toxicity monitoring. However, notwithstanding the accelerated monitoring results, if there is adequate evidence of a pattern of effluent toxicity, the Executive Officer may require that the Discharger initiate a TRE.

(b) If the source(s) of the toxicity is easily identified (e.g., temporary plant upset), the Discharger shall make necessary corrections to the facility and shall continue accelerated monitoring until four consecutive accelerated tests do not exceed the monitoring trigger. Upon confirmation that the effluent toxicity has been removed, the Discharger may cease accelerated monitoring and resume regular chronic toxicity monitoring.

(c) If the result of any accelerated toxicity test exceeds the monitoring trigger, the Discharger shall cease accelerated monitoring and begin a TRE to investigate the cause(s) of, and identify corrective actions to reduce or eliminate effluent toxicity. Within thirty (30) days of notification by the laboratory of any test result exceeding the monitoring trigger during accelerated monitoring, the Discharger shall submit a TRE Action Plan to the Central Valley Water Board including, at minimum:

(1) Specific actions the Discharger will take to investigate and identify the cause(s) of toxicity, including a TRE WET monitoring schedule;

(2) Specific actions the Discharger will take to mitigate the impact of the discharge and prevent the recurrence of toxicity; and

(3) A schedule for these actions.

b. **Filtration Operations Study.** After a sufficient degree of operational experience following commencement of operation of filtration facilities as designed, built and operated, including at least 3 years of circumstances described in the Future Facility description in Section II.A.2 of the Fact Sheet where some biological nutrient removal (BNR) effluent does not receive filtration, a study of November-April performance of the filtration and disinfection system will be required of the Discharger. The study, to be conducted at a time determined by the Central Valley Water Board, will summarize data including the amount (on a daily basis and annual basis) of effluent that did not receive filtration, influent and effluent flows, filter effluent turbidity, filter loading rates, effluent *Giardia* and *Cryptosporidium* data, and effluent *E. coli* and total coliform data.

c. **Phase 1 Methylmercury Control Study.** In accordance with the Basin Plan's Delta Mercury Control Program and the compliance schedule included in this Order for methylmercury (Section VI.C.7.c), the Discharger shall participate in the Central Valley Clean Water Association (CVCWA) Coordinated Methylmercury Control Study (Study) to evaluate existing control methods and, as needed, develop additional control methods that could be implemented to achieve the methylmercury waste load allocation. A work plan was submitted by CVCWA on 20 April 2013.

The Study shall evaluate the feasibility of reducing sources more than the minimum amount needed to achieve the methylmercury allocation. The Study also may include an evaluation of innovative actions, watershed approaches, offsets projects, and other short and long-term actions that result in reducing inorganic (total) mercury and methylmercury to address the accumulation of methylmercury in fish tissue and to reduce methylmercury exposure. The Study may evaluate the effectiveness of using inorganic (total) mercury controls to control methylmercury discharges.

The Study shall include a description of methylmercury and/or inorganic (total) mercury management practices identified in Phase 1; an evaluation of the effectiveness, costs, potential environmental effects, and overall feasibility of the control actions. The Study shall also include proposed implementation plans and schedules to comply with methylmercury allocations as soon as possible. The Study shall be submitted to the Central Valley Water Board by **20 October 2018**.

The Executive Officer may, after public notice, extend the due date up to 2 years if the Discharger demonstrates it is making significant progress towards developing, implementing, and/or completing the Study and reasonable attempts have been made to secure funding for the Study, but the Discharger has experienced severe budget shortfalls.

d. **Emergency Storage Basin Cleaning and Isolation System Study and Standard Operating Procedures.** The Discharger shall conduct a study and/or monitoring to demonstrate the emergency storage basin cleaning and isolation systems will not allow for wastewater pathogens to be reintroduced to the final effluent following the prior use of the emergency storage basins for non-final (e.g., untreated or partially-treated wastewater). The Discharger shall also develop standard operating procedures for use and cleaning of the emergency storage basins. The Discharger shall submit a Work Plan and Schedule for conducting the study and developing the standard operating procedures to the Central Valley Water Board for Executive Officer approval **by 1 June 2017**. The Discharger shall submit the final study results and standard operating procedures to the Central Valley Water Board for Executive Officer approval in accordance with the Work Plan and Schedule.

Upon completion of the tertiary filtration upgrades (described in Attachment F, Section II.A.2) and Executive Officer approval of the final study results and standard operating procedures, the Discharger may begin effluent monitoring for BOD_5, TSS, and total coliform organisms at Monitoring Location TER-001 for purposes of determining compliance with the final effluent limitations, and effluent monitoring for total coliform organisms may cease at Monitoring Location EFF-001.

e. **Temperature Receiving Water Limitations Compliance Methodology. Not later than 31 March 2017**, the Discharger shall evaluate the current method of compliance determination with temperature receiving water limitations V.A.15.a and V.A.15.b and propose a method that may be better suited for compliance determination taking into consideration the planned Facility upgrades. Upon approval by the Executive Officer, the updated method determination shall become part of this permit for purposes of determining compliance.

3. Best Management Practices and Pollution Prevention

a. **Pollution Prevention Plan (PPP) for Mercury.** The Discharger shall continue to implement a PPP for mercury in accordance with Water Code section 13263.3(d)(3), per the compliance schedule in this Order for methylmercury (section VI.C.7.c). Progress reports shall be submitted annually in accordance with the Monitoring and Reporting Program (Attachment E, section X.D.1.). The progress reports shall discuss the effectiveness of the PPP in the reduction of mercury in the discharge, include a summary of mercury and methylmercury monitoring results, and discuss updates to the PPP.

b. **Mercury Exposure Reduction Program.** The Discharger shall participate in a Mercury Exposure Reduction Program (MERP) in accordance with the Basin Plan's Delta Mercury Control Program. The Discharger elected to provide financial support in the collective MERP with other Delta dischargers, rather than be individually responsible for any MERP activities. An exposure reduction work plan for Executive Officer approval was submitted on 20 October 2013. The objective of the MERP is to reduce mercury exposure of Delta fish consumers most likely affected by mercury. The work plan shall address the MERP objective, elements, and the Discharger's coordination with other stakeholders. The minimum requirements for the exposure reduction work plan are outlined in the Fact Sheet (Attachment F, section VI.B.3.b). The Discharger shall continue to participate in the group effort to implement the work plan through 2020 or until they comply with all requirements related to the individual or subarea methylmercury allocation. The Discharger shall notify the Central Valley Water Board if it plans to perform mercury exposure reduction activities individually.

c. **Salinity Evaluation and Minimization Plan.** The Discharger shall continue to implement its salinity evaluation and minimization plan to identify and address sources of salinity discharged from the Facility. The Discharger shall evaluate the effectiveness of the salinity evaluation and minimization plan and provide a summary with the Report of Waste Discharge, due 180 days prior to the permit expiration date. The summary shall include municipal water supply quality and quantity data from water purveyors within the Discharger's service area. Total dissolved solids and electrical conductivity or specific conductance shall be reported as a weighted average of groundwater and surface water quality using the most recent published information from the water purveyors and other databases available to the public.

4. Construction, Operation and Maintenance Specifications

a. **Filtration System Operating Specifications.** Effective 9 May 2023, the turbidity of the filter effluent measured at Monitoring Location FIL-001 shall not exceed:

i. 2 NTU as a daily average;

ii. 5 NTU more than 5 percent of the time within a 24-hour period; and

iii. 10 NTU, at any time.

b. **Emergency Storage Basin Operating Requirements**

i. The treatment facilities shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.

ii. Public contact with wastewater shall be precluded through such means as fences, signs, and other acceptable alternatives.

iii. Ponds shall be managed to prevent breeding of mosquitoes. In particular,

(a) An erosion control program should assure that small coves and irregularities are not created around the perimeter of the water surface.

(b) Weeds shall be minimized.

(c) Dead algae, vegetation, and debris shall not accumulate on the water surface.

iv. Freeboard for the total emergency storage basin system shall never be less than 2 feet (measured vertically to the lowest point of overflow).

v. The discharge of waste classified as “hazardous” as defined in section 2521(a) of title 23 of the CCR, or “designated”, as defined in Water Code section 13173, to the treatment ponds is prohibited.

vi. Objectionable odors originating at this Facility shall not be perceivable beyond the limits of the wastewater treatment and disposal areas (or property owned by the Discharger).

5. Special Provisions for Municipal Facilities (POTW’s Only)

a. **Pretreatment Requirements**

i. The Discharger shall be responsible and liable for the performance of all Control Authority pretreatment requirements contained in 40 C.F.R. part 403, including any subsequent regulatory revisions to 40 C.F.R. part 403. Where 40 C.F.R. part 403 or subsequent revision places mandatory actions upon the Discharger as Control Authority but does not specify a timetable for completion of the actions, the Discharger shall complete the required actions within 6 months from the issuance date of this permit or the effective date of the 40 C.F.R. part 403 revisions, whichever comes later. For violations of pretreatment requirements, the Discharger shall be subject to enforcement actions, penalties, fines, and other remedies by U.S. EPA or other appropriate parties, as provided in the CWA. U.S. EPA may initiate enforcement action against a nondomestic user for noncompliance with applicable standards and requirements as provided in the CWA.

ii. The Discharger shall enforce the requirements promulgated under sections 307(b), 307(c), 307(d), and 402(b) of the CWA with timely, appropriate and effective enforcement actions. The Discharger shall cause all nondomestic users subject to federal categorical standards to achieve compliance no later than the date specified in those requirements or, in the case of a new nondomestic user, upon commencement of the discharge.

iii. The Discharger shall perform the pretreatment functions as required in 40 C.F.R. part 403 including, but not limited to:

(a) Implement the necessary legal authorities as provided in 40 C.F.R. section 403.8(f)(1);

(b) Enforce the pretreatment requirements under 40 C.F.R. section 403.5 and 403.6;

(c) Implement the programmatic functions as provided in 40 C.F.R. section 403.8(f)(2); and

(d) Provide the requisite funding and personnel to implement the pretreatment program as provided in 40 C.F.R. section 403.8(f)(3).

iv. **Pretreatment Reporting Requirements.** Pretreatment reporting requirements are included in the Monitoring and Reporting Program, section X.D.5 of Attachment E.

b. **Collection System.** On 2 May 2006, the State Water Board adopted State Water Board Order No. 2006-0003-DWQ, Statewide General WDR's for Sanitary Sewer Systems. The Discharger shall be subject to the requirements of Order No. 2006-0003-DWQ and any future revisions thereto. Order No. 2006-0003-DWQ requires that all public agencies that currently own or operate sanitary sewer systems apply for coverage under the general WDR's. The Discharger has applied for and has been approved for coverage under Order 2006-0003-DWQ for operation of its wastewater collection system.

c. **Anaerobically Digestible Material.** The Discharger is currently accepting anaerobically digestible material through its fats, oils and grease (FOG) reception system for injection into an anaerobic digester for co-digestion. **By 1 March 2017**, the Discharger shall develop and implement standard operating procedures (SOP's) for this activity. The SOP's shall address material handling, including unloading, screening, or other processing prior to anaerobic digestion; transportation; spill prevention; and spill response. In addition, the SOP's shall address avoidance of the introduction of materials that could cause interference, pass-through, or upset of the treatment processes; avoidance of prohibited material, vector control, odor control, operation and maintenance, and the disposition of any solid waste segregated from introduction to the digester. The Discharger shall provide training to its staff on the SOP's and shall maintain records for a minimum of three years for each load received, describing the hauler, waste type, and quantity received. In addition, the Discharger shall maintain records for a minimum of three years for the disposition, location, and quantity of accumulated pre-digestion-segregated solid waste hauled off-site.

6. Other Special Provisions

a. **Seasonal Title 22, or Equivalent, Disinfection Requirements. Effective 9 May 2023,** from May to October wastewater shall be oxidized, coagulated, filtered, and adequately disinfected pursuant to the DDW reclamation criteria, CCR, title 22, division 4, chapter 3, (Title 22), or equivalent, in accordance with the compliance schedule in Section VI.C.7.a.

7. Compliance Schedules

a. **Compliance Schedule for Seasonal Title 22, or Equivalent, Disinfection Requirements.** By **9 May 2023**, the Discharger shall comply with the seasonal disinfection requirements (Section VI.C.6.a), final seasonal effluent limitations for total coliform organisms (Section IV.A.1.g), final effluent limits for BOD_5 and TSS (Section IV.A.1.a), and the filtration system operating specifications (Section VI.C.4.a). Until final compliance, the Discharger shall submit progress reports in accordance with the Monitoring and Reporting Program (Attachment E, section X.D.1).

Task		Date Due
i.	Submit Method of Compliance Workplan/Schedule	Complete
ii.	Progress Reports[1]	**9 July**, annually, until final compliance
iii.	Begin CEQA process for Compliance Project	**Complete**
iv.	Begin construction of Compliance Project	**16 May 2020**
v.	Submit Seasonal Operations Plan[2]	**No later than 30 days prior to full compliance**
vi.	Full Compliance	**9 May 2023**

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

[2] The plan shall incorporate as a goal to reasonably limit the amount of unfiltered discharge and describe anticipated operations of the Facility when flows in excess of filter design capacity occur considering influent flows to the entire Facility, available storage, river flows, impending meteorological conditions, and any other relevant operational considerations. This plan will be periodically updated, as necessary, based on accumulated operating data and experience.

b. **Compliance Schedule for Final Effluent Limitations for Ammonia.** This Order requires compliance with the final effluent limitations for ammonia by **11 May 2021**. The Discharger shall comply with the following time schedule to ensure compliance with the final effluent limitations:

Task	Date Due
i. Submit Method of Compliance Workplan/Schedule	Complete
ii. Submit and Implement PPP[1] for ammonia	Complete
iii. Progress Reports[2]	**9 July,** annually, until final compliance
iv. Begin CEQA process for Compliance Project	Complete
v. Begin construction of Compliance Project	**19 May 2018**
vii. Full Compliance	**11 May 2021**

[1] The Discharger shall continue to implement the PPP.

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

c. **Compliance Schedule for Final Effluent Limitations for Methylmercury.** This Order requires compliance with the final effluent limitations for methylmercury by **31 December 2030**. The Discharger shall comply with the following time schedule to ensure compliance with the final effluent limitations:

Task	Date Due
Phase 1	
i. Submit CVCWA Coordinated Methylmercury Control Study Work Plan	Complete
ii. Update and Implement PPP[1] for Mercury (per Section VI.C.3.a)	Complete
iii. Implement CVCWA Coordinated Methylmercury Control Study Work Plan	**Immediately following Executive Officer approval**
iv. Annual Progress Reports[2]	**1 March, annually**
v. Submit Final CVCWA Coordinated Methylmercury Control Study	**20 October 2018[3]**
Phase 2	
vi. Implement methylmercury control programs	**TBD[4]**
vii. Full Compliance	**31 December 2030**

Task	Date Due

[1] The PPP for mercury shall be implemented in accordance with Section VI.C.3.a.

[2] Beginning **1 March 2017** and annually thereafter until the Facility achieves compliance with the final effluent limitations for methylmercury, the Discharger shall submit annual progress reports on pollution minimization activities implemented and evaluation of their effectiveness, including a summary of total mercury and methylmercury monitoring results.

[3] The Executive Officer may, after public notice, extend the due date for the Final CVCWA Coordinated Methylmercury Control Study up to 2 years if the Discharger demonstrates it is making significant progress towards developing, implementing, and/or completing the Study and reasonable attempts have been made to secure funding for the Study, but the Discharger has experienced severe budget shortfalls.

[4] To be determined. Following Phase 1 the Central Valley Water Board will conduct a Phase 1 Delta Mercury Control Program Review that considers: modification of methylmercury goals, objectives, allocations, final compliance date, etc. Consequently, the start of Phase 2 and the final compliance date is uncertain at the time this Order was adopted.

VII. COMPLIANCE DETERMINATION

A. BOD_5 and TSS Effluent Limitations (Sections IV.A.1.a, IV.A.1.b, and IV.A.2.a). Compliance with the final effluent limitations for BOD_5 and TSS required in Limitations and Discharge Requirements section IV.A.1.a and IV.A.2.a shall be ascertained by 24-hour composite samples. Compliance with effluent limitations required in Limitations and Discharge Requirements section IV.A.1.b for percent removal shall be calculated using the arithmetic mean of BOD_5 and TSS in effluent samples collected over a monthly period as a percentage of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period.

B. Methylmercury and Total Mercury Mass Loading Effluent Limitations (Sections IV.A.1.j and IV.A.2.e). The procedures for calculating mass loadings are as follows:

1. The total pollutant mass load for each individual calendar month shall be determined using an average of all concentration data collected that month and the corresponding total monthly flow. All effluent monitoring data collected under the monitoring and reporting program, pretreatment program, and any special studies shall be used for these calculations. The total annual mass loading shall be the sum of the individual calendar months.

2. In calculating compliance, the Discharger shall count all non-detect measures at one-half of the detection level. If compliance with the effluent limitation is not attained due to the non-detect contribution, the Discharger shall improve and implement available analytical capabilities and compliance shall be evaluated with consideration of the detection limits.

C. Average Dry Weather Flow Effluent Limitations (Section IV.A.1.h). The average dry weather discharge flow represents the daily average flow when groundwater is at or near normal and runoff is not occurring. Compliance with the average dry weather flow effluent limitations will be determined annually based on the average daily flow over three consecutive dry weather months (e.g., July, August, and September).

D. Total Coliform Organisms Effluent Limitations (Sections IV.A.1.g and IV.A.2.d)

1. **7-Day Median.** For each day that an effluent sample is collected and analyzed for total coliform organisms, compliance with the 7-day median final effluent limitation (Section IV.A.1.g.i.(a)) shall be determined by calculating the median concentration of total coliform bacteria in the effluent utilizing the bacteriological results of the last 7 days. For example, if a sample is collected on a Wednesday, the result from that sampling event and all results from the previous 6 days (i.e., Tuesday, Monday, Sunday, Saturday,

Friday, and Thursday) are used to calculate the 7-day median. The first compliance determination is made on 7 May of a year and the last compliance determination is made on 31 October of a year.

2. **Monthly Median.** Compliance with the total coliform monthly median final effluent limitation (Section IV.A.1.g.ii.(a)) shall be determined by calculating the median value of total coliform bacteria in the effluent utilizing all total coliform results during each calendar month in which the monthly median limitation applies (i.e., November – April).

3. **Weekly Median.** Compliance with the interim weekly median effluent limitation (Section IV.A.2.d.i) and final weekly median effluent limitation (Section IV.A.1.g.ii.(b)) shall be determined by calculating the median value of total coliform bacteria in the effluent utilizing all total coliform results from Sunday through Saturday of each calendar week.

E. Total Residual Chlorine Effluent Limitations (Sections IV.A.1.f and IV.A.2.c). Continuous monitoring analyzers for chlorine residual or for dechlorination agent residual in the effluent are appropriate methods for compliance determination. A positive residual dechlorination agent in the effluent indicates that chlorine is not present in the discharge, which demonstrates compliance with the effluent limitations. This type of monitoring can also be used to prove that some chlorine residual exceedances are false positives. Continuous monitoring data showing either a positive dechlorination agent residual or a chlorine residual at or below the prescribed limit are sufficient to show compliance with the total residual chlorine effluent limitations, as long as the instruments are maintained and calibrated in accordance with the manufacturer's recommendations.

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

F. Mass Effluent Limitations. The mass effluent limitations contained in the Final Effluent Limitations IV.A.1.a and Interim Effluent Limitations IV.A.2.a and IV.A.2.b are based on the permitted average dry weather flow and calculated as follows:

Mass (lbs/day) = Flow (MGD) x Concentration (mg/L) x 8.34 (conversion factor)

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

G. Priority Pollutant Effluent Limitations. Compliance with effluent limitations for priority pollutants shall be determined in accordance with Section 2.4.5 of the SIP, as follows:

1. Dischargers shall be deemed out of compliance with an effluent limitation, if the concentration of the priority pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reporting level (RL).

2. Dischargers shall be required to conduct a Pollutant Minimization Program (PMP) in accordance with section 2.4.5.1 of the SIP when there is evidence that the priority pollutant is present in the effluent above an effluent limitation and either:

a. A sample result is reported as detected, but not quantified (DNQ) and the effluent limitation is less than the RL; or

b. A sample result is reported as non-detect (ND) and the effluent limitation is less than the method detection limit (MDL).

3. When determining compliance with a maximum daily effluent limitation (MDEL), average weekly effluent limitation (AWEL), or an average monthly effluent limitation (AMEL) and more than one sample result is available in the monitoring period, the discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of DNQ or ND. In those cases, the discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:

a. The data set shall be ranked from low to high, reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.

b. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

4. If a sample result, or the arithmetic mean or median of multiple sample results, is below the RL, and there is evidence that the priority pollutant is present in the effluent above an effluent limitation and the discharger conducts a PMP (as described in section 2.4.5.1), the discharger shall <u>not</u> be deemed out of compliance.

H. Chronic Whole Effluent Toxicity Effluent Limitation (Section IV.A.1.d). Compliance with the accelerated monitoring and TRE provisions of Provision VI.C.2.a shall constitute compliance with the effluent limitation.

I. Acute Whole Effluent Toxicity Effluent Limitation (Section IV.A.1.c). For each 96-hour acute bioassay test result, compliance with the acute WET 90% median survival effluent limitation shall be determined based on the median of that test result and the previous two test results.

J. Turbidity Receiving Water Limitation (Section V.A.17). Compliance shall be determined using data samples from Monitoring Location RSWD-003 and analyzed with data samples for natural turbidity at Monitoring Location RSWU-001.

K. Dissolved Oxygen Receiving Water Limitation (Section V.A.5.). Compliance shall be determined using data samples from Monitoring Location RSWD-003.

L. pH Receiving Water Limitation (Section V.A.8.). Compliance shall be determined using data samples from Monitoring Location RSWD-003.

M. Temperature Receiving Water Limitation (Section V.A.15.). Compliance shall be determined using data samples from Monitoring Location RSWD-003 and analyzed with data samples for natural temperature at Monitoring Location RSWU-001.

N. Chlorpyrifos and Diazinon Effluent Limitations (Section IV.A.1.i). Compliance shall be determined by calculating the sum (S), as provided in this Order, with analytical results that are reported as “non-detectable” concentrations to be considered to be zero.

O. Use of Delta Regional Monitoring Program and Other Receiving Water Data to Determine Compliance with Receiving Water Limitations. Delta Regional Monitoring Program data and other receiving water monitoring data that is not specifically required to be

conducted by the Discharger under this permit will not be used directly to determine that the discharge is in violation of this Order. The Discharger may, however, conduct any site-specific receiving water monitoring deemed appropriate by the Discharger that is not conducted by the Delta Regional Monitoring Program and submit that monitoring data. As described in section VIII of Attachment E, such data may be used, if scientifically defensible, in conjunction with other receiving water data, effluent data, receiving water flow data, and other pertinent information to determine whether or not a discharge is in compliance with this Order.

ATTACHMENT A – DEFINITIONS

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

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

Average Monthly Effluent Limitation (AMEL)
The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

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

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

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

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

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

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

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

Detected, but Not Quantified (DNQ)
DNQ are those sample results less than the RL, but greater than or equal to the laboratory's MDL. Sample results reported as DNQ are estimated concentrations.

Dilution Credit
Dilution Credit is the amount of dilution granted to a discharge in the calculation of a water quality-based effluent limitation, based on the allowance of a specified mixing zone. It is calculated from the

dilution ratio or determined through conducting a mixing zone study or modeling of the discharge and receiving water.

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

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

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

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

Inland Surface Waters
All surface waters of the state that do not include the ocean, enclosed bays, or estuaries.

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

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

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

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

Method Detection Limit (MDL)
MDL is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero, as defined in in 40 C.F.R. part 136, Attachment B, revised as of July 3, 1999.

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

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

Not Detected (ND)
Sample results which are less than the laboratory's MDL.

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

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

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

Pollution Prevention
Pollution Prevention means any action that causes a net reduction in the use or generation of a hazardous substance or other pollutant that is discharged into water and includes, but is not limited to, input change, operational improvement, production process change, and product reformulation (as defined in Water Code section 13263.3). Pollution prevention does not include actions that merely shift a pollutant in wastewater from one environmental medium to another environmental medium, unless

clear environmental benefits of such an approach are identified to the satisfaction of the State Water Resources Control Board (State Water Board) or Central Valley Water Board.

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

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

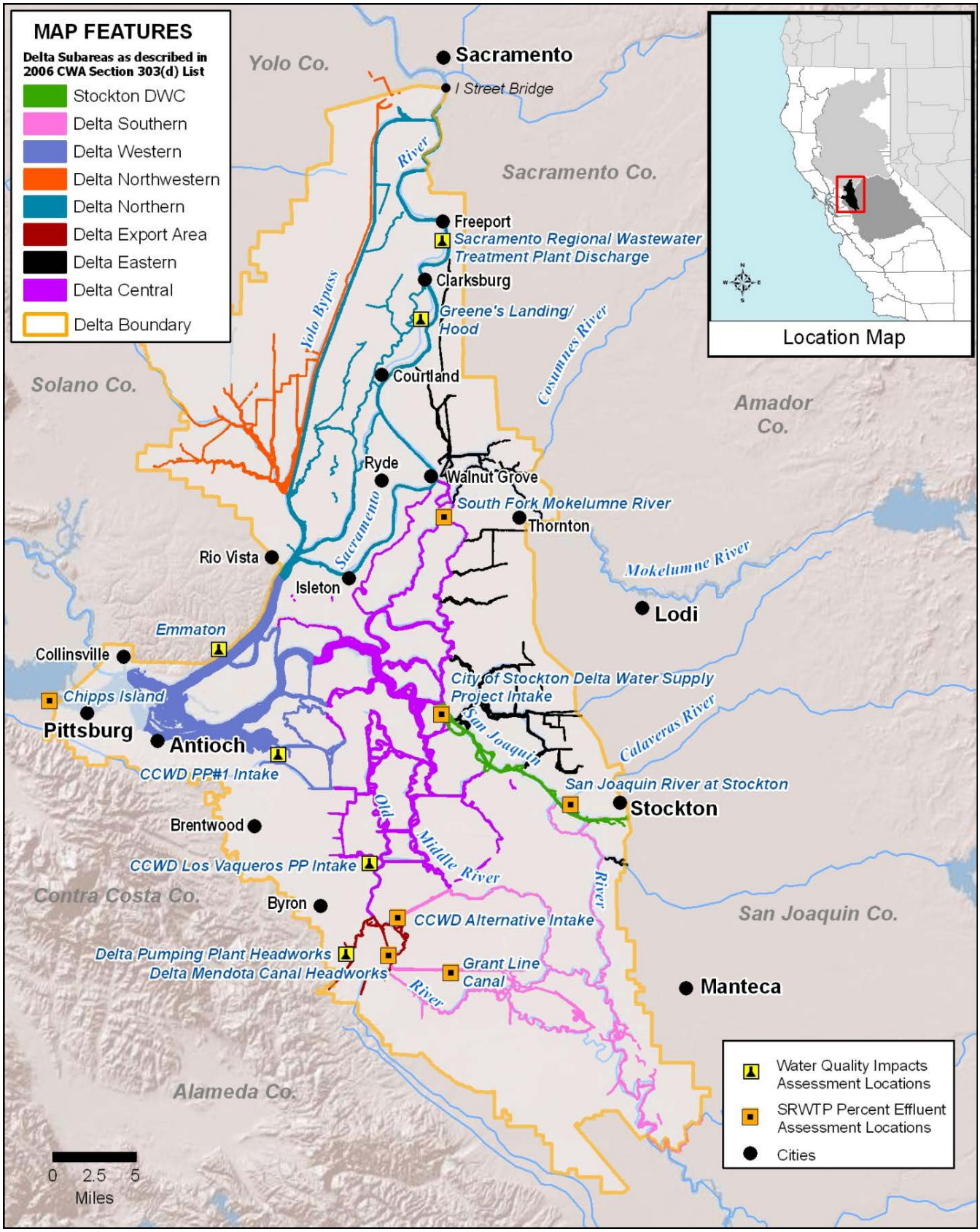
Standard Deviation (σ)
Standard Deviation is a measure of variability that is calculated as follows:

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

where:
x is the observed value;
μ is the arithmetic mean of the observed values; and
n is the number of samples.

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

ATTACHMENT B – MAP



ATTACHMENT C – FLOW SCHEMATIC

Figure C-1. Current Flow Schematic

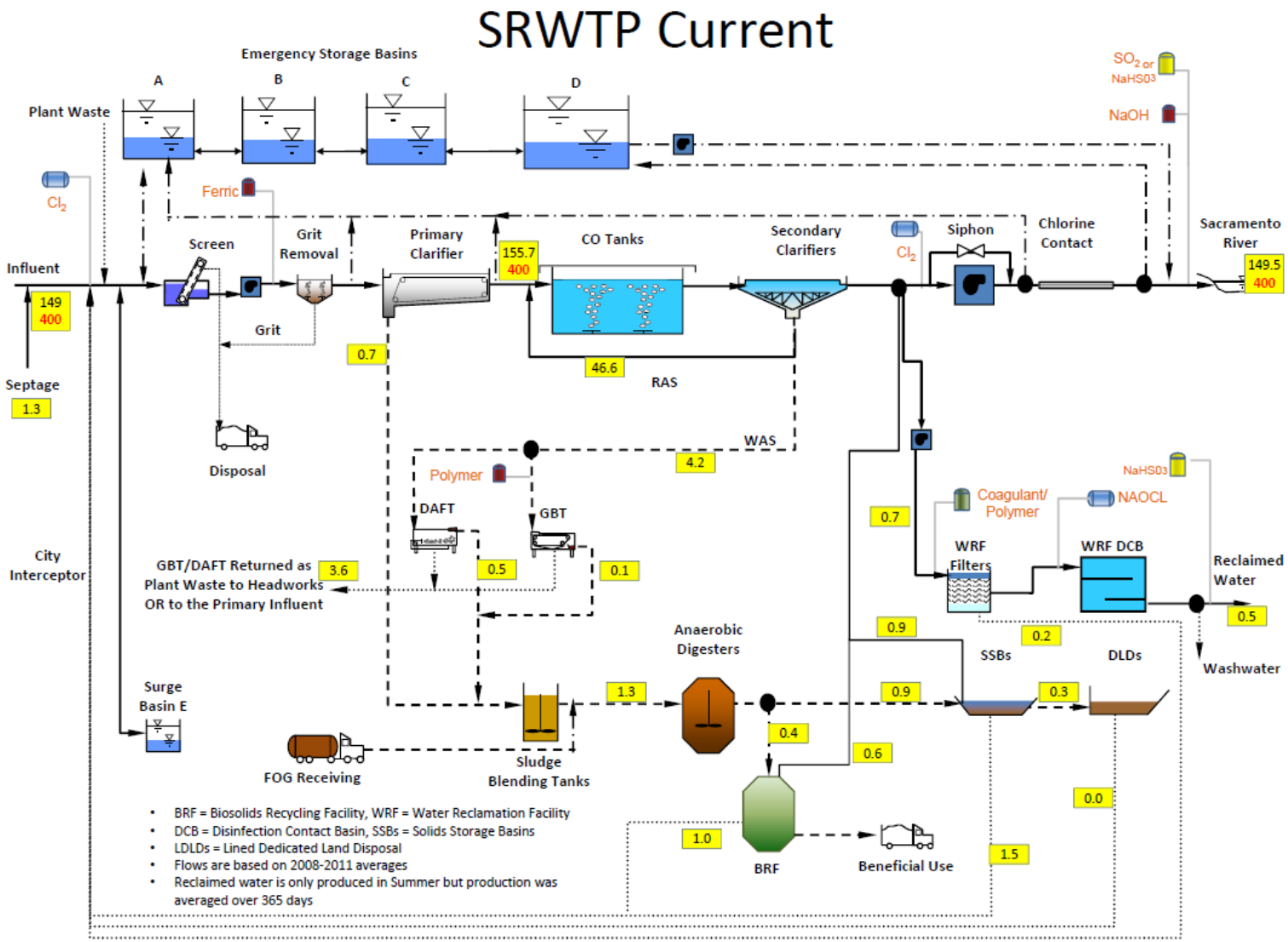
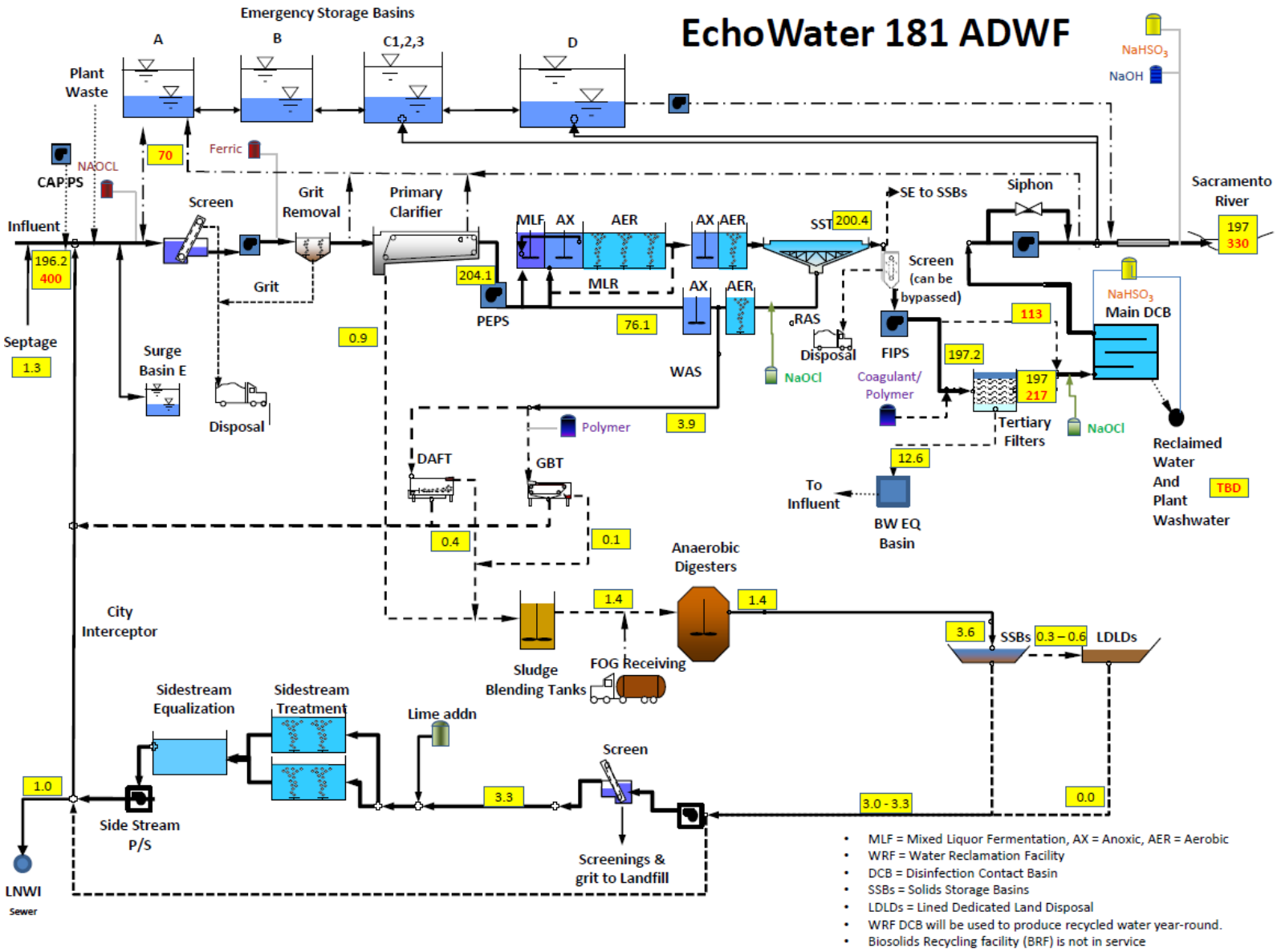


Figure C-2. Future Flow Schematic



ATTACHMENT D – STANDARD PROVISIONS

I. STANDARD PROVISIONS – PERMIT COMPLIANCE

A. Duty to Comply

1. The Discharger must comply with all of the terms, requirements, and conditions of this Order. Any noncompliance constitutes a violation of the Clean Water Act (CWA) and the California Water Code and is grounds for enforcement action; permit termination, revocation and reissuance, or modification; denial of a permit renewal application; or a combination thereof. (40 C.F.R. § 122.41(a); Wat. Code, §§ 13261, 13263, 13265, 13268, 13000, 13001, 13304, 13350, 13385.)

2. The Discharger shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants and with standards for sewage sludge use or disposal established under Section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions, even if this Order has not yet been modified to incorporate the requirement. (40 C.F.R. § 122.41(a)(1).)

B. Need to Halt or Reduce Activity Not a Defense

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

C. Duty to Mitigate

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

D. Proper Operation and Maintenance

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

E. Property Rights

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

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

F. Inspection and Entry

The Discharger shall allow the Central Valley Water Board, State Water Board, U.S. EPA, and/or their authorized representatives (including an authorized contractor acting as their representative), upon the presentation of credentials and other documents, as may be required by law, to (33 U.S.C. § 1318(a)(4)(B); 40 C.F.R. § 122.41(i); Wat. Code, § 13267, 13383):

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order (33 U.S.C § 1318(a)(4)(B)(ii); 40 C.F.R. § 122.41(i)(1); Wat. Code, §§ 13267, 13383);

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order (33 U.S.C. § 1318(a)(4)(B)(ii); 40 C.F.R. § 122.41(i)(2); Wat. Code, §§ 13267, 13383);

3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order (33 U.S.C § 1318(a)(4)(B)(ii); 40 C.F.R. § 122.41(i)(3); Wat. Code, § 13267, 13383); and

4. Sample or monitor, at reasonable times, for the purposes of assuring Order compliance or as otherwise authorized by the CWA or the Water Code, any substances or parameters at any location. (33 U.S.C § 1318(a)(4)(B); 40 C.F.R. § 122.41(i)(4); Wat. Code, §§ 13267, 13383.)

G. Bypass

1. Definitions

   a. “Bypass” means the intentional diversion of waste streams from any portion of a treatment facility. (40 C.F.R. § 122.41(m)(1)(i).)

   b. “Severe property damage” means substantial physical damage to property, damage to the treatment facilities, which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production. (40 C.F.R. § 122.41(m)(1)(ii).)

2. Bypass not exceeding limitations. The Discharger may allow any bypass to occur which does not cause exceedances of effluent limitations, but only if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions listed in Standard Provisions – Permit Compliance I.G.3, I.G.4, and I.G.5 below. (40 C.F.R. § 122.41(m)(2).)

3. Prohibition of bypass. Bypass is prohibited, and the Central Valley Water Board may take enforcement action against a Discharger for bypass, unless (40 C.F.R. § 122.41(m)(4)(i)):

   a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage (40 C.F.R. § 122.41(m)(4)(i)(A));

   b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance (40 C.F.R. § 122.41(m)(4)(i)(B)); and

   c. The Discharger submitted notice to the Central Valley Water Board as required under Standard Provisions – Permit Compliance I.G.5 below. (40 C.F.R. § 122.41(m)(4)(i)(C).)

4. The Central Valley Water Board may approve an anticipated bypass, after considering its adverse effects, if the Central Valley Water Board determines that it will meet the three conditions listed in Standard Provisions – Permit Compliance I.G.3 above. (40 C.F.R. § 122.41(m)(4)(ii).)

5. Notice

   a. Anticipated bypass. If the Discharger knows in advance of the need for a bypass, it shall submit a notice, if possible at least 10 days before the date of the bypass. (40 C.F.R. § 122.41(m)(3)(i).)

   b. Unanticipated bypass. The Discharger shall submit notice of an unanticipated bypass as required in Standard Provisions - Reporting V.E below (24-hour notice). (40 C.F.R. § 122.41(m)(3)(ii).)

H. Upset

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

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of Standard Provisions – Permit Compliance I.H.2 below are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review. (40 C.F.R. § 122.41(n)(2).)

2. Conditions necessary for a demonstration of upset. A Discharger who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that (40 C.F.R. § 122.41(n)(3)):

   a. An upset occurred and that the Discharger can identify the cause(s) of the upset (40 C.F.R. § 122.41(n)(3)(i));

   b. The permitted facility was, at the time, being properly operated (40 C.F.R. § 122.41(n)(3)(ii));

   c. The Discharger submitted notice of the upset as required in Standard Provisions – Reporting V.E.2.b below (24-hour notice) (40 C.F.R. § 122.41(n)(3)(iii)); and

   d. The Discharger complied with any remedial measures required under Standard Provisions – Permit Compliance I.C above. (40 C.F.R. § 122.41(n)(3)(iv).)

3. Burden of proof. In any enforcement proceeding, the Discharger seeking to establish the occurrence of an upset has the burden of proof. (40 C.F.R. § 122.41(n)(4).)

II. STANDARD PROVISIONS – PERMIT ACTION

A. General

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

B. Duty to Reapply

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

C. Transfers

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

III. STANDARD PROVISIONS – MONITORING

A. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. (40 C.F.R. § 122.41(j)(1).)

B. Monitoring results must be conducted according to test procedures approved under 40 C.F.R. part 136 for the analyses of pollutants unless another method is required under 40 C.F.R. subchapters N or O. In the case of pollutants for which there are no approved methods under 40 C.F.R. part 136 or otherwise required under 40 C.F.R. subchapters N or O, monitoring must be conducted according to a test procedure specified in this Order for such pollutants. (40 C.F.R. § 122.41(j)(4); 122.44(i)(1)(iv).)

IV. STANDARD PROVISIONS – RECORDS

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

B. Records of monitoring information shall include:

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

C. Claims of confidentiality for the following information will be denied (40 C.F.R. § 122.7(b)):

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

V. STANDARD PROVISIONS – REPORTING

A. Duty to Provide Information

The Discharger shall furnish to the Central Valley Water Board, State Water Board, or U.S. EPA within a reasonable time, any information which the Central Valley Water Board, State Water Board, or U.S. EPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order or to determine compliance with this Order. Upon request, the Discharger shall also furnish to the Central Valley Water Board, State Water Board, or U.S. EPA copies of records required to be kept by this Order. (40 C.F.R. § 122.41(h); Wat. Code, §§ 13267, 13383.)

B. Signatory and Certification Requirements

1. All applications, reports, or information submitted to the Central Valley Water Board, State Water Board, and/or U.S. EPA shall be signed and certified in accordance with Standard Provisions – Reporting V.B.2, V.B.3, V.B.4, and V.B.5 below. (40 C.F.R. § 122.41(k).)

2. All permit applications shall be signed by either a principal executive officer or ranking elected official. For purposes of this provision, a principal executive officer of a federal agency includes: (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of U.S. EPA). (40 C.F.R. § 122.22(a)(3).).

3. All reports required by this Order and other information requested by the Central Valley Water Board, State Water Board, or U.S. EPA shall be signed by a person described in Standard Provisions – Reporting V.B.2 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described in Standard Provisions – Reporting V.B.2 above (40 C.F.R. § 122.22(b)(1));

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) (40 C.F.R. § 122.22(b)(2)); and

   c. The written authorization is submitted to the Central Valley Water Board and State Water Board. (40 C.F.R. § 122.22(b)(3).)

4. If an authorization under Standard Provisions – Reporting V.B.3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard Provisions – Reporting V.B.3 above must be submitted to the Central Valley Water Board and State Water Board prior to or together with any reports, information, or applications, to be signed by an authorized representative. (40 C.F.R. § 122.22(c).)

5. Any person signing a document under Standard Provisions – Reporting V.B.2 or V.B.3 above shall make the following certification:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my

inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." (40 C.F.R. § 122.22(d).)

C. Monitoring Reports

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program (Attachment E) in this Order. (40 C.F.R. § 122.41(l)(4).)
2. Monitoring results must be reported on a Discharge Monitoring Report (DMR) form or forms provided or specified by the Central Valley Water Board or State Water Board for reporting results of monitoring of sludge use or disposal practices. (40 C.F.R. § 122.41(l)(4)(i).)
3. If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under 40 C.F.R. part 136, or another method required for an industry-specific waste stream under 40 C.F.R. subchapters N or O, the results of such monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Central Valley Water Board. (40 C.F.R. § 122.41(l)(4)(ii).)
4. Calculations for all limitations, which require averaging of measurements, shall utilize an arithmetic mean unless otherwise specified in this Order. (40 C.F.R. § 122.41(l)(4)(iii).)

D. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Order, shall be submitted no later than 14 days following each schedule date. (40 C.F.R. § 122.41(l)(5).)

E. Twenty-Four Hour Reporting

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

F. Planned Changes

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

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

G. Anticipated Noncompliance

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

H. Other Noncompliance

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

I. Other Information

When the Discharger becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Central Valley Water Board**,** State Water Board, or U.S. EPA, the Discharger shall promptly submit such facts or information. (40 C.F.R. § 122.41(l)(8).)

VI. STANDARD PROVISIONS – ENFORCEMENT

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

VII. ADDITIONAL PROVISIONS – NOTIFICATION LEVELS

A. Publicly-Owned Treatment Works (POTW's)

All POTW's shall provide adequate notice to the Central Valley Water Board of the following (40 C.F.R. § 122.42(b)):

1. Any new introduction of pollutants into the POTW from an indirect discharger that would be subject to sections 301 or 306 of the CWA if it were directly discharging those pollutants (40 C.F.R. § 122.42(b)(1)); and
2. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of adoption of the Order. (40 C.F.R. § 122.42(b)(2).)

3. Adequate notice shall include information on the quality and quantity of effluent introduced into the POTW as well as any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW. (40 C.F.R. § 122.42(b)(3).)

ATTACHMENT E – MONITORING AND REPORTING PROGRAM

Contents

I. General Monitoring Provisions E-2
II. Monitoring Locations E-3
III. Influent Monitoring Requirements E-4
A. Monitoring Location INF-001 ....E-4
B. Monitoring Location CAP-001 ....E-4
IV. Effluent Monitoring Requirements E-5
A. Monitoring Location EFF-001 ....E-5
B. Monitoring Location TER-001 ....E-8
V. Whole Effluent Toxicity Testing Requirements E-8
VI. Land Discharge Monitoring Requirements E-11
A. Monitoring Locations ESB-A through ESB-E E-11
VII. Recycling Monitoring Requirements – Not Applicable E-11
VIII. Receiving Water Monitoring Requirements E-11
A. Monitoring Locations RSWU-001 and RSWD-003 ....E-12
IX. Other Monitoring Requirements E-13
A. Filtration System Monitoring E-13
B. Effluent and Receiving Water Characterization E-13
X. Reporting Requirements E-17
A. General Monitoring and Reporting Requirements E-17
B. Self-Monitoring Reports (SMR's) E-18
C. Discharge Monitoring Reports (DMR's) E-22
D. Other Reports E-22

Tables

Table E-1. Monitoring Station Locations E-3
Table E-2. Influent Monitoring E-4
Table E-3. Groundwater Corrective Action Program (CAP) Monitoring E-4
Table E-4. Effluent Monitoring – Monitoring Location EFF-001 ....E-5
Table E-5. Effluent Monitoring – Monitoring Location TER-001 ....E-8
Table E-6. Chronic Toxicity Testing Dilution Series E-9
Table E-7. Land Discharge Monitoring Requirements E-11
Table E-8. Receiving Water Monitoring Requirements E-12
Table E-9. Filtration System Monitoring Requirements E-13
Table E-10. Effluent Characterization Monitoring E-14
Table E-11. Monitoring Periods and Reporting Schedule E-19
Table E-12. Reporting Requirements for Special Provisions Reports E-22

ATTACHMENT E – MONITORING AND REPORTING PROGRAM (MRP)

The Code of Federal Regulations (40 C.F.R. § 122.48) requires that all NPDES permits specify monitoring and reporting requirements. Water Code sections 13267 and 13383 also authorize the Central Valley Water Board to require technical and monitoring reports. This MRP establishes monitoring and reporting requirements that implement federal and California regulations.

I. GENERAL MONITORING PROVISIONS

A. Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring locations specified below and, unless otherwise specified, before the monitored flow joins or is diluted by any other waste stream, body of water, or substance. Monitoring locations shall not be changed without notification to and the approval of the Central Valley Water Board.

B. Final effluent samples shall be taken downstream of the last addition of wastes to the treatment or discharge works where a representative sample may be obtained prior to mixing with the receiving waters. Samples shall be collected at such a point and in such a manner to ensure a representative sample of the discharge.

C. Chemical, bacteriological, and bioassay analyses of any material required by this Order shall be conducted by a laboratory certified for such analyses by the State Water Resources Control Board (State Water Board), Division of Drinking Water (DDW; formerly the Department of Public Health). Laboratories that perform sample analyses must be identified in all monitoring reports submitted to the Central Valley Water Board. In the event a certified laboratory is not available to the Discharger for any onsite field measurements such as pH, dissolved oxygen (DO), turbidity, temperature, and residual chlorine, such analyses performed by a noncertified laboratory will be accepted provided a Quality Assurance-Quality Control Program is instituted by the laboratory. A manual containing the steps followed in this program for any onsite field measurements such as pH, DO, turbidity, temperature, and residual chlorine must be kept onsite in the treatment facility laboratory and shall be available for inspection by Central Valley Water Board staff. The Discharger must demonstrate sufficient capability (qualified and trained employees, properly calibrated and maintained field instruments, etc.) to adequately perform these field measurements. The Quality Assurance-Quality Control Program must conform to U.S. EPA guidelines or to procedures approved by the Central Valley Water Board.

D. Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. All monitoring instruments and devices used by the Discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary, at least yearly, to ensure their continued accuracy. All flow measurement devices shall be calibrated at least once per year to ensure continued accuracy of the devices.

E. Monitoring results, including noncompliance, shall be reported at intervals and in a manner specified in this Monitoring and Reporting Program.

F. Laboratories analyzing monitoring samples shall be certified by DDW, in accordance with the provision of Water Code section 13176, and must include quality assurance/quality control data with their reports.

G. The Discharger shall ensure that the results of the Discharge Monitoring Report-Quality Assurance (DMR-QA) Study or the most recent Water Pollution Performance Evaluation Study are submitted annually to the State Water Resources Control Board at the following address:

State Water Resources Control Board Quality Assurance Program Officer
Office of Information Management and Analysis
State Water Resources Control Board
1001 I Street, Sacramento, CA 95814

H. The Discharger shall file with the Central Valley Water Board technical reports on self-monitoring performed according to the detailed specifications contained in this Monitoring and Reporting Program.

I. The results of all monitoring required by this Order shall be reported to the Central Valley Water Board, and shall be submitted in such a format as to allow direct comparison with the limitations and requirements of this Order. Unless otherwise specified, discharge flows shall be reported in terms of the monthly average and the daily maximum discharge flows.

II. MONITORING LOCATIONS

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

Table E-1. Monitoring Station Locations

Discharge Point Name	Monitoring Location Name	Monitoring Location Description
--	INF-001	Location where a representative sample of the Facility's influent can be obtained.
--	CAP-001	Location where a representative sample of Groundwater Corrective Action Program (CAP) wastewater can be obtained prior to discharge to the effluent channel downstream of the secondary clarifiers and upstream of the plant chlorination station.
001	EFF-001	Location where a representative sample of the Facility's effluent can be obtained. Latitude: 38° 27' 15" Longitude: 121° 30' 00" W
001	TER-001	Location where a representative sample of tertiary treated wastewater can be obtained downstream of the filtration and disinfection systems and prior to discharge to the emergency storage basins or the Sacramento River.
--	ESB-A through ESB-E	Emergency Storage Basins A through E.
--	RSWU-001	Located in the Sacramento River upstream of Discharge Point 001 at Freeport Bridge.
--	RSWD-003	Located in the Sacramento River 4,200 feet downstream of Discharge Point 001 at Cliff's Marina.
--	FIL-001	Location where a representative sample of the Facility's filtration system effluent can be obtained without influence from downstream unit processes or flows.

The North latitude and West longitude information in Table E-1 are approximate for administrative purposes.

III. INFLUENT MONITORING REQUIREMENTS

A. Monitoring Location INF-001

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

Table E-2. Influent Monitoring

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow	MGD	Meter	Continuous	--
Conventional Pollutants				
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	24-hr Composite[1]	1/Day	[2]
pH	standard units	Meter[3]	Continuous	[2]
Total Suspended Solids	mg/L	24-hr Composite[1]	1/Day	[2]
Non-Conventional Pollutants				
Electrical Conductivity @ 25°C	µmhos/cm	24-hr Composite[1]	1/Week	[2]
Total Dissolved Solids	mg/L	24-hr Composite[1]	1/Month	[2]

[1] 24-hour flow proportional composite. In the event of composite sample malfunction, a grab sample must be substituted.

[2] Pollutants shall be analyzed using the analytical methods described in 40 C.F.R. part 136 or by methods requested by the Discharger that have been approved by the Central Valley Water Board or the State Water Board.

[3] Grab samples to be collected whenever the continuous pH meter is offline for 30 minutes or longer.

B. Monitoring Location CAP-001

1. The Discharger shall monitor the Groundwater Corrective Action Program (CAP) discharge to the Facility at Monitoring Location CAP-001 as follows. The Discharger is planning to modify the groundwater CAP discharge to redirect the discharge to wetlands or the Facility influent, rather than to the Facility's secondary effluent channel. After completion of this project these monitoring requirements may cease upon written Executive Officer approval.

Table E-3. Groundwater Corrective Action Program (CAP) Monitoring

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow	MGD	Meter/Totalizer	1/Month	--
Priority Pollutants				
Arsenic, Total Recoverable	µg/L	Grab	2/Year	[1]
Cadmium, Total Recoverable	µg/L	Grab	2/Year	[1]
Chromium, Total Recoverable	µg/L	Grab	2/Year	[1]
Copper, Total Recoverable	µg/L	Grab	2/Year	[1]

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Lead, Total Recoverable	µg/L	Grab	2/Year	[1]
Mercury, Total	µg/L	Grab	2/Year	[1]
Nickel, Total Recoverable	µg/L	Grab	2/Year	[1]
Zinc, Total Recoverable	µg/L	Grab	2/Year	[1]
Non-Conventional Pollutants				
Electrical Conductivity @ 25°C	µmhos/cm	Grab	2/Year	[1]
Nitrate Nitrogen, Total (as N)	mg/L	Grab	2/Year	[1]
Total Dissolved Solids	mg/L	Grab	2/Year	[1]

[1] Pollutants shall be analyzed using the analytical methods described in 40 C.F.R. part 136 or by methods requested by the Discharger that have been approved by the Central Valley Water Board or the State Water Board.

IV. EFFLUENT MONITORING REQUIREMENTS

A. Monitoring Location EFF-001

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

Table E-4. Effluent Monitoring – Monitoring Location EFF-001

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow	MGD	Meter	Continuous	--
Effluent/River Dilution Ratio[1]	--	Calculation	Continuous	--
Conventional Pollutants				
Biochemical Oxygen Demand (5-day @ 20° C)	mg/L	24-hr Composite[3]	1/Day	[4]
	lbs/day	Calculate	1/Day	--
pH	standard units	Meter	Continuous[5,6]	[4]
Total Suspended Solids	mg/L	24-hr Composite[3]	1/Day	[4]
	lbs/day	Calculate	1/Day	--
Priority Pollutants				
Bis (2-Ethylhexyl) Phthalate	µg/L	Grab	1/Month	[4,7,8]
Carbon Tetrachloride	µg/L	Grab	1/Month	[4,7]
Chlorodibromomethane	µg/L	Grab	1/Month	[4,7]
Copper, Dissolved	µg/L	24-hr Composite[3]	1/Month	[4,7]
Copper, Total Recoverable	µg/L	24-hr Composite[3]	1/Month	[4,7]
Cyanide, Total (as CN)	µg/L	Grab	1/Month	[4,7,9]
Dichlorobromomethane	µg/L	Grab	1/Month	[4,7]

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Mercury, Total	ng/L	24-hr Composite[3]	1/Month	[4,7,10]
Methylene Chloride	µg/L	Grab	1/Month	[4,7]
Non-Conventional Pollutants				
Alkalinity (as $CaCO_3$)	mg/L	24-hr Composite[3]	1/Month	[4]
Ammonia Nitrogen, Total (as N)	mg/L	24-hr Composite[3]	1/Day[5,11]	[4]
	lbs/day	Calculate	1/Day	--
Chlorine, Total Residual	mg/L	Meter	Continuous	[4,12]
Cryptosporidium	Oocysts/100 mL	Grab	1/Month	[4,13]
Dissolved Oxygen	mg/L	Meter	Continuous	[4]
Electrical Conductivity @ 25°C	µmhos/cm	24-hr Composite[3]	1/Week	[4]
Giardia	Oocysts/100 mL	Grab	1/Month	[4,14]
Hardness, Total (as $CaCO_3$)	mg/L	24-hr Composite[3]	1/Month[15]	[4]
Mercury (methyl)	ng/L	24-hr Composite[3]	1/Month	[4,10]
Nitrate Plus Nitrite (as N)	mg/L	24-hr Composite[3]	1/Week	[4]
Oil and Grease	mg/L	Grab	1/Month	[4]
Settleable Solids	ml/L	24-hr Composite[3]	1/Day	[4]
Sulphur Dioxide or Sodium Bisulfite	mg/L	Meter	Continuous	[4]
Temperature	°F	Meter	Continuous[5]	[4]
Total Coliform Organisms[2]	MPN/100 mL	Grab	1/Day[16]	[4]
Total Dissolved Solids	mg/L	24-hr Composite[3]	1/Week	[4]
Total Kjeldahl Nitrogen	mg/L	24-hr Composite[3]	1/Week	[4]
Total Organic Carbon	mg/L	24-hr Composite[3]	1/Month	[4]

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method

[1] Running Hourly Average Effluent Flow/Running Hourly Average Upstream Receiving Water Flow. The Discharger shall report the lowest, highest, and average ratio calculated for each day.

[2] Upon written Executive Officer approval per Special Provisions VI.C.2.d, the monitoring for total coliform organisms shall be discontinued at Monitoring Location EFF-001 and shall be conducted at Monitoring Location TER-001.

[3] 24-hour flow proportional composite. In the event of composite malfunction, a grab sample must be substituted.

[4] Pollutants shall be analyzed using the analytical methods described in 40 C.F.R. part 136 or by methods requested by the Discharger that have been approved by the Central Valley Water Board or the State Water Board.

[5] pH and temperature shall be recorded at the time of ammonia sample collection.

[6] Effluent pH shall be measured continuously at 1-second intervals and tracked as a 20-minute running average. The highest and lowest 20-minute averages each day shall be reported.

[7] For priority pollutant constituents the reporting level shall be consistent with Sections 2.4.2 and 2.4.3 of the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (See Attachment E, section IX.B).

[8] In order to verify if bis (2-ethylhexyl) phthalate is truly present in the effluent discharge, the Discharger shall take steps to assure that sample containers, sampling apparatus, and analytical equipment are not sources of the detected contaminant.

[9] Samples taken at the effluent without preservatives may be analyzed for cyanide within 15 minutes from collection and must be performed by a laboratory certified for such analysis by DDW.

[10] Unfiltered methyl mercury and total mercury samples shall be taken using clean hands/dirty hands procedures, as described in U.S. EPA method 1669: *Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels*, for collection of equipment blanks (section 9.4.4.2), The analysis of methyl mercury and total mercury shall be by U.S. EPA method 1630 and 1631 (Revision E), respectively, with a reporting limit of 0.05 ng/L for methyl mercury and 0.5 ng/L for total mercury.

[11] Concurrent with whole effluent toxicity monitoring

[12] Total chlorine residual must be monitored with a method sensitive to and accurate at the permitted level of 0.01 mg/L. The Discharger shall report the magnitude and duration of all non-zero chlorine residual events within the reporting period.

[13] *Cryptosporidium* shall be analyzed using U.S. EPA Method 1622/23.

[14] *Giardia* shall be analyzed using U.S. EPA Method 1623.

[15] Hardness samples shall be collected concurrently with metals samples.

[16] Samples for total coliform organisms shall be collected after chlorination and prior to dechlorination. The sample must be dechlorinated immediately after sample collection.

B. Monitoring Location TER-001

1. Upon written Executive Officer approval per Special Provisions VI.C.2.d, the Discharger shall monitor effluent from the Facility at Monitoring Location TER-001 as follows. If more than one analytical test method is listed for a given parameter, the Discharger must select from the listed methods and corresponding Minimum Level:

Table E-5. Effluent Monitoring – Monitoring Location TER-001

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Conventional Pollutants				
Biochemical Oxygen Demand (5-day @ 20° C)	mg/L	24-hr Composite[1]	1/Day	[2]
	lbs/day	Calculate	1/Day	--
Total Suspended Solids	mg/L	24-hr Composite[1]	1/Day	[2]
	lbs/day	Calculate	1/Day	--
Non-Conventional Pollutants				
Total Coliform Organisms	MPN/100 mL	Grab	1/Day[3]	[2]

[1] 24-hour flow proportional composite. In the event of composite malfunction, a grab sample must be substituted.

[2] Pollutants shall be analyzed using the analytical methods described in 40 C.F.R. part 136 or by methods requested by the Discharger that have been approved by the Central Valley Water Board or the State Water Board.

[3] Samples for total coliform organisms shall be collected after chlorination and prior to dechlorination. The sample must be dechlorinated immediately after sample collection. Upon written Executive Officer approval per Special Provisions VI.C.2.d, the monitoring for total coliform organisms shall be discontinued at Monitoring Location EFF-001 and shall be conducted at Monitoring Location TER-001.

V. WHOLE EFFLUENT TOXICITY TESTING REQUIREMENTS

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

1. *Monitoring Frequency* – The Discharger shall perform weekly acute toxicity testing, concurrent with effluent ammonia sampling.

2. *Sample Types* – The Discharger shall use flow-through testing. If the flow-through bioassay is not available for use, static renewal testing may be used. For static renewal testing, the samples shall be flow proportional 24-hour composites and shall be representative of the volume and quality of the discharge. The effluent samples shall be taken at Monitoring Location EFF-001.

3. *Test Species* – Test species shall be rainbow trout (*Oncorhynchus mykiss*).

4. *Methods* – The acute toxicity testing samples shall be analyzed using EPA-821-R-02-012, Fifth Edition. Temperature, total residual chlorine, and pH shall be recorded at the time of sample collection. No pH adjustment may be made unless approved by the Executive Officer.

5. *Test Failure* – If an acute toxicity test does not meet all test acceptability criteria, as specified in the test method, the Discharger must re-sample and re-test as soon as possible, not to exceed 7 days following notification of test failure.

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

1. *Monitoring Frequency –* The Discharger shall perform monthly three species chronic toxicity testing.

2. *Sample Types* – Effluent samples shall be flow proportional 24-hour composites and shall be representative of the volume and quality of the discharge. The effluent samples shall be taken at Monitoring Location EFF-001. The receiving water samples shall be grab samples obtained from Monitoring Locations RSWU-001 and RSWD-003, as identified in this Monitoring and Reporting Program.

3. *Sample Volumes* – Adequate sample volumes shall be collected to provide renewal water to complete the test in the event that the discharge is intermittent.

4. *Test Species* – Chronic toxicity testing measures sublethal (e.g., reduced growth, reproduction) and/or lethal effects to test organisms exposed to an effluent compared to that of the control organisms. The Discharger shall conduct chronic toxicity tests with:

   a. The cladoceran, water flea, *Ceriodaphnia dubia* (survival and reproduction test);

   b. The fathead minnow, *Pimephales promelas* (larval survival and growth test); and

   c. The green alga, *Selenastrum capricornutum* (growth test).

5. Methods – The presence of chronic toxicity shall be estimated as specified in *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition*, EPA/821-R-02-013, October 2002.

6. Reference Toxicant – As required by the SIP, all chronic toxicity tests shall be conducted with concurrent testing with a reference toxicant and shall be reported with the chronic toxicity test results.

7. *Dilutions -* The chronic toxicity testing shall be performed using the dilution series identified in Table E-6, below. For Toxicity Reduction Evaluation (TRE) monitoring, the chronic toxicity testing shall be performed using the dilution series identified in Table E-6, below, unless an alternative dilution series is detailed in the submitted TRE Action Plan. If the receiving water is toxic, laboratory water control may be used as the diluent.

Table E-6. Chronic Toxicity Testing Dilution Series

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

8. *Test Failure* – The Discharger must re-sample and re-test as soon as possible, but no later than fourteen (14) days after receiving notification of a test failure. A test failure is defined as follows:

a. The reference toxicant test or the effluent test does not meet all test acceptability criteria as specified in the *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition*, EPA/821-R-02-013, October 2002 (Method Manual), and its subsequent amendments or revisions; or

b. The percent minimum significant difference (PMSD) measured for the test exceeds the upper PMSD bound variability criterion in Table 6 on page 52 of the Method Manual. (A retest is only required in this case if the test results do not exceed the monitoring trigger specified in the Special Provision at section VI.C.2.a.ii. of the Order.)

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

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

1. **Chronic WET Reporting.** Regular chronic toxicity monitoring results shall be reported to the Central Valley Water Board within 45 days following completion of the test, and shall contain, at minimum:

   a. The results expressed in TUc, measured as 100/NOEC, and also measured as 100/LC50, 100/EC25, 100/IC25, and 100/IC50, as appropriate.

   b. The statistical methods used to calculate endpoints;

   c. The statistical output page, which includes the calculation of the percent minimum significant difference (PMSD);

   d. The dates of sample collection and initiation of each toxicity test; and

   e. The results compared to the numeric toxicity monitoring trigger.

   Additionally, the annual SMR shall contain an updated chronology of chronic toxicity test results expressed in TUc, and organized by test species, type of test (survival, growth or reproduction), and monitoring frequency, i.e., either quarterly, monthly, accelerated, or TRE.

2. **Acute WET Reporting.** Acute toxicity test results shall be submitted with the monthly SMR's and reported as percent survival.

3. **TRE Reporting.** Reports for TRE's shall be submitted in accordance with the schedule contained in the Discharger's approved TRE Workplan, or as amended by the Discharger's TRE Action Plan.

4. **Quality Assurance (QA).** The Discharger must provide the following information for QA purposes:

   a. Results of the applicable reference toxicant data with the statistical output page giving the species, NOEC, LOEC, type of toxicant, dilution water used, concentrations used, PMSD, and dates tested.

   b. The reference toxicant control charts for each endpoint, which include summaries of reference toxicant tests performed by the contracting laboratory.

c. Any information on deviations or problems encountered and how they were dealt with.

VI. LAND DISCHARGE MONITORING REQUIREMENTS

A. Monitoring Locations ESB-A through ESB-E

1. The Discharger shall monitor diverted wastewater to the emergency storage basins at Monitoring Locations ESB-A through ESB-E, when wastewater is present, as follows:

Table E-7. Land Discharge Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Reason for Diversion	--	Narrative	--	--
Duration of Diversion	Hours	Narrative	Per each intermittent diversion event	--
Description (e.g., Influent or Effluent)	--	Narrative	Per each intermittent diversion event	--
Freeboard	0.1 feet	Measurement	1/Week	--

VII. RECYCLING MONITORING REQUIREMENTS – NOT APPLICABLE

VIII. RECEIVING WATER MONITORING REQUIREMENTS

The Discharger has elected to participate in the Delta Regional Monitoring Program. The Executive Officer approved the Discharger's request on 24 December 2014. The Discharger shall continue to participate in the Delta Regional Monitoring Program until such time as the Discharger informs the Board that participation in the Delta Regional Monitoring Program will cease. If the Discharger request to cease participation or fails to adequately support the Delta Regional Monitoring Program, as defined by the Delta Regional Monitoring Program Steering Committee, this Order will be reopened to reinstitute individual receiving water monitoring.

Delta Regional Monitoring Program data is not intended to be used directly to represent either upstream or downstream water quality for purposes of determining compliance with this Permit. Delta Regional Monitoring Program monitoring stations are established generally as "integrator sites" to evaluate the combined impacts on water quality of multiple discharges into the Delta; Delta Regional Monitoring Program monitoring stations would not normally be able to identify the source of any specific constituent, but would be used to identify water quality issues needing further evaluation. Delta Regional Monitoring Program monitoring data, along with individual Discharger data, may be used to help establish background receiving water quality for reasonable potential analyses in an NPDES permit after evaluation of the applicability of the data for that purpose. Delta Regional Monitoring Program data, as with all environmental monitoring data, can provide an assessment of water quality at a specific place and time that can be used in conjunction with other information, such as other receiving water monitoring data, spatial and temporal distribution and trends of receiving water data, effluent data from the Discharger's discharge and other point and non-point source discharges, receiving water flow volume, speed and direction, and other information to determine the likely source or sources of a constituent that resulted in exceedance of a water quality objective.

A. Monitoring Locations RSWU-001 and RSWD-003

1. The Discharger shall monitor the Sacramento River at Monitoring Locations RSWU-001 and RSWD-003 as follows:

Table E-8. Receiving Water Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow[1]	cfs	Meter	Continuous	--
Conventional Pollutants				
Fecal Coliform Organisms	MPN/100 mL	Grab	1/Quarter	[2]
pH	standard units	Grab	1/Month[3]	[2]
Non-Conventional Pollutants				
Ammonia Nitrogen, Total (as N)	mg/L	Grab	1/Month	[2]
Dissolved Oxygen	mg/L	Grab	1/Month	[2]
Electrical Conductivity @ 25°C	µmhos/cm	Grab	1/Month	[2]
Hardness, Total (as $CaCO_3$)	mg/L	Grab	1/Month	[2]
Temperature	°F	Grab	1/Month[3]	[2]
Total Nitrogen	mg/L	Grab	1/Month	[2]
Turbidity	NTU	Grab	1/Month	[2]

[1] Monitoring required at Monitoring Location RSWU-001 only.
[2] Pollutants shall be analyzed using the analytical methods described in 40 C.F.R. part 136 or by methods requested by the Discharger that have been approved by the Central Valley Water Board or the State Water Board.
[3] pH and temperature shall be recorded at the time of ammonia sample collection.

2. In conducting the receiving water sampling when discharging to Sacramento River at Discharge Point 001, a log shall be kept of the receiving water conditions throughout the reach bounded by Monitoring Locations RSWU-001 and RSWD-003. Attention shall be given to the presence or absence of:

   a. Floating or suspended matter;
   b. Discoloration;
   c. Bottom deposits;
   d. Aquatic life;
   e. Visible films, sheens, or coatings;
   f. Fungi, slimes, or objectionable growths; and
   g. Potential nuisance conditions.

   Notes on receiving water conditions shall be summarized in the SMR.

IX. OTHER MONITORING REQUIREMENTS

A. Filtration System Monitoring

1. **Monitoring Location FIL-001**

   a. **Effective 9 May 2023**, the Discharger shall monitor the filtration system at Monitoring Location FIL-001 as follows:

Table E-9. Filtration System Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Turbidity	NTU	Meter	Continuous	[1,2,3]

[1] Pollutants shall be analyzed using the analytical methods described in 40 C.F.R. part 136 or by methods requested by the Discharger that have been approved by the Central Valley Water Board or the State Water Board.

[2] For continuous analyzers, the Discharger shall report documented routine meter maintenance activities including date, time of day, and duration in which the analyzer(s) is not in operation. If analyzer(s) fail to provide continuous monitoring for more than two hours, the Discharger shall obtain and report hourly manual and/or grab sample results.

[3] Report daily average and maximum turbidity.

B. Effluent and Receiving Water Characterization

Since the Discharger is participating in the Delta Regional Monitoring Program as described in Attachment E, Section VIII, this section only requires effluent characterization monitoring. However, the Report of Waste Discharge for the next permit renewal shall include, at minimum, one representative ambient background characterization monitoring event for priority pollutant constituents[1] during the term of the permit. Data from the Delta Regional Monitoring Program may be utilized to characterize the receiving water in the permit renewal. Alternatively, the Discharger may conduct any site-specific receiving water monitoring deemed appropriate by the Discharger and submit that monitoring data with the Report of Waste Discharge. In general, monitoring data from samples collected in the immediate vicinity of the discharge will be given greater weight in permitting decisions than receiving water monitoring data collected at greater distances from the discharge point.

1. **Monthly Monitoring Every Other Year.** Beginning 1 January 2017, the Discharger shall conduct monthly monitoring for one calendar year and repeat the monitoring every other calendar year thereafter, beginning 1 January of that year. Samples shall be collected from the effluent (Monitoring Locations EFF-001) and analyzed for the constituents listed in Table E-10, below. The results of such monitoring shall be submitted to the Central Valley Water Board no later than 1 April of the year following the calendar year of sampling. Each individual monitoring event shall provide representative sample results for the effluent.

   As part of the pretreatment program requirements, this Order requires annual effluent monitoring for priority pollutants, and quarterly samples for those pollutants detected in the full priority pollutant scan. The Discharger is not required to conduct effluent monitoring for priority pollutants that have already been sampled in a given month as part of the pretreatment program monitoring.

2. **Sample Type.** Effluent samples shall be taken as described in Table E-10, below.

[1] Appendix A to 40 C.F.R. part 423.

Table E-10. Effluent Characterization Monitoring

Parameter	Units	Effluent Sample Type	Maximum Reporting Level[1]
2- Chloroethyl vinyl ether	µg/L	Grab	1
Acrolein	µg/L	Grab	2
Acrylonitrile	µg/L	Grab	2
Benzene	µg/L	Grab	0.5
Bromoform	µg/L	Grab	0.5
Carbon Tetrachloride[2]	µg/L	Grab	0.5
Chlorobenzene	µg/L	Grab	0.5
Chloroethane	µg/L	Grab	0.5
Chloroform	µg/L	Grab	2
Chloromethane	µg/L	Grab	2
Dibromochloromethane[2]	µg/L	Grab	0.5
Dichlorobromomethane[2]	µg/L	Grab	0.5
Dichloromethane (Methylene Chloride)[2]	µg/L	Grab	2
Ethylbenzene	µg/L	Grab	2
Hexachlorobenzene	µg/L	Grab	1
Hexachlorobutadiene	µg/L	Grab	1
Hexachloroethane	µg/L	Grab	1
Methyl bromide (Bromomethane)	µg/L	Grab	1
Naphthalene	µg/L	Grab	10
Tetrachloroethene	µg/L	Grab	0.5
Toluene	µg/L	Grab	2
trans-1,2-Dichloroethylene	µg/L	Grab	1
Trichloroethene	µg/L	Grab	2
Vinyl chloride	µg/L	Grab	0.5
Methyl-tert-butyl ether (MTBE)	µg/L	Grab	
Trichlorofluoromethane	µg/L	Grab	
1,1,1-Trichloroethane	µg/L	Grab	0.5
1,1,2- Trichloroethane	µg/L	Grab	0.5
1,1-dichloroethane	µg/L	Grab	0.5
1,1-dichloroethylene	µg/L	Grab	0.5
1,2-dichloropropane	µg/L	Grab	0.5
1,3-dichloropropylene	µg/L	Grab	0.5
1,1,2,2-tetrachloroethane	µg/L	Grab	0.5
1,1,2-Trichloro-1,2,2-Trifluoroethane	µg/L	Grab	
1,2,4-trichlorobenzene	µg/L	Grab	1
1,2-dichoroethane	µg/L	Grab	0.5
1,2-dichlorobenzene	µg/L	Grab	0.5
1,3-dichlorobenzene	µg/L	Grab	0.5
1,4-dichlorobenzene	µg/L	Grab	0.5
Styrene	µg/L	Grab	
Xylenes	µg/L	Grab	
1,2-Benzanthracene	µg/L	Grab	5
1,2-Diphenylhydrazine	µg/L	Grab	1
2-Chlorophenol	µg/L	Grab	5
2,4-Dichlorophenol	µg/L	Grab	5
2,4-Dimethylphenol	µg/L	Grab	2
2,4-Dinitrophenol	µg/L	Grab	5
2,4-Dinitrotoluene	µg/L	Grab	5

Parameter	Units	Effluent Sample Type	Maximum Reporting Level[1]
2,4,6-Trichlorophenol	µg/L	Grab	10
2,6-Dinitrotoluene	µg/L	Grab	5
2-Nitrophenol	µg/L	Grab	10
2-Chloronaphthalene	µg/L	Grab	10
3,3'-Dichlorobenzidine	µg/L	Grab	5
3,4-Benzofluoranthene	µg/L	Grab	10
4-Chloro-3-methylphenol	µg/L	Grab	5
4,6-Dinitro-2-methylphenol	µg/L	Grab	10
4-Nitrophenol	µg/L	Grab	10
4-Bromophenyl phenyl ether	µg/L	Grab	10
4-Chlorophenyl phenyl ether	µg/L	Grab	5
Acenaphthene	µg/L	Grab	1
Acenaphthylene	µg/L	Grab	10
Anthracene	µg/L	Grab	10
Benzidine	µg/L	Grab	5
Benzo(a)pyrene (3,4-Benzopyrene)	µg/L	Grab	2
Benzo(g,h,i)perylene	µg/L	Grab	5
Benzo(k)fluoranthene	µg/L	Grab	2
Bis(2-chloroethoxy) methane	µg/L	Grab	5
Bis(2-chloroethyl) ether	µg/L	Grab	1
Bis(2-chloroisopropyl) ether	µg/L	Grab	10
Bis(2-ethylhexyl) phthalate[2,3]	µg/L	Grab	5
Butyl benzyl phthalate	µg/L	Grab	10
Chrysene	µg/L	Grab	5
Di-n-butylphthalate	µg/L	Grab	10
Di-n-octylphthalate	µg/L	Grab	10
Dibenzo(a,h)-anthracene	µg/L	Grab	0.1
Diethyl phthalate	µg/L	Grab	10
Dimethyl phthalate	µg/L	Grab	10
Fluoranthene	µg/L	Grab	10
Fluorene	µg/L	Grab	10
Hexachlorocyclopentadiene	µg/L	Grab	5
Indeno(1,2,3-c,d)pyrene	µg/L	Grab	0.05
Isophorone	µg/L	Grab	1
N-Nitrosodiphenylamine	µg/L	Grab	1
N-Nitrosodimethylamine	µg/L	Grab	5
N-Nitrosodi-n-propylamine	µg/L	Grab	5
Nitrobenzene	µg/L	Grab	10
Pentachlorophenol	µg/L	Grab	1
Phenanthrene	µg/L	Grab	5
Phenol	µg/L	Grab	1
Pyrene	µg/L	Grab	10
Aluminum	µg/L	24-hr Composite[4]	
Antimony	µg/L	24-hr Composite[4]	5
Arsenic	µg/L	24-hr Composite[4]	10
Asbestos	µg/L	24-hr Composite[4]	
Barium	µg/L	24-hr Composite[4]	
Beryllium	µg/L	24-hr Composite[4]	2
Cadmium	µg/L	24-hr Composite[4]	0.5
Chromium (VI)	µg/L	24-hr Composite[4]	10

Parameter	Units	Effluent Sample Type	Maximum Reporting Level[1]
Chromium, Total	µg/L	24-hr Composite[4]	50
Copper[2]	µg/L	24-hr Composite[4]	5
Cyanide[2]	µg/L	Grab	5
Fluoride	µg/L	24-hr Composite[4]	
Iron	µg/L	24-hr Composite[4]	
Lead	µg/L	24-hr Composite[4]	2
Mercury[2]	µg/L	24-hr Composite[4]	0.5
Manganese	µg/L	24-hr Composite[4]	
Molybdenum	µg/L	24-hr Composite[4]	
Nickel	µg/L	24-hr Composite[4]	20
Selenium	µg/L	24-hr Composite[4]	5
Silver	µg/L	24-hr Composite[4]	2
Thallium	µg/L	24-hr Composite[4]	1
Tributyltin[5]	µg/L	24-hr Composite[4]	
Zinc	µg/L	24-hr Composite[4]	20
4,4'-DDD[5]	µg/L	24-hr Composite[4]	0.05
4,4'-DDE[5]	µg/L	24-hr Composite[4]	0.05
4,4'-DDT[5]	µg/L	24-hr Composite[4]	0.01
alpha-Endosulfan[5]	µg/L	24-hr Composite[4]	0.02
alpha-Hexachlorocyclohexane (BHC) [5]	µg/L	24-hr Composite[4]	0.01
Aldrin[5]	µg/L	24-hr Composite[4]	0.005
beta-Endosulfan[5]	µg/L	24-hr Composite[4]	0.01
beta-Hexachlorocyclohexane[5]	µg/L	24-hr Composite[4]	0.005
Chlordane[5]	µg/L	24-hr Composite[4]	0.1
delta-Hexachlorocyclohexane[5]	µg/L	24-hr Composite[4]	0.005
Dieldrin[5]	µg/L	24-hr Composite[4]	0.01
Endosulfan sulfate[5]	µg/L	24-hr Composite[4]	0.05
Endrin[5]	µg/L	24-hr Composite[4]	0.01
Endrin Aldehyde[5]	µg/L	24-hr Composite[4]	0.01
Heptachlor[5]	µg/L	24-hr Composite[4]	0.01
Heptachlor Epoxide[5]	µg/L	24-hr Composite[4]	0.02
Lindane (gamma-Hexachlorocyclohexane) [5]	µg/L	24-hr Composite[4]	0.5
PCB-1016[5]	µg/L	24-hr Composite[4]	0.5
PCB-1221[5]	µg/L	24-hr Composite[4]	0.5
PCB-1232[5]	µg/L	24-hr Composite[4]	0.5
PCB-1242[5]	µg/L	24-hr Composite[4]	0.5
PCB-1248[5]	µg/L	24-hr Composite[4]	0.5
PCB-1254[5]	µg/L	24-hr Composite[4]	0.5
PCB-1260[5]	µg/L	24-hr Composite[4]	0.5
Toxaphene[5]	µg/L	24-hr Composite[4]	
Atrazine[5]	µg/L	24-hr Composite[4]	
Carbofuran[5]	µg/L	24-hr Composite[4]	
1,2-Dibromo-3-chloropropane (DBCP) [5]	µg/L	Grab	
Di(2-ethylhexyl)adipate	µg/L	Grab	
Diquat[5]	µg/L	24-hr Composite[4]	
Ethylene Dibromide[5]	µg/L	Grab	
Simazine (Princep) [5]	µg/L	24-hr Composite[4]	
Thiobencarb[5]	µg/L	24-hr Composite[4]	

Parameter	Units	Effluent Sample Type	Maximum Reporting Level[1]
2,3,7,8-TCDD (Dioxin)	µg/L	Grab	
Diazinon[2]	µg/L	24-hr Composite[4]	
Chlorpyrifos[2]	µg/L	24-hr Composite[4]	
Disulfoton	ng/L	24-hr Composite[4]	
N-nitrosomethylethylamine (NEMA) [5]	ng/L	Grab	
N-nitrosodimethylamine (NDEA) [5]	ng/L	Grab	
Ammonia (as N)[2]	mg/L	24-hr Composite[4]	
Boron	µg/L	24-hr Composite[4]	
Chloride	mg/L	24-hr Composite[4]	
Flow	MGD	Meter	
Hardness (as $CaCO_3$)[2]	mg/L	24-hr Composite[4]	
Foaming Agents (MBAS)	mg/L	24-hr Composite[4]	
Mercury, Methyl[2]	ng/L	24-hr Composite[4]	
Nitrate (as N) plus Nitrite (as N)[2]	mg/L	24-hr Composite[4]	
pH[2]	Std Units	Meter	
Phosphorus, Total (as P)	mg/L	24-hr Composite[4]	
Specific conductance (EC)[2]	µmhos/cm	24-hr Composite[4]	
Sulfate	mg/L	24-hr Composite[4]	
Sulfide (as S)	mg/L	Grab	
Sulfite (as SO_3)	mg/L	Grab	
Temperature[2]	^oC	Meter	
Total Dissolved Solids (TDS)[2]	mg/L	24-hr Composite[4]	
Dissolved Organic Carbon	mg/L	24-hr Composite[4]	

[1] The reporting levels required in this table for priority pollutant constituents are established based on Section 2.4.2 and Appendix 4 of the SIP.

[2] The Discharger is not required to conduct effluent monitoring for constituents that have already been sampled in a given month, as required in Table E-4 or as part of the pretreatment program monitoring, except for hardness, pH, and temperature, which shall be conducted concurrently with the effluent sampling.

[3] In order to verify if bis (2-ethylhexyl) phthalate is truly present, the Discharger shall take steps to assure that sample containers, sampling apparatus, and analytical equipment are not sources of the detected contaminant.

[4] 24-hour flow proportional composite.

[5] For these constituents, the Discharger shall conduct quarterly monitoring for one calendar year, rather than monthly monitoring described in Section IX.B.1, above.

X. REPORTING REQUIREMENTS

A. General Monitoring and Reporting Requirements

1. The Discharger shall comply with all Standard Provisions (Attachment D) related to monitoring, reporting, and recordkeeping.

2. Upon written request of the Central Valley Water Board, the Discharger shall submit a summary monitoring report. The report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous year(s).

3. **Compliance Time Schedules.** For compliance time schedules included in the Order, the Discharger shall submit to the Central Valley Water Board, on or before each compliance due date, the specified document or a written report detailing compliance or noncompliance with the specific date and task. If noncompliance is reported, the Discharger shall state the reasons for noncompliance and include an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Central

Valley Water Board by letter when it returns to compliance with the compliance time schedule.

4. The Discharger shall report to the Central Valley Water Board any toxic chemical release data it reports to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to section 313 of the "*Emergency Planning and Community Right to Know Act*" of 1986.

B. Self-Monitoring Reports (SMR's)

1. The Discharger shall electronically submit SMR's using the State Water Board's California Integrated Water Quality System (CIWQS) Program Web site (http://www.waterboards.ca.gov/ciwqs/index.html). The CIWQS Web site will provide additional information for SMR submittal in the event there will be a planned service interruption for electronic submittal.

2. The Discharger shall report in the SMR the results for all monitoring specified in this MRP under sections III through IX, except that Groundwater Corrective Action Plan monitoring required in section III.B and Effluent and Receiving Water Characterization monitoring required in section IX.B may be submitted as separate reports as specified in this MRP. The Discharger shall submit monthly SMR's including the results of all required monitoring using U.S. EPA-approved test methods or other test methods specified in this Order. SMR's are to include all new monitoring results obtained since the last SMR was submitted. If the Discharger monitors any pollutant more frequently than required by this Order, the results of this monitoring shall be included in the calculations and reporting of the data submitted in the SMR. Sampling to meet one requirement may be used to satisfy another monitoring requirement (e.g., during the calendar year effluent characterization monitoring of priority pollutants is required per section IX.B, the monitoring may satisfy the monthly effluent monitoring for the priority pollutants required in section IV.A).

3. Monitoring periods and reporting for all required monitoring shall be completed according to the following schedule:

Table E-11. Monitoring Periods and Reporting Schedule

Sampling Frequency	Monitoring Period Begins On…	Monitoring Period	SMR Due Date
Continuous	Permit effective date	All	Submit with monthly SMR
1/Day	Permit effective date	(Midnight through 11:59 PM) or any 24-hour period that reasonably represents a calendar day for purposes of sampling.	Submit with monthly SMR
1/Week	Permit effective date	Sunday through Saturday	Submit with monthly SMR
1/Month	Permit effective date	1st day of calendar month through last day of calendar month	First day of second calendar month following month of sampling
1/Quarter	Permit effective date	1 January through 31 March 1 April through 30 June 1 July through 30 September 1 October through 31 December	1 May 1 August 1 November 1 February of following year
2/Year	Permit effective date	1 January through 30 June 1 July through 31 December	1 August 1 February of following year
1/Year	Permit effective date	1 January through 31 December	1 February of following year

4. **Reporting Protocols.** The Discharger shall report with each sample result the applicable Reporting Level (RL) and the current laboratory's Method Detection Limit (MDL), as determined by the procedure in 40 C.F.R. part 136.

   The Discharger shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

   a. Sample results greater than or equal to the RL shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).

   b. Sample results less than the RL, but greater than or equal to the laboratory's MDL, shall be reported as "Detected, but Not Quantified," or DNQ. The estimated chemical concentration of the sample shall also be reported.

      For the purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ. The laboratory may, if such information is available, include numerical estimates of the data quality for the reported result. Numerical estimates of data quality may be percent accuracy (± a percentage of the reported value), numerical ranges (low to high), or any other means considered appropriate by the laboratory.

   c. Sample results less than the laboratory's MDL shall be reported as "Not Detected," or ND.

   d. Dischargers are to instruct laboratories to establish calibration standards so that the Minimum Level (ML) value (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no

time is the Discharger to use analytical data derived from extrapolation beyond the lowest point of the calibration curve.

5. **Multiple Sample Data.** When determining compliance with an AMEL, AWEL, or MDEL for priority pollutants and more than one sample result is available, the Discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of "Detected, but Not Quantified" (DNQ) or "Not Detected" (ND). In those cases, the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:

   a. The data set shall be ranked from low to high, ranking the reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.

   b. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

6. The Discharger shall submit SMR's in accordance with the following requirements:

   a. The Discharger shall arrange all reported data in a tabular format. The data shall be summarized to clearly illustrate whether the facility is operating in compliance with interim and/or final effluent limitations. The Discharger is not required to duplicate the submittal of data that is entered in a tabular format within CIWQS. When electronic submittal of data is required and CIWQS does not provide for entry into a tabular format within the system, the Discharger shall electronically submit the data in a tabular format as an attachment.

   b. The Discharger shall attach a cover letter to the SMR. The information contained in the cover letter shall clearly identify violations of the WDR's; discuss corrective actions taken or planned; and the proposed time schedule for corrective actions. Identified violations must include a description of the requirement that was violated and a description of the violation.

7. The Discharger shall submit in the SMR's calculations and reports in accordance with the following requirements:

   a. **Calendar Annual Average Limitations**. For constituents with effluent limitations specified as "calendar annual average" (electrical conductivity) the Discharger shall report the calendar annual average in the December SMR. The annual average shall be calculated as the average of the monthly averages for January through December.

   b. **Mass Loading Limitations**. For BOD_5, TSS, and ammonia, the Discharger shall calculate and report the mass loading (lbs/day) in the SMR's. The mass loading shall be calculated as follows:

   Mass Loading (lbs/day) = Flow (MGD) x Concentration (mg/L) x 8.34

   When calculating daily mass loading, the daily average flow and constituent concentration shall be used. For weekly average mass loading, the weekly average flow and constituent concentration shall be used. For monthly average mass loading, the monthly average flow and constituent concentration shall be used.

c. **Removal Efficiency (BOD_5 and TSS).** The Discharger shall calculate and report the percent removal of BOD_5 and TSS in the SMR's. The percent removal shall be calculated as specified in Section VII.A. of the Limitations and Discharge Requirements.

d. **Total Coliform Organisms Effluent Limitations**. Prior to the effective date of Special Provision VI.C.6.a, the Discharger shall calculate and report the weekly median total coliform organisms for the effluent. Upon the effective date of Special Provision VI.C.6.a, for May-October, the Discharger shall calculate and report the 7-day median of total coliform organisms for the effluent, and for November-April, the Discharger shall calculate and report the weekly median and monthly median of total coliform organisms for the effluent. The weekly median, 7-day median, and monthly median of total coliform organisms shall be calculated as specified in Section VII.D of the Limitations and Discharge Requirements.

e. **Total Calendar Annual Mass Loading Mercury Effluent Limitations**. The Discharger shall calculate and report the total calendar annual mercury mass loading for the effluent in the December SMR. The total calendar year annual mass loading shall be calculated as specified in section VII.B of the Limitations and Discharge Requirements.

f. **Temperature Effluent Limitation**. For every day receiving water temperature samples are collected at Monitoring Location RSWU-001, the Discharger shall calculate and report the difference between the effluent temperature and upstream receiving water temperature based on the difference in the effluent temperature at Monitoring Location EFF-001 and receiving water temperature of grab samples collected at Monitoring Location RSWU-001. The effluent temperature shall be taken from the continuous effluent data for the same time that the river grab sample was collected.

g. **Chlorpyrifos and Diazinon Effluent Limitations**. The Discharger shall calculate and report the value of S_{AMEL} and S_{AWEL} for the effluent, using the equation in Effluent Limitation IV.A.1.i and consistent with the Compliance Determination Language in Section VII.N of the Limitations and Discharge Requirements.

h. **Dissolved Oxygen Receiving Water Limitations**. The Discharger shall report monthly in the SMR the dissolved oxygen concentrations in the effluent (EFF-001) and the receiving water (Monitoring Locations RSWU-001 and RSWD-003).

i. **Turbidity Receiving Water Limitations**. The Discharger shall calculate and report the turbidity increase in the receiving water applicable to the natural turbidity condition specified in Section V.A.17.a-e. of the Limitations and Discharge Requirements.

j. **Temperature Receiving Water Limitations**. The Discharger shall calculate and report the temperature increase in the receiving water based on the difference in temperature at Monitoring Locations RSWU-001 and RSWD-003.

k. **Effluent Diversions.** The Discharger shall submit an annual summary of effluent diversions to include date, time, duration and reason(s) for the diversion with the annual self-monitoring report.

C. Discharge Monitoring Reports (DMR's)

1. DMRs are U.S. EPA reporting requirements. The Discharger shall electronically certify and submit DMRs together with SMRs using Electronic Self-Monitoring Reports module eSMR 2.5 or any upgraded version. Electronic DMR submittal shall be in addition to electronic SMR submittal. Information about electronic DMR submittal is available at the DMR website at: <http://www.waterboards.ca.gov/water_issues/programs/discharge_monitoring>.

D. Other Reports

1. **Special Study Reports and Progress Reports**. As specified in the compliance time schedules required in the Special Provisions contained in section VI of the Order, special study and progress reports shall be submitted in accordance with the following reporting requirements. At minimum, the progress reports shall include a discussion of the status of final compliance, whether the Discharger is on schedule to meet the final compliance date, and the remaining tasks to meet the final compliance date.

Table E-12. Reporting Requirements for Special Provisions Reports

Special Provision	Reporting Requirements
Filtration Operations Study (Special Provision VI.C.2.b)	To be determined
CVCWA Coordinated Methylmercury Control Study, Final Report (Special Provision VI.C.2.c)	**20 October 2018**
Emergency Storage Basin Cleaning and Isolation System Study and Standard Operating Procedures, Work Plan and Schedule (Special Provision VI.C.2.d)	**1 June 2017**
Emergency Storage Basin Cleaning and Isolation System Study and Standard Operating Procedures, Final Study (Special Provision VI.C.2.d)	Per the Work Plan and Schedule
Salinity Evaluation and Minimization Plan, Summary Report (Special Provision VI.C.3.c)	**Within 180 days** of permit expiration date (with Report of Waste Discharge)
Anaerobically Digestible Material Standard Operating Procedures (Special Provision VI.C.5.c)	**1 March 2017**
Compliance Schedule for Seasonal Title 22, or Equivalent, Disinfection Requirements, Progress Reports (Special Provision VI.C.7.a)	**9 July**, annually, until final compliance
Compliance Schedules for Final Effluent Limitations for Ammonia, Progress Reports Special Provision VI.C.7.b)	**9 July**, annually, until final compliance
Compliance Schedules for Final Effluent Limitations for Methylmercury, Progress Reports (Special Provision VI.C.7.c)	**1 March**, annually, until final compliance

2. The Discharger shall report the results of any special studies, acute and chronic toxicity testing, TRE/TIE, PMP, and Pollution Prevention Plan required by Special Provisions – VI.C. The Discharger shall report the progress in satisfaction of compliance schedule dates specified in Special Provisions VI.C.7. The Discharger shall submit reports with the first monthly SMR scheduled to be submitted on or immediately following the report due date.

3. **Within 60 days of permit adoption**, the Discharger shall submit a report outlining reporting levels (RL's), method detection limits (MDL's), and analytical methods for the constituents listed in tables E-2, E-3, E-4, E-5, E-8, and E-9. In addition, no less than 6 months prior to conducting the effluent and receiving water characterization monitoring required in Section IX.B, the Discharger shall submit a report outlining RL's, MDL's, and analytical methods for the constituents listed in Table E-10. The Discharger shall comply with the monitoring and reporting requirements for CTR constituents as outlined in section 2.3 and 2.4 of the SIP. The maximum required reporting levels for priority pollutant constituents shall be based on the Minimum Levels (ML's) contained in Appendix 4 of the SIP, determined in accordance with Section 2.4.2 and Section 2.4.3 of the SIP. In accordance with Section 2.4.2 of the SIP, when there is more than one ML value for a given substance, the Central Valley Water Board shall include as RL's, in the permit, all ML values, and their associated analytical methods, listed in Appendix 4 that are below the calculated effluent limitation. The Discharger may select any one of those cited analytical methods for compliance determination. If no ML value is below the effluent limitation, then the Central Valley Water Board shall select as the RL, the lowest ML value, and its associated analytical method, listed in Appendix 4 for inclusion in the permit. Table E-10 provides required maximum reporting levels in accordance with the SIP.

4. **Annual Operations Report.** By 30 January of each year, the Discharger shall submit a written report to the Executive Officer containing the following:

   a. The names, certificate grades, and general responsibilities of all persons employed at the Facility.

   b. The names and telephone numbers of persons to contact regarding the plant for emergency and routine situations.

   c. A statement certifying when the flow meter(s) and other monitoring instruments and devices were last calibrated, including identification of who performed the calibration.

   d. A statement certifying whether the current operation and maintenance manual, and contingency plan, reflect the wastewater treatment plant as currently constructed and operated, and the dates when these documents were last revised and last reviewed for adequacy.

   e. The Discharger may also be requested to submit an annual report to the Central Valley Water Board with both tabular and graphical summaries of the monitoring data obtained during the previous year. Any such request shall be made in writing. The report shall discuss the compliance record. If violations have occurred, the report shall also discuss the corrective actions taken and planned to bring the discharge into full compliance with the waste discharge requirements.

5. **Annual Pretreatment Reporting Requirements**. The Discharger shall submit annually a report to the Central Valley Water Board, with copies to U.S. EPA Region 9 and the State Water Board, describing the Discharger's pretreatment activities over the previous 12 months (1 January through 31 December). In the event that the Discharger is not in

compliance with any conditions or requirements of this Order, including noncompliance with pretreatment audit/compliance inspection requirements, then the Discharger shall also include the reasons for noncompliance and state how and when the Discharger shall comply with such conditions and requirements.

An annual report shall be submitted by **25 March** and include at least the following items:

a. A summary of analytical results from representative, flow proportioned, 24-hour composite sampling of the POTW's influent and effluent for those pollutants U.S. EPA has identified under section 307(a) of the CWA which are known or suspected to be discharged by nondomestic users. This will consist of an annual full priority pollutant scan, with quarterly samples analyzed only for those pollutants detected in the full scan. The Discharger is not required to sample and analyze for asbestos. The Discharger shall submit the results of the annual priority pollutant scan and subsequent quarterly samples electronically to the Central Valley Water Board using the State Water Board's CIWQS Program Website.

b. A discussion of Upset, Interference, or Pass-Through incidents, if any, at the treatment plant, which the Discharger knows or suspects were caused by nondomestic users of the POTW. The discussion shall include the reasons why the incidents occurred, the corrective actions taken and, if known, the name and address of, the nondomestic user(s) responsible. The discussion shall also include a review of the applicable pollutant limitations to determine whether any additional limitations, or changes to existing requirements, may be necessary to prevent Pass-Through, Interference, or noncompliance with sludge disposal requirements.

c. The cumulative number of nondomestic users that the Discharger has notified regarding Baseline Monitoring Reports and the cumulative number of nondomestic user responses.

d. An updated list of the Discharger's significant industrial users (SIU's) including their names and addresses, or a list of deletions, additions and SIU name changes keyed to a previously submitted list. The Discharger shall provide a brief explanation for each change. The list shall identify the SIUs subject to federal categorical standards by specifying which set(s) of standards are applicable to each SIU. The list shall indicate which SIUs, or specific pollutants from each industry, are subject to local limitations. Local limitations that are more stringent than the federal categorical standards shall also be identified.

e. The Discharger shall characterize the compliance status through the year of record of each SIU by employing the following descriptions:

   i. complied with baseline monitoring report requirements (where applicable);

   ii. consistently achieved compliance;

   iii. inconsistently achieved compliance;

   iv. significantly violated applicable pretreatment requirements as defined by 40 C.F.R. section 403.8(f)(2)(vii);

   v. complied with schedule to achieve compliance (include the date final compliance is required);

   vi. did not achieve compliance and not on a compliance schedule; and

   vii. compliance status unknown.

f. Semi-annual reports describing the compliance status of each SIU characterized by the descriptions in items iii through vii above shall be submitted by 1 August (for period covering 1 January -30 June) and 1 February (for period covering 1 July – 31 December). The reports shall identify the specific compliance status of each such SIU and shall also identify the compliance status of the POTW with regards to audit/pretreatment compliance inspection requirements. If none of the aforementioned conditions exist, at a minimum, a letter indicating that all industries are in compliance and no violations or changes to the pretreatment program have occurred during the quarter must be submitted. This semi-annual reporting requirement shall commence upon issuance of this Order.

g. A summary of the inspection and sampling activities conducted by the Discharger during the past year to gather information and data regarding the SIUs. The summary shall include:

   i. The names and addresses of the SIU's subjected to surveillance and an explanation of whether they were inspected, sampled, or both and the frequency of these activities at each user; and

   ii. The conclusions or results from the inspection or sampling of each industrial user.

h. The Discharger shall characterize the compliance status of each SIU by providing a list or table which includes the following information:

   i. Name of SIU;

   ii. Category, if subject to federal categorical standards;

   iii. The type of wastewater treatment or control processes in place;

   iv. The number of samples taken by the POTW during the year;

   v. The number of samples taken by the SIU during the year;

   vi. For an SIU subject to discharge requirements for total toxic organics, whether all required certifications were provided;

   vii. A list of the standards violated during the year. Identify whether the violations were for categorical standards or local limits.

   viii. Whether the facility is in significant noncompliance (SNC) as defined at 40 C.F.R. section 403.8(f)(2)(viii) at any time during the year; and

   ix. A summary of enforcement or other actions taken during the year to return the SIU to compliance. Describe the type of action (e.g., warning letters or notices of violation, administrative orders, civil actions, and criminal actions), final compliance date, and the amount of fines and penalties collected, if any. Describe any proposed actions for bringing the SIU into compliance;

   x. Restriction of flow to the POTW.

   xi. Disconnection from discharge to the POTW.

i. A brief description of any programs the POTW implements to reduce pollutants from nondomestic users that are not classified as SIU's;

j. A brief description of any significant changes in operating the pretreatment program which differ from the previous year including, but not limited to, changes concerning: the program's administrative structure, local limits, monitoring program or monitoring frequencies, legal authority, enforcement policy, funding levels, or staffing levels;

k. A summary of the annual pretreatment budget, including the cost of pretreatment program functions and equipment purchases; and

l. A summary of activities to involve and inform the public of the program including a copy of the newspaper notice, if any, required under 40 C.F.R.section 403.8(f)(2)(viii).

Pretreatment Program reports shall be submitted electronically to the Central Valley Water Board and the:

State Water Resources Control Board

NPDES_Wastewater@waterboards.ca.gov

and the

U.S. EPA Region 9 Regional Pretreatment Coordinator

R9Pretreatment@epa.gov

6. **Filtration Operations Summary Reporting Requirement.** Effective 9 May 2023, the Discharger shall, on a monthly basis, submit a summary report using existing data demonstrating operations consistent with the future Facility description with respect to operation of filtration facilities in section II.A.2 of the Fact Sheet and the Seasonal Operation Plan required in section VI.C.7.a, Task v.

ATTACHMENT F – FACT SHEET

Contents

I. Permit Information F-3
II. Facility Description F-4
A. Description of Wastewater and Biosolids Treatment and Controls F-5
B. Discharge Points and Receiving Waters F-7
C. Summary of Existing Requirements and Self-Monitoring Report (SMR) Data F-7
D. Compliance Summary F-9
E. Planned Changes F-10
III. Applicable Plans, Policies, and Regulations F-10
A. Legal Authorities F-10
B. California Environmental Quality Act (CEQA) F-11
C. State and Federal Laws, Regulations, Policies, and Plans F-11
D. Impaired Water Bodies on CWA 303(d) List F-15
E. Other Plans, Policies and Regulations F-16
IV. Rationale For Effluent Limitations and Discharge Specifications F-18
A. Discharge Prohibitions F-19
B. Technology-Based Effluent Limitations F-20
1. Scope and Authority F-20
2. Applicable Technology-Based Effluent Limitations F-21
C. Water Quality-Based Effluent Limitations (WQBEL's) F-22
1. Scope and Authority F-22
2. Applicable Beneficial Uses and Water Quality Criteria and Objectives F-22
3. Determining the Need for WQBEL's F-45
4. WQBEL Calculations F-82
5. Whole Effluent Toxicity (WET) F-85
D. Final Effluent Limitation Considerations F-87
1. Mass-based Effluent Limitations F-87
2. Averaging Periods for Effluent Limitations F-88
3. Satisfaction of Anti-Backsliding Requirements F-88
4. Antidegradation Policies F-91
5. Stringency of Requirements for Individual Pollutants F-92
E. Interim Effluent Limitations F-95
F. Land Discharge Specifications – Not Applicable F-99
G. Recycling Specifications – Not Applicable F-99
V. Rationale for Receiving Water Limitations F-99
A. Surface Water F-99
B. Groundwater F-100
VI. Rationale for Provisions F-100
A. Standard Provisions F-100
B. Special Provisions F-101
1. Reopener Provisions F-101
2. Special Studies and Additional Monitoring Requirements F-102
3. Best Management Practices and Pollution Prevention F-106
4. Construction, Operation, and Maintenance Specifications F-108
5. Special Provisions for Municipal Facilities (POTW's Only) F-108
6. Other Special Provisions F-109
7. Compliance Schedules F-110

VII. Rationale for Monitoring and Reporting Requirements F-112
A. Influent Monitoring F-112
B. Effluent Monitoring F-112
C. Whole Effluent Toxicity Testing Requirements F-113
D. Receiving Water Monitoring F-114
1. Surface Water F-114
2. Groundwater – Not Applicable F-116
E. Other Monitoring Requirements F-116
VIII. Public Participation F-116
A. Notification of Interested Parties F-116
B. Written Comments F-116
C. Public Hearing F-117
D. Reconsideration of Waste Discharge Requirements F-117
E. Information and Copying F-117
F. Register of Interested Persons F-117
G. Additional Information F-117

Tables

Table F-1. Facility Information F-3
Table F-2. Historic Effluent Limitations and Monitoring Data F-7
Table F-3. Basin Plan Beneficial Uses F-11
Table F-4. 303 (d) List for the Sacramento-San Joaquin Delta (Northern Portion) F-16
Table F-5. Summary of Technology-based Effluent Limitations F-21
Table F-6. Critical Receiving Water Flows F-24
Table F-7. Summary of CTR Criteria for Hardness-dependent Metals F-40
Table F-8. Verification of CTR Compliance for Copper F-44
Table F-9. Verification of CTR Compliance for Silver F-45
Table F-10. Salinity Water Quality Criteria/Objectives F-56
Table F-11. Water Quality Objectives for Electrical Conductivity F-57
Table F-12. Historical Compliance with Electrical Conductivity Objectives at Emmaton (Water Years 1999-2012) F-57
Table F-13. Salinity Water Quality Criteria/Objectives and Effluent and Receiving Water Concentrations F-60
Table F-14. Data Summary for N-nitrosodimethylamine F-62
Table F-15. Data Summary for PAH's F-64
Table F-16. Summary of Water Quality-Based Effluent Limitations F-84
Table F-17. Summary of Final Effluent Limitations F-93
Table F-18. Interim Effluent Limitation Calculation Summary F-99

ATTACHMENT F – FACT SHEET

As described in section II.B of this Order, the Central Valley Water Board incorporates this Fact Sheet as findings of the Central Valley Water Board supporting the issuance of this Order. This Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order.

This Order has been prepared under a standardized format to accommodate a broad range of discharge requirements for Dischargers in California. Only those sections or subsections of this Order that are specifically identified as "not applicable" have been determined not to apply to this Discharger. Sections or subsections of this Order not specifically identified as "not applicable" are fully applicable to this Discharger.

I. PERMIT INFORMATION

The following table summarizes administrative information related to the Facility.

Table F-1. Facility Information

WDID	5A340108002
CIWQS Facility Place ID	254981
Discharger	Sacramento Regional County Sanitation District
Name of Facility	Sacramento Regional Wastewater Treatment Plant
Facility Address	8521 Laguna Station Road
	Elk Grove, CA 95758
	Sacramento County
Facility Contact, Title and Phone	Ruben Robles, Director of Operations, (916) 875-9000
Authorized Person to Sign and Submit Reports	Prabhakar Somavarapu, District Engineer, (916) 876-6048
Mailing Address	10060 Goethe Road, Sacramento, CA 95827
Billing Address	Same as Mailing Address
Type of Facility	Publicly Owned Treatment Works (POTW)
Major or Minor Facility	Major
Threat to Water Quality	1
Complexity	A
Pretreatment Program	Yes
Recycling Requirements	Producer (Master Reclamation Permit No. 97-146)
Facility Permitted Flow	181 million gallons per day (MGD), average dry weather flow
Facility Design Flow	181 MGD, average dry weather flow
Watershed	Sacramento-San Joaquin Delta
Receiving Water	Sacramento River
Receiving Water Type	Estuary

A. Sacramento Regional County Sanitation District (hereinafter Discharger) is the owner and operator of the Sacramento Regional Wastewater Treatment Plant (hereinafter Facility), a POTW.

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

B. The Facility discharges wastewater to the Sacramento River within the Sacramento-San Joaquin Delta, a water of the United States. The Discharger was previously regulated by

Order R5-2010-0114-04 and National Pollutant Discharge Elimination System (NPDES) Permit No. CA0077682 adopted on 9 December 2010; amended on 1 December 2011 (Order R5-2011-0083), 4 October 2013 (Order R5-2013-0124), 8 August 2014 (Orders R5-2014-0102 and R5-2014-0103), 9 October 2014 (Order R5-2014-0122), and 31 July 2015 (Order R5-2015-0097); and expired on 1 December 2015. Attachment B provides a map of the area around the Facility. Attachment C provides a flow schematic of the Facility.

Prior to making any change in the point of discharge, place of use, or purpose of use of treated wastewater that results in a decrease of flow in any portion of a watercourse, the Discharger must file a petition with the State Water Board, Division of Water Rights, and receive approval for such a change. The State Water Board retains the jurisdictional authority to enforce such requirements under Water Code section 1211.

C. The Discharger filed a report of waste discharge (ROWD) and submitted an application for reissuance of its WDR's and NPDES permit on 4 June 2015. The application was deemed complete on 3 August 2015. A site visit was conducted on 23 October 2015 to observe operations and collect additional data to develop permit limitations and requirements for waste discharge.

II. FACILITY DESCRIPTION

The Discharger provides wastewater treatment service to the Cities of Sacramento, Folsom, and West Sacramento, the communities of Courtland and Walnut Grove, and the Sacramento Area Sewer District. The Sacramento Area Sewer District service area includes the Cities of Elk Grove, Rancho Cordova, Citrus Heights, as well as portions of the unincorporated areas of Sacramento County. The population served is approximately 1.48 million people.

The Discharger owns and operates the main trunk lines/interceptors feeding the Facility. The smaller diameter collection systems are owned and operated by the various contributing agencies and not by the Discharger, and are regulated under the State Water Resources Control Board (State Water Board) Order 2006-0003-DWQ, Statewide General WDR's for Sanitary Sewer Systems, effective November 2006.

The City of Sacramento operates both a separate sewer collection system and a combined (storm water and wastewater) collection system. During wet weather the Facility is contracted to accept up to 60 MGD of wastewater and storm runoff from the downtown Sacramento combined collection system. Combined collection flows in excess of 60 MGD are managed by the Combined Wastewater Collection and Treatment System (CWCTS) operated by the City of Sacramento. The CWCTS discharge is governed by WDR Order R5-2015-0045 issued to the City of Sacramento. Depending on treatment and conveyance capacity, flow in excess of 60 MGD may be received at the Facility.

The Facility discharges to the Sacramento River just downstream of the Freeport Bridge via an outfall diffuser. The outfall diffuser is approximately 300 feet long with 74 ports and is placed perpendicular to the river flow. At times, the river flows in the reverse direction northeast towards the City of Sacramento, due to tidal activity during low river flows. The Discharger diverts its discharge to emergency storage basins whenever these conditions exist. The Discharger has determined in studies that river flows of at least 1,300 cubic feet per second (cfs) and providing a flow ratio of at least 14 to 1 (river: effluent) are required to allow for adequate mixing of the effluent through the outfall diffuser.

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

A. Description of Wastewater and Biosolids Treatment and Controls

1. **Existing Facility.** The Facility is staffed and operated 24 hours per day and the liquid treatment process consists of influent pumps, septage receiving station, mechanical bar screening; aerated grit handling, grit classifiers that wash and dewater grit, covered primary sedimentation tanks, pure oxygen biological treatment by activated sludge, secondary sedimentation, disinfection with chlorine gas, and dechlorination with sulfur dioxide. Effluent can be diverted to lined and unlined emergency storage basins (ESBs) as needed to meet effluent dilution, thermal, and disinfection requirements or divert excess flows. The current average dry weather flows are approximately 119 MGD and the Facility has a design average dry weather flow capacity of 181 MGD. Odors are controlled through stripping towers and carbon treatment.

2. **Future Facility.** Based on information provided by the Discharger, the Facility will be modified in order to comply with certain requirements in this Order consistent with the applicable compliance deadlines. The future Facility and operation is as follows, and differs seasonally.

   The design capacity of the future Facility will remain 181 MGD. Facility modification will include replacement of the existing pure oxygen biological treatment facilities with biological nutrient removal (BNR) air activated treatment facilities capable of removing ammonia and nitrate nitrogen, addition of tertiary treatment in the form of filtration with granular media filters, sidestream ammonia treatment, and the storage capacity of the ESBs will be increased and all basins will be lined. The Facility will continue to be staffed and operated 24 hours per day and will consist of influent pumps; septage receiving station; anaerobically digested material reception and storage facility; mechanical bar screening; aerated grit handling; grit classifiers that wash and dewater grit; covered primary sedimentation tanks; primary effluent pumping station and peak-shaving storage facilities (using ESBs for flow equalization); BNR air activated sludge treatment; nitrifying sequencing batch reactor for treating high ammonia concentration waste streams from solids storage basins and biosolids reclamation facility; secondary sedimentation; secondary effluent screens; filter influent pumping station; granular media filtration; disinfection with chlorine liquid in a covered disinfection contact basin; and dechlorination with sodium bisulfite. Compliant effluent can be diverted to the lined ESBs as needed to meet effluent dilution and thermal limits before discharge to the river. Non-compliant effluent, primary influent or effluent, and raw wastewater can be diverted to the lined ESBs as needed for any reason including process upsets, or diversions for excess flows, and returned for additional treatment to the influent of the facility. Odors are controlled through biological fixed media scrubbers, scrubbing tower, chemical oxidizing towers, and carbon treatment towers.

   The BNR activated sludge treatment facilities will be designed to process up to 330 MGD. Flows in excess of 330 MGD will be stored in peak-shaving storage facilities (ESBs) and returned for processing through the BNR facilities when capacity is available. All wastewater will receive secondary treatment through the BNR facilities. The tertiary filters will be designed to process flows up to 217 MGD, measured as a daily average. This Order requires seasonal disinfection requirements and the Facility will be operated differently seasonally, as follows:

a. **1 May – 31 October.** The Facility will be operated to meet Title 22 or equivalent disinfection criteria (Special Provision VI.C.6.a).

b. **1 November – 30 April (commences 1 November 2023)**

In the descriptions below, "filtered" means tertiary filtration of BNR effluent under filter operations consistent with the design hydraulic loading rate necessary to comply with the Title 22, or equivalent, disinfection criteria.

i. When the BNR effluent flow is 217 MGD, or less, measured as a daily average:

The entire BNR effluent flow will be filtered.

ii. When BNR effluent flow exceeds 217 MGD:

Up to 217 MGD will be filtered, and remaining wastewater will not be filtered. A portion of the filtered effluent may be reclaimed. The remaining filtered and non-filtered wastewater will be combined prior to disinfection by the chlorination/de-chlorination facilities. Reclaimed water in excess of demands will be combined prior to the dechlorination facilities.

3. **Biosolids Treatment.** Solids are thickened by dissolved air flotation and gravity belt thickeners. Primary and secondary sludge is mixed. Fats, Oils, and Grease from FOG receiving station may be mixed to the waste and the mixed waste is sent to anaerobic digesters for approximately 15 days or more, stored at the sludge stabilization basins for 3 to 5 years then harvested and injected into lined dedicated land disposal sites. Some biosolids are recycled with the Synagro Organic Fertilizer Company and the Discharger can dispose of biosolids at the Keifer Landfill as an emergency disposal option. Separate WDR's (Order R5-2015-0133) in conformance with California Code of Regulations, title 27, division 2, subdivision 1 regulate the biosolids and solids storage and disposal facilities, the Class II dedicated land treatment units, unclassified solids storage basins, and the Class III grit and screenings landfill closure. When the treatment plant upgrades are complete, biosolids treatment and disposal will remain unchanged.

4. **Groundwater Corrective Action Plan (CAP).** As part of WDR Order R5-2015-0133, a CAP was initiated by the Discharger. The CAP is to address elevated constituent concentrations that were observed in samples from groundwater monitoring wells down gradient of the Dedicated Land Disposal areas (DLD's) and the Class III landfill when compared to upgradient groundwater monitoring wells. Extraction wells are used for hydraulic control of the site. Characterization of the groundwater aquifer is documented in the reports submitted twice annually pursuant to WDR Order R5-2015-0133. The Discharger conveys the extracted groundwater from the CAP extraction wells, at an average pumping rate of approximately 0.4 MGD, to the Facility effluent channel downstream of the secondary clarifiers and upstream of the plant chlorination station or onsite constructed wetlands. Discharging water from the CAP system downstream of the secondary clarifiers is acceptable and does not decrease the amount of treatment as the treatment processes upstream of this discharge point are not designed for removal of the CAP discharge constituents of concern. Furthermore, based on the extracted groundwater sampling, estimates of CAP discharge constituent concentrations are either below current Facility effluent concentrations or do not have a reasonable potential to violate water quality objectives in the receiving water. Based on these considerations, the Central Valley Water Board finds disposal of CAP discharge as described above to be acceptable. The CAP discharge is being modified in 2016 to return flows to the Facility influent rather than continue to discharge to the secondary effluent channel.

B. Discharge Points and Receiving Waters

1. The Facility is located in Section 19, T7N, R5E, MDB&M, as shown in Attachment B, a part of this Order.
2. Treated municipal wastewater is discharged at Discharge Point 001 to the Sacramento River, a water of the United States, within the legal boundary of the Sacramento-San Joaquin Delta at a point latitude 38° 27' 15" N and longitude 121° 30' 00" W.
3. The Facility and Discharge Point 001 are located near the community of Freeport south of the City of Sacramento.

C. Summary of Existing Requirements and Self-Monitoring Report (SMR) Data

Effluent limitations contained in Order R5-2010-0114-04 for discharges from Discharge Point 001 (Monitoring Location EFF-001) and representative monitoring data from the term of Order R5-2010-0114-04 are as follows:

Table F-2. Historic Effluent Limitations and Monitoring Data

Parameter	Units	Effluent Limitation			Monitoring Data (March 2011 - September 2015)		
		Average Monthly	Average Weekly	Maximum Daily	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	10	15	20	10	16	21
	lbs/day[1]	15,100	22,700	30,200	15,834	20,049	31,930
	% Removal	85	--	--	96[2]	--	--
Total Suspended Solids	mg/L	10	15	20	10	14	20
	lbs/day[1]	15,100	22,700	30,200	12,049	18,372	25,687
	% Removal	85	--	--	96[2]	--	--
pH	standard units	--	--	6.0 – 8.0	--	--	6.0 – 7.6
Bis (2-ethylhexyl) Phthalate	µg/L	--	--	13	--	--	8.1
Carbon Tetrachloride	µg/L	--	--	5.3	--	--	2.9
Chloro-dibromomethane (prior to nitrification facilities operating)	µg/L	--	--	2.2	--	--	1.2
Chloro-dibromomethane (after nitrification facilities begin operating)	µg/L	--	--	12	--	--	N/A
Copper, Total Recoverable	µg/L	7.4	--	10	7.7	--	10
Cyanide	µg/L	--	--	11	--	--	8.6
Dibenzo (ah) anthracene	µg/L	0.2	--	0.4	<0.001	--	<0.001
Dichloro-bromomethane (prior to nitrification facilities operating)	µg/L	--	--	3.4	--	--	3.9

Parameter	Units	Effluent Limitation			Monitoring Data (March 2011 - September 2015)		
		Average Monthly	Average Weekly	Maximum Daily	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge
Dichloro-bromomethane (after nitrification facilities begin operating)	µg/L	--	--	35	--	--	N/A
Methylene Chloride	µg/L	4.7	--	11	1.3	--	5
Pentachlorophenol	µg/L	--	--	18	--	--	<0.005
Tetrachloroethylene	µg/L	--	--	4.4	--	--	1
Settleable Solids	ml/L	0.1	--	0.2	<0.1	--	0.1
Aluminum, Total Recoverable	µg/L	470/200[3]	683	--	33/17[4]	NR	--
Ammonia Nitrogen, Total (as N) (Apr-Oct)	mg/L	1.5	--	2.0	38	--	43
	lbs/day[1]	2,264	--	3,019	31,747	--	53,200
Ammonia Nitrogen, Total (as N) (Nov-Mar)	mg/L	2.4	--	3.3	36	--	43
	lbs/day[1]	3,622	--	4,981	36,399	--	54,991
Nitrate, Total (as N)	mg/L	10	--	--	0.425	--	--
Manganese, Total Recoverable	µg/L	--	--	270	--	--	140
Methyl Tertiary Butyl Ether	µg/L	--	--	18	--	--	0.34
Chronic Toxicity	TUc	--	--	[5]	--	--	16
Acute Toxicity	% Survival	--	--	70/90[6]	--	--	45[7]
Temperature	°F	--	--	20/25[8]	--	--	26.4[9]
Total Residual Chlorine	mg/L	--	0.011[10]	0.019[11]	--	--	11.9
Total Coliform Organisms (May-Oct)	MPN/100 mL	--	2.2[12]	23[13]/240[14]	--	--	1,600
Total Coliform Organisms (Nov-Apr)	MPN/100 mL	2.2[15]	23[16]	240[14]	--	--	1,600
Average Dry Weather Flow	MGD	--	--	181[17]	--	--	307.4[18]
Electrical Conductivity @ 25°C	µmhos/cm	900[3]	--	--	907[4]	--	--
Mercury	lbs/year	2.3[19]	--	--	1.56[20]	--	--
Chlorpyrifos	µg/L	[21]	--	[22]	<0.003	--	<0.003
Diazinon	µg/L	[21]	--	[22]	<0.004	--	<0.004

Parameter	Units	Effluent Limitation			Monitoring Data (March 2011 - September 2015)		
		Average Monthly	Average Weekly	Maximum Daily	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge

N/A – Not Applicable
NR – Not Reported

[1] Based on a design average dry weather flow of 181 MGD.
[2] Reflects the minimum observed percent removal.
[3] Applied as an annual average effluent limitation.
[4] Reflects the maximum observed annual average effluent concentration.
[5] There shall be no chronic whole effluent toxicity in the effluent discharge.
[6] Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:
i. 70%, minimum of any one bioassay; and
ii. 90%, median for any three consecutive bioassays.
[7] Reflects the minimum observed percent survival.
[8] The maximum temperature of the discharge shall not exceed the natural receiving water temperature at RSWU-001 by more than 20 F from 1 May through 30 September and more than 25 F from 1 October through 30 April.
[9] Reflects the maximum difference between the effluent and natural receiving water temperature at RSWU-001.
[10] Applied as a 4-day average effluent limitation.
[11] Applied as a 1-hour average effluent limitation.
[12] Applied as a 7-day median effluent limitation.
[13] Not to be exceeded more than once in any 30-day period.
[14] Applied as an instantaneous maximum effluent limitation.
[15] Applied as a monthly median effluent limitation.
[16] Applied as a weekly median effluent limitation.
[17] The average dry weather discharge flow shall not exceed 181 MGD.
[18] Reflects the maximum observed daily average flow.
[19] For a calendar year, the performance-based interim annual mass load of total mercury shall not exceed 2.3 lbs/year.
[20] Reflects the maximum observed annual mass loading.
[21] Average Monthly Effluent Limitation

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

$C_{D\text{-}avg}$ = average monthly diazinon effluent concentration in µg/L.
$C_{C\text{-}avg}$ = average monthly chlorpyrifos effluent concentration in µg/L.

[22] Maximum Daily Effluent Limitation

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

$C_{D\text{-}max}$ = maximum daily diazinon effluent concentration in µg/L.
$C_{C\text{-}max}$ = maximum daily chlorpyrifos effluent concentration in µg/L

D. Compliance Summary

1. The Central Valley Water Board issued Administrative Civil Liability (ACL) Complaint R5-2013-0502 on 11 January 2013 which proposed to assess a civil liability of $21,000 against the Discharger for effluent violations of settleable matter, chlorine residual, manganese, dichlorobromomethane, bis (2-ethylhexyl) phthalate, and copper that occurred between 1 May 2008 and 31 August 2012. The Discharger paid the mandatory minimum penalty of $21,000.

2. The Central Valley Water Board issued ACL Complaint R5-2014-0554 on 8 September 2014 which proposed to assess a civil liability of $6,000 against the Discharger for effluent violations of temperature and ammonia that occurred between

September 2012 through 31 March 2014. The Discharger paid the mandatory minimum penalty of $6,000.

E. Planned Changes

As discussed further in section II.A.2 of this Fact Sheet, the Discharger is constructing upgrades to the Facility, including replacement of the existing pure oxygen biological treatment facilities with BNR air activated treatment facilities capable of removing ammonia and nitrate nitrogen, addition of tertiary treatment in the form of filtration with granular media filters, sidestream ammonia treatment, and an increase in lined emergency storage basin facilities.

In all, Facility modifications will result in the construction, commissioning, and operation of seven or more new or reconstructed wastewater treatment units: flow equalization, disinfection chemical storage, biological nutrient removal (phase I and phase II), nitrifying sidestream treatment, and tertiary treatment facilities. Biological nutrient removal and nitrifying sidestream treatment are biological treatment processes. The start-up and commissioning period (i.e., period of time necessary for adjusting and testing of new or reconstructed wastewater treatment units) for projects of this size, while maintaining consistent and ongoing treatment operations, is a complex undertaking. It involves the gradual transitioning of wastewater treatment from current plant facilities over to new or reconstructed treatment plant facilities. Prior to start-up and adjustment, the Discharger intends to submit start-up operation plans for the period of adjustment and testing to the Central Valley Water Board for review. The Discharger has indicated that plans will be submitted separately for each of the individual wastewater treatment units, and will be submitted in accordance with the schedule for the individual wastewater treatment unit in question. Specifically, such plans will be submitted at least 30 days prior to the period of adjusting and testing that will take place for each individual wastewater treatment unit. It is anticipated that the period of adjustment and testing may occur over several months to over many months - depending on the wastewater treatment unit. However, potential effluent or other permit violations will likely only occur during certain times of the adjustment and testing period. If the Discharger wishes to apply for protection from Mandatory Minimum Penalties during the start-up periods, then pursuant to Water Code section 13385(j)(1)(D), the Discharger's start-up operations plans must include steps that the Discharger will take to prevent violations and identify the shortest reasonable time required for the period of adjusting and testing that could result in effluent or permit violations. The Central Valley Water Board will work with the Discharger to identify the appropriate steps and actions to be taken to minimize the potential for Mandatory Minimum Penalties.

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in this Order are based on the requirements and authorities described in this section.

A. Legal Authorities

This Order serves as WDR's pursuant to article 4, chapter 4, division 7 of the California Water Code (commencing with section 13260). This Order is also issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations adopted by the U.S. EPA and chapter 5.5, division 7 of the Water Code (commencing with section 13370). It shall serve as an NPDES permit for point source discharges from this Facility to surface waters.

B. California Environmental Quality Act (CEQA)

Under Water Code section 13389, this action to adopt an NPDES permit is exempt from the provisions of Chapter 3 of CEQA, (commencing with section 21100) of Division 13 of the Public Resources Code.

C. State and Federal Laws, Regulations, Policies, and Plans

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

   a. **Basin Plan.** The Central Valley Water Board adopted a Water Quality Control Plan, Fourth Edition (Revised October 2011), for the Sacramento and San Joaquin River Basins (hereinafter 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. Requirements in this Order implement the Basin Plan. In addition, the Basin Plan implements State Water Board Resolution 88-63, which established state policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply. Beneficial uses applicable to Sacramento River within the Sacramento-San Joaquin Delta are as follows:

Table F-3. Basin Plan Beneficial Uses

Discharge Point	Receiving Water Name	Beneficial Use(s)
001	Sacramento River	Existing: Municipal and domestic water supply (MUN); agricultural supply including irrigation and stock watering (AGR); industrial process supply (PRO); industrial service supply (IND); water contact recreation (REC-1); non-contact water recreation (REC-2); warm freshwater habitat (WARM); cold freshwater habitat (COLD); cold and warm migration of aquatic organisms (MIGR); warm spawning, reproduction, and/or early development (SPWN); wildlife habitat (WILD); and navigation (NAV).
--	Groundwater	Existing: Municipal and domestic supply (MUN); agricultural supply (AGR); industrial service supply (IND); and industrial process supply (PROC).

   b. **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 State Water Board adopted Decision 1641 (D-1641) on 29 December 1999, and revised on 15 March 2000. 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.

   c. **Thermal Plan.** The State Water Board adopted the *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California* (Thermal Plan) on 7 January 1971, and amended this

plan on 18 September 1975. This plan contains temperature objectives for surface waters. Requirements of this Order implement the Thermal Plan.

For the purposes of the Thermal Plan, the Discharger is considered to be an Existing Discharger of Elevated Temperature Waste. The Thermal Plan in section 5.A contains the following temperature objectives for surface waters that are applicable to this discharge:

"*5. Estuaries*

A. Existing dischargers

(1) Elevated temperature waste discharges shall comply with the following:

a. The maximum temperature shall not exceed the natural receiving water temperature by more than 20°F.

b. Elevated temperature waste discharges either individually or combined with other discharges shall not create a zone, defined by water temperatures of more than 1°F above natural receiving water temperature, which exceeds 25 percent of the cross-sectional area of a main river channel at any point.

c. No discharge shall cause a surface water temperature rise greater than 4°F above the natural temperature of the receiving waters at any time or place.

d. Additional limitations shall be imposed when necessary to assure protection of beneficial uses.

i. **Thermal Plan Exceptions.** The Discharger requested limited exceptions to Thermal Plan Objectives 5A(1)(a) and 5A(1)(b). The Thermal Plan allows regional boards to provide exceptions to specific water quality objectives in the Thermal Plan so long as the exceptions comply with CWA section 316(a) and federal regulations. The applicable exception is promulgated in 40 C.F.R. section 125.73(a), which provides that, "*Thermal discharge effluent limitations or standards established in permits may be less stringent than those required by applicable standards and limitations if the discharger demonstrates to the satisfaction of the director that such effluent limitations are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made. This demonstration must show that the alternative effluent limitation desired by the discharger, considering the cumulative impact of its thermal discharge together with all other significant impacts on the species affected, will assure the protection and propagation of a balanced indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is to be made.*" The Thermal Plan requires that the State Water Board concur with any exceptions prior to them becoming effective.

The Central Valley Water Board has considered the applicability of the Thermal Plan exceptions for the Facility's discharge. Based on all evidence in the record the Board finds that the Discharger has adequately demonstrated through comprehensive thermal effect studies that the effluent and receiving water limitations based on the Thermal Plan are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge

is made. The Board also finds that the alternative limitations, considering the cumulative impact of its thermal discharge together with all other significant impacts on the species affected, will assure the protection and propagation of a balanced indigenous community of shellfish, fish and wildlife in and on the Sacramento River and Delta. The detailed rationale for allowing the Thermal Plan exceptions is provided in Attachment I.

In accordance with 40 C.F.R. section 125.73(a) this Order grants the following exceptions to Thermal Plan objectives 5A(1)(a) and 5A(1)(b):

- **Thermal Plan Objective 5A(1)(a) Exception:**

  The maximum temperature of the discharge shall not exceed the natural receiving water temperature by more than:

  25º F from 1 October through 30 April;

  -and-

  20º F from 1 May through 30 September

- **Thermal Plan Objective 5A(1)(b) Exception:**

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

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

These alternative effluent and receiving water limitations are not effective unless the Central Valley Water Board receives concurrence from the State Water Board regarding the Thermal Plan exceptions. On 14 January 2016, Central Valley Water Board staff provided technical justification for the Thermal Plan exceptions to the State Water Board for their review.[1] On 11 March 2016, State Water Board staff agreed there was adequate support for the exceptions and following adoption of this Order by the Central Valley Water Board will recommend concurrence by the State Water Board for the Thermal Plan exceptions.[2]

d. **Sediment Quality.** The State Water Board adopted the *Water Quality Control Plan for Enclosed Bays and Estuaries – Part 1, Sediment Quality* on 16 September 2008, and it became effective on 25 August 2009. This plan supersedes other narrative sediment quality objectives, and establishes new sediment quality objectives and related implementation provisions for specifically defined sediments in most bays

[1] Memorandum from Pamela Creedon, Executive Officer, Central Valley Water Board to Tom Howard, Executive Director, State Water Board, 14 January 2016

[2] Memorandum from Karen Larsen, Deputy Director, State Water Board Division of Water Quality to Pamela Creedon, Executive Officer, Central Valley Water Board, 11 March 2016

and estuaries. Requirements of this Order implement sediment quality objectives of this Plan.

2. **National Toxics Rule (NTR) and California Toxics Rule (CTR).** U.S. EPA adopted the NTR on 22 December 1992, and later amended it on 4 May 1995 and 9 November 1999. About forty criteria in the NTR applied in California. On 18 May 2000, U.S. EPA adopted the CTR. The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the state. The CTR was amended on 13 February 2001. These rules contain federal water quality criteria for priority pollutants.

3. **State Implementation Policy.** On 2 March 2000, the State Water Board adopted the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Policy or SIP). The SIP became effective on 28 April 2000, with respect to the priority pollutant criteria promulgated for California by the U.S. EPA through the NTR and to the priority pollutant objectives established by the Central Valley Water Board in the Basin Plan. The SIP became effective on 18 May 2000, with respect to the priority pollutant criteria promulgated by the U.S. EPA through the CTR. The State Water Board adopted amendments to the SIP on 24 February 2005, that became effective on 13 July 2005. The SIP establishes implementation provisions for priority pollutant criteria and objectives and provisions for chronic toxicity control. Requirements of this Order implement the SIP.

4. **Antidegradation Policy.** Federal regulation 40 C.F.R. 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 68-16 ("Statement of Policy with Respect to Maintaining High Quality of Waters in California"). Resolution 68-16 is deemed to incorporate the federal antidegradation policy where the federal policy applies under federal law. Resolution 68-16 requires that existing water quality be maintained unless degradation is justified based on specific findings. The Central Valley Water Board's Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies. The permitted discharge must be consistent with the antidegradation provision of 40 C.F.R. section 131.12 and State Water Board Resolution 68-16.

5. **Anti-Backsliding Requirements.** Sections 402(o) and 303(d)(4) of the CWA and federal regulations at 40 C.F.R. section 122.44(l) restrict 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.

6. **Domestic Water Quality.** In compliance with Water Code section 106.3, it is the policy of the State of California that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes. This Order promotes that policy by requiring discharges to meet MCL's designed to protect human health and ensure that water is safe for domestic use.

7. **Endangered Species Act Requirements.** 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, §§ 2050 to 2097) or the Federal Endangered Species Act (16 U.S.C.A. §§ 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.

8. **Emergency Planning and Community Right to Know Act.** Section 13263.6(a) of the 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) (EPCRA) indicate as discharged into the POTW, for which the State Water Board or the Regional Water Board has established numeric water quality objectives, and has determined that the discharge is or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to, an excursion above any numeric water quality objective"*.

   U.S EPA's Toxics Release Inventory (TRI) indicates that several pollutants were discharged to the Facility. Of these pollutants, numeric water quality objectives have been adopted for ammonia, benzene, benzo (g,h,i) perylene, chlorobenzene, chromium compounds, copper and copper compounds, dichloromethane, ethylbenzene, lead and lead compounds, manganese, methyl tertiary butyl ether, naphthalene, nitrate compounds, polycyclic aromatic hydrocarbons (PAH's), toluene, and xylene in the Basin Plan and the CTR. As detailed elsewhere in this Permit, available effluent quality data indicate that effluent concentrations of ammonia, copper, and nitrate have a reasonable potential to cause or contribute to an excursion above numeric water quality objectives and effluent limitations for these pollutants are included in this Order.

9. **Storm Water Requirements.** U.S. EPA promulgated federal regulations for storm water on 16 November 1990 in 40 C.F.R. parts 122, 123, and 124. The NPDES Industrial Storm Water Program regulates storm water discharges from wastewater treatment facilities. Wastewater treatment plants are applicable industries under the storm water program and are obligated to comply with the federal regulations. The State Water Board Water Quality Order No. 2014-0057-DWQ, NPDES General Permit No. CAS000001, NPDES General Permit for Storm Water Discharges Associated with Industrial Activities, does not require facilities to obtain coverage if storm water is captured and treated and/or disposed of with the Facility's NPDES permitted process wastewater or if storm water is disposed in evaporation ponds, percolation ponds, or combined sewer systems. The Discharger captures and treats all storm water that falls on-site. Therefore, coverage under the General Storm Water Permit is not required.

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

1. Under section 303(d) of the 1972 CWA, states, territories and authorized tribes are required to develop lists of water quality limited segments. The waters on these lists do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. On 26 June 2015 U.S. EPA gave final approval to California's 2012 section 303(d) List of Water Quality Limited Segments. The Basin Plan references this list of Water Quality Limited Segments (WQLS's), 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 C.F.R. part 130, et seq.)*." The Basin Plan also states, "*Additional treatment beyond minimum federal standards will be imposed on dischargers to* [WQLSs]. *Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment.*" The listing for the Sacramento-San Joaquin Delta (northern portion) includes: chlordane, chlorpyrifos, DDT, diazinon, dieldrin, Group A pesticides, invasive species, mercury, polychlorinated biphenyls (PCB's), and unknown toxicity.

2. **Total Maximum Daily Loads (TMDL's).** U.S. EPA requires the Central Valley Water Board to develop TMDL's for each 303(d) listed pollutant and water body combination. Table F-4, below, identifies the 303(d) listings and the status of each TMDL.

Table F-4. 303 (d) List for the Sacramento-San Joaquin Delta (Northern Portion)

Pollutant	Potential Sources	TMDL Completion[1]
Chlordane	Source Unknown	(2011)
Chlorpyrifos	Source Unknown	2007
DDT	Source Unknown	(2011)
Diazinon	Source Unknown	2007
Dieldrin	Source Unknown	(2011)
Group A Pesticides	Source Unknown	(2011)
Invasive Species	Source Unknown	(2019)
Mercury	Source Unknown	2009
PCB's	Source Unknown	(2019)
Unknown Toxicity	Source Unknown	(2019)

[1] Dates in parenthesis are proposed TMDL completion dates.

3. The 303(d) listings and TMDL's have been considered in the development of the Order. A pollutant-by-pollutant evaluation of each pollutant of concern is described in section IV.C.3 of this Fact Sheet.

E. Other Plans, Policies and Regulations

1. **Title 27, California Code of Regulations (CCR), section 20005 et seq. (hereafter Title 27).** Title 27 regulations contains the State Water Resources Control Board's water quality regulations for discharges of solid wastes to land. Exemption from Title 27 is provided if the discharges of domestic sewage or treated effluent are regulated by WDRs and are consistent with applicable water quality objectives and treatment or storage facilities associated with municipal wastewater treatment plants, provided solid wastes are discharged only in accordance with Title 27. Historically discharges of wastewater to land, including but not limited to evaporation ponds or percolation ponds, storage ponds have been exempt from the requirements of Title 27, CCR, based on section 20090 et seq. However, the State Water Resources Control Board issued a decision on another municipal wastewater treatment plant, the City of Lodi, that storage basins must be part of the treatment process in order to be included in the Title 27 exemptions.

   The Facility contains solids storage, land disposal and emergency influent and effluent storage. A determination has been made by the Central Valley Water Board whether the facilities meet the exemptions from Title 27. These facilities include the Solid Storage Basins (SSB's) and Dedicated Land Disposal areas (DLD's) and Emergency Storage Basins. The Central Valley Water Board's findings regarding Title 27 exemptions are discussed below.

   a. **Solids Storage Basins (SSB's).** The SSB's are unlined storage ponds for anaerobically digested primary and secondary sludge and scum. The SSB's receive about 6,000 tons of wet sludge per day. The digested sludge has about 0.4 to 3% solids and is composed of 50 to 80% volatile solids. Digested sludge may also contain variable concentrations of contaminants such as heavy metals, chlorinated hydrocarbons and pathogens. The sludge remains in the basins from 3 to 5 years prior to discharge to the DLD's. The SSB's provide additional stabilization treatment, storage and evaporation of the sludge. In July 2009, the Discharger installed six new wells to monitor groundwater water quality. The results from those wells will determine if the SSB's are impacting groundwater and need to be lined. The SSB's are governed by Order R5-2015-0133.

b. **Dedicated Land Disposal Areas (DLD's).** The DLD's are lined land disposal units that receive stabilized sludge from the SSB's. The semi-liquid sludge is applied to the DLD's by subsurface injection during dry seasons. To prevent leaching of heavy metals, the Discharger applies lime to maintain proper soil pH. The DLD's are not exempt from Title 27 and are governed by Order R5-2015-0133.

c. **Corrective Action Program (CAP).** During the 1990's the groundwater beneath the DLD's were found to be impacted by elevated concentrations of nitrates, chlorides and total dissolved solids. To mitigate the impacted groundwater, the Class III landfill that took grit and screenings was closed and the DLD's were either lined or closed. The Discharger implemented a CAP in December 1995 to remediate the impacted groundwater and it consisted of extraction wells down gradient of the DLD's. The extraction wells keep the groundwater from migrating off the Facility site. The groundwater is discharged downstream of the secondary clarifiers where it continues through the remaining treatment processes and is discharged to the Sacramento River or to the on-site constructed wetlands. The CAP is operational and is regulated under Order R5-2015-0133.

d. **Emergency Storage Basins (ESBs).** The Facility includes five Emergency Storage Basins (ESB's), ESB-A through ESB-E with a total capacity of 302 million gallons (MG). ESB-A is lined with concrete and has 15.5 MG of capacity. The purpose of ESB-A is to store diverted influent flows above the hydraulic capacity (peak wet weather flows) of the Facility and store diverted effluent flows to meet various conditions to comply with this Order. Reasons to divert final effluent to ESB-D and not discharge to the Sacramento River include maintaining the minimum 14:1 river to effluent ratio and maintaining compliance with effluent limitations for temperature and chlorine residual. Flow stored in ESB-A is returned to the headworks for treatment. Overflow from ESB-A discharges to unlined ESB-B that can, if necessary, overflow to unlined ESB-C. The combined capacity of ESB-B and C is 206 MG. Since construction of ESB-D, ESB-A is typically only used to store excess influent flows. ESB-A, B and C are exempt from Title 27 pursuant to CCR Title 27 section 20090(a) since these basins are integral to protecting the treatment processes from washing out due to peak wet weather flows or for storage of diverted flow to comply with the conditions of this Order.

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

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

The Discharger's ongoing Flow Equalization project includes deepening and lining of the ESBs. Following the upgrades the facilities will continue to be exempt from Title 27, as discussed above. The upgrades consist of the following project elements:

- Deepening ESB-B and ESB-C to increase storage volume by approximately 115 million gallons.

- Subdividing ESB-C into three sub-basins – ESB-C1, ESB-C2, and ESB-C3.
- Installation of a new underdrain system and associated pumping station.
- Lining ESB-B, ESB-C1, ESB-C2, and ESB-C3 with roller compact concrete floors and shotcrete walls.
- Installation of a new ESB washdown distribution system for ESB-A, ESB-B, ESB-C1, ESB-C2, and ESB-C3,
- Installation of new inlet/outlet structures between each of the basins,
- Installation of a new flow-through diversion structure and valves on the existing 102-inch effluent conduits,
- Installation of new 84-inch final effluent (FE) piping and associated gates,
- Installation of new ESB drain piping to allow ESB-B, ESB-C1, ESB-C2, and ESB-C3 to drain back to the City Interceptor,
- Relocation of the existing ESB emergency overflow spillway.

2. **Water Boards' Actions to Protect Beneficial Uses of the San Francisco Bay/Sacramento-San Joaquin Delta Estuary.** The Central Valley Water Board adopted Resolution R5-2007-0161, *Water Board's Actions to Protect Beneficial Uses of the San Francisco Bay/Sacramento- San Joaquin Delta Estuary* on 6 December 2007. The purpose of the resolution is to identify and implement actions needed to protect the San Francisco/San Joaquin Delta beneficial uses. Some actions include exercising the State Water Board's water rights authority over water right decisions and exercising the San Francisco Bay Regional Water Quality Control Board's and Central Valley Water Board's authority over controlling water quality in the Delta.

IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

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

The CWA mandates the implementation of effluent limitations that are as stringent as necessary to meet water quality standards established pursuant to state or federal law [33 U.S.C., §1311(b)(1)(C); 40 C.F.R. § 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 C.F.R. section 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 C.F.R. section 122.44(d)(1)(vi), further provide that "[w]*here a state has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits*."

The CWA requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. There are two principal bases for effluent limitations in the Code of Federal

Regulations: 40 C.F.R. section 122.44(a) requires that permits include applicable technology-based limitations and standards; and 40 C.F.R. section 122.44(d) requires that permits include WQBEL's to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water where numeric water quality objectives have not been established. The Basin Plan at page IV-17.00, contains an implementation policy, "Policy for Application of Water Quality Objectives", that specifies that the Central Valley 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 C.F.R. section 122.44(d)(1). With respect to narrative objectives, the Central Valley Water Board must establish effluent limitations using one or more of three specified sources, including: (1) U.S. EPA'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 Central Valley Water Board's "Policy for Application of Water Quality Objectives")(40 C.F.R. § 122.44(d)(1)(vi)(A), (B) or (C)), or (3) an indicator parameter.

The Basin Plan includes numeric site-specific water quality objectives and narrative objectives for toxicity, chemical constituents, discoloration, radionuclides, and tastes and odors. The narrative toxicity objective states: "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*" (Basin Plan at III-8.00) The Basin Plan states that material and relevant information, including numeric criteria, and recommendations from other agencies and scientific literature will be utilized in evaluating compliance with the narrative toxicity objective. The narrative chemical constituents objective states that waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. At minimum, "…*water designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs)*" in Title 22 of CCR. The Basin Plan further states that, to protect all beneficial uses, the Central Valley Water Board may apply limits more stringent than MCL's. The narrative tastes and odors objective states: "*Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses.*"

A. Discharge Prohibitions

1. **Prohibition III.A (No discharge or application of waste other than that described in this Order).** This prohibition is based on Water Code section 13260 that requires filing of a ROWD before discharges can occur. The Discharger submitted a ROWD for the discharges described in this Order; therefore, discharges not described in this Order are prohibited. Consistent with Order R5-2010-0114-04, this Order allows the Discharger to reclaim disinfected secondary effluent for dust control and compaction on construction projects, landscape irrigation, wash down water, vehicle washing and grounds maintenance within the Facility boundaries, and for flushing of pipelines within the sewer collection system. It may also be used for in-plant process water and fire protection and used in the tertiary treatment plant and distribution system. This Order requires that use of reclaimed disinfected secondary effluent meet the requirements of CCR, title 22, section 60301, et seq. and the associated DDW guidelines as applicable. Runoff of disinfected secondary effluent is prohibited except as regulated by Master Reclamation Permit No. 97-146.

2. **Prohibition III.B (No bypasses or overflow of untreated wastewater, except under the conditions at 40 C.F.R. section 122.41(m)(4)).** 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 C.F.R. section 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 C.F.R. section 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 C.F.R. section 122.41(m), as allowing bypass only for essential maintenance to assure efficient operation.

3. **Prohibition III.C (No controllable condition shall create a nuisance).** This prohibition is based on Water Code section 13050 that requires water quality objectives established for the prevention of nuisance within a specific area. The Basin Plan prohibits conditions that create a nuisance.

4. **Prohibition III.D (No inclusion of pollutant free wastewater shall cause improper operation of the Facility's systems).** This prohibition is based on 40 C.F.R. section 122.41 et seq. that requires the proper design and operation of treatment facilities.

5. **Prohibition III.E (No discharge when the Sacramento River instantaneous flow is less than 1,300 cfs) and Prohibition III.F (No discharge when there is less than 14:1 (river: effluent) flow ratio).** Previous Order 5-00-188 included the discharge prohibition of no discharge unless the river is flowing more than 1,300 cfs and there is at least a 14 to 1 flow ratio (river: effluent). These conditions were based on previous studies that determined river flows of at least 1,300 cfs and providing a flow ratio of at least 14 to 1 (river: effluent) are required to allow adequate mixing of the effluent. Although the diffuser configuration has changed from 99 ports to 74 ports and new dye studies confirmed the dynamic modeling showing mixing zones, all the analysis for antidegradation, thermal plumes, and dilution credits have been based on continuing these conditions. Therefore, consistent with previous Orders 5-00-188 and R5-2010-0114-04, these conditions remain in this Order.

B. Technology-Based Effluent Limitations

1. Scope and Authority

Section 301(b) of the CWA and implementing U.S. EPA permit regulations at 40 C.F.R. section 122.44 require that permits include conditions meeting applicable technology-based requirements at a minimum, and any more stringent effluent limitations necessary to meet applicable water quality standards. The discharge authorized by this Order must meet minimum federal technology-based requirements based on Secondary Treatment Standards at 40 C.F.R. part 133.

Regulations promulgated in 40 C.F.R. 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 POTW's [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 U.S. EPA Administrator.

Based on this statutory requirement, U.S. EPA developed secondary treatment regulations, which are specified in 40 C.F.R. 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 at 40 C.F.R. 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 C.F.R. section 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. This Order requires WQBEL's that are equal to or more stringent than the secondary technology-based treatment described in 40 C.F.R. part 133 (see section IV.C.3 of the Fact Sheet for a discussion on pathogens which includes WQBEL's for BOD_5 and TSS).

b. **Flow.** The Facility was designed to provide a secondary level of treatment for up to a design flow of 181 MGD. Therefore, this Order contains an average dry weather discharge flow effluent limit of 181 MGD.

c. **pH.** The secondary treatment regulations at 40 C.F.R. part 133 also require that pH be maintained between 6.0 and 9.0 standard units. This Order, however, requires a more stringent instantaneous maximum effluent limitation for pH, as discussed further in section IV.C.3 of this Fact Sheet.

Summary of Technology-based Effluent Limitations
Discharge Point 001

Table F-5. Summary of Technology-based Effluent Limitations

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow	MGD	181[1]	--	--	--	--
Conventional Pollutants						
Biochemical Oxygen Demand (5-day @ 20°C)[2]	mg/L	30	45	--	--	--
	lbs/day[3]	45,286	67,929	--	--	--
	% Removal	85	--	--	--	--
pH[2]	standard units	--	--	--	6.0	9.0
Total Suspended Solids[2]	mg/L	30	45	--	--	--
	lbs/day[3]	45,286	67,929	--	--	--
	% Removal	85	--	--	--	--

1 The average dry weather flow shall not exceed 181 MGD.
2 Note that more stringent WQBEL's for BOD_5, pH, and TSS are applicable and are established as final effluent limitations in this Order (see section IV.C.3 of this Fact Sheet).
3 Based on an average dry weather flow of 181 MGD.

C. Water Quality-Based Effluent Limitations (WQBEL's)

1. Scope and Authority

CWA Section 301(b) and 40 C.F.R. section 122.44(d) require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards. This Order contains requirements, expressed as a technology equivalence requirement, more stringent than secondary treatment requirements that are necessary to meet applicable water quality standards. The rationale for these requirements, which consist of tertiary treatment or equivalent requirements and other provisions, is discussed in section IV.C.3 of this Fact Sheet.

Section 122.44(d)(1)(i) of 40 C.F.R. requires that permits include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, WQBEL's must be established using: (1) U.S. EPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in section 122.44(d)(1)(vi).

The process for determining reasonable potential and calculating WQBEL's when necessary is intended to protect the designated uses of the receiving water as specified in the Basin Plan, and achieve applicable water quality objectives and criteria that are contained in other state plans and policies, or any applicable water quality criteria contained in the CTR and NTR.

2. Applicable Beneficial Uses and Water Quality Criteria and Objectives

The Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. In addition, the Basin Plan implements State Water Board Resolution No. 88-63, which established state policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply.

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

The federal CWA section 101(a)(2), states: "*it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and for recreation in and on the water be achieved by July 1, 1983.*" Federal Regulations, developed to implement the requirements of the CWA, create a rebuttable presumption that all waters be designated as fishable and swimmable. Federal Regulations, 40 C.F.R. sections 131.2 and 131.10, require that all waters of the State regulated to protect the beneficial uses of public water supply, protection and propagation of fish, shell fish and wildlife, recreation in and on the water, agricultural, industrial and other purposes including navigation.
40 C.F.R. section 131.3(e) defines existing beneficial uses as those uses actually attained after 28 November 1975, whether or not they are included in the water quality

standards. Federal Regulation, 40 C.F.R. section 131.10 requires that uses be obtained by implementing effluent limitations, requires that all downstream uses be protected and states that in no case shall a state adopt waste transport or waste assimilation as a beneficial use for any waters of the United States.

a. **Receiving Water and Beneficial Uses.** The Sacramento-San Joaquin Delta is vital to California and comprises over 700 miles of interconnected waterways and encompasses 1,153 square miles. The Sacramento-San Joaquin Delta is home to over 280 species of birds and more than 50 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 Sacramento-San Joaquin Delta via the State Water Project, Central Valley Water Project, and local water intakes. The Sacramento-San Joaquin 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 Sacramento River at Freeport is within the designated critical habitat for five federally-listed fish species including winter- and spring-run Chinook salmon (*Oncorhynchus tshawytscha*), Steelhead (*O. mykiss*), Delta smelt (*Hypomesus transpacificus*) and Green sturgeon (*Acipenser medirostris*). Other listed wildlife species that feed on Central Valley fishes include the California Least Tern (*Stenula antillarum brownie*) and the Giant Garter snake (*Thamnopsis gigas*). In addition to the federally-listed species the California State Species of Special Concern include the Sacramento Splittail (*Pogonichthys macrolepidotus*) and the Central Valley Fall/Late-Fall Salmon (*Oncorhynchus tshawytscha*).

   Refer to section III.C.1 of this Fact Sheet for a complete description of the beneficial uses.

b. **Effluent and Ambient Background Data.** The reasonable potential analysis (RPA), as described in section IV.C.3 of this Fact Sheet, was based on data collected between January 2012 and December 2014 which includes effluent and ambient background data submitted in SMR's.

c. **Assimilative Capacity/Mixing Zone**

   i. **Receiving Water Characteristics.** The lower Sacramento River in the vicinity of the discharge is a large river with sufficient flows for dilution. The Sacramento watershed is a heavily managed system of reservoirs and diversions. The Sacramento River near the discharge location (Freeport) drains a 26,146-square-mile basin that spans the entire northern Central Valley of California from the crest of the Coast Range to the crest of the Sierra Nevada. Flows in the Sacramento River are influenced by precipitation (rainfall and snowpack/snowmelt), but are also influenced by several reservoirs on the tributaries and main stem, which are managed for flood control, water supply, and hydroelectric power generation. Irrigation diversions and agricultural return flows also affect the river regime. Winter and spring flows in the Sacramento River often exceed 50,000 cfs. While summer flows average 10,000 cfs, they can fall below 4,000 cfs. Daily flow probabilities for the Sacramento River at Freeport, based on U.S. Geologic Survey gauged flow data from 1942-1989, indicate that there is only a 10% probability of flows less than or equal to 10,000 cfs, and a 10% probability of flows greater than 70,000 cfs. Therefore, typical flows in the Sacramento range from 10,000 to 70,000 cfs. The critical low flows for the Sacramento River based on flow data at Freeport from 1970 to 2009 are shown in Table F-6, below.

Table F-6. Critical Receiving Water Flows

Critical Low Flows	Receiving Water Flow (cfs)
1Q10[1]	5,060
7Q10[2]	5,846
30Q5[3]	8,234
Harmonic Mean[4]	15,403

[1] Lowest daily average flow with a return frequency of 10 years.
[2] Lowest 7-day average flow with a return frequency of 10 years.
[3] Lowest 30-day average flow with a return frequency of 5 years.
[4] At Freeport from 1 January 1970 through 31 December 2014.

ii. **Regulatory Guidance for Dilution Credits and Mixing Zones.** The Discharger has requested mixing zones and dilution credits for compliance with acute and chronic aquatic life water quality criteria (i.e., copper, cyanide, and chronic whole effluent toxicity) and human health water quality criteria (i.e., chlorodibromomethane, dichlorobromomethane, bis (2-ethylhexyl) phthalate, and carbon tetrachloride). The Central Valley Water Board has the discretion to accept or deny mixing zones and dilution credits.

The CWA directs the states to adopt water quality standards to protect the quality of its waters. U.S. EPA's current water quality standards regulation authorizes states to adopt general policies, such as mixing zones, to implement state water quality standards (40 C.F.R. § 122.44 and 122.45). The U.S. EPA allows states to have broad flexibility in designing its mixing zone policies. Primary policy and guidance on determining mixing zone and dilution credits is provided by the SIP and the Basin Plan. If no procedure applies in the SIP or the Basin Plan, then the Central Valley Water Board may use the U.S. EPA *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001)(TSD).

For non-priority pollutant constituents the allowance of mixing zones by the Central Valley Water Board is discussed in the Basin Plan, *Policy for Application of Water Quality Objectives*, which states in part, "*In conjunction with the issuance of NPDES and storm water permits, the Regional Board may designate mixing zones within which water quality objectives will not apply provided the discharger has demonstrated to the satisfaction of the Regional Board that the mixing zone will not adversely impact beneficial uses. If allowed, different mixing zones may be designated for different types of objectives, including, but not limited to, acute aquatic life objectives, chronic aquatic life objectives, human health objectives, and acute and chronic whole effluent toxicity objectives, depending in part on the averaging period over which the objectives apply. In determining the size of such mixing zones, the Regional Board will consider the applicable procedures and guidelines in the EPA's Water Quality Standards Handbook and the* [TSD]*. Pursuant to EPA guidelines, mixing zones designated for acute aquatic life objectives will generally be limited to a small zone of initial dilution in the immediate vicinity of the discharge.*"

For priority pollutants, the SIP supersedes the Basin Plan mixing zone provisions. Section 1.4.2 of the SIP states, in part, "…*with the exception of effluent limitations derived from TMDL's, 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 through 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*." [emphasis added]

For completely-mixed discharges, Section1.4.2.1 of the SIP states, "*For completely-mixed discharges, as determined by the RWQCB and based on information provided by the discharger, the amount of receiving water available to dilute the effluent shall be determined by calculating the *dilution ratio (i.e., the critical receiving water flow divided by the effluent flow) using the appropriate flows in Table 3. In no case shall the RWQCB grant a dilution credit that is greater than the calculated dilution ratio. The dilution credit may be set equal to the dilution ratio only if the site-specific conditions concerning the discharge and the receiving water do not indicate that a smaller dilution credit is necessary to protect beneficial uses and meet the conditions of this Policy. If, however, dilution ratios that are calculated using the Table 3 parameters are inappropriate for use due to site-specific issues, the mixing zone and dilution credit shall be determined using site-specific information and procedures detailed for incompletely-mixed discharges."*

For incompletely-mixed discharges, the Discharger must complete an independent mixing zone study to demonstrate to the Central Valley Water Board that a dilution credit is appropriate. In granting a mixing zone, Section 1.4.2.2 of the SIP requires the following to be met:

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

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."

Section 1.4.2.1 of the SIP establishes the authority for the Central Valley Water Board to consider dilution credits based on the mixing zone conditions in a receiving water. Section 1.4.2.1 in part states:

"*The dilution credit, D, is a numerical value associated with the mixing zone that accounts for the receiving water entrained into the discharge. The dilution credit is a value used in the calculation of effluent limitations (described in Section 1.4).* ***Dilution credits may be limited or denied on a pollutant-by-pollutant basis, which may result in a dilution credit for all, some, or no priority pollutants in the discharge.***" [emphasis added]

The mixing zone is thus an administrative construct defined as an area around the outfall that may exceed water quality objectives, but is otherwise protective of the beneficial uses. Dilution is defined as the amount of mixing that has occurred at the edge of this mixing zone under critical conditions, thus protecting the beneficial uses at the concentration and for the duration and frequency required.

iii. **Dilution/Mixing Zone Study Results.** For completely-mixed discharges, the Central Valley Water Board may grant a mixing zone and apply a dilution credit in accordance with Section 1.4.2.1 of the SIP, based on the dilution ratio. For incompletely-mixed discharges, the Discharger must perform a mixing zone study to demonstrate to the Central Valley Water Board that a dilution credit is appropriate. The discharge is considered an incompletely-mixed discharge, so the Discharger conducted a mixing zone study. A mathematical dynamic model was developed by Flow Sciences Incorporated and consists of five models linked in series, with the output from previous models used as part of the inputs to subsequent models. The models are linked as shown in Figure F-1 and are described below.

PROSIM – *U.S. Bureau of Reclamation's Project Simulation Model*. PROSIM simulates the existing hydrologic conditions in the Delta study area and was used to calculate the 70-year period of record (1922-1991) that served as the basis for the Discharger's study. Flow and storage calculated by PROSIM was used as input to the Temperature Models. Also, output from PROSIM were used as input to the Fischer Delta Model (FDM) and includes: export pumping rates from Tracy and Banks; Contra Costa Water District pumping at Rock Slough and Old River; North Bay Aqueduct pumping; City of Vallejo pumping; net Delta consumptive use; Delta Cross Channel position; and Delta inflows from Yolo Bypass, San Joaquin River, Calaveras River, Cosumnes River, Mokelumne River, and Sacramento River.

Temperature Models – *U.S. Bureau of Reclamation models*. The Bureau of Reclamation has developed temperature models for five reservoirs (Trinity, Whiskytown, Shasta, Oroville, and Folsom) and three river systems (Sacramento, Feather, and American). These models estimate mean monthly water temperatures based on flow and storage quantities calculated by PROSIM.

FDM – *Fischer Delta Model*. The Fischer Delta Model was used to support both the near-field and far-field modeling. For the near-field region, FDM was used to disaggregate hourly flow rates for the Sacramento River at Freeport

from the 70-year record of monthly flows calculated by PROSIM. The hourly flow data were then used as input to the 3-D near-field model (FLOWMOD) as well as the Longitudinal Dispersion model. For the far-field region, FDM was used to simulate the contribution of Facility discharges to water quality concentrations at various critical locations in the Delta.

FLOWMOD – *Flow Science's computational fluid dynamics model*. The near-field modeling was accomplished with the 3-dimensional FLOWMOD computational fluid dynamics model developed by Flow Science. FLOWMOD was used to calculate the steady-state concentration of effluent in each grid cell of the model domain for specific combinations of river and effluent flow rates. A horizontal grid resolution of 6 feet was defined from the diffuser to a point 300 feet downstream of the diffuser. The grid resolution increased geometrically from 300 feet to 700 feet downstream of the diffuser. Results from the model defined the average effluent concentration in the area of impact (i.e., within the 200:1 dilution contour) downstream of the diffuser. The Discharger used this model to separately evaluate the thermal characteristics of the discharge plume.

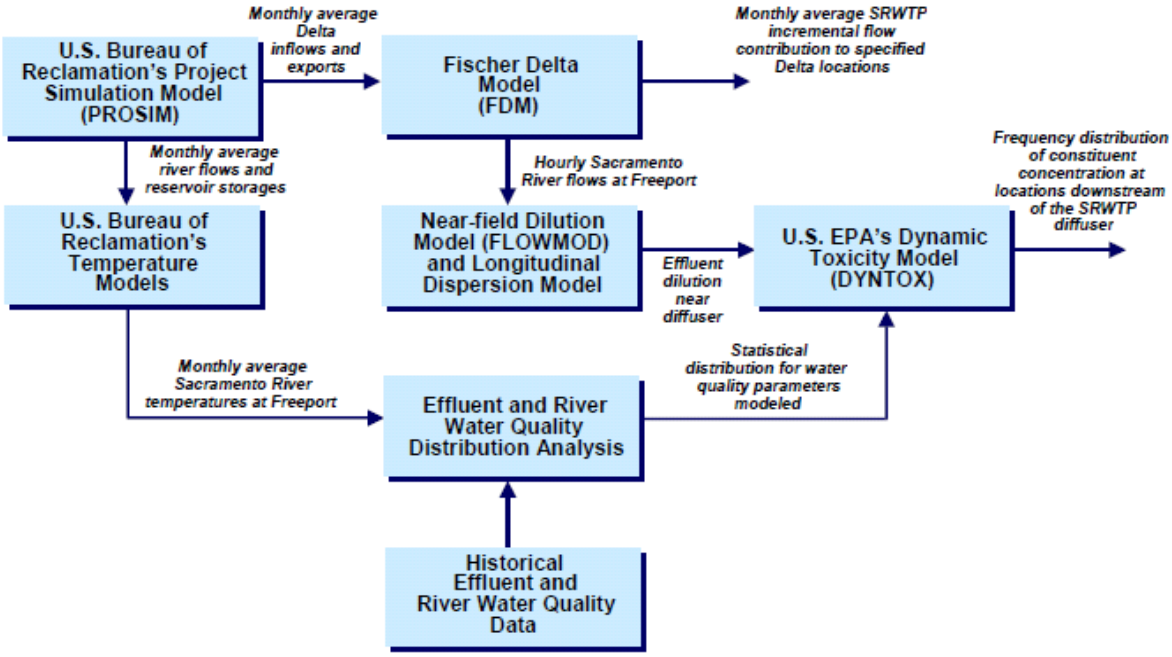
LD – *Flow Science's Longitudinal Dispersion Model*. The LD model was developed by Flow Science and the computer code is written in the Matlab programming language for implementation on an IBM-PC compatible microcomputer. This 1-dimensional model simulates the advection and dispersion of effluent discharged to the Sacramento River including reverse tidal flow conditions. The LD model is used to estimate the concentration in the near-field vicinity of the diffuser following the start of a diversion event in which the effluent discharge is diverted to storage when the Sacramento River flow rate falls below the minimum required 14:1 dilution ratio[1].

The results from the LD model are combined with the results from the FLOWMOD model (by method of superposition) to estimate the concentrations of the effluent in the near-field zone that result from "double dosing" during the flow reversal events. The length of the LD model domain is 53,000 feet (about 10 miles) and includes the diffuser. The model domain is represented by 530 discrete spatial intervals, each 100 feet long. Calculations are made at a 400-second time step.

DYNTOX – *U.S. EPA's Dynamic Toxicity Model*. DYNTOX was developed in 1985 with funding support provided by U.S. EPA. The model is designed for waste load allocations of toxic substances. DYNTOX contains three procedures to define the frequency and duration of exposure above a specific water quality criterion: (1) continuous simulation, (2) Monte Carlo simulation, and (3) log normal analysis. The continuous simulation procedure with randomly generated water quality distributions was used for the Discharger's study. Hourly values for the 70-year simulation period resulted in over 600,000 data points that were representative of the statistical concentration distribution at 6 key locations downstream of the diffuser.

[1] The Discharger is prohibited from discharging when the dilution ratio (river:effluent) is less than 14:1 or if river flows are less than 1,300 cfs and diverts all effluent discharge to emergency storage basins. These requirements ensure the diffuser is operating as designed and limits double-dosing of the discharge during flow reversals.

Figure F-1. Dynamic Model Flow Diagram



In the period from 2005 through 2007, the Discharger performed several field validation studies to corroborate the effectiveness of the modeling tools in representing water quality conditions in the Sacramento River. Due to the complexity of the mathematical models, in 2006 the Central Valley Water Board used the services of Tetra Tech, a U.S. EPA contractor, to assist with the review of the dynamic model. Tetra Tech's modeling experts concluded that the model study was conducted in a sound and scientifically defensible manner. The modeling experts determined that the linked dynamic modeling system is capable of providing an accurate probabilistic representation of receiving water quality conditions. The only perceived shortcoming noted by the model experts from a regulatory perspective was the complexity of the system of linked models and the proprietary status of some of the model components preventing its transmittal and direct use by Central Valley Water Board staff. The results of Tetra Tech's review are summarized in a Tetra Tech memorandum dated 30 June 2008.

The Discharger provided an update to the dynamic modeling results in its 14 August 2015 *Mixing Zone Request* that reflected effluent data collected between January 2012 and December 2014 and an expanded historical ambient dataset to include data from 2005 to 2014.

iv. **Evaluation of Available Dilution for Acute Aquatic Life Criteria.** U.S. EPA Region VIII, in its "*EPA Region VIII Mixing Zones and Dilution Policy*", recommends no dilution for acute aquatic life criteria, stating the following, "*In incomplete mix situations, discharge limitations to implement acute chemical-specific aquatic life criteria and narrative (no acute toxicity) criteria shall be based on achieving such acute criteria at the end-of-pipe (i.e., without an allowance for dilution). This approach is intended to implement the narrative requirement prohibiting acutely toxic conditions in the mixing zone*." The

Discharger has requested an acute mixing zone for compliance with acute water quality criteria.

The Discharger requested in their 14 August 2015 *Mixing Zone Request* an acute aquatic life mixing zone that is 300 feet wide and extends 60 feet downstream of the diffuser. The requested acute mixing zone meets the requirements of the SIP as follows:

(a) *Shall not compromise the integrity of the entire waterbody* – The TSD states that, "*If the total area affected by elevated concentrations within all mixing zones combined is small compared to the total area of a waterbody (such as a river segment), then mixing zones are likely to have little effect on the integrity of the waterbody as a whole, provided that the mixing zone does not impinge on unique or critical habitats*."[1] The Sacramento River is approximately 600 feet wide at the surface. The acute mixing zone is approximately 60 feet long by 300 feet wide, located along the bottom half of the river. The Sacramento River is a very large waterbody. For the pollutants for which a mixing zone was requested, the acute mixing zone would not compromise the integrity of the entire waterbody.

(b) *Shall not cause acutely toxic conditions to aquatic life passing through the mixing zone* – The SIP requires that the acute mixing zone be appropriately sized to prevent lethality to organisms passing through the mixing zone. U.S. EPA recommends that float times through a mixing zone less than 15 minutes ensures that there will not be lethality to passing organisms. The acute mixing zone proposed by the Discharger extends 60 feet downstream from the outfall. Based on a minimum river velocity of 0.35 feet/second, the minimum float time is 2.8 minutes[2]. Furthermore, this Order includes an acute toxicity effluent limitation that requires compliance to be determined based on acute bioassays using 100% effluent. Compliance with these requirements ensures that acutely toxic conditions to aquatic life passing through the chronic mixing zone do not occur.

(c) *Shall not restrict the passage of aquatic life* – The Discharger developed a dynamic model to evaluate the near-field effects of the discharge. The dynamic model was used to evaluate the zone of passage around the mixing zone where water quality objectives are met. The dynamic model indicates there is a zone of passage for aquatic life, which was verified through dye testing. The size of the zone of passage varies on either side of the river depending on the river geometry[3]. The surface of the river is approximately 600 feet across and the bottom of the river is approximately 500 feet across. Based on the model, a zone of passage approximately 75 to 100 feet wide occurs along the west bank and 175 to 200 feet wide occurs along the east bank downstream of the discharge. Because the diffuser is located at the bottom of the river, the mixing zone will typically occupy only a portion of the bottom half of the river at the edge of the 60 foot mixing zone.

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[1] TSD, pg. 33
[2] Memorandum from Larry Walker Associates to the Discharger, *Mixing Zones and Prevention of Acutely Toxic Conditions*, dated 13 July 2009.
[3] *Model Verification Results for FLOWMOD Simulations of SRCSD Effluent Discharge to the Sacramento River at Freeport, November 2007 Field Study,* Flow Science

(d) *Shall not adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws* – The acute mixing zone will not cause acutely toxic conditions, allows adequate zones of passage, and is sized appropriately to ensure that there will be no adverse impacts to biologically sensitive or critical habitats. The Discharger evaluated the probability of migratory and resident fish being exposed to acute or chronic toxicity in the vicinity of the discharge and found that fish did not congregate and hold within the discharge plume for continuous periods of time sufficient to result in exposure durations that would cause acute or chronic toxicity, based on plume water quality.

(e) *Shall not produce undesirable or nuisance aquatic life; result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; cause nuisance* – The current discharge has not been shown to result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; or cause nuisance. This Order requires the discharge meets Title 22 (or equivalent) tertiary filtration, which will ensure continued compliance with these mixing zone requirements. With these requirements the acute mixing zone will not produce undesirable or nuisance aquatic life, result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; or cause nuisance.

(f) *Shall not dominate the receiving water body or overlap a mixing zone from different outfalls* – The acute mixing zone is small relative to the water body, so it will not dominate the water body. Furthermore, the mixing zone does not overlap mixing zones from other outfalls. There are no outfalls or mixing zones in the vicinity of the discharge.

(g) *Shall not be allowed at or near any drinking water intake* – The acute mixing zone is not near a drinking water intake. The nearest downstream drinking water intake is the Barker Slough Pumping Plant, which is approximately 40 miles downstream of the discharge.

Although the acute aquatic life mixing zone complies with the SIP and the Basin Plan, due to concerns with aquatic toxicity in the Delta, the Central Valley Water Board has denied the allowance of an acute aquatic life mixing zone in this Order. Section 1.4.2 of the SIP states, in part, "…*The allowance of mixing zones is discretionary and shall be determined on a discharge-by-discharge basis*." In this case, the Delta is impaired for unknown toxicity and has experienced a significant pelagic organism decline. Therefore, the Central Valley Water Board finds that the allowance of an acute aquatic life mixing zone is not acceptable for this discharge.

v. **Evaluation of Available Dilution for Chronic Aquatic Life Criteria.** The chronic aquatic life mixing zone is sized to protect the water body as a whole and is generally larger than the acute mixing zone. A mixing zone for chronic aquatic life criteria has been allowed in this Order for development of the WQBEL's for copper and cyanide.

The chronic aquatic life mixing zone is 400 feet wide and extends 60 feet downstream of the diffuser. The chronic mixing zone meets the requirements of the SIP as follows.

(a) *Shall not compromise the integrity of the entire waterbody* – The TSD states that, "*If the total area affected by elevated concentrations within all mixing zones combined is small compared to the total area of a waterbody (such as a river segment), then mixing zones are likely to have little effect on the integrity of the waterbody as a whole, provided that the mixing zone does not impinge on unique or critical habitats*."[1] The Sacramento River is approximately 600 feet wide at the surface. The chronic mixing zone is approximately 400 feet wide by 60 feet long, located along the bottom half of the river. The Sacramento River is a very large waterbody. For the pollutants for which a mixing zone was requested, the chronic mixing zone would not compromise the integrity of the entire waterbody.

(b) *Shall not cause acutely toxic conditions to aquatic life passing through the mixing zone* – The chronic mixing zone does not allow acute aquatic life criteria to be exceeded and this Order requires acute bioassays to be conducted using 100% effluent. Compliance with these requirements ensures that acutely toxic conditions to aquatic life passing through the chronic mixing zone do not occur.

(c) *Shall not restrict the passage of aquatic life* – The Discharger developed a dynamic model to evaluate the near-field effects of the discharge. The dynamic model was used to evaluate the zone of passage around the mixing zone where water quality objectives are met. The dynamic model indicates there is a zone of passage for aquatic life, which was verified through dye testing. The size of the zone of passage varies on either side of the river depending on the river geometry[2]. The surface of the river is approximately 600 feet across and the bottom of the river is approximately 500 feet across. Based on the model, , the zone of passage at the surface of the river is generally at least 100 feet on both sides of the river, while the zone of passage at the bottom of the river is greater than 40 feet from both sides of the river.

(d) *Shall not adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws* – The chronic mixing zone will not cause acutely toxic conditions, allows adequate zones of passage, and, except as noted for ammonia in subsection vii, below, is sized appropriately to ensure that there will be no adverse impacts to biologically sensitive or critical habitats. The Discharger evaluated the probability of migratory and resident fish being exposed to acute or chronic toxicity in the vicinity of the discharge and found that fish did not congregate and hold within the discharge plume for continuous periods of time sufficient to result in exposure durations that would cause acute or chronic toxicity, based on plume water quality.

(e) *Shall not produce undesirable or nuisance aquatic life; result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; cause nuisance* – The current discharge has not been shown to result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable

[1] TSD, pg. 33
[2] *Model Verification Results for FLOWMOD Simulations of SRCSD Effluent Discharge to the Sacramento River at Freeport, November 2007 Field Study,* Flow Science

bottom deposits; or cause nuisance. This Order requires the discharge meets Title 22 (or equivalent) tertiary filtration, which will ensure continued compliance with these mixing zone requirements With these requirements the chronic mixing zone will not produce undesirable or nuisance aquatic life, result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; or cause nuisance.

(f) *Shall not dominate the receiving water body or overlap a mixing zone from different outfalls* – The chronic mixing zone is small relative to the water body, so it will not dominate the water body. Furthermore, the mixing zone does not overlap mixing zones from other outfalls. There are no outfalls or mixing zones in the vicinity of the discharge.

(g) *Shall not be allowed at or near any drinking water intake* – The chronic mixing zone is not near a drinking water intake. The nearest downstream drinking water intake is the Barker Slough Pumping Plant, which is approximately 40 miles downstream of the discharge.

The chronic aquatic life mixing zone therefore complies with the SIP. The mixing zone also complies with the Basin Plan, which requires that the mixing zone not adversely impact beneficial uses. Beneficial uses will not be adversely affected for the same reasons discussed above. In determining the size of the mixing zone, the Central Valley Water Board considered the procedures and guidelines in the EPA's Water Quality Standards Handbook, 2d Edition (updated July 2007), Section 5.1, and Section 2.2.2 of the TSD. The SIP incorporates the same guidelines.

vi. **Evaluation of Available Dilution for Human Health Criteria.** The Discharger's dynamic model is useful in determining the mixing and dilution near the discharge (i.e., near-field) and the model domain extends 700 feet downstream. Human health-based criteria are generally based long-term exposures, such as safe levels for lifetime exposure (e.g., for carcinogens, consumption of 1 liter/day for 70 years) and the mixing zones typically extend beyond the near-field mixing estimated by the Discharger's dynamic model. Since the human health mixing zone extends beyond the model domain of the dynamic model, the Discharger conducted a study titled "*Sacramento River Harmonic Mean Mixing Zone Report*" (June 2010) to establish the human health mixing zone and dilution. The June 2010 study identified the point downstream of the discharge where complete mixing occurs. Based on the results of the June 2010 study, the discharge is completely-mixed approximately 3 miles downstream. The Discharger has requested the human health mixing zone extend to this point.

In determining the available receiving water dilution for compliance with human health criteria, the SIP, section 1.4.2.1 requires that the harmonic mean of the receiving water flow be compared against the arithmetic mean of the effluent flow of the observed discharge period. Based on Sacramento River flow data at Freeport from 1 January 1970 to 31 December 2014, the harmonic mean river flow is 15,403 cfs. The permitted average dry weather flow for the Facility is 181 MGD (280 cfs). Therefore, a dilution ratio of 55:1 is available for compliance with human health criteria. This Order allows a dilution credit for human health criteria of 55:1 and the mixing zone extends 3 miles downstream of the discharge. A mixing zone for human health criteria has been allowed in

this Order for development of the WQBEL's for bis (2-ethylhexyl) phthalate, carbon tetrachloride, chlorodibromomethane, and dichlorobromomethane.

The human health criteria mixing zone meets the requirements of the SIP as follows:

(a) *Shall not compromise the integrity of the entire waterbody* – The TSD states that, "*If the total area affected by elevated concentrations within all mixing zones combined is small compared to the total area of a waterbody (such as a river segment), then mixing zones are likely to have little effect on the integrity of the waterbody as a whole, provided that the mixing zone does not impinge on unique or critical habitats*."[1] The Sacramento River is a very large waterbody and the human health mixing zone is not applicable to aquatic life criteria, therefore, the human health mixing zone does not compromise the integrity of the entire waterbody.

(b) *Shall not cause acutely toxic conditions to aquatic life passing through the mixing zone* – The human health mixing zone is not applicable to aquatic life criteria. Therefore, acutely toxic conditions will not occur in the mixing zone.

(c) *Shall not restrict the passage of aquatic life* – The human health mixing zone is not applicable to aquatic life criteria. Therefore, the mixing zone will not restrict the passage of aquatic life.

(d) *Shall not adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws* – The human health mixing zone is not applicable to aquatic life criteria, therefore, the mixing zone will not impact biologically sensitive or critical habitats.

(e) *Shall not produce undesirable or nuisance aquatic life; result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; cause nuisance* – The allowance of a human health mixing zone will not produce undesirable or nuisance aquatic life, result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; or cause nuisance.

(f) *Shall not dominate the receiving water body or overlap a mixing zone from different outfalls* – The human health mixing zone is small relative to the water body, so it will not dominate the water body. Furthermore, the mixing zone does not overlap mixing zones from other outfalls. There are no outfalls or mixing zones in the vicinity of the discharge.

(g) *Shall not be allowed at or near any drinking water intake* – There are no drinking water intakes within the human health mixing zone. The nearest drinking water intake is the Freeport Regional Water Authority intake 1 mile upstream of the discharge at Freeport, which is owned and operated by East Bay Municipal Utility District (EBMUD) and Sacramento County Water Agency (SCWA). An operating agreement between the Freeport Regional Water Authority and the Discharger dated 2006 will prevent diversion of river water containing diluted treated wastewater at the Freeport water intake. The nearest downstream drinking water intake

[1] TSD, pg. 33

is the Barker Slough Pumping Plant, which is approximately 40 miles downstream of the discharge.

The human health mixing zone therefore complies with the SIP. The mixing zone also complies with the Basin Plan, which requires that the mixing zone not adversely impact beneficial uses. Beneficial uses will not be adversely affected for the same reasons discussed above. In determining the size of the mixing zone, the Central Valley Water Board considered the procedures and guidelines in the EPA's Water Quality Standards Handbook, 2d Edition (updated July 2007), Section 5.1, and Section 2.2.2 of the TSD. The SIP incorporates the same guidelines.

vii. **Evaluation of Available Dilution for Specific Constituents (Pollutant-by-Pollutant Evaluation).** When determining to allow dilution credits for a specific pollutant, several factors must be considered, such as available assimilative capacity, facility performance, and best practicable treatment or control (BPTC). In this subsection a pollutant-by-pollutant evaluation of dilution is discussed. The Discharger requested in their 14 August 2015 *Mixing Zone Request* acute and chronic aquatic life dilution credits for copper and cyanide. Human health dilution credits were requested for bis (2-ethylhexyl) phthalate, carbon tetrachloride, chlorodibromomethane, and dichlorobromomethane. A pollutant-by-pollutant evaluation of dilution is discussed below:

(a) **Bis (2-Ethylhexyl) Phthalate.** Based on existing effluent data between January 2012 and December 2014, it appears that the Facility cannot meet end-of-pipe effluent limitations for bis (2-ethylhexyl) phthalate. Assimilative capacity is available for bis (2-ethylhexyl) phthalate in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBEL's for bis (2-ethylhexyl) phthalate have been developed considering the allowance of human health dilution credits. Section 1.4.2.2 of the SIP requires that, "*A mixing zone shall be as small as practicable*.", and Section 1.4.2.2.B requires, "*The RWQCB shall deny or significantly limit a mixing zone and dilution credits as necessary to protect beneficial uses, meet the conditions of this Policy, or comply with other regulatory requirements*." A 55:1 dilution credit is available for bis (2-ethylhexyl) phthalate, which will allow a final AMEL of 83 µg/L and a MDEL of 184 µg/L; however, the Facility performance level is 20 µg/L (i.e., projected maximum effluent concentration) based on monitoring data from 2012 to 2014. Therefore, the Facility can meet more stringent WQBEL's for bis (2-ethylhexyl) phthalate than with the full allowance of dilution. This Order contains an AMEL of 8.9 µg/L and MDEL of 20 µg/L for bis (2-ethylhexyl) phthalate, based on Facility performance. This represents a mixing zone that is as small as practicable for this Facility and that fully complies with the SIP.

(b) **Carbon tetrachloride.** Based on existing effluent data between January 2012 and December 2014, it appears that the Facility cannot meet end-of-pipe effluent limitations for carbon tetrachloride. Assimilative capacity is available for carbon tetrachloride in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBEL's for carbon tetrachloride have been developed considering the allowance of human health dilution credits. Section 1.4.2.2 of the SIP requires that, "*A*

mixing zone shall be as small as practicable.", and Section 1.4.2.2.B requires, "*The RWQCB shall deny or significantly limit a mixing zone and dilution credits as necessary to protect beneficial uses, meet the conditions of this Policy, or comply with other regulatory requirements*." A 55:1 dilution credit is available for carbon tetrachloride, which will allow a final AMEL of 8.5 µg/L and a MDEL of 15.8 µg/L; however, the Facility performance level is 2.9 µg/L (i.e., maximum effluent concentration) based on monitoring data from 2012 to 2014. Therefore, the Facility can meet more stringent WQBEL's for carbon tetrachloride than with the full allowance of dilution. For carbon tetrachloride, this Order carries forward the performance-based MDEL of 5.3 µg/L from previous Order R5-2010-0114-04. Additionally, to be consistent with the SIP, which requires establishment of AMEL's for priority pollutants, this Order includes an AMEL of 2.9 µg/L calculated considering effluent variability using the AMEL/MDEL multipliers in Table 2 of the SIP. This represents a mixing zone that is as small as practicable for this Facility and that fully complies with the SIP.

(c) **Chlorodibromomethane and Dichlorobromomethane.** Based on the projected effluent quality upon implementation of ammonia removal, the Facility will not be able to meet end-of-pipe effluent limitations for chlorodibromomethane and dichlorobromomethane. Assimilative capacity is available in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBEL's for chlorodibromomethane and dichlorobromomethane have been developed considering the allowance of human health dilution credits. Section 1.4.2.2 of the SIP requires that, "*A mixing zone shall be as small as practicable*.", and Section 1.4.2.2.B requires, "*The RWQCB shall deny or significantly limit a mixing zone and dilution credits as necessary to protect beneficial uses, meet the conditions of this Policy, or comply with other regulatory requirements*." Based on the projected effluent quality upon implementation of ammonia removal, the Central Valley Water Board has determined a 55:1 dilution credit is needed for the chlorodibromomethane and dichlorobromomethane. This represents a mixing zone that is as small as practicable for this Facility and that fully complies with the SIP.

(d) **Copper.** Based on existing effluent data between January 2012 and December 2014, and increasing copper concentrations due to water conservation and the drought, it appears that the Facility cannot meet end-of-pipe effluent limitations for copper. Assimilative capacity is available for copper in the receiving water and, as discussed above, the chronic aquatic life mixing zone meets the requirements of the SIP and Basin Plan. As discussed in section IV.C.2.c.iv, the Central Valley Water Board has denied the allowance of an acute aquatic life mixing zone in this Order. Therefore, the WQBEL's for copper have been developed considering the allowance of chronic aquatic life dilution credits. For copper the dynamic modeling approach described in Section IV.C.4.f has not been used to calculate the WQBELs. Instead, the Discharger's model was used to determine the dilution factor at the edge of the 60 foot chronic aquatic life mixing zone and the long-term average was calculated using the SIP's steady-state modeling approach. Considering a chronic aquatic life mixing zone with a dilution factor of 2.45, and no mixing zone for acute

criteria, the WQBELs for copper are an AMEL of 8.6 µg/L and MDEL of 12 µg/L. Based on Facility performance and due to concerns that effluent copper concentrations are increasing due to recent drought conditions and water conservation efforts, the mixing zone for copper is as small as practicable for this Facility and fully complies with the SIP.

(e) **Cyanide.** Based on existing effluent data between January 2012 and December 2014, it appears that the Facility cannot meet end-of-pipe effluent limitations for cyanide. Assimilative capacity is available for cyanide in the receiving water and, as discussed above, the chronic aquatic life mixing zone meets the requirements of the SIP and Basin Plan. As discussed in section IV.C.2.c.iv, the Central Valley Water Board has denied the allowance of an acute aquatic life mixing zone in this Order. Therefore, the WQBEL's for cyanide have been developed considering the allowance of chronic aquatic life dilution credits. Considering a chronic aquatic life mixing zone, the WQBELs for cyanide are an AMEL of 13 µg/L and MDEL of 22 µg/L. Based on Facility performance and due to concerns that effluent cyanide concentrations are increasing due to recent drought conditions and water conservation efforts, the mixing zone for cyanide is as small as practicable for this Facility and fully complies with the SIP.

viii. **Regulatory Compliance for Dilution Credits and Mixing Zones.** To fully comply with all applicable laws, regulations and policies of the State, Central Valley Water Board approved mixing zones and the associated dilution credits based on the following:

(a) Mixing zones are allowed under the SIP provided all elements contained in Section 1.4.2.2 are met. Based on the mixing zone study conducted by the Discharger, the Central Valley Water Board has determined that these factors are met.

Section 1.4.2.2.of the SIP requires mixing zones to be as small as practicable. Based on the mixing zone study conducted by the Discharger, the Central Valley Water Board has determined the mixing zones are as small as practicable.

(b) The allowance of mixing zones in this Order complies with California's State Anti-Degradation Policy, State Water Board Resolution 68-16, which incorporates the federal antidegradation regulations and requires that existing quality of waters be maintained unless degradation is justified based on specific findings. Item 2 of Resolution 68-16 states:

> *"Any activity which produces or may produce a waste or increased volume or concentration of waste and which dischargers or proposed to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained*."

The water quality-based effluent limitations in this Order for bis (2-ethylhexyl) phthalate, carbon tetrachloride, copper, cyanide, chlorodibromomethane, and dichlorobromomethane will result in the

Discharger implementing best practicable treatment or control (BPTC) of the discharge necessary to assure that pollution or nuisance will not occur and the highest water quality consistent with maximum benefit to the people of the State will be maintained.

(c) In accordance with Section 1.4.2.2 of the SIP, the Board has determined the mixing zones are as small as practicable, will not compromise the integrity of the entire water body, restrict the passage of aquatic life, dominate the water body or overlap existing mixing zones from different outfalls. The mixing zones are small relative to the large size of the receiving water, are not at or near a drinking water intake, and do not overlap a mixing zone from a different outfall.

(d) The Central Valley Water Board has determined allowing such mixing zones will not cause acutely toxic conditions to aquatic life passing through the mixing zone.

(e) The Central Valley Water Board has determined the discharge will not adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under the federal or State endangered species laws, because the mixing zones are relatively 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 odor, taste, or turbidity, cause objectionable bottom deposits, or cause nuisance, because the Order establishes end-of-pipe effluent limitations (e.g., for BOD_5 and TSS) and discharge prohibitions to prevent these conditions from occurring.

(f) As required by the SIP, in determining the extent of or whether to allow mixing zones and dilution credits, the Central Valley 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 zones and dilution credits are adequately protective of the beneficial uses of the receiving water.

(g) The Central Valley Water Board has determined the mixing zones comply with the SIP for priority pollutants.

(h) The Central Valley Water Board has determined the mixing zones comply with the Basin Plan for non-priority pollutants. The Basin Plan requires a mixing zone not adversely impact beneficial uses. Beneficial uses will not be adversely affected for the same reasons discussed above. In determining the size of the mixing zone, the Central Valley Water Board has considered the procedures and guidelines in Section 5.1 of U.S. EPA's *Water Quality Standards Handbook*, 2nd Edition (updated July 2007) and Section 2.2.2 of the TSD. The SIP incorporates the same guidelines.

(i) Section 1.4.2.2B of the SIP, in part states, *"The RWQCB shall deny or significantly limit a mixing zone and dilution credits as necessary to protect beneficial uses, meet the conditions of this Policy, or comply with other regulatory requirements."* The Central Valley Water Board has determined full allowance of dilution is not needed or necessary for the Discharger to achieve compliance with effluent limitations for bis (2-

ethylhexyl) phthalate and carbon tetrachloride. Therefore, the effluent limitations established in the Order for bis (2-ethylhexyl) phthalate and carbon tetrachloride have been adjusted by reduced dilution credits developed based on performance of the current wastewater treatment capabilities.

The Central Valley Water Board determined the effluent limitations required by this Order for bis (2-ethylhexyl) phthalate and carbon tetrachloride comply with the State Anti-Degradation Policy because the Order will result in the Discharger implementing BPTC of the discharge necessary to assure that pollution or nuisance will not occur and the highest water quality consistent with maximum benefit to the people of the State will be maintained. The Central Valley Water Board also determined the Discharger will be in immediate compliance with the effluent limitations. The effluent limitations for bis (2-ethylhexyl) phthalate and carbon tetrachloride that have been adjusted using reduced dilution credits is consistent with Section 1.4.2.2B of the SIP that requires the Central Valley Water Board deny or significantly limit a mixing zone and dilution credits as necessary to comply with other regulatory requirements.

d. **Conversion Factors.** The CTR contains aquatic life criteria for arsenic, cadmium, chromium III, chromium VI, copper, lead, nickel, silver, and zinc which are presented in dissolved concentrations. U.S. EPA recommends conversion factors to translate dissolved concentrations to total concentrations. The default U.S. EPA conversion factors contained in Appendix 3 of the SIP were used to convert the applicable dissolved criteria to total recoverable criteria.

e. **Hardness-Dependent CTR Metals Criteria.** The CTR and the NTR contain water quality criteria for seven metals that vary as a function of hardness. The lower the hardness the lower the water quality criteria. The metals with hardness-dependent criteria include cadmium, copper, chromium III, lead, nickel, silver, and zinc.

This Order has established the criteria for hardness-dependent metals based on the hardness of the receiving water (actual ambient hardness) as required by the SIP[1], the CTR[2]. The SIP and the CTR require the use of “receiving water” or “actual ambient” hardness, respectively, to determine effluent limitations for these metals. The CTR requires that the hardness values used shall be consistent with the design discharge conditions for design flows and mixing zones[3]. Where design flows for aquatic life criteria include the lowest 1-day flow with an average reoccurrence frequency of once in 10 years (1Q10) and the lowest average 7 consecutive day flow with an average reoccurrence frequency of once in 10 years (7Q10)[4]. This section of the CTR also indicates that the design conditions should be established such that the appropriate criteria are not exceeded more than once in a 3 year period on average[5]. The CTR requires that when mixing zones are allowed, the CTR criteria apply at the edge of the mixing zone, otherwise the criteria apply

[1] The SIP does not address how to determine the hardness for application to the equations for the protection of aquatic life when using hardness-dependent metals criteria. It simply states, in Section 1.2, that the criteria shall be properly adjusted for hardness using the hardness of the receiving water.
[2] 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 (40 C.F.R. § 131.38(c)(4)).
[3] 40 C.F.R. §131.3(c)(4)(ii)
[4] 40 C.F.R. §131.38(c)(2)(iii) Table 4
[5] 40 C.F.R. §131.38(c)(2)(iii) Table 4, notes 1 and 2

throughout the water body, including at the point of discharge[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.

i. **Summary Findings**

Given the high variability in ambient hardness values (see Figure F-2 below), there is no single hardness value that describes the ambient receiving water for all possible scenarios (e.g., minimum, maximum). Because of this variability, staff has determined that, based on the ambient hardness concentrations measured in the receiving water, the Central Valley Water Board has discretion to select ambient hardness values within the range of 34 mg/L (minimum) up to 100 mg/L (maximum). Staff recommends that the Board use the ambient hardness values shown in Table F-7 for the following reasons.

(a) Using the ambient receiving water hardness values shown in Table F-7 will result in criteria and effluent limitations that ensure protection of beneficial uses under all ambient receiving water conditions.

(b) The Water Code mandates that the Central Valley Water Board establish permit terms that will ensure the reasonable protection of beneficial uses. In this case, using the lowest measured ambient hardness to calculate effluent limitations is not reasonable, because it would result in overly conservative limits that will impart substantial costs to the Discharger and ratepayers without providing any additional protection of beneficial uses. In compliance with applicable state and federal regulatory requirements, Board staff has instead used the ambient hardness values shown in Table F-7 to calculate the proposed effluent limitations for hardness-dependent metals. The proposed effluent limitations will still be fully protective of all beneficial uses under all flow conditions.

(c) Using an ambient hardness that is higher than the minimum of 34 mg/L will result in a limit that may allow increased metals to be discharged to the river, but such discharge is allowed under the antidegradation policy (State Water Board Resolution 68-16). The Board finds that this degradation is consistent with the antidegradation policy (see antidegradation findings in Section IV.D.4 of the Fact Sheet). The Antidegradation policy requires the Discharger to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that: a) a pollution or nuisance will not occur, and b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

(d) Using the ambient hardness values shown in Table F-7 is fully consistent with the CTR and SIP's requirements for developing metals criteria.

[1] 40 C.F.R. §131.38(c)(2)(i)

Table F-7. Summary of CTR Criteria for Hardness-dependent Metals

CTR Metals	Ambient Hardness (mg/L)[2,3]	CTR Criteria (µg/L, total recoverable)[1]	
		acute	chronic
Copper	84	12	8.0
Chromium III	84	1,500	180
Cadmium	78 (acute) 84 (chronic)	3.4	2.1
Lead	78	60	2.3
Nickel	84	400	45
Silver	72	2.3	--
Zinc	84	100	100

[1] Metal criteria rounded to two significant figures in accordance with the CTR (40 C.F.R. §131.38(b)(2)).

[2] The ambient hardness values in this table represent actual observed receiving water hardness measurements from the dataset shown in Figure F-2.

[3] The CTR's hardness-dependent metals criteria equations vary depending on the metal, which results in difference in the range of ambient hardness values that may be used to develop effluent limitations that are protective of beneficial uses and comply with CTR criteria for all ambient flow conditions.

ii. **Background**

The State Water Board provided direction regarding the selection of hardness in two precedential water quality orders; WQO 2008-0008 for the City of Davis Wastewater Treatment Plant (Davis Order) and WQO 2004-0013 for the Yuba City Wastewater Treatment Plant (Yuba City Order). The State Water Board recognized that the SIP and the CTR do not discuss the manner in which hardness is to be ascertained, thus regional water boards have considerable discretion in determining ambient hardness so long as the selected value is protective of water quality criteria under the given flow conditions. (Davis Order, p.10). The State Water Board explained that it is necessary that, "*The [hardness] value selected should provide protection for all times of discharge under varying hardness conditions*." (Yuba City Order, p. 8). The Davis Order also provides that, "*Regardless of the hardness used, the resulting limits must always be protective of water quality criteria under all flow conditions*." (Davis Order, p. 11)

The equation describing the total recoverable regulatory criterion, as established in the CTR, is as follows:

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

Where:

H = ambient hardness (as $CaCO_3$)[1]

WER = water-effect ratio

m, b = metal- and criterion-specific constants

The direction in the CTR regarding hardness selection is that it must be based on ambient hardness and consistent with design discharge conditions for

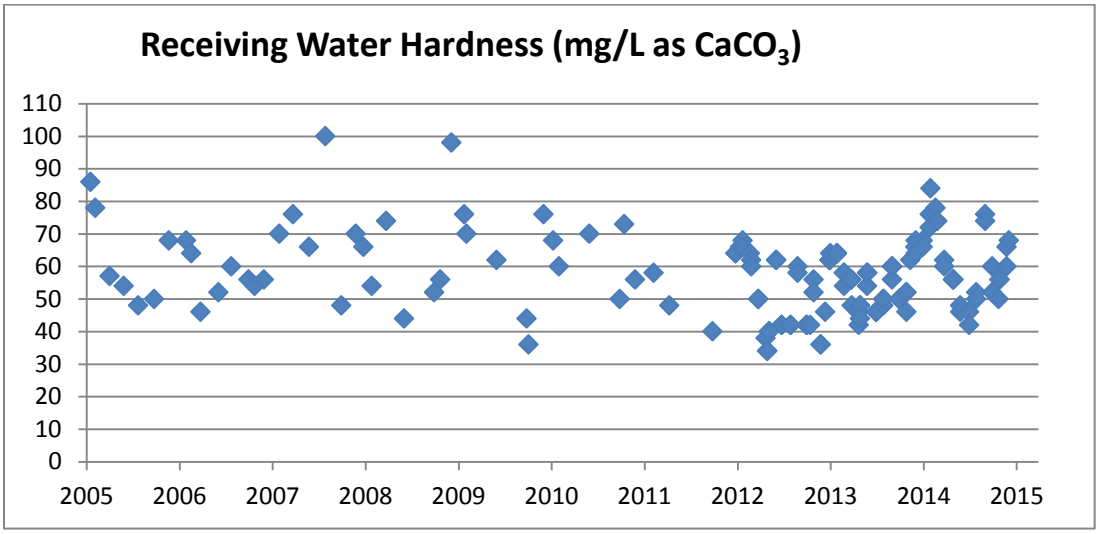
[1] For this discussion, all hardness values are expressed in mg/L as $CaCO_3$.

design flows and mixing zones. Consistent with design discharge conditions and design flows means that the selected "design" hardness must result in effluent limitations under design discharge conditions that do not result in more than one exceedance of the applicable criteria in a 3 year period[1]. Where design flows for aquatic life criteria include the lowest one-day flow with an average reoccurrence frequency of once in ten years (1Q10) and the lowest average 7 consecutive day flow with an average reoccurrence frequency of once in ten years (7Q10). The 1Q10 and 7Q10 Sacramento River flows are 5,060 cfs and 5,846 cfs, respectively.

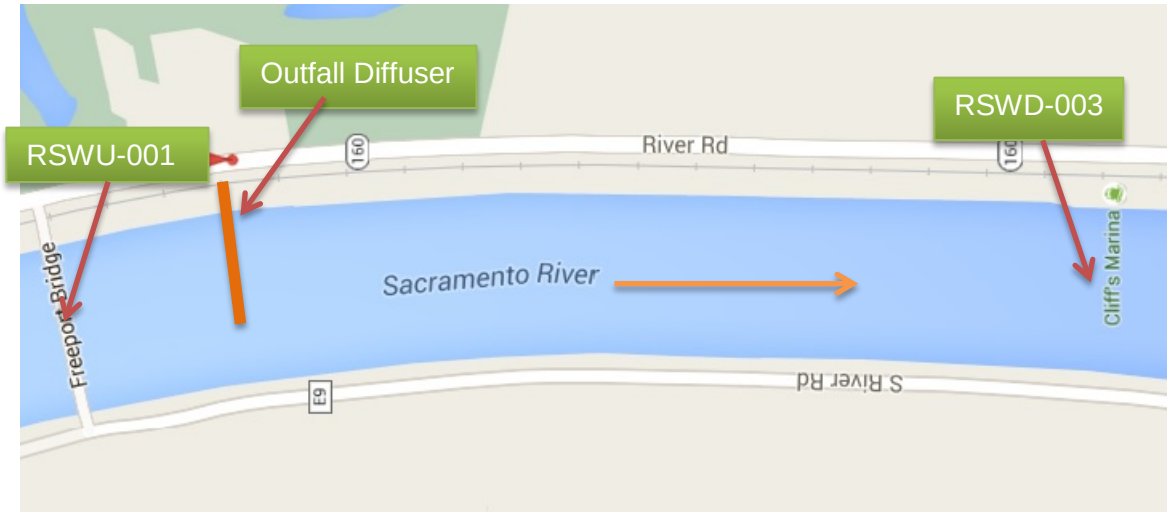
iii. **Ambient Conditions**

The upstream receiving water hardness at Monitoring Location RSWU-001 (Sacramento River at Freeport Bridge) varied from 34 mg/L to 100 mg/L, based on 107 samples collected between January 2005 and December 2014; the downstream receiving water hardness at Monitoring Location RSWD-003 (Sacramento River at Cliff's Marina) varied from 34 mg/L to 76 mg/L, based on 38 samples collected between January 2012 and December 2014. The Board has found that downstream hardness must be considered in developing metals criteria because it best represents the ambient receiving water downstream of the facility. In the location of the discharge, the receiving water periodically reverses direction, so both upstream and downstream hardness have been used in this analysis. Figure F-2 below shows the observed hardness data measured in the receiving water.

Figure F-2. Observed Receiving Water Hardness Concentrations from January 2005 to December 2014 (Upstream and Downstream Values)



[1] 40 C.F.R. §131.38(c)(2)(iii) Table 4, notes 1 and 2



In this analysis, the entire range of ambient hardness concentrations shown in Figure F-2 were considered to determine the appropriate ambient hardness to calculate the CTR criteria and effluent limitations that are protective under all discharge conditions.

iv. **Approach to Derivation of Criteria**

As shown above, ambient hardness varies substantially. Because of the variation, there is no single hardness value that describes the ambient receiving water for all possible scenarios (e.g., minimum, maximum, mid-point). While the hardness selected must be hardness of the ambient receiving water, selection of an ambient receiving water hardness that is too high would result in effluent limitations that do not protect beneficial uses. Also, the use of minimum ambient hardness would result in criteria that are protective of beneficial uses, but such criteria may not be representative or fair and reasonable considering the wide range of ambient conditions.

Reasonable worst-case ambient conditions. To determine whether a selected ambient hardness value results in fair and reasonable effluent limitations that are fully protective while complying with federal regulations and state policy, staff have conducted an analysis considering varying ambient hardness and flow conditions. To do this, the Board has ensured that the receiving water hardness and criteria selected for effluent limitations are protective under "reasonable-worst case ambient conditions." These conditions represent the receiving water conditions under which derived effluent limitations would ensure protection of beneficial uses under all ambient flow and hardness conditions.

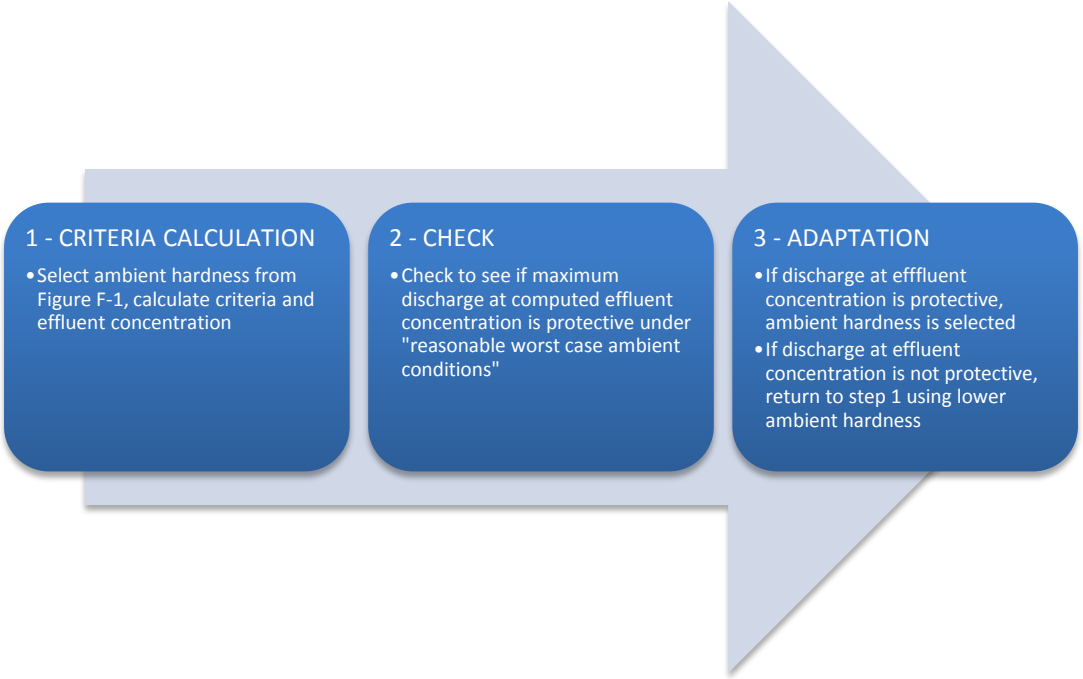
Reasonable worst-case ambient conditions:

- "Low receiving water flow." CTR design discharge conditions (1Q10 and 7Q10) have been selected to represent reasonable worst case receiving water flow conditions.
- "High receiving water flow (maximum receiving water flow)." This additional flow condition has been selected consistent with the Davis Order, which required that the hardness selected be protective of water quality criteria under all flow conditions.

- "Low receiving water hardness." The minimum receiving water hardness condition of 34 mg/L was selected to represent the reasonable worst case receiving water hardness.
- "Upstream ambient metal concentration at criteria." This condition assumes that the metal concentration in the upstream receiving water is equal to CTR criteria (upstream of the facility's discharge).

Iterative approach. An iterative analysis has been used to select the ambient hardness to calculate the criteria that will result in effluent limitations that protect beneficial uses under all flow conditions.

The iterative approach is summarized in the following algorithm and described below in more detail.



1. CRITERIA CALCULATION. CTR criteria are calculated based on actual measured ambient hardness sample results, starting with the maximum observed ambient hardness of 100 mg/L. Effluent concentrations are calculated.
2. CHECK. Using U.S. EPA's simple mass balance equation[1], maximum discharge at the computed effluent concentration is assumed. Resultant downstream metal concentration is then compared with downstream calculated CTR criteria under reasonable worst-case ambient conditions.
3. ADAPT. If step 2 results in:
   (A) receiving water metal concentration that complies with CTR criteria under reasonable worst-case ambient conditions, then the hardness value is selected.
   (B) receiving water metal concentration greater than CTR criteria, then return to bullet 1, selecting a lower ambient hardness value.

[1] U.S. EPA NPDES Permit Writers' Handbook (EPA 833-K-10-001 September 2010, pg. 6-24)

The CTR's hardness dependent metals criteria equation contains metal-specific constants, so the criteria vary differently depending on the metal. Therefore, steps 1 through 3 must be repeated separately for each metal until ambient hardness values are determined that will result in criteria and effluent limitations that comply with the CTR and protect beneficial uses for all metals. This is the reason for the differences in the selected ambient hardness values shown in Table F-7 above.

v. **Results of Iterative Analysis**

The above iterative analysis for each CTR hardness-dependent metal results in the selected ambient hardness values shown in Table F-7, above. Using these hardness values to calculate criteria, which are actual sample results collected in the receiving water, will result in effluent limitations that are protective under all ambient flow conditions. Copper and silver are used as examples below to illustrate the results of the analysis. Tables F-8 and F-9 below summarize the numeric results of the three step iterative approach for copper and silver. As shown in the example tables, ambient hardness values of 84 mg/L (copper) and 72 mg/L (silver) are used to derive criteria and effluent limitations. Then under the "check" step, worst-case ambient receiving water conditions are used to test whether discharge at the computed effluent limitations results in compliance with CTR criteria and protection of beneficial uses.

The results of the above analysis, summarized in the tables below, show that the ambient hardness values selected using the three-step iterative process results in protective effluent limitations that achieve CTR criteria under all flow conditions. Tables F-8 and F-9 below summarize the critical flow conditions. However, the analysis evaluated all flow conditions to ensure compliance with the CTR criteria at all times.

Table F-8. Verification of CTR Compliance for Copper

Receiving water hardness used to compute effluent limitations				**84 mg/L**
Effluent Concentration Allowance for Copper				**8.0 µg/L[2,3]**
Effluent Limitations for Copper				**7.4/10 µg/L[2,3]**
	Downstream Ambient Concentrations Under Worst-Case Ambient Receiving Water Conditions			**Complies with CTR Criteria?**
	Hardness	**CTR Criteria (µg/L)**	**Ambient Copper Concentration[1] (µg/L)**	
1Q10	36.7	4.0	3.9	**Yes**
7Q10	36.4	3.9	3.9	**Yes**
Max receiving water flow	34.2	3.7	3.7	**Yes**

[1] This concentration is derived using worst-case ambient conditions. These conservative assumptions will ensure that the receiving water always complies with CTR criteria.

[2] The chronic effluent concentration allowance is shown in this table without the allowance for dilution. An average monthly effluent limitation (AMEL) of 7.4 µg/L and maximum daily effluent limitation (MDEL) of 10 µg/L are calculated based on the chronic effluent concentration allowance, without the allowance for dilution, in accordance with section 1.4 of the SIP.

[3] As discussed in Section IV.C.2.c, above, this Order allows a chronic aquatic life mixing zone for copper. Therefore, per 40 C.F.R. §131.38(c)(2)(i) the CTR chronic criteria for copper apply at the edge of the approved 60-foot chronic aquatic life mixing zone. In

accordance with section 1.4 of the SIP, a chronic dilution factor of 2.45 was applied to the applicable CTR chronic criterion shown in Table F-7 to calculate the WQBELs for copper. Considering no dilution for the CTR acute criterion, this Order includes an AMEL of 8.6 µg/L and MDEL of 12 µg/L for copper (see Attachment H for calculation of WQBELs).

Table F-9. Verification of CTR Compliance for Silver

Receiving water hardness used to compute effluent limitations				**72 mg/L**
Effluent Concentration Allowance for Silver				**2.3 µg/L**
Effluent Limitations for Silver				**N/A[2]**
	Downstream Ambient Concentrations Under Worst-Case Ambient Receiving Water Conditions			**Complies with CTR Criteria?**
	Hardness	**CTR Criteria (µg/L)**	**Ambient Silver Concentration[1] (µg/L)**	
1Q10	36.7	0.7	0.7	**Yes**
7Q10	36.4	0.7	0.7	**Yes**
Max receiving water flow	34.2	0.6	0.6	**Yes**

[1] This concentration is derived using worst-case ambient conditions. These conservative assumptions will ensure that the receiving water always complies with CTR criteria.
[2] There is no effluent limitation for silver as it does not demonstrate reasonable potential.

3. Determining the Need for WQBEL's

a. **Constituents with No Reasonable Potential.** WQBEL's are not included in this Order for constituents that do not demonstrate reasonable potential (e.g., constituents were not detected in the effluent or receiving water); however, monitoring for those pollutants is established in this Order as required by the SIP. If the results of effluent monitoring demonstrate reasonable potential, this Order may be reopened and modified by adding an appropriate effluent limitation.

Most constituents with no reasonable potential are not discussed in this Order. However, the following constituents were found to have no reasonable potential after assessment of the data:

i. **Aluminum**

Aluminum is the third most abundant element in the earth's crust and is ubiquitous in both soils and aquatic sediments. When mobilized in surface waters, aluminum has been shown to be toxic to various fish species. However, the potential for aluminum toxicity in surface waters is directly related to the chemical form of aluminum present, and the chemical form is highly dependent on water quality characteristics that ultimately determine the mechanism of aluminum toxicity. Surface water characteristics, including pH, temperature, colloidal material, fluoride and sulfate concentrations, and total organic carbon, all influence aluminum speciation and its subsequent bioavailability to aquatic life. Calcium [hardness] concentrations in surface water may also reduce aluminum toxicity by competing with monomeric aluminum (Al^{3+}) binding to negatively charged fish gills.

(a) **WQO.** DDW has established Secondary Maximum Contaminant Levels (MCL's) to assist public drinking water systems in managing their drinking water for aesthetic conditions such as taste, color, and odor. The Secondary MCL for aluminum is 200 µg/L for protection of the MUN

beneficial use. Title 22 requires compliance with Secondary MCL's on an annual average basis.

The Code of Federal Regulations promulgated criteria for priority toxic pollutants for California's surface waters as part of section 131.38 Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California (California Toxics Rule or CTR), including metals criteria. However, aluminum criteria were not promulgated as part of the CTR. Absent numeric aquatic life criteria for aluminum, WQBEL's in the Central Valley Region's NPDES permits are based on the Basin Plans' narrative toxicity objective. The Basin Plans' Policy for Application of Water Quality Objectives requires the Central Valley Water Board to consider, "*on a case-by-case basis, direct evidence of beneficial use impacts, all material and relevant information submitted by the discharger and other interested parties, and relevant numerical criteria and guidelines developed and/or published by other agencies and organizations. In considering such criteria, the Board evaluates whether the specific numerical criteria which are available through these sources and through other information supplied to the Board, are relevant and appropriate to the situation at hand and, therefore, should be used in determining compliance with the narrative objective*." Relevant information includes, but is not limited to (1) U.S. EPA Ambient Water Quality Criteria (NAWQC) and subsequent Correction, (2) site-specific conditions of the Sacramento River, the receiving water, and (3) site-specific aluminum studies conducted by dischargers within the Central Valley Region. (Basin Plan, p. IV.-17.00; see also, 40 C.F.R. §122.44(d)(vi).)

U.S. EPA NAWQC. U.S. EPA recommended the NAWQC aluminum acute criterion at 750 µg/L based on test waters with a pH of 6.5 to 9.0. U.S. EPA also recommended the NAWQC aluminum chronic criterion at 87 µg/L based upon the following two toxicity tests. All test waters contained hardness at 12 mg/L as $CaCO_3$.

(1) Acute toxicity tests at various aluminum doses were conducted in various acidic waters (pH 6.0 – 6.5) on 159- and 160-day old striped bass. The 159-day old striped bass showed no mortality in waters with pH at 6.5 and an aluminum dose at 390 µg/L, and the 160-day old striped bass showed 58% mortality at a dose of 174.4 µg/L in same pH waters. However, the 160-day old striped bass showed 98% mortality at an aluminum dose of 87.2 µg/L in waters with pH at 6.0, which is U.S. EPA's basis for the 87 µg/L chronic criterion. The varied results draw into question this study and the applicability of the NAWQC chronic criterion of 87 µg/L.

(2) Chronic toxicity effects on 60-day old brook trout were evaluated in circumneutral pH waters (6.5-6.9 pH) in five cells at various aluminum doses (4, 57, 88, 169, and 350 µg/L). Chronic evaluation started upon hatching of eyed eggs of brook trout, and their weight and length were measure after 45 days and 60 days. The 60-day old brook trout showed 24% weight loss at 169 µg/L of aluminum and 4% weight loss at 88 µg/L of aluminum, which is the basis for U.S. EPA's chronic criteria. Though this test study shows chronic toxic effects of 4% reduction in weight after exposure for 60-days, the chronic

criterion is based on 4-day exposure; so again, the applicability of the NAWQC chronic criterion of 87 µg/L is questionable.

Site-specific Conditions. U.S. EPA advises that a water effects ratio may be more appropriate to better reflect the actual toxicity of aluminum to aquatic organisms when the pH and hardness conditions of the receiving water are not similar to that of the test conditions.[1] Effluent and Sacramento River monitoring data indicate that the pH and hardness values are not similar to the low pH and hardness conditions under which the chronic criterion for aluminum was developed, as shown in the table below, and therefore, the Central Valley Water Board does not expect aluminum to be as toxic in the Sacramento River as in the previously described toxicity tests. The pH of the Sacramento River, the receiving water, ranged from 6.6 to 8.4 with a median of 7.6 based on 170 monitoring results obtained between January 2012 and December 2014. These water conditions typically are circumneutral pH where aluminum is predominately in the form of $Al(OH)_3$ and non-toxic to aquatic life. The hardness of the Sacramento River ranged from 34 mg/L to 100 mg/L, based on 107 samples between January 2005 and December 2014, which is above the conditions, and thus less toxic, than the tests used to develop the chronic criterion.

Parameter	Units	Test Conditions for Applicability of Chronic Criterion	Effluent	Receiving Water
pH	standard units	6.0 – 6.5	6.2 – 7.0	6.6 – 8.4
Hardness, Total (as $CaCO_3$)	mg/L	12	86 – 140	34 – 100
Aluminum, Total Recoverable	µg/L	87.2 - 390	5.7 – 38	78 – 900

Local Environmental Conditions and Studies. Twenty-one site-specific aluminum toxicity tests have been conducted within the Central Valley Region. The pH and hardness of the Sacramento River are similar, as shown in the table below, and thus the results of these site-specific aluminum toxicity tests are relevant and appropriate for the Sacramento River. As shown in the following table, all EC_{50}[2] toxicity study result values are at concentrations of aluminum above 5,000 µg/L. Thus, the toxic effects of aluminum in these surface waters and in the Sacramento River is less toxic (or less reactive) to aquatic species then demonstrated in the toxicity tests that U.S. EPA used for the basis of establishing the chronic criterion of 87 µg/L. This new information, and review of the toxicity tests U.S. EPA used to establish the chronic criterion, indicates that 87 µg/L is overly stringent and not applicable to the Sacramento River.

[1] "*The value of 87 micro-g/L is based on a toxicity test with striped bass in water with pH = 6.5-6.6 and hardness < 10 mg/L. Data in [a 1994 Study] indicate that aluminum is substantially less toxic at higher pH and hardness, but the effects of pH and hardness are not well quantified at this time.*" U.S. EPA 1999 NAWQC Correction, Footnote L

[2] The effect concentration is a point estimate of the toxicant concentration that would cause an observable adverse effect (e.g. death, immobilization, or serious incapacitation) in a given percent of the test organisms, calculated from a continuous model (e.g. Probit Model). EC_{50} is a point estimate of the toxicant concentration that would cause an observable adverse effect in 50 percent of the test organisms. The EC_{50} is used in toxicity testing to determine the appropriate chronic criterion.

Central Valley Region Site-Specific Aluminum Toxicity Data

Discharger	Test Waters	Hardness Value	Total Aluminum EC_{50} Value	pH	WER
***Oncorhynchus mykiss* (rainbow trout)**					
Manteca	Surface Water/Effluent	124	>8600	9.14	N/C
Auburn	Surface Water	16	>16500	7.44	N/C
Modesto	Surface Water/Effluent	120/156	>34250	8.96	>229
Yuba City	Surface Water/Effluent	114/164[1]	>8000	7.60/7.46	>53.5
***Ceriodaphnia dubia* (water flea)**					
Auburn	Effluent	99	>5270	7.44	>19.3
	Surface Water	16	>5160	7.44	>12.4
Manteca	Surface Water/Effluent	124	>8800	9.14	N/C
	Effluent	117	>8700	7.21	>27.8
	Surface Water	57	7823	7.58	25.0
	Effluent	139	>9500	7.97	>21.2
	Surface Water	104	>11000	8.28	>24.5
	Effluent	128	>9700	7.78	>25.0
	Surface Water	85	>9450	7.85	>25.7
	Effluent	106	>11900	7.66	>15.3
	Surface Water	146	>10650	7.81	>13.7
Modesto	Surface Water/Effluent	120/156	31604	8.96	211
Yuba City	Surface Water/Effluent	114/164[1]	>8000	7.60/7.46	>53.5
Placer County (SMD 1)	Effluent	150	>5000	7.4 – 8.7	>13.7
***Daphnia magna* (water flea)**					
Manteca	Surface Water/Effluent	124	>8350	9.14	N/C
Modesto	Surface Water/Effluent	120/156	>11900	8.96	>79.6
Yuba City	Surface Water/Effluent	114/164[1]	>8000	7.60/7.46	>53.5

The Discharger has not conducted a toxicity test for aluminum; however, the City of Manteca conducted toxicity tests in the San Joaquin River. As shown, the test water quality characteristics of the San Joaquin River near Manteca are similar for pH and hardness in the Sacramento River, with the hardness ranging from 57 mg/L to 156 mg/L as $CaCO_3$ in comparison to the hardness of the Sacramento River near the discharge that ranged from 34 mg/L to 100 mg/L as $CaCO_3$. Thus, results of the site-specific study conducted on the San Joaquin River near Manteca are representative of the Sacramento River near the discharge. Therefore, the City of Manteca aluminum toxicity test study is relevant for use in determining the specific numerical criteria to be used in determining compliance with the Basin Plan's narrative toxicity objective. The City of Manteca aluminum toxicity study resulted in a minimum site-specific aluminum objective of 7,823 µg/L. Thus, these results support the conclusion that the 87 µg/L chronic criterion is overly stringent for the Sacramento River near the discharge.

Applicable WQOs. This Order implements the Secondary MCL of 200 µg/L as an annual average for the protection of MUN and implements the Basin Plan's narrative toxicity objective for the protection of aquatic life using an acute (1-hour) criterion and chronic (4-day) criterion of 750 µg/L based on U.S. EPA's NAWQC and the discussion above. Order

R5-2010-0114-04 included effluent limitations for aluminum based on the Secondary MCL of 200 µg/L and the NAWQC acute aquatic life criterion of 750 µg/L.

(b) **RPA Results.** For priority pollutants, the SIP dictates the procedures for conducting the RPA. Aluminum is not a priority pollutant. Therefore, the Central Valley Water Board is not restricted to one particular RPA method. Due to the site-specific conditions of the discharge, the Central Valley Water Board has used its judgment in determining the appropriate method for conducting the RPA for this non-priority pollutant constituent. The most stringent objective is the Secondary MCL, which is derived from human welfare considerations (e.g., taste, odor, laundry staining), not for toxicity. Secondary MCL's are drinking water standards contained in Title 22 of the California Code of Regulations. Title 22 requires compliance with these standards on an annual average basis, when sampling at least quarterly. To be consistent with how compliance with the standards is determined, the RPA was conducted based on the calendar annual average effluent aluminum concentrations. Calculating a maximum annual average concentration considers variability in the data, per 40 C.F.R. § 122.44(d)(1)(ii).

The maximum annual average effluent concentration for aluminum was 17 µg/L based on 105 samples collected between January 2012 and December 2015. Effluent aluminum is consistently less than the concentrations in the receiving water and below the Secondary MCL and the NAWQC acute criterion. Therefore, the Central Valley Water Board finds the discharge does not have reasonable potential to cause or contribute to an exceedance in the receiving water and the Facility is adequately controlling the discharge of aluminum. Since the discharge does not demonstrate reasonable potential, the effluent limitations for aluminum have not been retained in this Order. Removal of these effluent limitations is in accordance with federal anti-backsliding regulations (see section IV.D.3 of the Fact Sheet).

ii. **Diazinon and Chlorpyrifos**

(a) **WQO.** The Central Valley Water Board completed a TMDL for diazinon and chlorpyrifos in the Sacramento – San Joaquin Delta Waterways and amended the Basin Plan to include diazinon and chlorpyrifos WLA's and water quality objectives. The Basin Plan Amendment for the Control of Diazinon and Chlorpyrifos Runoff into the Sacramento – San Joaquin Delta was adopted by the Central Valley Water Board on 23 June 2006 and became effective on 10 October 2007.

The amendment modified Basin Plan Chapter III (Water Quality Objectives) to establish site-specific numeric objectives for diazinon and chlorpyrifos in the Delta waterways and identified the requirements to meet the additive formula already in Basin Plan Chapter IV (Implementation) for the additive toxicity of diazinon and chlorpyrifos.

The amendment states that "*The Waste Load Allocations (WLA) for all NPDES-permitted dischargers…shall not exceed the sum (S) of one (1) as defined below.*

$$S = \frac{C_d}{WQO_d} + \frac{C_c}{WQO_c} \leq 1.0$$

Where:

C_D = diazinon concentration in µg/L of point source discharge for WLA…

C_C = chlorpyrifos concentration in µg/L of point source discharge for the WLA…

WQO_d = acute or chronic diazinon water quality objective in µg/L.

WQO_c = acute or chronic chlorpyrifos water quality objective in µg/L.

Available samples collected within the applicable averaging period for the water quality objective will be used to determine compliance with the allocations and loading capacity. For purposes of calculating the sum (S) above, analytical results that are reported as 'non-detectable' concentrations are considered to be zero."

Appendix A of the Diazinon and Chlorpyrifos TMDL lists waterways subject to the TMDL and includes the Sacramento River.

The water quality objectives for chlorpyrifos are 0.025 µg/L as a 1-hour average (acute) and 0.015 µg/L as a 4-day average (chronic), not to be exceeded more than once in a 3-year period. The water quality objectives for diazinon are 0.16 µg/L as a 1-hour average (acute) and 0.10 µg/L as a 4-day average (chronic), not to be exceeded more than once in a 3-year period.

(b) **RPA Results.** Diazinon was not detected in the effluent based on 38 samples collected between January 2012 and December 2014. The maximum observed upstream receiving water diazinon concentration was an estimated concentration of 0.0004 µg/L based on 36 samples collected between January 2012 and December 2014.

Chlorpyrifos was not detected in the effluent based on 38 samples collected between January 2012 and December 2014. The maximum observed upstream receiving water chlorpyrifos concentration was an estimated concentration of 0.004 µg/L based on 36 samples collected between January 2012 and December 2014.

Although diazinon and chlorpyrifos were not detected in the effluent, due to the TMDL for diazinon and chlorpyrifos in the San Joaquin River, WQBEL's for these constituents are required. The TMDL WLA applies to all NPDES dischargers to Delta waterways and will serve as the basis for WQBEL's.

(c) **WQBEL's.** WQBEL's for diazinon and chlorpyrifos are required based on the TMDL for diazinon and chlorpyrifos for the Sacramento – San Joaquin Delta. Therefore, this Order includes effluent limits calculated based on the WLA's contained in the TMDL, as follows:

(1) Average Monthly Effluent Limitation (AMEL)

$$S_{AMEL} = \frac{C_{D\ M-avg}}{0.079} + \frac{C_{C\ M-avg}}{0.012} \leq 1.0$$

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

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

(2) Average Weekly Effluent Limitation (AWEL)

$$S_{AWEL} = \frac{C_{D\ W-avg}}{0.14} + \frac{C_{C\ W-avg}}{0.021} \leq 1.0$$

$C_{D\ W\text{-}avg}$ = average weekly diazinon effluent concentration in µg/L.

$C_{C\ W\text{-}avg}$ = average weekly chlorpyrifos effluent concentration in µg/L.

(d) **Plant Performance and Attainability.** Diazinon and chlorpyrifos were not detected in the effluent. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

iii. **Dibenzo(a,h)anthracene**

(a) **WQO.** The CTR includes a criterion of 0.0044 µg/L for dibenzo(a,h)anthracene for the protection of human health for waters from which both water and organisms are consumed. Order R5-2010-0114-04 included effluent limitations for dibenzo(a,h)anthracene based on the CTR criterion.

(b) **RPA Results.** Dibenzo(a,h)anthracene was not detected in the effluent based on 105 samples collected between January 2012 and December 2014. Dibenzo(a,h)anthracene was not detected in the upstream receiving water based on 25 samples collected between January 2012 and December 2014. Therefore, the discharge does not demonstrate reasonable potential to cause or contribute to an in-stream excursion above the CTR criteria for dibenzo(a,h)anthracene, and the effluent limitations for dibenzo(a,h)anthracene have not been retained in this Order. Removal of these effluent limitations is in accordance with federal anti-backsliding regulations (see section IV.D.3 of the Fact Sheet).

iv. **1,2-Diphenylhydrazine**

(a) **WQO.** The CTR includes a criterion of 0.040 µg/L for 1,2-diphenylhydrazine for the protection of human health for waters from which both water and organisms are consumed.

(b) **RPA Results.** Order R5-2010-0114-04 concluded that insufficient information was available to make a determination whether 1,2-diphenylhydrazine in the discharge had reasonable potential to exceed the CTR criterion, and required the Discharger to conduct a study to evaluate the effluent using appropriate analytical methods. The Discharger submitted the study results to the Central Valley Water Board on 16 July 2013, which concluded that 1,2-diphenylhydrazine was not detected in the effluent based on effluent sampling conducted every 3 weeks over a 54 week period.

1,2-diphenylhydrazine was not detected in the effluent based on 52 samples collected between January 2012 and December 2014.

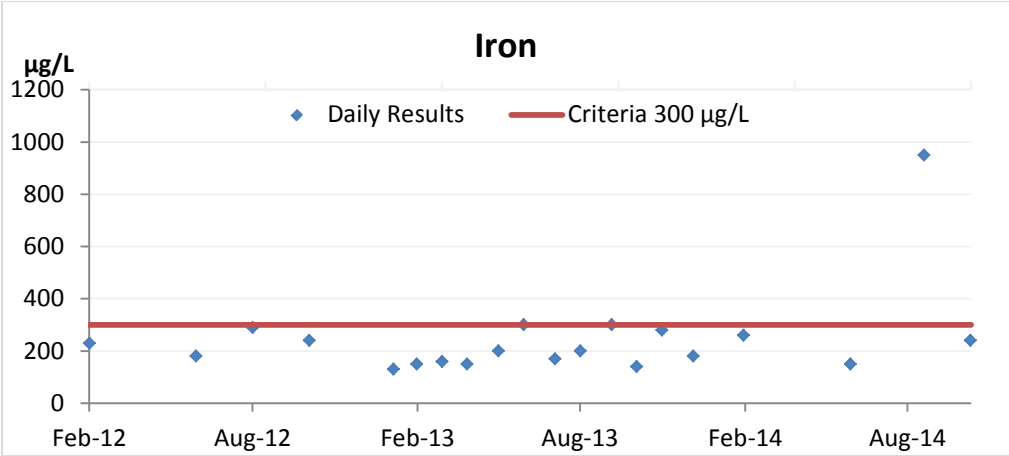
1,2-diphenylhydrazine was not detected in the upstream receiving water based on 12 samples collected between January 2012 and December 2014. Therefore, the discharge does not demonstrate reasonable potential to cause or contribute to an in-stream excursion above the CTR criteria for 1,2-diphenylhydrazine.

v. **Iron**

(a) **WQO.** The Secondary MCL – Consumer Acceptance Limit for iron is 300 µg/L, which is used to implement the Basin Plan's chemical constituent objective for the protection of municipal and domestic supply. The Basin Plan contains a site-specific numeric objective for the Delta of 300 µg/L (maximum concentration) for iron, expressed as dissolved metal, based on the Secondary MCL.

(b) **RPA Results.** For priority pollutants, the SIP dictates the procedures for conducting the RPA. Iron is not a priority pollutant. Therefore, the Central Valley Water Board is not restricted to one particular RPA method. Due to the site-specific conditions of the discharge, the Central Valley Water Board has used its judgment in determining the appropriate method for conducting the RPA for this non-priority pollutant constituent. The most stringent objective is the site-specific Basin Plan objective based on the Secondary MCL, which is derived from human welfare considerations (e.g., taste, odor, laundry staining), not for toxicity. Secondary MCL's are drinking water standards contained in Title 22 of the California Code of Regulations. Title 22 requires compliance with these standards on an annual average basis, when sampling at least quarterly. To be consistent with how compliance with the standards is determined, the RPA was conducted based on the calendar annual average effluent iron concentrations. Calculating a maximum annual average concentration considers variability in the data, per 40 C.F.R. § 122.44(d)(1)(ii).

The maximum effluent iron concentration was 950 µg/L, based on 20 samples collected between January 2012 and December 2014. The mean value of the effluent data was 245 µg/L and the standard deviation was 175 µg/L. The remaining results for iron in the effluent ranged from 130 µg/L to 300 µg/L, as shown in the figure below. The maximum effluent iron concentration, which was observed on 24 August 2014, was determined to be an outlier based on both Rosner's outlier test and Grubbs outlier test. Rosner's outlier test is the recommended test by the U.S. EPA and the Grubbs outlier test is the recommended test when testing for a single outlier by the State Water Board, Division of Water Quality.



The Central Valley Water Board has determined that the 24 August 2014 effluent result of 950 µg/L is not representative of the discharge from the Facility. Excluding the 24 August 2014 result, the maximum annual average effluent concentration for iron was 235 µg/L. Although the receiving water contains iron exceeding the Secondary MCL, the effluent iron is consistently less than the concentrations in the receiving water and below the Secondary MCL. Therefore, the Central Valley Water Board finds the discharge does not have reasonable potential to cause or contribute to an exceedance in the receiving water and the Facility is adequately controlling the discharge of iron.

vi. **Manganese**

(a) **WQO.** The Secondary MCL – Consumer Acceptance Limit for manganese is 50 µg/L, which is used to implement the Basin Plan's chemical constituent objective for the protection of municipal and domestic supply. The Basin Plan contains a site-specific numeric objective for the Delta of 50 µg/L (maximum concentration) for manganese, expressed as dissolved metal, based on the Secondary MCL. Order R5-2010-0114-01 established an effluent limitation for manganese based on the Secondary MCL.

(b) **RPA Results.** For priority pollutants, the SIP dictates the procedures for conducting the RPA. Manganese is not a priority pollutant. Therefore, the Central Valley Water Board is not restricted to one particular RPA method. Due to the site-specific conditions of the discharge, the Central Valley Water Board has used its judgment in determining the appropriate method for conducting the RPA for this non-priority pollutant constituent. For conducting the RPA, U.S. EPA recommends using a mass-balance approach to determine the expected critical downstream receiving water concentration using a steady-state approach[1]. This downstream receiving water concentration is then compared to the applicable water quality objectives to determine if the discharge has reasonable potential to cause or contribute to an in-stream excursion. This approach allows assimilative capacity and dilution to be factored into the RPA. This U.S. EPA recommended approach has been used for manganese. The critical

[1] U.S. EPA NPDES Permit Writers' Course (EPA 833-B-97-001 rev. October 2009)

downstream receiving water concentration is calculated using the following equation:

$$C_r = \frac{Q_s C_s + Q_d C_d}{Q_s + Q_d}$$

Where:

Q_s = Critical stream flow (1Q10) for acute criteria, (7Q10) for chronic criteria, harmonic mean flow for human carcinogen criteria, and (30Q5) for non-human carcinogen criteria

Q_d =Critical effluent flow from discharge flow data (maximum permitted discharge)

C_s =Critical upstream pollutant concentration

C_d =Critical effluent pollutant concentration

C_r = Critical downstream receiving water pollutant concentration

The Secondary MCL is a long-term objective. As described in section IV.C.2.c.vi, the TSD recommends dilution based on a 30Q5 receiving water flow for non-human carcinogen human health criteria. Therefore, a critical stream flow (Q_s) of 8,234 cfs (5,322 MGD), which represents the 30Q5 receiving water flow, was used for the RPA for manganese. The critical effluent flow, Q_d, is 181 MGD, which is the maximum permitted flow allowed in this Order. Title 22 requires compliance with the Secondary MCL for manganese based on an annual average concentration, therefore, a critical effluent pollutant concentration, C_d, of 79 µg/L was determined by projecting the running annual average manganese concentration using statistics recommended in the TSD for statistically projecting effluent concentrations (i.e., Table 3-1 of the TSD using the 99% probability basis and 99% confidence level). Since the Secondary MCL for manganese is a long-term objective and was derived from human welfare considerations (e.g., taste, odor, laundry staining), a critical upstream pollutant concentration, C_s, of 20 µg/L was determined using the ambient background concentration as an arithmetic mean.

Q_s = 5,322 MGD

Q_d = 181 MGD

C_s = 20 µg/L

C_d = 79 µg/L

$$C_r = \frac{(5{,}322\ MGD \times 20\ \mu g/L\ ) + (181\ MGD \times 79\ \mu g/L)}{(5{,}322\ MGD + 181\ MGD)} = 22\ \mu g/$$

The critical downstream receiving water manganese concentration, C_r, is22 mg/L, which does not exceed the Secondary MCL. Therefore, the discharge does not have reasonable potential for manganese and the WQBEL for manganese has not been retained in this Order. Removal of this effluent limitation is in accordance with federal anti-backsliding regulations (see section IV.D.3 of the Fact Sheet).

vii. **Methyl Tertiary Butyl Ether**

(a) **WQO.** The Secondary MCL – Consumer Acceptance Limit for methyl tertiary butyl ether is 5.0 µg/L, which is used to implement the Basin Plan's chemical constituent objective for the protection of municipal and domestic supply. Order R5-2010-0114-01 established an effluent limitation for methyl tertiary butyl ether based on the Secondary MCL.

(b) **RPA Results.** For priority pollutants, the SIP dictates the procedures for conducting the RPA. Methyl tertiary butyl ether is not a priority pollutant. Therefore, the Central Valley Water Board is not restricted to one particular RPA method. Due to the site-specific conditions of the discharge, the Central Valley Water Board has used its judgment in determining the appropriate method for conducting the RPA for this non-priority pollutant constituent. The most stringent objective is the Secondary MCL, which is derived from human welfare considerations (e.g., taste, odor, laundry staining), not for toxicity. Secondary MCL's are drinking water standards contained in Title 22 of the California Code of Regulations. Title 22 requires compliance with these standards on an annual average basis, when sampling at least quarterly. To be consistent with how compliance with the standards is determined, the RPA was conducted based on the calendar annual average effluent methyl tertiary butyl ether concentrations.

Methyl tertiary butyl ether was not detected in the effluent based on 41 samples collected between January 2012 and December 2015. Effluent Methyl tertiary butyl ether is consistently less than the concentrations in the receiving water and below the Secondary MCL. Therefore, the Central Valley Water Board finds the discharge does not have reasonable potential to cause or contribute to an exceedance in the receiving water and the Facility is adequately controlling the discharge of methyl tertiary butyl ether. Since the discharge does not demonstrate reasonable potential, the effluent limitation for methyl tertiary butyl ether has not been retained in this Order. Removal of this effluent limitation is in accordance with federal anti-backsliding regulations (see section IV.D.3 of the Fact Sheet).

viii. **Pentachlorophenol**

(a) **WQO.** The CTR includes a criterion of 0.28 µg/L for pentachlorophenol for the protection of human health for waters from which both water and organisms are consumed. Order R5-2010-0114-01 included an effluent limitation for pentachlorophenol based on the CTR criterion.

(b) **RPA Results.** Pentachlorophenol was not detected in the effluent based on 101 samples collected between January 2012 and December 2014. Pentachlorophenol was not detected in the upstream receiving water based on 12 samples collected between January 2012 and December 2014. Therefore, the discharge does not demonstrate reasonable potential to cause or contribute to an in-stream excursion above the CTR criteria for pentachlorophenol, and the effluent limitations for pentachlorophenol have not been retained in this Order. Removal of these effluent limitations is in accordance with federal anti-backsliding regulations (see section IV.D.3 of the Fact Sheet).

ix. **Perchlorate**

(a) **WQO.** DDW has adopted a Primary MCL for perchlorate of 6 µg/L, which is protective of the Basin Plan's chemical constituent objective.

(b) **RPA Results.** Order R5-2010-0114-04 concluded that insufficient information was available to make a determination whether perchlorate in the discharge had reasonable potential to exceed the Primary MCL, and required the Discharger to conduct a study to evaluate the effluent using appropriate analytical methods. The Discharger submitted the study results to the Central Valley Water Board on 16 July 2013, which concluded that the maximum observed effluent perchlorate concentration was 1.06 µg/L based on effluent sampling conducted every 3 weeks over a 54 week period. Therefore, the discharge does not demonstrate reasonable potential to cause or contribute to an in-stream excursion above the CTR criteria for perchlorate.

x. **Salinity**

(a) **WQO.** The Basin Plan contains a chemical constituent objective that incorporates state MCL's for electrical conductivity, total dissolved solids, sulfate, and chloride. In addition, the Basin Plan contains numeric site-specific water quality objectives for electrical conductivity and chloride for the Sacramento River at Emmaton in the vicinity of the discharge. The site-specific objectives for electrical conductivity are based on protection of the agricultural supply beneficial use. In addition, U.S. EPA has developed NAWQC for chloride for the protection of aquatic life.

Table F-10. Salinity Water Quality Criteria/Objectives

Parameter	Agricultural WQ Objective[1]	Secondary MCL[2]	U.S. EPA NAWQC	Effluent	
				Average[3]	Maximum
EC (µmhos/cm) or TDS (mg/L)	Varies[2]	900, 1600, 2200 or 500, 1000, 1500	N/A	907 (EC) 435 (TDS)	1,000 (EC) 620 (TDS)
Sulfate (mg/L)	Varies	250, 500, 600	N/A	110	130
Chloride (mg/L)	Varies	250, 500, 600	860 1-hr 230 4-day	106	110

1 Narrative chemical constituent objective of the Basin Plan. Procedures for establishing the applicable numeric limitation to implement the narrative objective can be found in the Policy for Application of Water Quality, Chapter IV, Section 8 of the Basin Plan. However, the Basin Plan does not require improvement over naturally occurring background concentrations. In cases where the natural background concentration of a particular constituent exceeds an applicable water quality objective, the natural background concentration will be considered to comply with the objective.

2 The Secondary MCL's are stated as a recommended level, upper level, and a short-term maximum level.

3 Maximum calendar annual average.

(1) **Chloride.** The Secondary MCL for chloride is 250 mg/L, as a recommended level, 500 mg/L as an upper level, and 600 mg/L as a short-term maximum. The NAWQC acute and chronic criteria are 860 mg/L and 230 mg/L, respectively.

(2) **Electrical Conductivity or Total Dissolved Solids.** The Secondary MCL for electrical conductivity is 900 µmhos/cm as a recommended level, 1600 µmhos/cm as an upper level, and 2200 µmhos/cm as a short-term maximum, or when expressed as TDS is 500 mg/L as a recommended level, 1000 mg/L as an upper level, and 1500 mg/L as a short-term maximum.

The Basin Plan contains site-specific water quality objectives for electrical conductivity for the Sacramento River at Emmaton based on the 2006 Bay-Delta Plan. The electrical conductivity objectives vary depending on the water year type and are applied as 14-day running average of the mean daily electrical conductivity, as detailed in the table below:

Table F-11. Water Quality Objectives for Electrical Conductivity

Date	Water Year Type				
	Wet	Above Normal	Below Normal	Dry	Critical
1 April – 14 June	450	450	450	450	2,780
15 June – 19 June	450	450	450	1,670	2,780
20 June – 30 June	450	450	1,140	1,670	2,780
1 July – 15 August	450	630	1,140	1,670	2,780

The Bay-Delta Plan, Chapter IV – Program of Implementation, requires that the EC objectives for protection of AGR to be implemented through water rights actions. Consequently, compliance with the Bay-Delta Plan's electrical conductivity objectives is met through reservoir operations by DWR and USBR. An evaluation of historical compliance from 1999 to 2012 was performed and the results of the evaluation are summarized in the table below. Not considering the exceedances during the Jones Tract levee break in June 2004, which was an unusual event, the Sacramento River at Emmaton has been in compliance with the objectives.

Table F-12. Historical Compliance with Electrical Conductivity Objectives at Emmaton (Water Years 1999-2012)

Water Year Type	Number of Years of this Type	Number of Years with Exceedances	Year with Exceedances (number of days)	Applicable Objectives[1] (µmhos/cm)
Wet	3	0	0	450
Above Normal	3	0	0	450/630
Below Normal	3	1	2004 (13)[1]	450/1,140
Dry	4	0	0	450/1,670
Critically Dry	1	0	0	2,780

[1] Objectives apply from April 1 through August 15 as 14-day running daily averages. Objectives change in certain water years partway through June.

[2] The Jones Tract levee break occurred on 3 June 2004, and was closed on 30 June 2004; the exceedances of criteria, 450 µmhos/cm as 14-day running averages, occurred from 10-21 June 2004.

(3) **Sulfate.** The Secondary MCL for sulfate is 250 mg/L as a recommended level, 500 mg/L as an upper level, and 600 mg/L as a short-term maximum.

(b) **RPA Results.** For priority pollutants, the SIP dictates the procedures for conducting the RPA. Electrical conductivity, total dissolved solids, sulfate, and chloride are not priority pollutants. Therefore, the Central Valley Water Board is not restricted to one particular RPA method. The SIP RPA procedures have been used for chloride. However, due to the site-specific conditions of the discharge, the Central Valley Water Board has used its judgment in determining the appropriate method for conducting the RPA for EC, TDS, and sulfate.

For sulfate and TDS the most stringent objective is the site-specific Basin Plan objective based on the Secondary MCL, which is derived from human welfare considerations (e.g., taste, odor, laundry staining), not for toxicity. Secondary MCL's are drinking water standards contained in Title 22 of the California Code of Regulations. Title 22 requires compliance with these standards on an annual average basis, when sampling at least quarterly. To be consistent with how compliance with the standards is determined, the RPA was conducted based on the calendar annual average effluent iron concentrations. Calculating a maximum annual average concentration considers variability in the data, per 40 C.F.R. § 122.44(d)(1)(ii).

For EC the RPA was conducted using U.S. EPA's recommended mass-balance approach to determine the expected critical downstream receiving water concentration using a steady-state approach[1]. This downstream receiving water concentration is then compared to the applicable water quality objectives to determine if the discharge has reasonable potential to cause or contribute to an in-stream excursion. This approach allows assimilative capacity and dilution to be factored into the RPA. The critical downstream receiving water concentration is calculated using the following equation:

$$C_r = \frac{Q_s C_s + Q_d C_d}{Q_s + Q_d}$$

Where:

Q_s = Critical stream flow (1Q10) for acute criteria, (7Q10) for chronic criteria, harmonic mean flow for human carcinogen criteria, and (30Q5) for non-human carcinogen criteria

Q_d = Critical effluent flow from discharge flow data (maximum permitted discharge)

C_s = Critical upstream pollutant concentration

C_d = Critical effluent pollutant concentration

C_r = Critical downstream receiving water pollutant concentration

The Basin Plan's EC water quality objectives are based on a 14-day running average. Therefore, a critical stream flow (Q_s) of 5,060 cfs (3270 MGD), which represents the 7Q10 receiving water flow, was used for the RPA for EC. The critical effluent flow, Q_d, is 181 MGD, which is the maximum permitted flow allowed in this Order. The critical effluent

[1] U.S. EPA NPDES Permit Writers' Handbook (EPA 833-K-10-001 September 2010)

pollutant concentration, C_d, was determined using statistics recommended in the TSD for statistically calculating the projected maximum effluent concentration (i.e., Table 3-1 of the TSD using the 99% probability basis and 99% confidence level).

(1) **Chloride.** Chloride concentrations in the effluent ranged from 87 mg/L to 110 mg/L, with a maximum observed calendar year annual average of 106 mg/L based on 20 samples collected between January 2012 and December 2014. Background concentrations in the Sacramento River ranged from 3.7 mg/L to 11 mg/L, with a maximum observed calendar year annual average of 7.4 mg/L, based on 25 samples collected between January 2012 through December 2014. These levels do not exceed the NAWQC chronic criterion. Therefore, the discharge does not have reasonable potential for chloride.

(2) **Sulfate.** Sulfate concentrations in the effluent ranged from 54 mg/L to 130 mg/L, with a maximum observed calendar year annual average of 110 mg/L based on 21 samples collected between January 2012 and December 2014. Background concentrations in the Sacramento River ranged from 4.8 mg/L to 16 mg/L, with a maximum observed calendar year annual average of 7.5 mg/L based on 12 samples collected between January 2012 and December 2014. These levels do not exceed the Secondary MCL. Therefore, the discharge does not have reasonable potential for sulfate.

(3) **Total Dissolved Solids.** Total dissolved solids concentrations in the effluent ranged from 280 mg/L to 620 mg/L, with a maximum observed calendar year annual average of 435 mg/L based on 333 samples collected between January 2012 and December 2014. Background concentrations in the Sacramento River ranged from 68 mg/L to 150 mg/L, with a maximum observed calendar year annual average of 119 mg/L based on 25 samples collected between January 2012 and December 2014. These levels do not exceed the Secondary MCL. Therefore, the discharge does not have reasonable potential for TDS.

(4) **Electrical Conductivity**. Electrical conductivity concentrations in the effluent ranged from 540 µmhos/cm to 1,000 µmhos/cm with a maximum observed calendar year annual average of 907 µmhos/cm based on 315 samples collected between January 2012 and December 2014. Electrical conductivity concentrations in the upstream receiving water ranged from 100 µmhos/cm to 246 µmhos/cm with a maximum observed calendar year annual average of 176 µmhos/cm based on 199 samples collected between January 2012 and December 2014. The receiving water has been consistently in compliance with the Bay-Delta objectives resulting in available assimilative capacity for consideration in the RPA. Considering the large dilution and assimilative capacity in the receiving water, the small increase in electrical conductivity caused by the discharge does not result in a reasonable potential to cause or contribute to an exceedance of the objectives for electrical conductivity in the receiving water.

The projected maximum effluent electrical conductivity concentration is 1,013 µmhos/cm. Receiving water electrical conductivity data in the Sacramento River gives the day with the maximum electrical conductivity as 246 µmhos/cm from 18 February 2014. This represents the reasonable worst-case scenario for evaluating the impact of the discharge on the receiving water.

Q_s = 3,270 MGD

Q_d = 181 MGD

C_s = 246 µmhos/cm

C_d = 1,013 µmhos/cm

$$C_r = \frac{(3{,}270\ MGD \times 246\ \mu mhos/cm\ ) + (181\ MGD \times 1{,}013\ \mu mhos/cm\ )}{(3{,}270\ MGD + 181\ MGD)} = 286\ \mu mhos/cm$$

The critical downstream receiving water concentration, Cr, is 286 µmhos/cm, which does not exceed the Bay-Delta Objective of 450 µmhos/cm. Therefore, the discharge does not have reasonable potential for electrical conductivity.

Table F-13, below, shows a summary of the reasonable potential determination for EC.

Table F-13. Water Quality Criteria/Objectives and Effluent and Receiving Water Concentrations

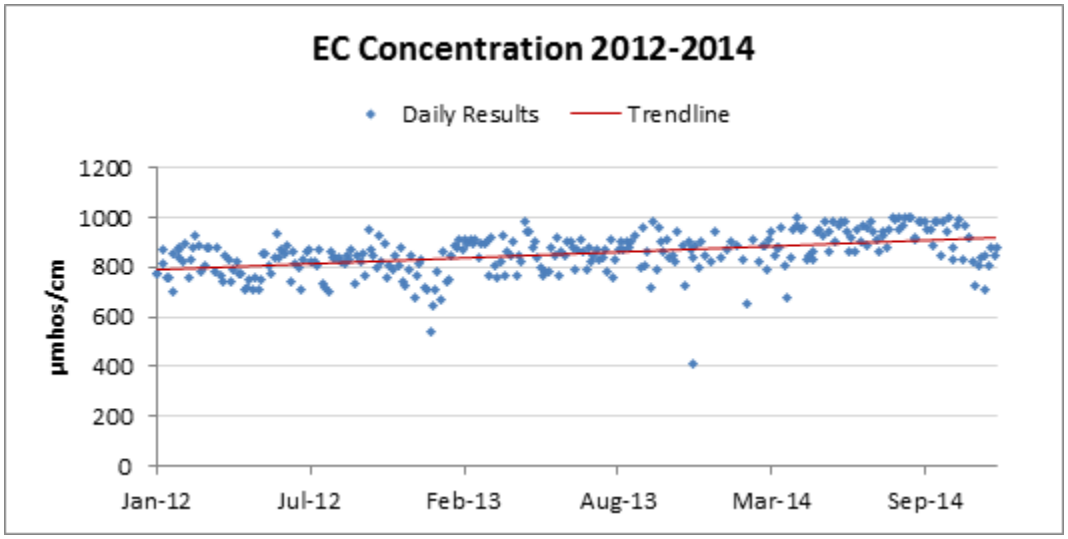
Parameter	Sacramento River Max	Effluent		TSD Max. RW Conc.[2]	WQO	RP?
		MEC	Projected MEC[1]			
EC (µmhos/cm)	246	1,000	1,013	271	varies[3] 450~2780	No

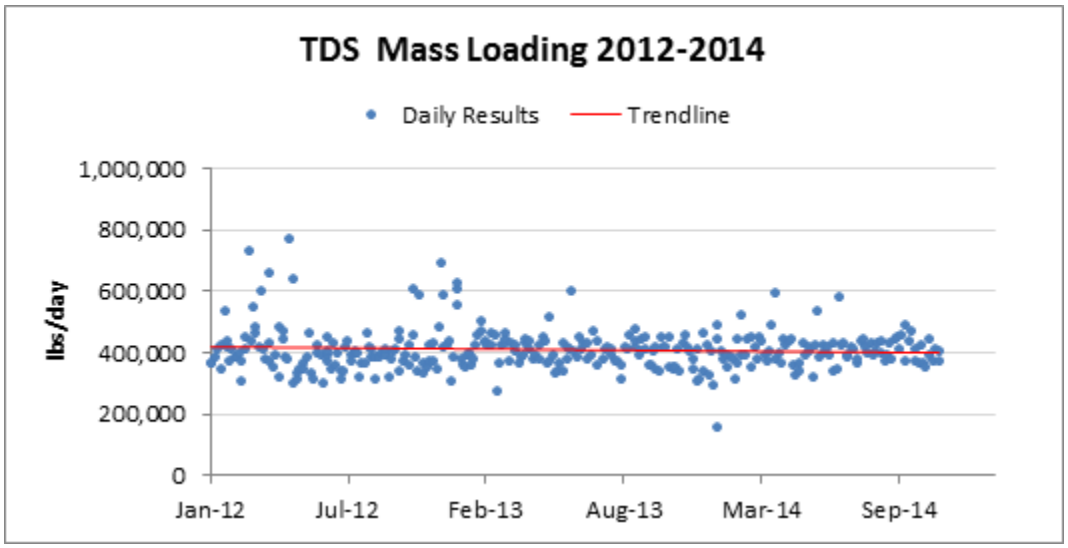
1 Projected maximum effluent concentration using Table 3-1 from TSD.
2 Critical downstream receiving water pollutant concentration using mass balance, $C_r = (Q_sC_s + Q_dC_d)/ (Q_s+ Q_d)$.
3 EC = Bay-Delta Plan, Sacramento River at Emmaton in the Western Delta.

(c) **WQBEL's.** Based on the relatively low reported salinity, the discharge does not have reasonable potential to cause or contribute to an in-stream excursion of water quality objectives for salinity. However, since the Discharger discharges to the Sacramento River within the Sacramento-San Joaquin Delta, of additional concern is the salt contribution to Delta waters. Allowing the Discharger to increase its current salt loading may be contrary to the Region-wide effort to address salinity in the Central Valley. Therefore, this Order includes a performance-based effluent limitation for electrical conductivity.

Order R5-2010-0114-04 included a performance-based annual average effluent limitation of 900 µmhos/cm. However, due to drought conditions and ongoing water conservations efforts during the term of Order R5-2010-0114-04, the Facility experienced increasing effluent salinity concentrations and the Discharger exceeded the annual average effluent limitation once (in 2014). In 2016, the Discharger is planning to convert the

disinfection process from a gaseous to a liquid disinfection process for safety and treatment efficiency purposes. This conversion is expected to temporarily increase salinity levels. The salinity levels are expected to decrease after the BNR process is online in 2020. Although effluent electrical conductivity concentrations have been increasing, the mass loading of salinity is not increasing over time, as shown in the following figures. Therefore, this Order includes a revised performance-based annual average effluent limitation of 1,139 µmhos/cm, which reflects the projected effluent quality until the BNR facilities come online.





In order to ensure that the Discharger will continue to control the discharge of salinity, this Order includes a requirement to continue to implement a salinity evaluation and minimization plan.

(d) **Plant Performance and Attainability.** The effluent limitation for electrical conductivity is based on projected Facility performance. The Central Valley Water Board concludes, therefore, that immediate compliance with this effluent limitation is feasible.

xi. **Tetrachloroethylene**

(a) **WQO.** The CTR includes a criterion of 0.8 µg/L for tetrachloroethylene for the protection of human health for waters from which both water and organisms are consumed. Order R5-2010-0114-01 included an effluent limitation for tetrachloroethylene based on the CTR criterion.

(b) **RPA Results.** Tetrachloroethylene was not detected in the effluent based on 41 samples collected between January 2012 and December 2014. Tetrachloroethylene was not detected in the upstream receiving water based on 12 samples collected between January 2012 and December 2014. Therefore, the discharge does not demonstrate reasonable potential to cause or contribute to an in-stream excursion above the CTR criteria for tetrachloroethylene, and the effluent limitations for tetrachloroethylene have not been retained in this Order. Removal of these effluent limitations is in accordance with federal anti-backsliding regulations (see section IV.D.3 of the Fact Sheet).

b. **Constituents with No Data or Insufficient Data.** Reasonable potential cannot be determined for the following constituents because effluent data are limited or ambient background concentrations are not available. The Discharger is required to continue to monitor for these constituents in the effluent using analytical methods that provide the best feasible detection limits. When additional data become available, further analysis will be conducted to determine whether to add numeric effluent limitations or to continue monitoring.

i. **N-Nitrosodimethylamine**

(a) **WQO.** The CTR includes a criterion of 0.00069 µg/L for n-nitrosodimethylamine for the protection of human health for waters from which both water and organisms are consumed.

(b) **RPA Results.** As shown in the table below, based on data collected between January 2012 and December 2014, the MEC for n-nitrosodimethylamine exceeds the applicable CTR criterion.

Table F-14. Data Summary for N-nitrosodimethylamine

Parameter	Effluent				Background (µg/L)	Lowest MDL (µg/L)	Lowest RL (µg/L)	SIP ML (µg/L)
	MEC (µg/L)	No. of Samples	No. of ND	No. of DNQ				
N-nitrosodimethylamine	0.035 (DNQ)	45	13	32	<0.05	0.00028	0.002	5

SIP Section 2.4.2 states that the Minimum Level (ML) is the lowest quantifiable concentration in a sample based on the proper application of all method-based analytical procedures and the absence of any matrix interferences.

(1) Required ML's are listed in Appendix 4 of the SIP. Where more than one ML is listed in Appendix 4, the Discharger may select any one of the cited analytical methods for compliance determination. The selected ML used for compliance determination is referred to as the Reporting Level (RL).

(2) An RL can be lower than the ML in Appendix 4 only when the Discharger agrees to use a RL that is lower than the ML listed in

Appendix 4. The Central Valley Water Board and the Discharger have no agreement to use a RL lower than the listed ML.

(3) SIP Section 1.2 requires that the Regional Board use all available, valid, relevant, representative data and information, as determined by the Regional Board, to implement the SIP. SIP Section 1.2 further states that the Regional Board has the discretion to consider if any data are inappropriate or insufficient for use in implementing the SIP.

(4) Data reported below the ML indicates the data may not be valid due to possible matrix interferences during the analytical procedure.

(5) Further, SIP Section 2.4.5 (Compliance Determination) supports the insufficiency of data reported below the ML or RL. In part it states, "*Dischargers shall be deemed out of compliance with an effluent limitation, for reporting and administrative enforcement purposes, if the concentration of the priority pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the RL.*" Thus, if submitted data is below the RL, that data cannot be used to determine compliance with effluent limitations.

(6) Data reported below the ML is not considered valid data for use in determining reasonable potential. Therefore, in accordance with Section 1.2 of the SIP, the Central Valley Water Board has determined that data reported below the ML is inappropriate and insufficient to be used to determine reasonable potential.

(7) In implementing its discretion, the Central Valley Water Board is not finding that reasonable potential does not exist; rather the Central Valley Water Board cannot make such a determination given the invalid data. Therefore, the Central Valley Water Board will require additional monitoring for such constituents until such time a determination can be made in accordance with the SIP policy.

The lowest applicable ML cited in SIP Appendix 4 for n-nitrosodimethylamine is 5 µg/L. The Discharger used analytical methods that were more sensitive than the ML required by the SIP. In their 2012 annual progress report, the Discharger provided the results of research treatment technologies and sources, laboratory analysis methods, and laboratories that conduct analyses at low RL's, and concluded that ultra-low RL's for n-nitrosodimethylamine are not reliable and there are no laboratories that can achieve valid and reliable results for n-nitrosodimethylamine. The effluent results were all below the applicable SIP ML. Therefore, the submitted effluent data for these constituents is inappropriate and insufficient to determine reasonable potential under the SIP.

Section 1.3, Step 8 of the SIP allows the Central Valley Water Board to require additional monitoring for a pollutant in place of an effluent limitation if data are unavailable or insufficient. Instead of limitations, additional monitoring has been established for n-nitrosodimethylamine in both the effluent and the receiving water. Should monitoring results indicate that the discharge has the reasonable potential to cause or contribute to an exceedance of a water quality standard, this Order may be reopened and modified by adding an appropriate effluent limitation.

ii. **Polycyclic Aromatic Hydrocarbons (PAH's)**

(a) **WQO.** Benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene are PAH's. The CTR includes criteria of 0.0044 µg/L for each of these PAH's for the protection of human health for waters from which both water and organisms are consumed.

(b) **RPA Results.** As shown in the table below, based on data collected between January 2012 and December 2014, the MEC's for benzo(a)anthracene, benzo(b)fluoranthene, and chrysene and the maximum background concentration of benzo(k)fluoranthene exceed the applicable CTR criteria.

Table F-15. Data Summary for PAH's

Parameter	Effluent				Background (µg/L)	MDL (µg/L)	RL (µg/L)	SIP ML (µg/L)
	MEC (µg/L)	No. of Samples	No. of ND	No. of DNQ				
Benzo(a)anthracene	0.0067	38	24	10	0.0023	0.001	0.005	5
Benzo(b)fluoranthene	0.0057	38	35	2	0.0054 (DNQ)	0.001	0.005	10
Benzo(k)fluoranthene	0.0033 (DNQ)	38	35	3	0.005	0.001	0.005	2
Chrysene	0.0129	38	22	13	0.0114	0.001	0.005	5

SIP Section 2.4.2 states that the ML is the lowest quantifiable concentration in a sample based on the proper application of all method-based analytical procedures and the absence of any matrix interferences.

(1) Required ML's are listed in Appendix 4 of the SIP. Where more than one ML is listed in Appendix 4, the Discharger may select any one of the cited analytical methods for compliance determination. The selected ML used for compliance determination is referred to as the RL.

(2) An RL can be lower than the ML in Appendix 4 only when the Discharger agrees to use a RL that is lower than the ML listed in Appendix 4. The Central Valley Water Board and the Discharger have no agreement to use a RL lower than the listed ML.

(3) SIP Section 1.2 requires that the Regional Board use all available, valid, relevant, representative data and information, as determined by the Regional Board, to implement the SIP. SIP Section 1.2 further states that the Regional Board has the discretion to consider if any data are inappropriate or insufficient for use in implementing the SIP.

(4) Data reported below the ML indicates the data may not be valid due to possible matrix interferences during the analytical procedure.

(5) Further, SIP Section 2.4.5 (Compliance Determination) supports the insufficiency of data reported below the ML or RL. In part it states, "*Dischargers shall be deemed out of compliance with an effluent limitation, for reporting and administrative enforcement purposes, if the concentration of the priority pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the RL.*" Thus, if submitted data is below the RL, that data cannot be used to determine compliance with effluent limitations.

(6) Data reported below the ML is not considered valid data for use in determining reasonable potential. Therefore, in accordance with Section 1.2 of the SIP, the Central Valley Water Board has determined that data reported below the ML is inappropriate and insufficient to be used to determine reasonable potential.

(7) In implementing its discretion, the Central Valley Water Board is not finding that reasonable potential does not exist; rather the Central Valley Water Board cannot make such a determination given the invalid data. Therefore, the Central Valley Water Board will require additional monitoring for such constituents until such time a determination can be made in accordance with the SIP policy.

The lowest applicable ML's cited in SIP Appendix 4 for benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene are 5 µg/L, 10 µg/L, 2 µg/L, and 5 µg/L, respectively. The Discharger used analytical methods that were more sensitive than the ML required by the SIP. The effluent results were all below the applicable SIP ML's. Therefore, the submitted effluent data for these constituents is inappropriate and insufficient to determine reasonable potential under the SIP.

The upstream receiving water concentration of 0.005 µg/L for benzo(k)fluoranthene does exceed the CTR chronic criterion. Section 1.3, Step 6 of the SIP states that if the receiving water concentration exceeds the criteria and the pollutant is detected in the effluent, an effluent limitation is required. However, as discussed in detail above, chrysene was not detected in the effluent in concentrations greater than the applicable SIP ML and, therefore, insufficient effluent data is available at this time to justify establishing an effluent limitation for chrysene.

Section 1.3, Step 8 of the SIP allows the Central Valley Water Board to require additional monitoring for a pollutant in place of an effluent limitation if data are unavailable or insufficient. Instead of limitations, additional monitoring has been established for benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene in both the effluent and the receiving water. Should monitoring results indicate that the discharge has the reasonable potential to cause or contribute to an exceedance of a water quality standard, this Order may be reopened and modified by adding an appropriate effluent limitation.

c. **Constituents with Reasonable Potential.** The Central Valley Water Board finds that the discharge has a reasonable potential to cause or contribute to an in-stream excursion above a water quality standard for ammonia, bis (2-ethylhexyl) phthalate, BOD_5, carbon tetrachloride, chlorine residual, chlorodibromomethane, copper, cyanide, dichlorobromomethane, mercury, methylene chloride, nitrate plus nitrite, pathogens, pH, temperature, and TSS. WQBEL's for these constituents are included in this Order. A summary of the RPA is provided in Attachment G, and a detailed discussion of the RPA for each constituent is provided below.

i. **Ammonia**

(a) **WQO.** The 1999 NAWQC for the protection of freshwater aquatic life for total ammonia (the "1999 Criteria"), 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. U.S. EPA also recommends that no 4-day average concentration should exceed 2.5 times the 30-day CCC. U.S. EPA 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.

The U.S. EPA recently published national recommended water quality criteria for the protection of aquatic life from the toxic effects of ammonia in freshwater (the "2013 Criteria")[1]. The 2013 Criteria is an update to U.S. EPA's 1999 Criteria, and varies based on pH and temperature. Although the 2013 Criteria reflects the latest scientific knowledge on the toxicity of ammonia to certain freshwater aquatic life, including new toxicity data on sensitive freshwater mussels in the Family Unionidae, the species tested for development of the 2013 Criteria may not be present in some Central Valley waterways. The 2013 Criteria document therefore states that, "*unionid mussel species are not prevalent in some waters, such as the arid west …*" and provides that, "*In the case of ammonia, where a state demonstrates that mussels are not present on a site-specific basis, the recalculation procedure may be used to remove the mussel species from the national criteria dataset to better represent the species present at the site.*"

The Central Valley Water Board issued a 3 April 2014 *California Water Code Section 13267 Order for Information: 2013 Final Ammonia Criteria for Protection of Freshwater Aquatic Life* (13267 Order) requiring the Discharger to either participate in an individual or group study to determine the presence of mussels or submit a method of compliance for complying with effluent limitations calculated assuming mussels present using the 2013 Criteria. The Discharger submitted a letter to the Central Valley Water Board indicating their participation in the Central Valley Clean Water Association Freshwater Collaborative Mussel Study. Studies are currently underway to determine how the latest scientific knowledge on the toxicity of ammonia reflected in the 2013 Criteria can be implemented in the Central Valley Region as part of a Basin Planning effort to adopt nutrient and ammonia objectives. Until the Basin Planning process is completed, the Central Valley Water Board will continue to implement the 1999 Criteria to interpret the Basin Plan's narrative toxicity objective.

Because the Sacramento River has a beneficial use of cold freshwater habitat and the presence of salmonids and early fish life stages in the Sacramento River is well-documented, the recommended criteria for waters where salmonids and early life stages are present were used.

The maximum permitted effluent pH is 8.0, as discussed in section IV.C.3.c.xili. In order to protect against the worst-case short-term

[1] *Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater*, published August 2013 [EPA 822-R-13-001]

exposure of an organism, a pH value of 8.0 was used to derive the acute criterion. The resulting acute criterion is 5.62 mg/L.

A chronic criterion was calculated for each day when paired temperature data and pH were measured using rolling 30-day average downstream receiving water data for temperature and pH. The temperature of the receiving water varies seasonally. Therefore, seasonal water quality criteria were calculated for the winter season (i.e., 1 November through 31 March) and the summer season (1 April through 31 October). The minimum criterion, or CCC, was established as the applicable 30-day average chronic criterion, or 30-day CCC, for each season. For the summer season, the most stringent 30-day CCC was 2.45 mg/L (as N) and the 4-day average concentration was 6.13 mg/L (as N). For the winter season, the most stringent 30-day CCC was 3.58 mg/L (as N) and the 4-day average concentration was 8.95 mg/L (as N).

(b) **RPA Results.** The Facility is a POTW that treats domestic wastewater. Untreated domestic wastewater contains ammonia in concentrations that is harmful to aquatic life and exceeds the Basin Plan narrative toxicity objective. Reasonable potential therefore exists and effluent limitations are required.

Federal regulations at 40 C.F.R. section 122.44(d)(1)(i) requires that, "*Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality*." For priority pollutants, the SIP dictates the procedures for conducting the RPA. Ammonia is not a priority pollutant. Therefore, the Central Valley Water Board is not restricted to one particular RPA method. Due to the site-specific conditions of the discharge, the Central Valley Water Board has used professional judgment in determining the appropriate method for conducting the RPA for this non-priority pollutant constituent.

U.S. EPA's September 2010 NPDES Permit Writer's Manual, page 6-30, states, "*State implementation procedures might allow, or even require, a permit writer to determine reasonable potential through a qualitative assessment process without using available facility-specific effluent monitoring data or when such data are not available…A permitting authority might also determine that WQBEL's are required for specific pollutants for all facilities that exhibit certain operational or discharge characteristics (e.g., WQBEL's for pathogens in all permits for POTW's discharging to contact recreational waters)*." U.S. EPA's TSD also recommends that factors other than effluent data should be considered in the RPA, "*When determining whether or not a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality criterion for individual toxicants or for toxicity, the regulatory authority can use a variety of factors and information where facility-specific effluent monitoring data are unavailable. These factors also should be considered with available effluent monitoring data*." With regard to POTW's, U.S. EPA recommends that, "*POTW's should also be*

characterized for the possibility of chlorine and ammonia problems." (TSD, p. 50)

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 provide 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 in concentrations that produce detrimental physiological responses to human, plant, animal, or aquatic life would violate the Basin Plan narrative toxicity objective. **I**nadequate or incomplete nitrification creates the potential for ammonia to be discharged and provides the basis for the discharge to have a reasonable potential to cause or contribute to an in-stream excursion above the NAWQC. Therefore, the Central Valley Water Board finds the discharge has reasonable potential for ammonia and WQBEL's are required.

(c) **WQBEL's.** This Order retains the average monthly effluent limitations (AMEL's) of 1.5 mg/L (1 April through 31 October) and 2.4 mg/L (1 November through 31 March) from Order R5-2010-0114-04; however, in accordance with 40 C.F.R. section 122.45(d)(2), average weekly effluent limitations (AWEL's) are included in lieu of maximum daily effluent limitations (MDEL's). AWEL's of 1.7 mg/L (1 April through 31 October) and 3.0 mg/L (1 November through 31 March) were calculated using the existing ECA's and statistical multipliers with a 98th percentile occurrence probability.

(d) **Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 43 mg/L is greater than the applicable WQBEL's. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is not feasible and appears to put the Discharger in immediate non-compliance with the ammonia final effluent limitations. New or modified control measures may be necessary in order to comply with the effluent limitations, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. The Discharger submitted an infeasibility analysis dated August 2010. As discussed in section IV.E of this Fact Sheet, a compliance schedule has been included in this Order for ammonia.

ii. **Bis (2-Ethylhexyl) Phthalate**

(a) **WQO.** The CTR includes a criterion of 1.8 µg/L for bis (2-ethylhexyl) phthalate for the protection of human health for waters from which both water and organisms are consumed.

(b) **RPA Results.** The MEC for bis (2-ethylhexyl) phthalate was 8.1 µg/L based on 87 grab samples collected between January 2012 and December 2014. The maximum observed upstream receiving water concentration was an estimated concentration of 1.93 µg/L based on 12 samples collected between January 2012 and December 2014. Therefore, bis (2-ethylhexyl) phthalate in the discharge has a reasonable

potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.

(c) **WQBEL's.** The receiving water contains assimilative capacity for bis (2-ethylhexyl) phthalate; therefore, as discussed further in section IV.C.2.c of this Fact Sheet, a dilution credit of 55:1 may be allowed in the development of the WQBEL's for bis (2-ethylhexyl) phthalate. However, the Central Valley Water Board finds that granting of this dilution credit would allocate an unnecessarily large portion of the receiving water's assimilative capacity for bis (2-ethylhexyl) phthalate and could violate the Antidegradation Policy. Therefore, this Order contains an AMEL of 8.9 µg/L and MDEL of 20 µg/L for bis (2-ethylhexyl) phthalate based on Facility performance.

(d) **Plant Performance and Attainability.** The effluent limitations for bis (2-ethylhexyl) phthalate are based on Facility performance. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

iii. **Carbon Tetrachloride**

(a) **WQO.** The CTR includes a criterion of 0.25 µg/L for carbon tetrachloride for the protection of human health for waters from which both water and organisms are consumed.

(b) **RPA Results.** The MEC for carbon tetrachloride was 2.9 µg/L based on 41 samples collected between January 2012 and December 2014. Carbon tetrachloride was not detected in the upstream receiving water based on 12 samples collected between January 2012 and December 2014. Therefore, carbon tetrachloride in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.

(c) **WQBEL's.** The receiving water contains assimilative capacity for carbon tetrachloride; therefore, as discussed further in section IV.C.2.c of this Fact Sheet, a dilution credit of 55:1 may be allowed in the development of the WQBEL's for carbon tetrachloride. However, the Central Valley Water Board finds that granting of this dilution credit would allocate an unnecessarily large portion of the receiving water's assimilative capacity for carbon tetrachloride and could violate the Antidegradation Policy. Therefore, this Order retains the performance-based MDEL of 5.3 µg/L from Order R5-2010-0114-04. Additionally, to be consistent with the SIP, which requires establishment of AMEL's for priority pollutants, this Order includes an AMEL of 2.9 µg/L calculated considering effluent variability using the AMEL/MDEL multipliers in Table 2 of the SIP.

(d) **Plant Performance and Attainability.** The effluent limitations for carbon tetrachloride are based on Facility performance. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

iv. **Chlorine Residual**

(a) **WQO.** U.S. EPA developed NAWQC for protection of freshwater aquatic life for chlorine residual. The recommended 4-day average (chronic) and 1-hour average (acute) criteria for chlorine residual are 0.011 mg/L and

0.019 mg/L, respectively. These criteria are protective of the Basin Plan's narrative toxicity objective.

(b) **RPA Results.** The concentrations of chlorine used to disinfect wastewater are high enough to harm aquatic life and violate the Basin Plan narrative toxicity objective if discharged to the receiving water. Reasonable potential therefore does exist and effluent limits are required.

Federal regulations at 40 C.F.R. section 122.44(d)(1)(i) requires that, "*Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality*." For priority pollutants, the SIP dictates the procedures for conducting the RPA. Chlorine is not a priority pollutant. Therefore, the Central Valley Water Board is not restricted to one particular RPA method. Due to the site-specific conditions of the discharge, the Central Valley Water Board has used its judgment in determining the appropriate method for conducting the RPA for this non-priority pollutant constituent.

U.S. EPA's September 2010 NPDES Permit Writer's Manual, page 6-30, states, "*State implementation procedures might allow, or even require, a permit writer to determine reasonable potential through a qualitative assessment process without using available facility-specific effluent monitoring data or when such data are not available…A permitting authority might also determine that WQBEL's are required for specific pollutants for all facilities that exhibit certain operational or discharge characteristics (e.g., WQBEL's for pathogens in all permits for POTW's discharging to contact recreational waters)*." U.S. EPA's TSD also recommends that factors other than effluent data should be considered in the RPA, "*When determining whether or not a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality criterion for individual toxicants or for toxicity, the regulatory authority can use a variety of factors and information where facility-specific effluent monitoring data are unavailable. These factors also should be considered with available effluent monitoring data*." With regard to POTW's, U.S. EPA recommends that, "*POTW's should also be characterized for the possibility of chlorine and ammonia problems*." (TSD, p. 50)

The Discharger uses chlorine for disinfection, which is extremely toxic to aquatic organisms. Although the Discharger uses a sulfur dioxide process to dechlorinate the effluent prior to discharge to the Sacramento River, the existing chlorine use and the potential for chlorine to be discharged provides the basis for the discharge to have a reasonable potential to cause or contribute to an in-stream excursion above the NAWQC.

(c) **WQBEL's.** The U.S. EPA *Technical Support Document for Water Quality-Based Toxics Control* [EPA/505/2-90-001] contains statistical methods for converting chronic (4-day) and acute (1-hour) aquatic life criteria to average monthly and maximum daily effluent limitations based on the variability of the existing data and the expected frequency of monitoring. However, because chlorine is an acutely toxic constituent that can and will

be monitored continuously, an average 1-hour limitation is considered more appropriate than an average daily limitation. This Order contains a 4-day average effluent limitation and 1-hour average effluent limitation for chlorine residual of 0.011 mg/L and 0.019 mg/L, respectively, based on U.S. EPA's NAWQC, which implements the Basin Plan's narrative toxicity objective for protection of aquatic life.

(d) **Plant Performance and Attainability.** The Discharger is unable to immediately comply with the final effluent limitations for total residual chlorine. Previous Order R5-2010-0114-04 allowed the Discharger until 1 December 2020 to comply with the final effluent limitations for total residual chorine. This Order carries forward this effective date for compliance with the final effluent limitations.

v. **Chlorodibromomethane**

(a) **WQO.** The CTR includes a criterion of 0.41 µg/L for chlorodibromomethane for the protection of human health for waters from which both water and organisms are consumed.

(b) **RPA Results.** The MEC for chlorodibromomethane was 0.33 µg/L based on 41 samples collected between January 2012 and December 2014. Chlorodibromomethane was not detected in the upstream receiving water based on 12 samples collected between January 2012 and December 2014. Although the effluent concentrations of chlorodibromomethane did not exceed the CTR criterion, effluent concentrations of chlorodibromomethane are expected to increase upon completion of upgrades to provide ammonia and nitrate removal. Therefore, chlorodibromomethane in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.

(c) **WQBEL's.** The receiving water contains assimilative capacity for chlorodibromomethane; therefore, as discussed further in section IV.C.2.c of this Fact Sheet, a dilution credit of 55:1 is allowed in the development of the WQBEL's for chlorodibromomethane. Based on the allowable dilution credit, this Order contains an AMEL of 14 µg/L and MDEL of 27 µg/L for chlorodibromomethane.

(d) **Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 0.33 µg/L is less than the applicable WQBEL's. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

vi. **Copper**

(a) **WQO.** The CTR includes hardness-dependent criteria for the protection of freshwater aquatic life for copper. These criteria for copper are presented in dissolved concentrations, as 1-hour acute criteria and 4-day chronic criteria. U.S. EPA recommends conversion factors to translate dissolved concentrations to total concentrations. Default U.S. EPA translators were used for the receiving water and effluent. As described in section IV.C.2.e of this Fact Sheet, the applicable acute (1-hour average) and chronic (4-day average) criteria for copper in the effluent are 12 µg/L and 8.0 µg/L, respectively, as total recoverable.

(b) **RPA Results.** The MEC for copper was 10 µg/L (as total recoverable) based on 108 samples collected between January 2012 and December 2014. The maximum observed upstream receiving water concentration was 5.8 µg/L (as total recoverable) based on 25 samples collected between January 2012 and December 2014. Therefore, copper in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criteria for the protection of freshwater aquatic life.

(c) **WQBEL's.** The receiving water contains assimilative capacity for copper and a chronic aquatic life criteria mixing zone has been allowed, as discussed further in section IV.C.2.c of this Fact Sheet. For copper the dynamic modeling approach described in Section IV.C.4.f has not been used to calculate the WQBELs. Instead, the Discharger's model was used to determine the dilution factor at the edge of the 60 foot chronic aquatic life mixing zone and the long-term average was calculated using the SIP's steady-state modeling approach. Considering a chronic aquatic life mixing zone with a dilution factor of 2.45, and no mixing zone for acute criteria, the WQBELs for copper are an AMEL of 8.6 µg/L and MDEL of 12 µg/L, based on the CTR criteria for the protection of freshwater aquatic life.

(d) **Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 10 µg/L is less than the applicable MDEL and the maximum monthly average concentration of 7.7 µg/L is less than the applicable AMEL. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

vii. **Cyanide**

(a) **WQO.** The CTR includes maximum 1-hour average and 4-day average criteria of 22 µg/L and 5.2 µg/L, respectively, for total recoverable cyanide for the protection of freshwater aquatic life.

(b) **RPA Results.** The MEC for cyanide was 8.6 µg/L based on 81 samples collected between January 2012 and December 2014. The maximum observed upstream receiving water concentration was 0.77 µg/L (as total recoverable) based on 12 samples collected between January 2012 and December 2014. Therefore, cyanide in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criteria for the protection of freshwater aquatic life.

(c) **WQBEL's.** The receiving water contains assimilative capacity for cyanide and a chronic aquatic life criteria mixing zone has been allowed, as discussed further in section IV.C.2.c of this Fact Sheet. Based on the allowed chronic aquatic life mixing zone this Order contains a final AMEL and MDEL for cyanide of 13 µg/L and 22 µg/L, respectively, based on the CTR criterion for the protection of freshwater aquatic life.

(d) **Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 8.6 µg/L is less than the applicable WQBEL's. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

viii. **Dichlorobromomethane**

(a) **WQO.** The CTR includes a criterion of 0.56 µg/L for dichlorobromomethane for the protection of human health for waters from which both water and organisms are consumed.

(b) **RPA Results.** The MEC for dichlorobromomethane was 2.3 µg/L based on 41 samples collected between January 2012 and December 2014. Dichlorobromomethane was not detected in the upstream receiving water based on 12 samples collected between January 2012 and December 2014. Therefore, dichlorobromomethane in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.

(c) **WQBEL's.** The receiving water contains assimilative capacity for dichlorobromomethane; therefore, as discussed further in section IV.C.2.c of this Fact Sheet, a dilution credit of 55:1 may be allowed in the development of the WQBEL's for dichlorobromomethane. Based on the allowable dilution credit, this Order contains a final AMEL of 23 µg/L and MDEL of 36 µg/L for dichlorobromomethane.

(d) **Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 2.3 µg/L is less than the applicable WQBEL's. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

ix. **Mercury**

(a) **WQO.** The Basin Plan contains fish tissue objectives for all Delta waterways listed in Appendix 43 of the Basin Plan that states *"…the average methylmercury concentrations shall not exceed 0.08 and 0.24 mg methylmercury/kg, wet weight, in muscle tissue of trophic level 3 and 4 fish, respectively (150-500 mm total length.) The average methylmercury concentrations shall not exceed 0.03 mg methylmercury/kg, wet weight, in whole fish less than 50 mm in length*". The Delta Mercury Control Program contains aqueous methylmercury wasteload allocations that are calculated to achieve these fish tissue objectives. Methylmercury reductions are assigned to dischargers with concentrations of methylmercury greater than 0.06 mg/L (the concentration of methylmercury in water to meet the fish tissue objective). The Facility is allocated 89 grams/year of methylmercury by 31 December 2030, as listed in Table IV-7B of the Basin Plan.

The CTR contains a human health criterion of 50 ng/L for total mercury for waters from which both water and aquatic organisms are consumed. However, in 40 C.F.R. part 131, U.S. EPA 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 the use of the State's narrative criterion*." In the CTR, U.S. EPA reserved the mercury criteria for freshwater and aquatic life and may adopt new criteria at a later date.

(b) **RPA Results.** Section 1.3 of the SIP states, "*The RWQCB shall conduct the analysis in this section for each priority pollutant with an applicable criterion or objective,* ***excluding priority pollutants for which a TMDL***

has been developed, to determine if a water quality-based effluent limitation is required in the discharger's permit." (emphasis added).

The MEC for mercury was 8.2 ng/L based on 115 samples collected between January 2012 and December 2014. The maximum observed upstream receiving water mercury concentration was 5.9 ng/L based on 25 samples collected between January 2012 and December 2014.

The MEC for methylmercury was 0.65 ng/L based on 40 samples collected between January 2012 and December 2014. The maximum observed upstream receiving water methylmercury concentration was 0.17 ng/L based on 13 samples collected between January 2012 and December 2014.

(c) **WQBEL's.** The Basin Plan's Delta Mercury Control Program includes wasteload allocations for POTW's in the Delta, including for the Discharger. This Order contains a final WQBEL for methylmercury based on the wasteload allocation. Effective 31 December 2030, the total calendar annual methylmercury load shall not exceed 89 grams.

(d) **Plant Performance and Attainability.** Based on available effluent methylmercury data, the Central Valley Water Board finds the Discharger is unable to immediately comply with the final WQBEL's for methylmercury. Therefore, a compliance schedule in accordance with the State Water Board's Compliance Schedule Policy and the Delta Mercury Control Program has been established in Section VI.C.7.c this Order. The final WQBEL's are effective 31 December 2030.

x. **Methylene Chloride**

(a) **WQO.** The CTR includes a criterion of 4.7 µg/L for methylene chloride for the protection of human health for waters from which both water and organisms are consumed.

(b) **RPA Results.** The MEC for methylene chloride was 5 µg/L based on 41 samples collected between January 2012 and December 2014. Methylene chloride was not detected in the upstream receiving water based on 12 samples collected between January 2012 and December 2014. Therefore, methylene chloride in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criteria for the protection of human health.

(c) **WQBEL's.** Although the receiving water contains assimilative capacity for methylene chloride and, as discussed in section IV.C.2.c of this Fact Sheet, a dilution credit of 55:1 may be allowed in the development of the WQBEL's for human health criteria, the Discharger can immediately comply with the applicable WQBEL's without dilution. Therefore, consistent with Order R5-2010-0114-04, this Order does not allow dilution for methylene chloride. This Order contains a final AMEL and MDEL for methylene chloride of 4.7 µg/L and 11 µg/L, respectively, based on the CTR criterion for the protection of human health.

(d) **Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 5 µg/L is less than the applicable MDEL and the maximum observed monthly average of 1.3 µg/L is less than the

applicable AMEL. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

xi. **Nitrate and Nitrite**

(a) **WQO.** DDW has adopted Primary MCL's 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. DDW has also adopted a Primary MCL of 10 mg/L for the sum of nitrate and nitrite, measured as nitrogen.

U.S. EPA has developed a Primary MCL and an MCL goal of 1 mg/L for nitrite (as nitrogen). For nitrate, U.S. EPA has developed Drinking Water Standards (10 mg/L as Primary MCL) and NAWQC for protection of human health (10 mg/L for non-cancer health effects).

(b) **RPA Results.** The Facility is a POTW that treats domestic wastewater. Untreated domestic wastewater contains ammonia in concentrations that is harmful to fish and exceeds the Basin Plan's narrative toxicity objective. This Order, therefore, requires removal of ammonia (i.e., nitrification). Nitrification is a biological process that converts ammonia to nitrate and nitrite, and will result in effluent nitrate concentrations above the Primary MCL for nitrate plus nitrite. Nitrate concentrations in a drinking water supply above the Primary MCL threatens the health of human fetuses and newborn babies by reducing the oxygen-carrying capacity of the blood (methemoglobinemia). Reasonable potential for nitrate and nitrite therefore exists and WQBEL's are required.

Federal regulations at 40 C.F.R. section 122.44(d)(1)(i) requires that, "*Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality*." For priority pollutants, the SIP dictates the procedures for conducting the RPA. Nitrate and nitrite are not priority pollutants. Therefore, the Central Valley Water Board is not restricted to one particular RPA method. Due to the site-specific conditions of the discharge, the Central Valley Water Board has used professional judgment in determining the appropriate method for conducting the RPA for this non-priority pollutant constituent.

U.S. EPA's September 2010 NPDES Permit Writer's Manual, page 6-30, states, "*State implementation procedures might allow, or even require, a permit writer to determine reasonable potential through a qualitative assessment process without using available facility-specific effluent monitoring data or when such data are not available…A permitting authority might also determine that WQBEL's are required for specific pollutants for all facilities that exhibit certain operational or discharge characteristics (e.g., WQBEL's for pathogens in all permits for POTW's discharging to contact recreational waters)*." U.S. EPA's TSD also recommends that factors other than effluent data should be considered in the RPA, "*When determining whether or not a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality criterion for individual toxicants or for toxicity, the regulatory authority can use a variety of factors and information where*

facility-specific effluent monitoring data are unavailable. These factors also should be considered with available effluent monitoring data." With regard to POTW'S, U.S. EPA recommends that, "*POTW's should also be characterized for the possibility of chlorine and ammonia problems*." (TSD, p. 50)

The concentration of nitrogen in raw domestic wastewater is sufficiently high that the resultant treated wastewater has a reasonable potential to exceed or threaten to exceed the Primary MCL for nitrate plus nitrite unless the wastewater is treated for nitrogen removal, and therefore an effluent limit for nitrate plus nitrite is required. 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 and effluent concentrations of nitrate and nitrite are low. However, this Order requires the Discharger to fully nitrify its effluent. The ammonia will convert to nitrate and the nitrate concentrations will increase. Inadequate or incomplete denitrification may result in the discharge of nitrate and/or nitrite to the receiving stream. Discharges of nitrate plus nitrite in concentrations that exceed the Primary MCL would violate the Basin Plan narrative chemical constituents objective. **I**nadequate or incomplete denitrification creates the potential for nitrate and nitrite to be discharged and provides the basis for the discharge to have a reasonable potential to cause or contribute to an in-stream excursion above the Primary MCL. Therefore, the Central Valley Water Board finds the discharge has reasonable potential for nitrate plus nitrite and WQBEL's are required.

(c) **WQBEL's.** This Order contains an AMEL and AWEL for nitrate plus nitrite of 10 mg/L and 22 mg/L, respectively, based on the Basin Plan's narrative chemical constituents objective for protection of the MUN beneficial use. These effluent limitations are included in this Order to assure the treatment process adequately nitrifies and denitrifies the waste stream to protect the beneficial use of municipal and domestic supply.

(d) **Plant Performance and Attainability.** The maximum effluent nitrate and nitrite concentrations of 0.52 mg/L and 0.084 mg/L, respectively, are below the WQBEL's. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

xii. **Pathogens**

(a) **WQO.** DDW has developed reclamation criteria, CCR, Division 4, Chapter 3 (Title 22), for the reuse of wastewater. Title 22 requires that for spray irrigation of food crops, parks, playgrounds, schoolyards, and other areas of similar public access, wastewater be adequately disinfected, oxidized, coagulated, clarified, and filtered, and that the effluent total coliform levels not exceed 2.2 MPN/100 mL as a 7-day median; 23 MPN/100 mL, not to be exceeded more than once in a 30-day period; and 240 MPN/100 mL, at any time.

Title 22 also requires that recycled water used as a source of water supply for non-restricted recreational impoundments be disinfected tertiary recycled water that has been subjected to conventional treatment. A non-restricted recreational impoundment is defined as *"…an impoundment of*

recycled water, in which no limitations are imposed on body-contact water recreational activities." Title 22 is not directly applicable to surface waters; however, the stringent disinfection criteria of Title 22 may be appropriate in the site-specific circumstances of a discharge where the irrigation of food crops and/or for body-contact water recreation are beneficial uses. Coliform organisms are intended as an indicator of the effectiveness of the entire treatment train and the effectiveness of removing other pathogens.

(b) **RPA Results.** Raw domestic wastewater inherently contains human pathogens that threaten human health and life, and constitute a threatened pollution and nuisance under Water Code Section 13050 if discharged untreated to the receiving water. Reasonable potential for pathogens therefore exists and WQBEL's are required.

Federal regulations at 40 C.F.R. section 122.44(d)(1)(i) requires that, "*Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.*" For priority pollutants, the SIP dictates the procedures for conducting the RPA. Pathogens are not priority pollutants. Therefore, the Central Valley Water Board is not restricted to one particular RPA method. Due to the site-specific conditions of the discharge, the Central Valley Water Board has used professional judgment in determining the appropriate method for conducting the RPA for this non-priority pollutant constituent.

U.S. EPA's September 2010 NPDES Permit Writer's Manual, page 6-30, states, "*State implementation procedures might allow, or even require, a permit writer to determine reasonable potential through a qualitative assessment process without using available facility-specific effluent monitoring data or when such data are not available…A permitting authority might also determine that WQBEL's are required for specific pollutants for all facilities that exhibit certain operational or discharge characteristics (e.g., WQBEL's for pathogens in all permits for POTW's discharging to contact recreational waters).*" U.S. EPA's TSD also recommends that factors other than effluent data should be considered in the RPA, "*When determining whether or not a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality criterion for individual toxicants or for toxicity, the regulatory authority can use a variety of factors and information where facility-specific effluent monitoring data are unavailable. These factors also should be considered with available effluent monitoring data*." (TSD, p. 50)

To protect beneficial uses, the Central Valley Water Board finds that the wastewater must be adequately treated and disinfected to prevent disease. The method of treatment is not prescribed by this Order; however, wastewater must be treated to a level equivalent to that recommended by DDW in the Title 22 regulation from May through October. The Discharger shall also operate the filters in all other months.

The Central Valley Water Board generally follows a November 1980 general recommendations by DDW on the appropriate levels of disinfection for protection of body-contact recreation in waters downstream of a sewage treatment plant discharge. The general, the DDW 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 DDW recommendations are a "rule of thumb" and are not regulation. Site-specific disinfection recommendations are often sought from DDW in preparing NPDES permits. In this instance, DDW has recommended Title 22 or equivalent filtration and disinfection during May-October, which includes periods of highest anticipated body contract recreation. DDW has also concurred that during November-April, this stringent level of treatment is not necessary. The Discharger will, however, filter treated effluent at Title 22-equivalent rates up to the design capacity of the filters, resulting in Title 22 equivalent filtration of the great majority of all flows year-around even at full permitted discharge rates. The seasonal differences allow the Discharger to avoid unnecessary costs to provide filtration of peak flows. DDW has concurred with the seasonal requirements and the Discharger is proceeding with its compliance project. In addition to effluent limitations for pathogens, this order includes effluent limitations for BOD and TSS, and filter performance specifications for turbidity that are consistent with tertiary treatment.

The Discharger has determined that the existing pure oxygen activated sludge secondary treatment system will be replaced by a BNR secondary wastewater treatment system. Pilot testing of the BNR secondary treatment system indicates that the BNR secondary effluent will have lower pathogen concentrations (cryptosporidium and giardia) than the current pure oxygen activated sludge secondary effluent, which will reduce the pathogens discharged to the Sacramento River relative to the current wastewater discharge, even without addition of effluent filtration[1]. Expansion and enhancement of wastewater storage within the wastewater treatment plant that will occur as part of the treatment plant upgrades will allow the Discharger improved control of the varying flow of wastewater, including during peak wet weather flow events. The Discharger would need to construct an effluent filtration system with a design effluent flow of 330 MGD in order to filter peak wet weather flows that occur during sustained wet weather. The 330 MGD flow takes into consideration the flow equalization that will occur with operation of the wastewater storage facilities.

Construction of a smaller filtration system to treat a discharge flow of 217 MGD will allow the Discharger to fully filter the wastewater during dry weather, which would include the times when dilution is the lowest in the Sacramento River and when potential for public contact with the discharged wastewater is the highest, and additionally during most wet weather periods. The Discharger estimated that filters designed for 217 MGD, operated year-round, would provide tertiary filtration for approximately 97 percent of the annual wastewater flow discharged from

[1] Technical Memorandum to District Leadership from Ken Abraham, "Draft Answers to Question Raised by Regional Water Quality Board", 28 February 2014.

the Facility to the Sacramento River[1]. At this filter design, between May and October the Title 22, or equivalent, disinfection requirements would be met. Between November and April, the filters would be operated to the 217 MGD design capacity. Treated wastewater effluent flows to the river or storage basins in excess of the 217 MGD design capacity would not be filtered, but would be of improved BNR secondary effluent quality with a reduced pathogen concentration relative to the current wastewater discharge. Unfiltered BNR effluent and filtered wastewater would be combined and disinfected with chlorine and dechlorinated prior to discharge to the Sacramento River. This combined discharge would occur at times when wet weather and other conditions minimize public use of the river, and high river dilution is generally available, minimizing any increased risk of public contact with wastewater pathogens. By allowing for construction of a smaller filtration facility, the Discharger estimated savings of over $100 million in capital and operational costs.

Between November and April, when potential exposure is less extensive, strict compliance with the Title 22, or equivalent, disinfection criteria is not required. However, as described in Section II.A.2 of this Fact Sheet, the Facility will be operated to provide filtration for effluent discharges up to 217 MGD resulting in most effluent receiving filtration. DDW was consulted in the development of the seasonally-based requirements of this order and agrees the beneficial uses of the Sacramento River will be protected with seasonal total coliform effluent limitations.

(c) **WQBEL's.** In accordance with the requirements of Title 22, this Order includes effluent limitations for total coliform organisms applicable between May and October of 2.2 MPN/100 mL as a 7-day median; 23 MPN/100 mL, not to be exceeded more than once in a 30-day period; and 240 MPN/100 mL as an instantaneous maximum. Between November and April, the effluent limitations for total coliform organisms are 2.2 MPN/100 mL as a monthly median; 23 MPN/100 mL as a weekly median; and 240 MPN/100 mL, as an instantaneous maximum.

The tertiary treatment process, or equivalent, is capable of reliably treating wastewater to a turbidity level of 2 nephelometric turbidity units (NTU) as a daily average. Failure of the filtration system such that virus removal is impaired would normally result in increased particles in the effluent, which result in higher effluent turbidity. Turbidity has a major advantage for monitoring filter performance. Coliform testing, by comparison, is not conducted continuously and requires several hours, to days, to identify high coliform concentrations. Therefore, to ensure compliance with the DDW recommended Title 22 disinfection criteria and ensure effective performance of the filters year-round, this Order includes operational specifications for turbidity of 2 NTU as a daily average; 5 NTU, not to be exceeded more than 5 percent of the time within a 24-hour period; and 10 NTU as an instantaneous maximum, to be met prior to disinfection of effluent from the tertiary filters.

This Order contains effluent limitations for BOD_5, total coliform organisms, and TSS and requires a tertiary level of treatment, or equivalent,

[1] Technical Memorandum to District Leadership from Ken Abraham, "Additional Tables Calculation Projected Blend Volumes", 11 March 2014.

necessary to protect the beneficial uses of the receiving water. The Central Valley Water Board previously considered the factors in Water Code section 13241 in establishing these requirements in Order R5-2010-0114-04.

Final WQBEL's for BOD_5 and TSS are based on the technical capability of the tertiary process, which is necessary to protect the beneficial uses of the receiving water. BOD_5 is a measure of the amount of oxygen used in the biochemical oxidation of organic matter. The tertiary treatment standards for BOD_5 and TSS are indicators of the effectiveness of the tertiary treatment process. The principal design parameter for wastewater treatment plants is the daily BOD_5 and TSS loading rates and the corresponding removal rate of the system. The application of tertiary treatment processes results in the ability to achieve lower levels for BOD_5 and TSS than the secondary standards currently prescribed. Therefore, this Order requires AMEL's for BOD_5 and TSS of 10 mg/L, which is technically based on the capability of a tertiary system. In addition to the AWEL's and AMEL's, MDEL's for BOD_5 and TSS is included in the Order to ensure that the treatment works are not organically overloaded and operate in accordance with design capabilities.

(d) **Plant Performance and Attainability.** New or modified control measures will be necessary in order to comply with the effluent limitations for BOD_5, total coliform organisms, and TSS, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. Furthermore, the effluent limitations for filtration are a new regulatory requirement within Order R5-2010-0114-04, which was adopted after 1 July 2000. The Discharger submitted an infeasibility analysis dated August 2010 for compliance with these disinfection requirements. Therefore, a compliance time schedule for compliance with the BOD_5, total coliform organisms, and TSS effluent limitations and a requirement to provide Title 22 (or equivalent) tertiary filtration is established in this Order.

xiii. **pH**

(a) **WQO.** The Basin Plan includes a water quality objective for surface waters (except for Goose Lake) that the *"…pH shall not be depressed below 6.5 nor raised above 8.5.*"

(b) **RPA Results.** Raw domestic wastewater inherently has variable pH. Additionally, some wastewater treatment processes can increase or decrease wastewater pH.

Based on 1,096 samples collected between January 2012 and December 2014, the maximum pH reported was 7.0 and the minimum was 6.2. Although the minimum effluent pH is lower than the Basin Plan objective, based on modeling using the Discharger's dynamic model, the discharge does not exhibit reasonable potential to cause or contribute to an exceedance of the Basin Plan objectives in the receiving water.

(c) **WQBEL's.** WQBEL's for pH are not required, because there is no reasonable potential. As discussed in Section IV.B, above, the technology-based effluent limitations for pH are 6.0 and 9.0, as an instantaneous minimum and maximum, respectively. Effluent limitations

for pH of 6.0 as an instantaneous minimum and 8.0 as an instantaneous maximum are included in this Order. The instantaneous maximum effluent limitation is more stringent than the technology-based effluent limitation and is based on Facility performance and considering ammonia toxicity, which varies based on pH. The instantaneous minimum effluent limitation of 6.0 is based on the technology-based effluent limitation, and has also been demonstrated through modeling that the limit ensures compliance with the Basin Plan's minimum objective in the receiving water.

(d) **Plant Performance and Attainability.** Analysis of the effluent data shows that the maximum pH of 7.0 does not exceed the instantaneous maximum effluent limitation and the minimum pH of 6.2 is greater than the instantaneous minimum effluent limitation. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

xiv. **Settleable Solids**

(a) **WQO.** For inland surface waters, the Basin Plan states that "[w]ater shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses."

(b) **RPA Results.** The discharge of domestic wastewater has a reasonable potential to cause or contribute to an excursion above the Basin Plan's narrative objective for settleable solids. There was one detection of 0.1ml/L on 11 November 2012 out of 1130 samples between 2012 and 2014. Currently, the Discharger only provides secondary treatment; therefore, settleable solids in the discharge has reasonable potential to cause or contribute to an in-stream excursion above the narrative toxicity objective or Basin Plan numeric objectives and waste load allocation.

(c) **WQBELs.** This Order contains average monthly and average weekly effluent limitations for settleable solids. Because the amount of settleable solids is measured in terms of volume per volume without a mass component, it is impracticable to calculate mass limitations for inclusion in this Order.

(d) **Plant Performance and Attainability.** Based on existing performance the Facility can immediately comply with the final WQBELs for settleable solids.

xv. **Temperature**

(a) **WQO.** The Thermal Plan requires that, "*The maximum temperature shall not exceed the natural receiving water temperature by more than 20°F.*"

(b) **RPA Results.** The highest daily temperature of the discharge was more than 20°F above the natural receiving water temperature. The discharge is an elevated temperature waste, which could cause or threaten to cause the receiving water temperature to exceed temperature objectives established in the Thermal Plan. Therefore, reasonable potential exists for temperature and WQBEL's are required.

(c) **WQBEL's.** Consistent with the Thermal Plan exceptions described in Section III.C.1.c of this Fact Sheet, this Order requires that the maximum temperature of the discharge shall not exceed the natural receiving water temperature at Monitoring Location RSWU-001 by more than 20°F from 1

May through 30 September and more than 25°F from 1 October through 30 April. However, these alternative effluent limitations based on the Thermal Plan exception are not effective unless the Central Valley Water Board receives concurrence from the State Water Board regarding the Thermal Plan exceptions. Therefore, effective immediately, the maximum temperature of the discharge shall not exceed the natural receiving water temperature at Monitoring Location RSWU-001 by more than 20°F, year-round.

(d) **Plant Performance and Attainability.** The alternative effluent limitation was retained from Order R5-2010-0114-04 and the Discharger has demonstrated continuous compliance with this effluent limitation. The Central Valley Water Board concludes, therefore, that immediate compliance with this effluent limitation is feasible. The Discharger is unable to immediately comply with the effluent limitation without the exception. The Discharger submitted an infeasibility analysis and requested a time schedule order (TSO). The Central Valley Water Board may consider a TSO at a later board hearing.

4. WQBEL Calculations

a. This Order includes WQBEL's for ammonia, bis (2-ethylhexyl) phthalate, BOD_5, carbon tetrachloride, chlorine residual, chlorodibromomethane, copper, cyanide, dichlorobromomethane, methylmercury, methylene chloride, nitrate plus nitrite, pH, total coliform organisms, temperature, and TSS. The general methodology for calculating WQBEL's based on the different criteria/objectives is described in subsections IV.C.4.b through e, below. See Attachment H for the WQBEL calculations.

b. **Effluent Concentration Allowance.** For each water quality criterion/objective, the ECA is calculated using the following steady-state mass balance equation from Section 1.4 of the SIP:

$ECA = C + D(C - B)$ *where C>B, and*
$ECA = C$ *where C≤B*

where:

ECA = effluent concentration allowance
D = dilution credit
C = the priority pollutant criterion/objective
B = the ambient background concentration.

According to the SIP, the ambient background concentration (B) in the equation above shall be the observed maximum with the exception that an ECA calculated from a priority pollutant criterion/objective that is intended to protect human health from carcinogenic effects shall use the arithmetic mean concentration of the ambient background samples. For ECA's based on MCL's, which implement the Basin Plan's chemical constituents objective and are applied as annual averages, an arithmetic mean is also used for B due to the long-term basis of the criteria.

c. **Basin Plan Objectives and MCL's.** For WQBEL's based on site-specific numeric Basin Plan objectives or MCL's, the effluent limitations are applied directly as the ECA as either an MDEL, AMEL, or average annual effluent limitations, depending on the averaging period of the objective.

d. **Aquatic Toxicity Criteria.** WQBEL's based on acute and chronic aquatic toxicity criteria are calculated in accordance with Section 1.4 of the SIP. The ECA's are converted to equivalent LTA's (i.e., LTA_{acute} and $LTA_{chronic}$) using statistical multipliers and the lowest LTA is used to calculate the AMEL and MDEL using additional statistical multipliers.

e. **Human Health Criteria.** WQBEL's based on human health criteria, are also calculated in accordance with Section 1.4 of the SIP. The AMEL is set equal to ECA and a statistical multiplier was used to calculate the MDEL.

$$AMEL = mult_{AMEL}\left[\min\left(\overbrace{M_A ECA_{acute}}^{LTA_{acute}}, M_C ECA_{chronic}\right)\right]$$

$$MDEL = mult_{MDEL}\left[\min\left(M_A ECA_{acute}, \underbrace{M_C ECA_{chronic}}_{LTA_{chronic}}\right)\right]$$

$$MDEL_{HH} = \left(\frac{mult_{MDEL}}{mult_{AMEL}}\right) AMEL_{HH}$$

where:
$mult_{AMEL}$ = statistical multiplier converting minimum LTA to AMEL
$mult_{MDEL}$ = statistical multiplier converting minimum LTA to MDEL
M_A = statistical multiplier converting acute ECA to LTA_{acute}
M_C = statistical multiplier converting chronic ECA to $LTA_{chronic}$

f. **Dynamic Model.** Section 1.4.D. of the SIP allows the use of a dynamic model to calculate WQBEL's. Chapter 5.4.1 of the TSD (see page 101) provides guidance for deriving WQBEL's using a dynamic model. A three step process has been used in this Order to derive WQBEL's for cyanide when calculating the chronic long-term average using the Discharger's dynamic model[1].

i. A point of compliance (edge of mixing zone) is selected. For acute aquatic life criteria no mixing zone has been allowed. For chronic aquatic life criteria the edge of the chronic mixing zone is selected.

ii. An LTA is developed for chronic criteria using the dynamic model (i.e., $LTA_{chronic}$) by iteratively running the dynamic model with successively lower [or higher] LTA's until the model shows compliance with the water quality criteria at the edge of the mixing zone at the appropriate frequency of compliance and averaging period (e.g., chronic criteria are based on a 4-day exposure). The acute LTA was calculated using the steady-state model, because an acute mixing zone has not been allowed in this Order.

iii. The LTA and CV are used to derive MDEL's and AMEL's using the steady-state model procedures described in Step 5 of Section 1.4.B of the SIP. WQBEL's are calculated using the LTA_{acute} and $LTA_{chronic}$ and the more stringent WQBEL's are applied.

[1] These procedures are discussed in more detail in a Technical Memorandum from Larry Walker Associates to SRCSD titled, "Calculation of WQBEL via Output from a Dynamic Model – DRAFT", 23 February 2009.

Summary of Water Quality-Based Effluent Limitations
Discharge Point 001

Table F-16. Summary of Water Quality-Based Effluent Limitations

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Conventional Pollutants						
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	10	15	20	--	--
	lbs/day[1]	15,100	22,700	30,200	--	--
pH	standard units	--	--	--	6.0	8.0
Total Suspended Solids	mg/L	10	15	20	--	--
	lbs/day[1]	15,100	22,700	30,200	--	--
Priority Pollutants						
Bis (2-Ethylhexyl) Phthalate	µg/L	8.9	--	20	--	--
Carbon Tetrachloride	µg/L	2.9	--	5.3	--	--
Chlorodibromomethane	µg/L	14	--	27	--	--
Copper, Total Recoverable	µg/L	8.6	--	12	--	--
Cyanide, Total (as CN)	µg/L	13	--	22	--	--
Dichlorobromomethane	µg/L	23	--	36	--	--
Methylene Chloride	µg/L	4.7	--	11	--	--
Non-Conventional Pollutants						
Ammonia Nitrogen, Total (as N)[1] 1 April – 31 October	mg/L	1.5	1.7	--	--	--
	lbs/day[1]	2,264	2,566	--	--	--
Ammonia Nitrogen, Total (as N)[1] 1 November – 31 March	mg/L	2.4	3.0	--	--	--
	lbs/day[1]	3,622	4,529	--	--	--
Chlorine, Total Residual	mg/L	--	0.011[2]	0.019[3]	--	--
Diazinon and Chlorpyrifos	µg/L	[4]	--	[5]	--	--
Electrical Conductivity @ 25°C	µmhos/cm	1,139[6]	--	--	--	--
Methylmercury	grams/year	89[7]	--	--	--	--
Nitrate Plus Nitrite (as N)	mg/L	10	22	--	--	--
Settleable Solids	mL/L	0.1	0.2	--	--	--
Temperature	°F	--	--	[8]	--	--
Total Coliform Organisms 1 May – 31 October	MPN/100 mL	--	23[9]/2.2[10]	--	--	240
Total Coliform Organisms	MPN/100 mL	2.2[11]	23[12]	--	--	240

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum

[1] Based on an average dry weather flow of 181 million gallons per day (MGD).
[2] Applied as a 4-day average effluent limitation.
[3] Applied as a 1-hour average effluent limitation.
[4] Average Monthly Effluent Limitation

$$S_{AMEL} = \frac{C_{D\ M-AVG}}{0.079} + \frac{C_{D\ M-AVG}}{0.012} \leq 1.0$$

$C_{D\ M-AVG}$ = average monthly diazinon effluent concentration in µg/L.
$C_{C\ M-AVG}$ = average monthly chlorpyrifos effluent concentration in µg/L.

[5] Average Weekly Effluent Limitation

$$S_{AWEL} = \frac{C_{D\ W-AVG}}{0.14} + \frac{C_{C\ W-AVG}}{0.021} \leq 1.0$$

$C_{D\ W-AVG}$ = average weekly diazinon effluent concentration in µg/L.
$C_{C\ W-AVG}$ = average weekly chlorpyrifos effluent concentration in µg/L.

[6] Applied as an annual average effluent limitation.
[7] The effluent calendar year annual methylmercury load shall not exceed 89 grams, in accordance with the Delta Mercury Control Program effective 31 December 2020.
[8] Effective immediately, the maximum temperature of the discharge shall not exceed the natural receiving water temperature at Monitoring Location RSWU-001 by more than 20°F, year-round. If the State Water Board concurs with the Thermal Plan exception, the alternative effluent limitations become effective, such that the maximum temperature of the discharge shall not exceed the natural receiving water temperature at Monitoring Location RSWU-001 by more than 20°F from 1 May through 30 September and more than 25°F from 1 October through 30 April.
[9] Not to be exceeded more than once in any 30-day period.
[10] Applied as a 7-day median effluent limitation.
[11] Applied as a monthly median effluent limitation.
[12] Applied as a weekly median effluent limitation.

5. Whole Effluent Toxicity (WET)

For compliance with the Basin Plan's narrative toxicity objective, this Order requires the Discharger to conduct whole effluent toxicity testing for acute and chronic toxicity, as specified in the Monitoring and Reporting Program (Attachment E, section V). This Order also contains effluent limitations for acute toxicity and requires the Discharger to implement best management practices to investigate the causes of, and identify corrective actions to reduce or eliminate effluent toxicity.

a. **Acute Aquatic Toxicity.** The Basin Plan contains a narrative toxicity objective that states, "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*" (Basin Plan at page III-8.00) The Basin Plan also states that, *"…effluent limits based upon acute biotoxicity tests of effluents will be prescribed where appropriate…*".

For priority pollutants, the SIP dictates the procedures for conducting the RPA. Acute toxicity is not a priority pollutant. Therefore, the Central Valley Water Board is not restricted to one particular RPA method. Therefore, due to the site-specific conditions of the discharge, the Central Valley Water Board has used professional judgment in determining the appropriate method for conducting the RPA. U.S. EPA's September 2010 NPDES Permit Writer's Manual, page 6-30, states, "*State implementation procedures might allow, or even require, a permit writer to*

determine reasonable potential through a qualitative assessment process without using available facility-specific effluent monitoring data or when such data are not available…A permitting authority might also determine that WQBEL's are required for specific pollutants for all facilities that exhibit certain operational or discharge characteristics (e.g., WQBEL's for pathogens in all permits for POTW's discharging to contact recreational waters)." The Facility is a POTW that treats domestic wastewater containing ammonia and other acutely toxic pollutants. Acute toxicity effluent limits are required to ensure compliance with the Basin Plan's narrative toxicity objective.

U.S. EPA Region 9 provided guidance for the development of acute toxicity effluent limitations in the absence of numeric water quality objectives for toxicity in its document titled "Guidance for NPDES Permit Issuance", dated February 1994. In section B.2. "Toxicity Requirements" (pgs. 14-15) it states that, "*In the absence of specific numeric water quality objectives for acute and chronic toxicity, the narrative criterion 'no toxics in toxic amounts' applies. Achievement of the narrative criterion, as applied herein, means that ambient waters shall not demonstrate for acute toxicity: 1) less than 90% survival, 50% of the time, based on the monthly median, or 2) less than 70% survival, 10% of the time, based on any monthly median. For chronic toxicity, ambient waters shall not demonstrate a test result of greater than 1 TUc.*" Consistent with Order R5-2010-0114-04, effluent limitations for acute toxicity have been included in this Order as follows:

Acute Toxicity. Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:

Minimum for any one bioassay ---------- 70%
Median for any three consecutive bioassays ---------- 90%

b. **Chronic Aquatic Toxicity.** The Basin Plan contains a narrative toxicity objective that states, "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*" (Basin Plan at page III-8.00.) Since the Facility is a POTW that is categorized as a major facility, the influent can be highly variable due to commercial, industrial, and other inputs. Therefore, it is assumed that the discharge has reasonable potential to cause or contribute to an in-stream excursion above the Basin Plan's narrative toxicity objective.

The Monitoring and Reporting Program of this Order requires monthly chronic WET monitoring for demonstration of compliance with the narrative toxicity objective. In addition to WET monitoring, the Special Provision in section VI.C.2.a of the Order includes a numeric toxicity monitoring trigger, requirements for accelerated monitoring, and requirements for Toxicity Reduction Evaluation (TRE) initiation if toxicity is demonstrated.

Numeric chronic WET effluent limitations have not been included in this Order. The SIP contains implementation gaps regarding the appropriate form and implementation of chronic toxicity limits. This has resulted in the petitioning of a NPDES permit in the Los Angeles Region[1] that contained numeric chronic toxicity

[1] In the Matter of the Review of Own Motion of Waste Discharge Requirements Order Nos. R4-2002-0121 [NPDES No. CA0054011] and R4-2002-0123 [NPDES NO. CA0055119] and Time Schedule Order Nos. R4-2002-0122 and R4-2002-0124 for Los Coyotes and Long Beach Wastewater Reclamation Plants Issued by the California Regional Water Quality Control Board, Los Angeles Region SWRCB/OCC FILES A-1496 AND 1496(a)

effluent limitations. To address the petition, the State Water Board adopted WQO 2003-012 directing its staff to revise the toxicity control provisions in the SIP. The State Water Board states the following in WQO 2003-012, "*In reviewing this petition and receiving comments from numerous interested persons on the propriety of including numeric effluent limitations for chronic toxicity in NPDES permits for publicly-owned treatment works that discharge to inland waters, we have determined that this issue should be considered in a regulatory setting, in order to allow for full public discussion and deliberation. We intend to modify the SIP to specifically address the issue. We anticipate that review will occur within the next year. We therefore decline to make a determination here regarding the propriety of the final numeric effluent limitations for chronic toxicity contained in these permits."* The process to revise the SIP is currently underway. Proposed changes include clarifying the appropriate form of effluent toxicity limits in NPDES permits and general expansion and standardization of toxicity control implementation related to the NPDES permitting process. Since the toxicity control provisions in the SIP are under revision it is infeasible to develop numeric effluent limitations for chronic toxicity. Therefore, this Order requires that the Discharger meet best management practices for compliance with the Basin Plan's narrative toxicity objective, as allowed under 40 C.F.R. section 122.44(k).

To ensure compliance with the Basin Plan's narrative toxicity objective, the Discharger is required to conduct chronic WET testing, as specified in the Monitoring and Reporting Program (Attachment E, section V). Furthermore, the Special Provision contained at VI.C.2.a. of this Order requires the Discharger to investigate the causes of, and identify and implement corrective actions to reduce or eliminate effluent toxicity. If the discharge demonstrates toxicity exceeding the numeric toxicity monitoring trigger, the Discharger is required to initiate a TRE in accordance with an approved TRE workplan. The numeric toxicity monitoring trigger is not an effluent limitation; it is the toxicity threshold at which the Discharger is required to perform accelerated chronic toxicity monitoring, as well as, the threshold to initiate a TRE if effluent toxicity has been demonstrated.

D. Final Effluent Limitation Considerations

1. Mass-based Effluent Limitations

40 C.F.R section 122.45(f)(1) requires effluent limitations be expressed in terms of mass, with some exceptions, and 40 C.F.R. section 122.45(f)(2) allows pollutants that are limited in terms of mass to additionally be limited in terms of other units of measurement. This Order includes effluent limitations expressed in terms of mass and concentration. In addition, pursuant to the exceptions to mass limitations provided in 40 CF.R. section 122.45(f)(1), some effluent limitations are not expressed in terms of mass, such as pH and temperature, and when the applicable standards are expressed in terms of concentration (e.g., CTR criteria and MCL's) and mass limitations are not necessary to protect the beneficial uses of the receiving water.

Mass-based effluent limitations have been established in this Order for ammonia, BOD_5, and TSS because they are oxygen demanding substances. In addition, mass-based limits for methylmercury have been established in this Order in accordance with the Delta Methylmercury Control Program. Except for the pollutants listed above, mass-based effluent limitations are not included in this Order for pollutant parameters for which effluent limitations are based on water quality objectives and criteria that are concentration-based.

Mass-based effluent limitations were calculated based upon the average dry weather flows permitted in section IV.A.1.h of this Order.

2. Averaging Periods for Effluent Limitations

40 C.F.R. section 122.45 (d) requires average weekly and average monthly discharge limitations for POTW's unless impracticable. For BOD_5, pH, TSS, bis (2-ethylhexyl) phthalate, carbon tetrachloride, chlorodibromomethane, copper, cyanide, dichlorobromomethane, methylene chloride, and chlorine residual, weekly average effluent limitations have been replaced or supplemented with effluent limitations utilizing shorter averaging periods. For the CTR priority pollutant constituents (i.e., bis (2-ethylhexyl) phthalate, carbon tetrachloride, chlorodibromomethane, copper, cyanide, dichlorobromomethane, methylene chloride), a maximum daily effluent limitation has been applied in lieu of an average weekly effluent limitation in accordance with the SIP. The rationale for using shorter averaging periods the non-priority pollutants (i.e., BOD, TSS, pH, and chlorine residual) is discussed in section IV.C.3 of this Fact Sheet.

3. Satisfaction of Anti-Backsliding Requirements

The CWA specifies that a revised permit may not include effluent limitations that are less stringent than the previous permit unless a less stringent limitation is justified based on exceptions to the anti-backsliding provisions contained in CWA sections 402(o) or 303(d)(4), or, where applicable, 40 C.F.R. section 122.44(l).

The effluent limitations in this Order are at least as stringent as the effluent limitations in Order R5-2010-0114-04, with the exception of effluent limitations for aluminum, bis (2-ethylhexyl) phthalate, chlorodibromomethane, copper, cyanide, dibenzo(a,h)anthracene, dichlorobromomethane, electrical conductivity, manganese, methyl tertiary butyl ether, pentachlorophenol, and tetrachloroethylene. The effluent limitations for these pollutants are less stringent than those in Order R5-2010-0114-04. This relaxation of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations.

a. **CWA section 402(o)(1) and 303(d)(4).** CWA section 402(o)(1) prohibits the establishment of less stringent WQBEL's "*except in compliance with Section 303(d)(4).*" CWA section 303(d)(4) has two parts: paragraph (A) which applies to nonattainment waters and paragraph (B) which applies to attainment waters.

   i. For waters where standards are not attained, CWA section 304(d)(4)(A) specifies that any effluent limit based on a TMDL or other WLA may be revised only if the cumulative effect of all such revised effluent limits based on such TMDL's or WLA's will assure the attainment of such water quality standards.

   ii. For attainment waters, CWA section 303(d)(4)(B) specifies that a limitation based on a water quality standard may be relaxed where the action is consistent with the antidegradation policy.

   The Sacramento River is considered an attainment water for aluminum, bis (2-ethylhexyl) phthalate, chlorodibromomethane, copper, cyanide, dibenzo(a,h)anthracene, dichlorobromomethane, electrical conductivity, manganese, methyl tertiary butyl ether, pentachlorophenol, and tetrachloroethylene because the receiving water is not listed as impaired on the 303(d) list for these constituents.[1] As discussed in section IV.D.4, below, relaxation of the effluent

[1] "*The exceptions in Section 303(d)(4) address both waters in attainment with water quality standards and those not in attainment, i.e. waters on the section 303(d) impaired waters list*." State Water Board Order WQ 2008-0006, Berry Petroleum Company, Poso Creek/McVan Facility.

limitations complies with federal and state antidegradation requirements. Thus, removal of the effluent limitations for aluminum, bis (2-ethylhexyl) phthalate, dibenzo(a,h)anthracene, manganese, methyl tertiary butyl ether, pentachlorophenol, and tetrachloroethylene and relaxation of effluent limitations for chlorodibromomethane, copper, cyanide, dichlorobromomethane, and electrical conductivity from Order R5-2010-0114-04 meets the exception in CWA section 303(d)(4)(B).

b. **CWA section 402(o)(2).** CWA section 402(o)(2) provides several exceptions to the anti-backsliding regulations. CWA 402(o)(2)(B)(i) allows a renewed, reissued, or modified permit to contain a less stringent effluent limitation for a pollutant if information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance.

As described further in section IV.C.3.a of this Fact Sheet, updated information that was not available at the time Order R5-2010-0114-04 was issued indicates that aluminum, dibenzo(a,h)anthracene, manganese, methyl tertiary butyl ether, pentachlorophenol, and tetrachloroethylene do not exhibit reasonable potential to cause or contribute to an exceedance of water quality objectives in the receiving water. Additionally, updated information that was not available at the time Order R5-2010-0114-04 was issued indicates that less stringent effluent limitations for bis (2-ethylhexyl) phthalate, chlorodibromomethane, copper, cyanide, dichlorobromomethane, and electrical conductivity satisfy the requirements in CWA section 402(o)(2). The updated information that supports the removal and relaxation of effluent limitations for these constituents includes the following:

i. **Aluminum.** Effluent monitoring data collected between January 2012 and December 2014 indicates that aluminum in the discharge does not exhibit reasonable potential to cause or contribute to an exceedance of the Secondary MCL or NAWQC acute criterion.

ii. **Bis (2-ethylhexyl) phthalate.** Effluent monitoring data collected between January 2012 and December 2014 indicates that bis (2-ethylhexyl) phthalate in the discharge cannot meet the performance based effluent limit in Order R5-2010-0014-04. Assimilative capacity and dilution is available for bis (2-ethylhexyl) phthalate in the receiving water as discussed in section IV.C.3. Therefore, this Order includes less stringent effluent limitations for bis (2-ethylhexyl) phthalate based on the updated monitoring data.

iii. **Chlorodibromomethane and Dichlorobromomethane.** Order R5-2010-0014-04 established performance-based MDELs for chlorodibromomethane and dichlorobromomethane, because the entire dilution credit was not needed for compliance based on the Discharger pilot plant (Phase I testing) to evaluate biological nutrient removal and disinfection alternatives. However, the Discharger's Phase II pilot study during 2014 showed the maximum concentrations of chlorodibromomethane and dichlorobromomethane would exceed the MDELs in Order R5-2010-0014-04. This Order relaxes the effluent limitations for chlorodibromomethane and dichlorobromomethane from Order R5-2010-0114-04. The Phase II pilot testing data submitted by the Discharger is considered new information by the Central Valley Water Board which justifies the application of less stringent effluent limitations.

iv. **Copper.** Previous Order R5-2010-0114-04 included effluent limitations for copper without the allowance for dilution, because based on Facility

performance end-of-pipe effluent limits could be met. The Discharger has provided updated information indicating that effluent concentrations of copper are increasing due to recent drought conditions and water conservation efforts and requested dilution for copper. This Order allows a chronic mixing zone for copper resulting in less stringent effluent limitations for copper, which are based on updated dynamic modeling results and effluent characteristics.

v. **Cyanide.** The Discharger provided updated dynamic modeling results in a 14 August 2014 *Mixing Zone Request* (Larry Walker Associates) that reflected effluent data collected between January 2012 and December 2014 and an expanded historical ambient dataset to include data from 2005 to 2014.This Order includes less stringent effluent limitations for cyanide based on the updated dynamic modeling results.

vi. **Dibenzo(a,h)anthracene.** Effluent and receiving water monitoring data collected between January 2012 and December 2014 for dibenzo(a,h)anthracene indicates that the discharge does not exhibit reasonable potential to cause or contribute to an exceedance of the CTR human health criteria.

vii. **Electrical Conductivity.** Updated effluent data collected between January 2012 and December 2014 indicates that effluent concentrations of electrical conductivity are increasing due to recent drought conditions and water conservation efforts. Although the concentrations are increasing, as shown in section IV.C.3.a.x of this Fact Sheet, the mass loading of salinity is not increasing.

viii. **Manganese.** Effluent and receiving water monitoring data collected between January 2012 and December 2014for manganese indicates that the discharge does not exhibit reasonable potential to cause or contribute to an exceedance of the Secondary MCL.

ix. **Methyl Tertiary Butyl Ether.** Effluent monitoring data collected between January 2012 and December 2014 indicates that methyl tertiary butyl ether in the discharge does not exhibit reasonable potential to cause or contribute to an exceedance of the Secondary MCL.

x. **Pentachlorophenol.** Effluent and receiving water monitoring data collected between January 2012 and December 2014 for pentachlorophenol indicates that the discharge does not exhibit reasonable potential to cause or contribute to an exceedance of the CTR human health criteria.

xi. **Tetrachloroethylene.** Effluent and receiving water monitoring data collected between January 2012 and December 2014 for tetrachloroethylene indicates that the discharge does not exhibit reasonable potential to cause or contribute to an exceedance of the CTR human health criteria.

Thus, removal of the effluent limitations for aluminum, dibenzo(a,h)anthracene, manganese, methyl tertiary butyl ether, pentachlorophenol, and tetrachloroethylene, and the relaxation of the effluent limitations for bis (2-ethylhexyl) phthalate, chlorodibromomethane, copper, cyanide, dichlorobromomethane, and electrical conductivity from Order R5-2010-0114-04 is in accordance with CWA section 402(o)(2)(B)(i), which allows for the relaxation of effluent limitations based on new information that was not available at the time of permit issuance.

4. Antidegradation Policies

The permitted discharge is consistent with the antidegradation provisions of 40 C.F.R. section 131.12 and State Water Board Resolution No. 68-16. This Order provides for an increase in the volume and mass of pollutants discharged for bis (2-ethylhexyl) phthalate, copper, cyanide, chlorodibromomethane, and dichlorobromomethane. The increase will not have significant impacts on beneficial uses and will not cause a violation of water quality objectives. The increase in the mass of the discharge allows wastewater utility service necessary to accommodate housing and economic expansion in the area, and is considered to be a benefit to the people of the State. Compliance with these requirements will result in the use of best practicable treatment or control of the discharge.

This Order removes effluent limitations for aluminum, dibenzo(a,h)anthracene, manganese, methyl tertiary butyl ether, pentachlorophenol, and tetrachloroethylene based on updated monitoring data demonstrating that the effluent does not cause or contribute to an exceedance of the applicable water quality criteria or objectives in the receiving water. The removal of WQBEL's for these parameters will not result in an increase in pollutant concentration or loading, a decrease in the level of treatment or control, or a reduction of water quality. Thus, the removal of effluent limitations for these constituents is consistent with the antidegradation provisions of 40 C.F.R. section 131.12 and State Water Board Resolution No. 68-16.

This Order relaxes the effluent limitations for copper, cyanide, and bis (2-ethylhexyl) phthalate. The revised effluent limitations are based on allowance of mixing zones in accordance with the Basin Plan, the SIP, and EPA's Water Quality Standards handbook, 2nd Edition (updated July 2007) and TSD. As discussed in Finding IV.C.2.c of this Fact Sheet, the mixing zones comply with all applicable requirements and will not be adverse to the purpose of the state and federal antidegradation policies. Furthermore, the increase in the effluent limits for these constituents are minor resulting in use of less than 10% of the available assimilative capacity in the receiving water. According to USEPA's memorandum on Tier 2 Antidegradation Reviews and Significance Thresholds, any individual decision to lower water quality for non- bioaccumulative chemicals that is limited to 10% of the available assimilative capacity represents minimal risk to the receiving water and is fully consistent with the objectives and goals of the Clean Water Act. The minimal increase in these constituents is fully consistent with the antidegradation analysis performed in support of the prior Order (R5-2010-0114). The Central Valley Water Board staff finds that any lowering of water quality outside the mixing zone will be de minimus and will accommodate important economic or social development in the Sacramento area. Further, any change to water quality will not unreasonably affect present and anticipated beneficial uses and will not result in water quality less than prescribed in State Water Board policies or the Basin Plan. The measures implemented by the Discharger and required by this Order constitute BPTC. Thus, the relaxation of the effluent limitations for copper, cyanide, and bis (2-ethylhexyl) phthalate is consistent with the antidegradation provisions of 40 C.F.R. section 131.12 and State Water Board Resolution No. 68-16.

This Order relaxes the effluent limitations for chlorodibromomethane and dichlorobromomethane. The revised effluent limitations are based on the Discharger's 2014 Phase II pilot testing of the biological nutrient removal and liquid chlorine disinfection. A complete antidegradation analysis "Antidegradation Analysis in Consideration of Water Quality-Based Effluent Limitations for Chlorodibromomethane and Dichlorobromomethane at the Sacramento Regional Wastewater Treatment Plant"

was submitted by the Discharger in January 2016. The relaxed effluent limitations for chlorodibromomethane and dichlorobromomethane are within the available assimilative capacity of the Sacramento River and will not adversely impact the in-stream beneficial uses of the Sacramento River. Comparison of environmental and socioeconomic impacts of liquid chlorine disinfection with the alternatives (pre-ozonation and UV disinfection) shows that liquid chlorine disinfection providing best practicable treatment or control consistent with maximum benefit to the people of the State. The Central Valley Water Board finds that the increased loading of chlorodibromomethane and dichlorobromomethane is consistent with the antidegradation provisions of 40 C.F.R. section 131.12 and State Water Board Resolution No. 68-16.

This Order relaxes the effluent limitations for electrical conductivity. Although updated effluent data indicates that effluent concentrations of electrical conductivity are increasing due to recent drought conditions and water conservation efforts, as shown in section IV.C.3.a.x of this Fact Sheet, the mass loading of salinity is not increasing, and the relaxed effluent limitations will not result in an increased mass loading to the receiving water. Thus, the relaxation of effluent limitations for electrical conductivity is consistent with the antidegradation provisions of 40 C.F.R. section 131.12 and State Water Board Resolution No. 68-16.

5. Stringency of Requirements for Individual Pollutants

This Order contains both technology-based effluent limitations and WQBEL's for individual pollutants. The technology-based effluent limitations consist of restrictions on flow and percent removal requirements for BOD_5 and TSS. Restrictions on these constituents are discussed in section IV.B.2 of this Fact Sheet. This Order's technology-based pollutant restrictions implement the minimum, applicable federal technology-based requirements. In addition, this Order contains effluent limitations more stringent than the minimum, federal technology-based requirements that are necessary to meet water quality standards.

WQBEL's have been derived to implement water quality objectives that protect beneficial uses. Both the beneficial uses and the water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards. To the extent that toxic pollutant WQBEL's were derived from the CTR, the CTR is the applicable standard pursuant to 40 C.F.R. section 131.38. The procedures for calculating the individual WQBEL's for priority pollutants are based on the CTR implemented by the SIP, which was approved by U.S. EPA on 18 May, 2000. All beneficial uses and water quality objectives contained in the Basin Plan were approved under state law and submitted to and approved by U.S. EPA prior to 30 May 2000. Any water quality objectives and beneficial uses submitted to U.S. EPA prior to 30 May 2000, but not approved by U.S. EPA before that date, are nonetheless "*applicable water quality standards for purposes of the CWA*" pursuant to 40 C.F.R. section 131.21(c)(1). Collectively, this Order's restrictions on individual pollutants are no more stringent than required to implement the requirements of the CWA.

Summary of Final Effluent Limitations
Discharge Point 001

Table F-17. Summary of Final Effluent Limitations

Parameter	Units	Effluent Limitations					Basis[1]
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum	
Flow	MGD	181[2]	--	--	--	--	DC
Conventional Pollutants							
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	10	15	20	--	--	TTC
	lbs/day[3]	15,100	22,700	30,200	--	--	
	% Removal	85	--	--	--	--	CFR
pH	standard units	--	--	--	6.0	8.0	BP
Total Suspended Solids	mg/L	10	15	20	--	--	TTC
	lbs/day[3]	15,100	22,700	30,200	--	--	
	% Removal	85	--	--	--	--	CFR
Priority Pollutants							
Bis (2-Ethylhexyl) Phthalate	µg/L	8.9	--	20	--	--	CTR
Carbon Tetrachloride	µg/L	2.9	--	5.3	--	--	CTR
Chloro-dibromomethane	µg/L	14	--	27	--	--	CTR
Copper, Total Recoverable	µg/L	8.6	--	12	--	--	CTR
Cyanide, Total (as CN)	µg/L	13	--	22	--	--	CTR
Dichloro-bromomethane	µg/L	23	--	36	--	--	CTR
Methylene Chloride	µg/L	4.7	--	11	--	--	CTR
Non-Conventional Pollutants							
Ammonia Nitrogen, Total (as N) 1 April – 31 October	mg/L	1.5	1.7	--	--	--	NAWQC
	lbs/day[3]	2,264	2,566	--	--	--	
Ammonia Nitrogen, Total (as N) 1 November – 31 March	mg/L	2.4	3.0	--	--	--	NAWQC
	lbs/day[3]	3,622	4,529	--	--	--	
Chlorine, Total Residual	mg/L	--	0.011[4]	0.019[5]	--	--	NAWQC
Diazinon and Chlorpyrifos	µg/L	[6]	--	[7]	--	--	TMDL

Parameter	Units	Effluent Limitations					Basis[1]
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum	
Electrical Conductivity @ 25°C	µmhos/cm	1,139[8]	--	--	--	--	PB
Methylmercury	grams/year	89[9]	--	--	--	--	TMDL
Nitrate Plus Nitrite (as N)	mg/L	10	22	--	--	--	MCL
Settleable Solids	mL/L	0.1	0.2	--	--	--	BP
Temperature	°F	--	--	[10]	--	--	TP
Total Coliform Organisms 1 May – 31 October	MPN/100 mL	--	23[11]/2.2[12]	--	--	240	Title 22
Total Coliform Organisms	MPN/100 mL	2.2[13]	23[14]	--	--	240	Title 22
Acute Toxicity	% Survival	--	--	70[15]/90[16]	--	--	BP
Chronic Toxicity	TUc	--	--	Narrative[17]	--	--	BP

Parameter	Units	Effluent Limitations					Basis[1]
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum	

[1] DC – Based on the design capacity of the Facility.
TTC – Based on tertiary treatment capability. These effluent limitations reflect the capability of a properly operated tertiary treatment plant.
CFR – Based on secondary treatment standards contained in 40 C.F.R. part 133.
BP – Based on water quality objectives contained in the Basin Plan.
CTR – Based on water quality criteria contained in the California Toxics Rule and applied as specified in the SIP.
NAWQC – Based on U.S. EPA's National Ambient Water Quality Criteria for the protection of freshwater aquatic life.
TMDL – Based on the applicable TMDL.
PB – Based on Facility performance.
MCL – Based on the Primary Maximum Contaminant Level.
TP – Based on the Thermal Plan.
Title 22 – Based on DDW Reclamation Criteria, CCR, Division 4, Chapter 3 (Title 22).

[2] The average dry weather flow shall not exceed 181 MGD.

[3] Based on an average dry weather flow of 181 million gallons per day (MGD).

[4] Applied as a 4-day average effluent limitation.

[5] Applied as a 1-hour average effluent limitation.

[6] Average Monthly Effluent Limitation

$$S_{AMEL} = \frac{C_{D\ M-AVG}}{0.079} + \frac{C_{D\ M-AVG}}{0.012} \leq 1.0$$

$C_{D\ M\text{-}AVG}$ = average monthly diazinon effluent concentration in µg/L.
$C_{C\ M\text{-}AVG}$ = average monthly chlorpyrifos effluent concentration in µg/L.

[7] Average Weekly Effluent Limitation

$$S_{AWEL} = \frac{C_{D\ W-AVG}}{0.14} + \frac{C_{C\ W-AVG}}{0.021} \leq 1.0$$

$C_{D\ W\text{-}AVG}$ = average weekly diazinon effluent concentration in µg/L.
$C_{C\ W\text{-}AVG}$ = average weekly chlorpyrifos effluent concentration in µg/L.

[8] Applied as an annual average effluent limitation.

[9] The effluent calendar year annual methylmercury load shall not exceed 89 grams, in accordance with the Delta Mercury Control Program, effective 31 December 2020.

[10] Effective immediately, the maximum temperature of the discharge shall not exceed the natural receiving water temperature at Monitoring Location RSWU-001 by more than 20°F. If the State Water Board concurs with the Thermal Plan exception, the alternative effluent limitations become effective, such that the maximum temperature of the discharge shall not exceed the natural receiving water temperature at Monitoring Location RSWU-001 by more than 20°F from 1 May through 30 September and more than 25°F from 1 October through 30 April.

[11] Not to be exceeded more than once in any 30-day period.

[12] Applied as a 7-day median effluent limitation.

[13] Applied as a monthly median effluent limitation.

[14] Applied as a weekly median effluent limitation.

[15] 70% minimum of any one bioassay.

[16] 90% median for any three consecutive bioassays.

[17] There shall be no chronic toxicity in the effluent discharge.

E. Interim Effluent Limitations

The State Water Board's Resolution 2008-0025 "*Policy for Compliance Schedules in National Pollutant Discharge Elimination System Permits*" (Compliance Schedule Policy) requires the Central Valley Water Board to establish interim numeric effluent limitations in this Order for

compliance schedules longer than 1 year. As discussed in section VI.B.7 of this Fact Sheet, the Central Valley Water Board is approving a compliance schedule longer than 1 year for ammonia, BOD_5, methylmercury, total coliform organisms, and TSS. The Compliance Schedule Policy requires that interim effluent limitations must be based on current treatment plant performance or existing permit limitations, whichever is more stringent. The interim effluent limitations for ammonia and total mercury are based on Facility performance. The interim effluent limitations for BOD_5, total coliform organisms, and TSS are based on levels recommended by DDW for secondary treatment-level disinfection. Consistent with the Delta Mercury Control Program, this Order includes interim effluent limitations for total mercury based on Facility performance.

1. **Compliance Schedules**

a. **Ammonia and Seasonal Title 22 (or Equivalent) Requirements.** This Order contains final effluent limitations for ammonia, BOD_5, total coliform organisms, and TSS that are the same as those contained in Order R5-2010-0114-04, which were. more stringent than the limitations previously imposed and were based on a new interpretation of a narrative objective. The Discharger has complied with the application requirements in paragraph 4 of the State Water Board's Compliance Schedule Policy, and the Discharger's application demonstrates the need for additional time to implement actions to comply with the new limitations, as described below. Therefore, compliance schedules for compliance with the effluent limitations for ammonia, BOD_5, total coliform organisms, and TSS are retained in the Order.

i. **Demonstration that the Discharger needs time to implement actions to comply with a more stringent permit limitation specified to implement a new, revised, or newly interpreted water quality objective or criterion in a water quality standard.** Table 2.2 of the Discharger's August 2010 Infeasibility Report identifies constituents with the potential to exceed effluent limitations in the proposed NPDES Permit based on monitoring data collected between June 2005 and July 2008, including ammonia, BOD_5, total coliform organisms, and TSS. The Discharger states that the requested compliance schedules are driven primarily by the need to construct treatment plant upgrades.

ii. **Diligent efforts have been made to quantify pollutant levels in the discharge and the sources of the pollutant in the waste stream, and the results of those efforts.** The Infeasibility Report stated that the Discharger has pretreatment program that regulates industrial discharges and an active source control program. The Discharger issues permits to significant and non-significant users which require monitoring of pollutants of concern and implementation of limits where deemed necessary to control a point source. Table 2-3 of the Infeasibility Report identified 33 categorical industrial users, 27 significant industrial users and 306 non-significant users. Potential sources of ammonia, BOD_5, TSS and total coliform organisms include domestic and non-domestic sources.

iii. **Source control efforts are currently underway or completed, including compliance with any pollution prevention programs that have been established.** The Discharger has active source reduction programs targeting mercury, pesticides (including chlorpyrifos, diazinon and lindane) and waste medications.

iv. **A proposed schedule for additional source control measures or waste treatment.** Table 2-4 of the Infeasibility Report provided proposed compliance

schedules, which, for ammonia, included pilot testing, design of improvements and construction to be achieved 10 years from the permit effective date of Order R5-2010-0114-04 and full compliance with effluent limitations by 1 December 2020. For BOD_5, TSS, and total coliform organisms, the Discharger proposed pilot testing, design and construction to be achieved 9 years from the permit effective date and full compliance with effluent limitations by 1 December 2019.[1]

v. **Data demonstrating current treatment facility performance to compare against existing permit effluent limits, as necessary to determine which is the more stringent interim permit effluent limit to apply if a schedule of compliance is granted.** Interim effluent limitations must be based on current treatment plant performance or existing permit limitations, whichever is more stringent. The Discharger can consistently comply with the effluent limitations for BOD_5, total coliform organisms, and TSS required by Orders. 5-00-188 and R5-2010-0114-04. Therefore, this Order requires compliance with interim effluent limitations based on the effluent limitations required by Orders. 5-00-188 and R5-2010-0114-04. This Order retains the performance-based interim effluent limitations for ammonia from Order R5-2010-0114-04, which were based on Facility performance.

vi. **The highest discharge quality that can reasonably be achieved until final compliance is attained.** Compliance with the interim effluent limitations will ensure that the Discharger maintains the discharge at levels that can reasonably be achieved until final compliance is attained.

vii. **The proposed compliance schedule is as short as possible, given the type of facilities being constructed or programs being implemented, and industry experience with the time typically required to construct similar facilities or implement similar programs.** The Discharger determined in the Infeasibility Report that the compliance schedule is as short as possible. The estimated durations for each task and estimated completion dates were included in Table 2-4 of the Infeasibility Report. Interim performance-based MDEL's have been retained from Order R5-2010-0114-04 and are in effect through 11 May 2021 (ammonia) and 9 May 2023 (total coliform organisms) until the final limitations take effect. Order R5-2010-0114-04 required the Discharger to submit a Method of Compliance Workplan/Schedule to assure compliance with the final effluent limitations for ammonia, BOD_5, TSS, and total coliform organisms. In addition, Order R5-2010-0114-04 required the Discharger to prepare and implement a pollution prevention plan (PPP) for ammonia that is in compliance with Water Code section 13263.3(d)(3). This Order requires the Discharger to continue to implement the PPP. The interim numeric effluent limitations and source control measures will result in the highest discharge quality that can reasonably be achieved until final compliance is attained.

b. **Methylmercury.** This Order contains a new final effluent limitation for methylmercury based on the new objective that became effective on 20 October 2011. The Discharger has complied with the application requirements in

[1] The final compliance dates were originally 1 December 2020, but were stayed by certain orders issued by the Sacramento County Superior Court, Honorable Michael Kenny. The stays resulted in change, or shift by a period of time, in the compliance deadlines as well as in the schedule for certain steps toward compliance. The operative orders were issued by the Superior Court on 13 July 2012 and 6 May 2013.

paragraph 4 of the State Water Board's Compliance Schedule Policy, and the Discharger's application demonstrates the need for additional time to implement actions to comply with the new limitations, as described below. Therefore, a compliance schedule for compliance with the effluent limitations for methylmercury is established in the Order.

A compliance schedule is necessary because the Discharger must implement actions, including a Phase 1 Methylmercury Control Study and possible upgrades to the Facility, to comply with the final effluent limitations.

The Discharger has made diligent efforts to quantify pollutant levels in the discharge and the sources of the pollutant in the waste stream. The Discharger has developed a PPP for mercury, which was updated on 31 August 2011, and provided annual progress reports during the term of Order R5-2010-0114-04. The Discharger identified dental and residential communities as the most significant contributors of mercury to the Facility, and the updated PPP proposed to continue a public outreach and education program, development of a dental mercury reduction program, continued monitoring, and potentially issuing local wastewater discharge permits if a significant source is identified.

The compliance schedule is as short as possible. The Central Valley Water Board will use the Phase 1 Control Studies' results and other information to consider amendments to the Delta Mercury Control Program during the Phase 1 Delta Mercury Control Program Review. Therefore, at this time it is uncertain what measures must be taken to consistently comply with the waste load allocation for methylmercury. The interim effluent limits and final compliance date may be modified at the completion of Phase 1.

Interim performance-based limitations have been established in this Order. The interim limitations were determined as described in section IV.E.2, below, and are in effect until the final limitations take effect. The interim numeric effluent limitations and source control measures will result in the highest discharge quality that can reasonably be achieved until final compliance is attained.

2. **Interim Limits for Ammonia, BOD_5, Methylmercury, Total Coliform Organisms, and TSS.** The Compliance Schedule Policy requires the Central Valley Water Board to establish interim requirements and dates for their achievement in the NPDES permit. Interim numeric effluent limitations are required for compliance schedules longer than 1 year. Interim effluent limitations must be based on current treatment plant performance or previous final permit limitations, whichever is more stringent. When feasible, interim limitations must correspond with final permit effluent limitations with respect to averaging bases (e.g., AMEL, MDEL, average monthly, etc.) for effluent limitations for which compliance protection is intended.

The interim effluent limitations for ammonia and total mercury are based on Facility performance. The interim effluent limitations for BOD_5, total coliform organisms, and TSS are based on levels recommended by DDW for secondary treatment-level disinfection.

For mercury, the Delta Mercury Control Program requires POTW's to limit their discharges of inorganic (total) mercury to Facility performance-based levels during Phase 1. The interim inorganic (total) mercury effluent mass limit is to be derived using current, representative data and shall not exceed the 99.9th percentile of the 12-month running effluent inorganic (total) mercury mass loads. At the end of Phase 1, the interim inorganic (total) mercury mass limit will be re-evaluated and modified as appropriate. The Delta Mercury Control Program also requires interim limits established during Phase 1

and allocations will not be reduced as a result of early actions that result in reduced inorganic (total) mercury and/or methylmercury in discharges.

The interim limitations for total mercury in this Order are based on the current treatment plant performance. In developing the interim limitation, where there are 10 sampling data points or more, sampling and laboratory variability is accounted for by establishing interim limits that are based on normally distributed data where 99.9 percent of the data points lie within 3.3 standard deviations of the mean (Basic Statistical Methods for Engineers and Scientists, Kennedy and Neville, Harper and Row). Therefore, the 99.9th percentile was determined using the mean plus 3.3 standard deviations of the available data.

Total mercury effluent data collected from January 2012 through December 2014 was used to determine performance-based interim effluent limitations. 12-month running mercury loads were calculated, the average and standard deviation of the 12-month running mercury loads were determined, and used to calculate the 99.9th percentile.

The Central Valley Water Board finds that the Discharger can undertake source control and treatment plant measures to maintain compliance with the interim limitations included in this Order. Interim limitations are established when compliance with final effluent limitations cannot be achieved by the existing discharge. Discharge of constituents in concentrations in excess of the final effluent limitations, but in compliance with the interim effluent limitations, can significantly degrade water quality and adversely affect the beneficial uses of the receiving stream on a long-term basis. The interim limitations, however, establish an enforceable ceiling concentration until compliance with the effluent limitation can be achieved.

The following table summarizes the calculations of the interim effluent limitations for total mercury based on the Facility's current performance (January 2012 through December 2014), which resulted in an interim limitation of 754 grams/year. However, this Order retains the existing performance-based effluent limitation for total mercury of 2.3 lbs/year (converted to 1,043 grams/year) from Order R5-2010-0114-04, which is consistent with the intent of the TMDL to not penalize dischargers for early actions to reduce mercury. **Effective immediately, and until 31 December 2030,** the effluent calendar annual total mercury load shall not exceed 1,043 grams. These interim effluent limitations shall apply in lieu of the final effluent limits for methylmercury.

Table F-18. Interim Effluent Limitation Calculation Summary

Parameter	Units	Maximum Effluent Concentration	Mean	Standard Deviation	Number of Samples	Interim Limitation
Mercury, Total Recoverable	grams/year	633	553	61	25	1,043[1]

[1] The interim total mercury limitation has been established as 1,043 grams/year, as discussed in the preceding paragraph.

F. Land Discharge Specifications – Not Applicable

G. Recycling Specifications – Not Applicable

V. RATIONALE FOR RECEIVING WATER LIMITATIONS

A. Surface Water

1. CWA section 303(a-c), requires states to adopt water quality standards, including criteria where they are necessary to protect beneficial uses. The Central Valley Water Board adopted water quality criteria as water quality objectives in the Basin Plan. The Basin

Plan states that "[t]*he numerical and narrative water quality objectives define the least stringent standards that the Regional Water Board will apply to regional waters in order to protect the beneficial uses.*" The Basin Plan includes numeric and narrative water quality objectives for various beneficial uses and water bodies. This Order contains receiving surface water limitations based on the Basin Plan numerical and narrative water quality objectives for bacteria, biostimulatory substances, color, chemical constituents, dissolved oxygen, floating material, oil and grease, pH, pesticides, radioactivity, suspended sediment, settleable substances, suspended material, tastes and odors, temperature, toxicity, and turbidity.

B. Groundwater

1. The beneficial uses of the underlying groundwater are municipal and domestic supply, industrial service supply, industrial process supply, and agricultural supply.
2. Basin Plan water quality objectives include narrative objectives for chemical constituents, tastes and odors, and toxicity of groundwater. The toxicity objective requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in humans, plants, animals, or aquatic life. The chemical constituent objective states groundwater shall not contain chemical constituents in concentrations that adversely affect any beneficial use. The tastes and odors objective prohibits taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses. The Basin Plan also establishes numerical water quality objectives for chemical constituents and radioactivity in groundwaters designated as municipal supply. These include, at a minimum, compliance with MCL's in Title 22 of the CCR. The bacteria objective prohibits coliform organisms at or above 2.2 MPN/100 mL. The Basin Plan requires the application of the most stringent objective necessary to ensure that waters do not contain chemical constituents, toxic substances, radionuclides, taste- or odor-producing substances, or bacteria in concentrations that adversely affect municipal or domestic supply, agricultural supply, industrial supply or some other beneficial use.
3. Groundwater limitations are required to protect the beneficial uses of the underlying groundwater.

VI. RATIONALE FOR PROVISIONS

A. Standard Provisions

Standard Provisions, which apply to all NPDES permits in accordance with 40 C.F.R. section 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 C.F.R. section 122.42, are provided in Attachment D. The discharger must comply with all standard provisions and with those additional conditions that are applicable under section 122.42.

Sections 122.41(a)(1) and (b) through (n) of 40 C.F.R. establish conditions that apply to all state-issued NPDES permits. These conditions must be incorporated into the permits either expressly or by reference. If incorporated by reference, a specific citation to the regulations must be included in the Order. Section 123.25(a)(12) of 40 C.F.R. allows the state to omit or modify conditions to impose more stringent requirements. In accordance with 40 C.F.R. section 123.25, this Order omits federal conditions that address enforcement authority specified in 40 C.F.R. sections 122.41(j)(5) and (k)(2) because the enforcement authority under the Water Code is more stringent. In lieu of these conditions, this Order incorporates by reference Water Code section 13387(e).

B. Special Provisions

1. Reopener Provisions

a. **Mercury.** The Delta Mercury Control Program was designed to proceed in two phases. Phase 1 spans a period of approximately 9 years. Phase 1 emphasizes studies and pilot projects to develop and evaluate management practices to control methylmercury. At the end of Phase 1, the Central Valley Water Board will conduct a Phase 1 Delta Mercury Control Program Review that considers: modification of methylmercury goals, objectives, allocations and/or the Final Compliance Date; implementation of management practices and schedules for methylmercury controls; and adoption of a mercury offset program for dischargers who cannot meet their load and wasteload allocations after implementing all reasonable load reduction strategies. The fish tissue objectives, the linkage analysis between objectives and sources, and the attainability of the allocations will be re-evaluated based on the findings of Phase 1 control studies and other information. The linkage analysis, fish tissue objectives, allocations, and time schedules may be adjusted at the end of Phase 1, or subsequent program reviews, as appropriate. Therefore, this Order may be reopened to address changes to the Delta Mercury Control Program.

b. **Whole Effluent Toxicity.** This Order requires the Discharger to investigate the causes of, and identify corrective actions to reduce or eliminate effluent toxicity through a TRE. This Order may be reopened to include a numeric chronic toxicity limitation, a new acute toxicity limitation, and/or a limitation for a specific toxicant identified in the TRE. Additionally, if a numeric chronic toxicity water quality objective is adopted by the State Water Board, this Order may be reopened to include a numeric chronic toxicity limitation based on that objective.

c. **Water Effects Ratio (WER) and Metal Translators.** A default WER of 1.0 has been used in this Order for calculating criteria for applicable inorganic constituents. In addition, default dissolved-to-total metal translators have been used to convert water quality objectives from dissolved to total recoverable when developing effluent limitations for copper. If the Discharger performs studies to determine site-specific WERs and/or site-specific dissolved-to-total metal translators, this Order may be reopened to modify the effluent limitations for the applicable inorganic constituents.

d. **Drinking Water Policy.** On 26 July 2013 the Central Valley Water Board adopted Resolution No. R5-2013-0098 amending the Basin Plan and establishing a Drinking Water Policy. The State Water Board approved the Drinking Water Policy on 3 December 2013. This Order may be reopened to incorporate monitoring of drinking water constituents to implement the Drinking Water Policy.

e. **Electrical Conductivity (EC) Effluent Limits and Other Limits Based on Facility Performance.** This Order may be reopened to revise interim and/or final effluent limitations where Facility performance was considered in development of the limitations (e.g., performance-based effluent limitations for EC and ammonia) should the Discharger provide information demonstrating the increase in discharge concentrations have been caused by water conservation efforts, drought conditions, and/or the change in disinfection chemicals. This provision has been included because water conservation efforts over the past few years have resulted in reduced influent wastewater flows and higher concentrations of some constituents, such as EC and ammonia. If this trend continues, the Discharger has estimated effluent concentrations will exceed the current performance-based effluent limitations.

2. Special Studies and Additional Monitoring Requirements

a. **Chronic Whole Effluent Toxicity Requirements.** The Basin Plan contains a narrative toxicity objective that states, "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*" (Basin Plan at page III-8.00.) As discussed in section IV.C.5 of this Fact Sheet, the discharge has reasonable potential to cause or contribute to an in-stream excursion above of the Basin Plan's narrative toxicity objective.

The Monitoring and Reporting Program of this Order requires chronic WET monitoring for demonstration of compliance with the narrative toxicity objective. In addition to WET monitoring, this provision includes a numeric toxicity monitoring trigger, requirements for accelerated monitoring, and requirements for TRE initiation if toxicity is demonstrated.

Monitoring Trigger. This Order includes Discharge Prohibition III.F that prohibits the discharge unless there is at least a 14:1 flow ratio (river-to-effluent). Considering this prohibition, the chronic toxicity trigger from previous Orders 5-00-188 and R5-2010-0114-04 has been carried forward to this Order. The numeric toxicity monitoring trigger to initiate a toxicity reduction evaluation (TRE) is 8 chronic toxicity units or TUc based on the no observed effect concentration (NOEC)[1], i.e., where 8 TUc = 100/NOEC. The monitoring trigger is not an effluent limitation; it is the toxicity threshold at which the Discharger is required to begin accelerated monitoring and initiate a TRE.

Accelerated Monitoring. The provision requires accelerated WET testing when a regular WET test result exceeds the monitoring trigger. The purpose of accelerated monitoring is to determine, in an expedient manner, whether there is toxicity before requiring the implementation of a TRE. Due to possible seasonality of the toxicity, the accelerated monitoring should be performed in a timely manner, preferably taking no more than 2 to 3 months to complete.

The provision requires accelerated monitoring consisting of four chronic toxicity tests in a six-week period (i.e., one test every two weeks) using the species that exhibited toxicity. Guidance regarding accelerated monitoring and TRE initiation is provided in the *Technical Support Document for Water Quality-based Toxics Control,* EPA/505/2-90-001, March 1991 (TSD). The TSD at page 118 states, "*EPA recommends if toxicity is repeatedly or periodically present at levels above effluent limits more than 20 percent of the time, a TRE should be required.*" Therefore, four accelerated monitoring tests are required in this provision. If no toxicity is demonstrated in the four accelerated tests, then it demonstrates that toxicity is not present at levels above the monitoring trigger more than 20 percent of the time (only 1 of 5 tests are toxic, including the initial test). However, notwithstanding the accelerated monitoring results, if there is adequate evidence of effluent toxicity (i.e. toxicity present exceeding the monitoring trigger more than 20 percent of the time), the Executive Officer may require that the Discharger initiate a TRE.

[1] The No-Observed-Effect-Concentration (NOEC) is the highest concentration of effluent in the receiving water to which organisms are exposed that causes no observable adverse effects on the test organisms (i.e., the highest concentration in which the values for the observed responses are not statistically significantly different from the control).

See the WET Accelerated Monitoring Flow Chart (Figure F-3), below, for further clarification of the accelerated monitoring requirements and for the decision points for determining the need for TRE initiation.

TRE Guidance. The Discharger is required to prepare a TRE Workplan in accordance with U.S. EPA guidance. Numerous guidance documents are available, as identified below:

i. *Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants*, EPA/833-B-99/002, August 1999.

ii. *Generalized Methodology for Conducting Industrial Toxicity Reduction Evaluations (TREs)*, EPA/600/2-88/070, April 1989.

iii. *Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures, Second Edition*, EPA 600/6-91/003, February 1991.

iv. *Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I*, EPA/600/6-91/005F, May 1992.

v. *Methods for Aquatic Toxicity Identification Evaluations: Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity, Second Edition*, EPA/600/R-92/080, September 1993.

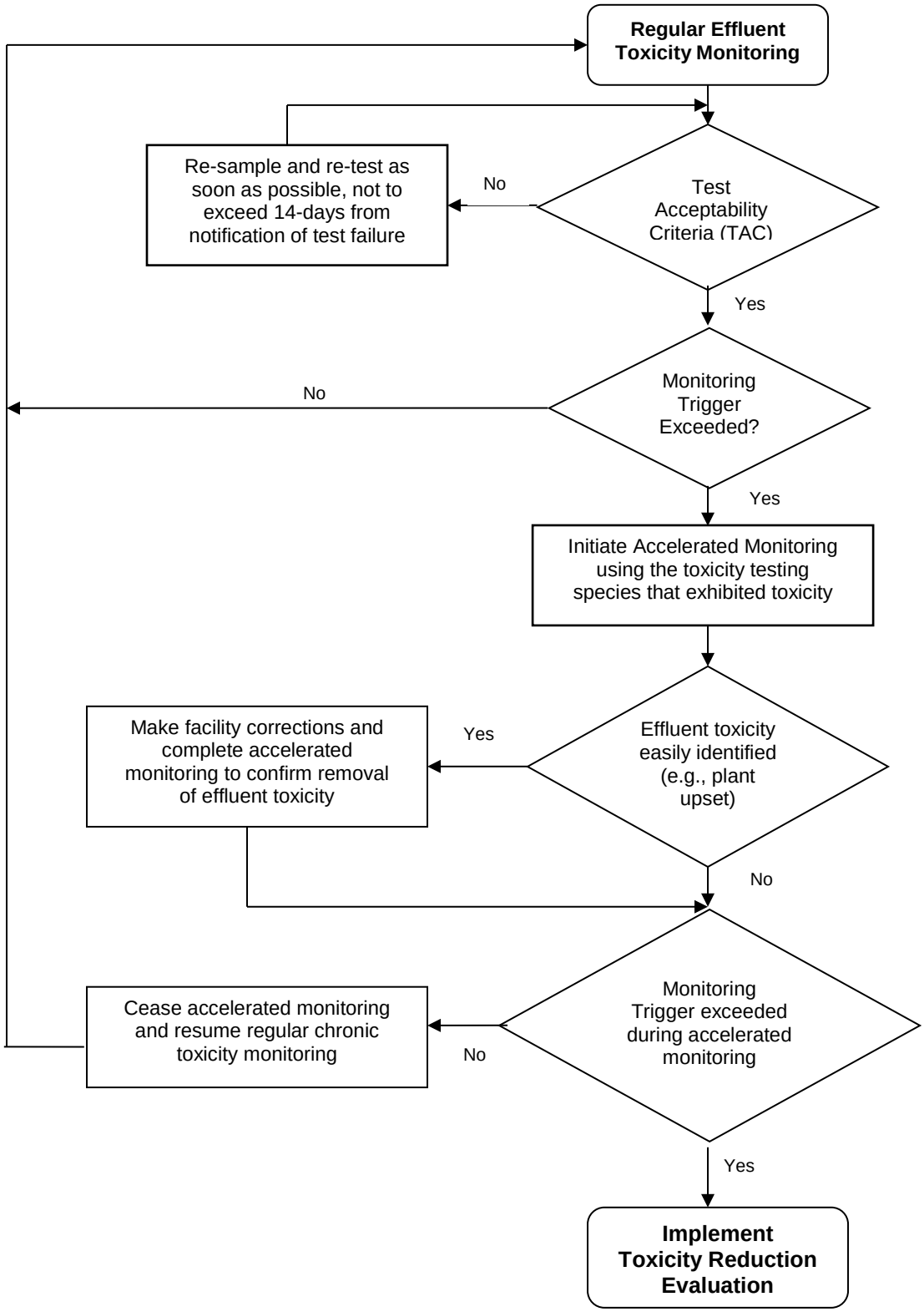
vi. *Methods for Aquatic Toxicity Identification Evaluations: Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity, Second Edition*, EPA 600/R-92/081, September 1993.

vii. *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition*, EPA-821-R-02-012, October 2002.

viii. *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition*, EPA-821-R-02-013, October 2002.

ix. *Technical Support Document for Water Quality-based Toxics Control*, EPA/505/2-90-001, March 1991.

Figure F-3
WET Accelerated Monitoring Flow Chart



b. **Filtration Operations Study.** After a sufficient degree of operational experience following commencement of operation of filtration facilities as designed, built and operated, including at least 3 years of circumstances described in the Future Facility description in Section II.A.2 of the Fact Sheet where some BNR effluent does not receive filtration, a study of November-April performance of the filtration and disinfection system will be required of the Discharger. The study, to be conducted at a time determined by the Central Valley Water Board, will summarize data including the amount (on a daily basis and annual basis) of effluent that did not receive filtration, influent and effluent flows, filter effluent turbidity, filter loading rates, effluent *Giardia* and *Cryptosporidium* data, and effluent *E. coli* and total coliform data.

c. **Phase 1 Methylmercury Control Study.** The Basin Plan's Delta Mercury Control Program requires NPDES dischargers, working with other stakeholders, to conduct methylmercury control studies (Control Studies) to evaluate existing control methods and, as needed, develop additional control methods that could be implemented to achieve their methylmercury load and waste load allocations. Control studies can be developed through a stakeholder group approach or other collaborative mechanism, or by individual dischargers. The Discharger has agreed to participate in the Central Valley Clean Water Association (CVCWA) Coordinated Methylmercury Control Study (Study).

The Central Valley Water Board will use the Phase 1 Control Studies' results and other information to consider amendments to the Delta Mercury Control Program during the Phase 1 Delta Mercury Control Program Review. The objective of the Control Studies is to evaluate existing control methods and, as needed, develop additional control methods that could be implemented to achieve the methylmercury load and wasteload allocations. In accordance with the Delta Mercury Control Plan, a work plan was submitted on 20 April 2013 by CVCWA on behalf of a group of POTW's in the region. The Central Valley Water Board commits to supporting an adaptive management approach. The adaptive management approach includes the formation of a Stakeholder Group(s) and a Technical Advisory Committee (TAC).

The Study shall evaluate the feasibility of reducing sources more than the minimum amount needed to achieve the methylmercury allocation. The Study also may include an evaluation of innovative actions, watershed approaches, offsets projects, and other short and long-term actions that result in reducing inorganic (total) mercury and methylmercury to address the accumulation of methylmercury in fish tissue and to reduce methylmercury exposure. The Study may evaluate the effectiveness of using inorganic (total) mercury controls to control methylmercury discharges. The Study shall include a description of methylmercury and/or inorganic (total) mercury management practices identified in Phase 1; an evaluation of the effectiveness; and costs, potential environmental effects, and overall feasibility of the control actions. The Study shall also include proposed implementation plans and schedules to comply with methylmercury allocations as soon as possible. The Study shall be submitted by **20 October 2018**.

The Executive Officer may authorize extending the Study due date. The Executive Officer may, after public notice, extend the due date up to 2 years if the Discharger demonstrates it is making significant progress towards developing, implementing and/or completing the Study and reasonable attempts have been made to secure funding for the Study, but the Discharger has experienced severe budget shortfalls.

d. **Emergency Storage Basin Cleaning and Isolation System Study and Standard Operating Procedures.** Upon upgrades to the emergency storage basins, the Discharger proposes to use the basins for multiple uses, including storage and treatment of non-final wastewater (e.g., untreated or partially-treated wastewater) and final treated wastewater. The proposed multiple use basins have been designed with a double block and bleed system and monitoring system to ensure water does not unintentionally transfer between basins. Furthermore, a high pressure cleaning system will be used after the basins store non-final wastewater. This Order requires the Discharger to conduct a study and/or monitoring to demonstrate the emergency storage basin cleaning and isolation systems will not allow for wastewater pathogens to be reintroduced to the final effluent following the prior use of the emergency storage basins for non-final (e.g., untreated or partially-treated wastewater). This Order also requires the Discharger to develop standard operating procedures for use and cleaning of the emergency storage basins. Upon Executive Officer approval of the final study results and standard operating procedures, the Discharger may discontinue effluent monitoring for BOD_5, TSS, and total coliform organisms at Monitoring Location EFF-001 and monitor for these constituents at Monitoring Location TER-001.

3. Best Management Practices and Pollution Prevention

a. **Water Code Section 13263.3(d)(3) Pollution Prevention Plans.** A pollution prevention plan for mercury is required in this Order per Water Code section 13263.3(d)(1)(C). Order R5-2010-0114-04 required the Discharger to implement a PPP for mercury and the requirement is retained in this Order. The PPP required in section VI.C.3.a and VI.C.7.c of this Order, shall, at a minimum, meet the requirements outlined in Water Code section 13263.3(d)(3). The minimum requirements for the pollution prevention plans include the following:

i. An estimate of all of the sources of a pollutant contributing, or potentially contributing, to the loadings of a pollutant in the treatment plant influent.

ii. An analysis of the methods that could be used to prevent the discharge of the pollutants into the Facility, including application of local limits to industrial or commercial dischargers regarding pollution prevention techniques, public education and outreach, or other innovative and alternative approaches to reduce discharges of the pollutant to the Facility. The analysis also shall identify sources, or potential sources, not within the ability or authority of the Discharger to control, such as pollutants in the potable water supply, airborne pollutants, pharmaceuticals, or pesticides, and estimate the magnitude of those sources, to the extent feasible.

iii. An estimate of load reductions that may be attained through the methods identified in subparagraph ii.

iv. A plan for monitoring the results of the pollution prevention program.

v. A description of the tasks, cost, and time required to investigate and implement various elements in the pollution prevention plan.

vi. A statement of the Discharger's pollution prevention goals and strategies, including priorities for short-term and long-term action, and a description of the Discharger's intended pollution prevention activities for the immediate future.

vii. A description of the Discharger's existing pollution prevention programs.

viii. An analysis, to the extent feasible, of any adverse environmental impacts, including cross-media impacts or substitute chemicals that may result from the implementation of the pollution prevention program.

ix. An analysis, to the extent feasible, of the costs and benefits that may be incurred to implement the pollution prevention program.

b. **Mercury Exposure Reduction Program.** The Basin Plan's Delta Mercury Control Program requires dischargers to participate in a Mercury Exposure Reduction Program. The Exposure Reduction Program is needed to address public health impacts of mercury in Delta fish, including activities that reduce actual and potential exposure of and mitigate health impacts to those people and communities most likely to be affected by mercury in Delta caught fish, such as subsistence fishers and their families. The Exposure Reduction Program must include elements directed toward:

i. Developing and implementing community-driven activities to reduce mercury exposure;

ii. Raising awareness of fish contamination issues among people and communities most likely affected by mercury in Delta-caught fish such as subsistence fishers and their families;

iii. Integrating community-based organizations that serve Delta fish consumers, Delta fish consumers, tribes, and public health agencies in the design and implementation of an exposure reduction program;

iv. Identifying resources, as needed, for community-based organizations and tribes to participate in the Program;

v. Utilizing and expanding upon existing programs and materials or activities in place to reduce mercury, and as needed, create new materials or activities; and

vi. Developing measures for program effectiveness.

This Order requires the Discharger participate in a Mercury Exposure Reduction Program (MERP) in accordance with the Delta Mercury Control Program. The Discharger has elected to provide financial support in the collective MERP with other Delta dischargers, rather than be individually responsible for any MERP activities. The objective of the MERP is to reduce mercury exposure of Delta fish consumers most likely affected by mercury. The work plan shall address the Exposure Reduction Program objective, elements, and the Discharger's coordination with other stakeholders. The Discharger shall continue to participate in the group effort to implement the work plan through 2020 or until they comply with all requirements related to the individual or subarea methylmercury allocation. The Discharger shall notify the Central Valley Water Board if it plans to perform mercury exposure reduction activities individually.

c. **Salinity Evaluation and Minimization Plan.** An Evaluation and Minimization Plan for salinity is required to be maintained in this Order to ensure adequate measures are developed and implemented by the Discharger to reduce the discharge of salinity to the Sacramento River.

Order R5-2010-0114-04 included an annual reporting requirement for a Salinity and Municipal Water Supply Study to evaluate the efficacy of salt minimization plans. The Discharger is a regional facility that covers about 20 individual water purveyors.

Due to the complexity of the analysis, limitations on data quality and availability, and resulting uncertainty regarding the output, and because the water supply salinity does not appreciably vary from year to year, this Order reduces the reporting frequency to once during the permit term, as part of the summary update of the effectiveness of the salinity evaluation plan, due within 180 days prior to the permit expiration date.

4. Construction, Operation, and Maintenance Specifications

a. **Filtration System Operating Specifications.** Turbidity is included as an operational specification as an indicator of the effectiveness of the filtration system for providing adequate disinfection. The tertiary treatment process is capable of reliably meeting a turbidity limitation of 2 NTU as a daily average. Failure of the treatment system such that virus removal is impaired would normally result in increased particles in the effluent, which result in higher effluent turbidity. Turbidity has a major advantage for monitoring filter performance, allowing immediate detection of filter failure and rapid corrective action. The operational specification requires that turbidity prior to disinfection shall not exceed 2 NTU as a daily average; 5 NTU, more than 5 percent of the time within a 24-hour period, and an instantaneous maximum of 10 NTU.

b. **Emergency Storage Basin Operating Requirements.** The operation and maintenance specifications for the emergency storage basins are necessary to protect the beneficial uses of the groundwater. The specifications included in this Order are retained from Order R5-2010-0114-04. In addition, reporting requirements related to use of the emergency storage basins are required to monitor their use and the potential impact on groundwater.

5. Special Provisions for Municipal Facilities (POTW's Only)

a. **Pretreatment Requirements**

i. The federal CWA section 307(b), and federal regulations, 40 C.F.R. part 403, require publicly owned treatment works to develop an acceptable industrial pretreatment program. A pretreatment program is required to prevent the introduction of pollutants, which will interfere with treatment plant operations or sludge disposal, and prevent pass through of pollutants that exceed water quality objectives, standards or permit limitations. Pretreatment requirements are imposed pursuant to 40 C.F.R. part 403.

ii. The Discharger has an approved EPA pretreatment program that includes one non-categorical significant industrial user and 25 categorical significant industrial users.

iii. The Discharger shall implement and enforce its approved pretreatment program and is an enforceable condition of this Order. If the Discharger fails to perform the pretreatment functions, the Central Valley Water Board, the State Water Board or U.S. EPA may take enforcement actions against the Discharger as authorized by the CWA.

b. **Collection System.** The State Water Board issued General Waste Discharge Requirements for Sanitary Sewer Systems, Water Quality Order 2006-0003-DWQ (General Order) on 2 May 2006. The Monitoring and Reporting Requirements for the General Order were amended by Water Quality Order WQ 2008-0002-EXEC on 20 February , 2008. The General Order requires public agencies that own or operate sanitary sewer systems with greater than one mile of pipes or sewer lines to

enroll for coverage under the General Order. The General Order requires agencies to develop sanitary sewer management plans (SSMPs) and report all sanitary sewer overflows (SSO's), among other requirements and prohibitions.

Furthermore, the General Order contains requirements for operation and maintenance of collection systems and for reporting and mitigating sanitary sewer overflows. Inasmuch that the Discharger's collection system is part of the system that is subject to this Order, certain standard provisions are applicable as specified in Provisions, section VI.C.5. For instance, the 24-hour reporting requirements in this Order are not included in the General Order. The Discharger must comply with both the General Order and this Order. The Discharger and public agencies that are discharging wastewater into the facility were required to obtain enrollment for regulation under the General Order by 1 December 2006.

c. **Anaerobically Digestible Material.** Managers of POTW's increasingly are considering the addition of organic material such as food waste, fats, oils and grease into their anaerobic digesters for co-digestion. Benefits of accepting these materials include increasing the volume of methane and other biogases available for energy production and ensuring such materials are disposed of at the POTW instead of discharged into the collection system potentially causing sanitary sewer overflows. The State Water Board has been working with the California Department of Resources Recycling and Recovery (CalRecycle), the California Department of Food and Agriculture (CDFA), and the California Association of Sanitation Agencies (CASA) to delineate jurisdictional authority for the receipt of hauled-in anaerobically digestible material (ADM[1]) at POTW's for co-digestion.

CalRecycle is proposing an exclusion from Process Facility/Transfer Station permits for direct injection of ADM to POTW anaerobic digesters for co-digestion that are regulated under waste discharge requirements or NPDES permits. The proposed CalRecycle exclusion is restricted to ADM that has been prescreened, slurried, and processed/conveyed in a closed system to be co-digested with regular POTW sludge. The CalRecycle exclusion assumes that a POTW has developed Standard Operating Procedures (SOP's) for the proper handling, processing, tracking, and management of the ADM received.

The Discharger currently accepts hauled-in ADM for direct injection into its anaerobic digester for co-digestion. This Order requires the Discharger to develop and implement standard operating procedures. The requirements of the SOP's are discussed in Section VI.C.5.c.

6. Other Special Provisions

a. **Seasonal Title 22, or Equivalent, Disinfection Requirements.** Consistent with Order R5-2010-0114-04, from May to October wastewater shall be oxidized, coagulated, filtered, and adequately disinfected pursuant to the State Water Board, Division of Drinking Water (DDW) reclamation criteria, CCR, title 22, division 4, chapter 3, (Title 22), or equivalent, in accordance with the compliance schedule in Section VI.C.7.a.

[1] CalRecycle has proposed to define "anaerobically digestible material" to include inedible kitchen grease as defined in Food and Agricultural Code section 19216, food material as defined in California Code of Regulations, title 14, section 17852 and vegetative food material.

7. Compliance Schedules

In general, an NPDES permit must include final effluent limitations that are consistent with CWA section 301 and with 40 C.F.R. section 122.44(d). There are exceptions to this general rule. The State Water Board's Resolution 2008-0025 "*Policy for Compliance Schedules in National Pollutant Discharge Elimination System Permits*" (Compliance Schedule Policy) allows compliance schedules for new, revised, or newly interpreted water quality objectives or criteria, or in accordance with a TMDL. All compliance schedules must be as short as possible, and may not exceed 10 years from the effective date of the adoption, revision, or new interpretation of the applicable water quality objective or criterion, unless a TMDL allows a longer schedule. Where a compliance schedule for a final effluent limitation exceeds one year, the Order must include interim numeric effluent limitations for that constituent or parameter, interim requirements and dates toward achieving compliance, and compliance reporting within 14 days after each interim date. The Order may also include interim requirements to control the pollutant, such as pollutant minimization and source control measures.

In accordance with the Compliance Schedule Policy and 40 C.F.R. section 122.47, a discharger who seeks a compliance schedule must demonstrate additional time is necessary to implement actions to comply with a more stringent permit limitation. The discharger must provide the following documentation as part of the application requirements:

- Diligent efforts have been made to quantify pollutant levels in the discharge and the sources of the pollutant in the waste stream, and the results of those efforts;
- Source control efforts are currently underway or completed, including compliance with any pollution prevention programs that have established;
- A proposed schedule for additional source control measures or waste treatment;
- Data demonstrating current treatment facility performance to compare against existing permit effluent limits, as necessary to determine which is the more stringent interim, permit effluent limit to apply if a schedule of compliance is granted;
- The highest discharge quality that can reasonably be achieved until final compliance is attained;
- The proposed compliance schedule is as short as possible, given the type of facilities being constructed or programs being implemented, and industry experience with the time typically required to construct similar facilities or implement similar programs; and
- Additional information and analyses to be determined by the Regional Water Board on a case-by-case basis.

Based on information submitted with the ROWD, SMR's, and other miscellaneous submittals, it has been demonstrated to the satisfaction of the Central Valley Water Board that the Discharger needs time to implement actions to comply with the new effluent limitations for ammonia, seasonal Title 22 requirements, and methylmercury.

a. **Ammonia and Seasonal Title 22 (or Equivalent) Disinfection Requirements.** The Discharger submitted a request, and justification (dated 20 August 2010), for a compliance schedule for BOD_5, TSS, ammonia, and total coliform organisms. This Order retains compliance schedules from Order R5-2010-0114-04 for the final WQBEL's for BOD_5, TSS, and total coliform organisms with compliance required by 9 May 2023, and ammonia with full compliance by 11 May 2021. These final

compliance dates were originally 1 December 2020, but have been stayed by certain orders issued by the Sacramento County Superior Court, Honorable Michael Kenny. The stays resulted in change, or shift by a period of time, in the compliance deadlines as well as in the schedule for certain steps toward compliance. The operative orders were issued by the Superior Court on 13 July 2012 and 6 May 2013.

b. **Methylmercury.** The Delta Mercury Control Program is composed of two phases. Phase 1 spans from 20 October 2011 through the Phase I Delta Mercury Control Program Review, expected to conclude by October 2020. Phase 1 emphasizes studies and pilot projects to develop and evaluate management practices to control methylmercury. Phase 1 includes provisions for: implementing pollution minimization programs and interim mass limits for inorganic (total) mercury point sources in the Delta and Yolo Bypass; controlling sediment-bound mercury in the Delta and Yolo Bypass that may become methylated in agricultural lands, wetland, and open-water habitats; and reducing total mercury loading to San Francisco Bay, as required by the *Water Quality Control Plan for the San Francisco Bay Basin*.

At the end of Phase 1, the Central Valley Water Board will conduct a Phase 1 Delta Mercury Control Program Review that considers: modification of methylmercury goals, objectives, allocations and/or the Final Compliance Date; implementation of management practices and schedules for methylmercury controls; and adoption of a mercury offset program for dischargers who cannot meet their load and waste load allocations after implementing all reasonable load reduction strategies. The review also will consider other potential public and environmental benefits and negative impacts (e.g., habitat restoration, flood protection, water supply, fish consumption) of attaining the allocations. The fish tissue objectives, the linkage analysis between objectives and sources, and the attainability of the allocations will be re-evaluated based on the findings of Phase 1 control studies and other information. The linkage analysis, fish tissue objectives, allocations, and time schedules shall be adjusted at the end of Phase 1, or subsequent program reviews, if appropriate.

Phase 2 begins after the Phase 1 Delta Mercury Control Program Review or by 20 October 2022, whichever occurs first, and ends in 2030. During Phase 2, dischargers shall implement methylmercury control programs and continue inorganic (total) mercury reduction programs. Compliance monitoring and implementation of upstream control programs also shall occur in Phase 2. Any compliance schedule contained in an NPDES permit must be "... *an enforceable sequence of actions or operations leading to compliance with an effluent limitation...*" per the definition of a compliance schedule in CWA Section 502(17). See also 40 C.F.R. section 122.2 (definition of schedule of compliance). The compliance schedule for methylmercury meets these requirements.

Federal Regulations at 40 C.F.R. section 122.47(a)(1) requires that, "*Any schedules of compliance under this section shall require compliance as soon as possible*..." The Compliance Schedule Policy also requires that compliance schedules are as short as possible and may not exceed 10 years, except when "...*a permit limitation that implements or is consistent with the waste load allocations specified in a TMDL that is established through a Basin Plan amendment, provided that the TMDL implementation plan contains a compliance schedule or implementation schedule*." As discussed above, the Basin Plan's Delta Mercury Control Program includes compliance schedule provisions and allows compliance with the waste load allocations for methylmercury by 2030. Until the Phase 1 Control Studies are complete and the Central Valley Water Board conducts the Phase 1 Delta Mercury

Control Program Review, it is not possible to determine the appropriate compliance date for the Discharger that is as soon as possible. Therefore, this Order establishes a compliance schedule for the new, final WQBEL's for methylmercury with full compliance required by 31 December 2030, which is consistent with the Final Compliance Date of the TMDL. At completion of the Phase 1 Delta Mercury Control Program Review, the final compliance date for this compliance schedule will be re-evaluated to ensure compliance is required as soon as possible. Considering the available information, the compliance schedule is as short as possible in accordance with federal regulations and the Compliance Schedule Policy.

VII. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

CWA section 308 and 40 C.F.R. sections 122.41(h), (j)-(l), 122.44(i), and 122.48 require that all NPDES permits specify monitoring and reporting requirements. Water Code sections 13267 and 13383 also authorize the Central Valley Water Board to establish monitoring, inspection, entry, reporting, and recordkeeping requirements. The Monitoring and Reporting Program (MRP), Attachment E of this Order establishes monitoring, reporting, and recordkeeping requirements that implement federal and state requirements. The following provides the rationale for the monitoring and reporting requirements contained in the MRP for this Facility.

A. Influent Monitoring

1. Influent monitoring is required to collect data on the characteristics of the wastewater and to assess compliance with effluent limitations (e.g., BOD_5 and TSS reduction requirements). The monitoring frequencies for flow (continuous), BOD_5 (daily), pH (continuous), TSS (daily), electrical conductivity (weekly), and total dissolved solids (monthly) have been retained from Order R5-2010-0114-04.

2. Influent monitoring is required to collect data on the characteristics of the Groundwater CAP discharge to the Facility. The monitoring frequencies for flow (monthly), priority pollutant metals, electrical conductivity, total dissolved solids, and nitrates (twice per year) have been retained from Order R5-2010-0114-04.

B. Effluent Monitoring

1. Pursuant to the requirements of 40 C.F.R. section 122.44(i)(2) effluent monitoring is required for all constituents with effluent limitations. Effluent monitoring is necessary to assess compliance with effluent limitations, assess the effectiveness of the treatment process, and to assess the impacts of the discharge on the receiving stream and groundwater.

2. This Order requires effluent monitoring for BOD_5, TSS, and total coliform organisms at Monitoring Location EFF-001. Upon upgrades to the emergency storage basins, the Discharger proposes to use the basins for multiple uses, including storage and treatment of non-final wastewater (e.g., untreated or partially-treated wastewater) and final treated wastewater. The proposed multiple use basins have been designed with a double block and bleed system and monitoring system to ensure water does not unintentionally transfer between basins. Furthermore, a high pressure cleaning system will be used after the basins store non-final wastewater. This Order requires the Discharger to conduct a study and/or monitoring to demonstrate the emergency storage basin cleaning and isolation systems will not allow for wastewater pathogens to be reintroduced to the final effluent following the prior use of the emergency storage basins for non-final (e.g., untreated or partially-treated wastewater). This Order also requires the Discharger to develop Emergency Storage Basin Cleaning and Isolation System Study and Standard Operating Procedures in Special Provisions VI.C.2.d. Upon Executive Officer approval of the final study results and standard operating procedures, compliance with final effluent

limitations for BOD5 and TSS shall be measured at Monitoring Location TER-001. Otherwise, compliance shall be measured at Monitoring Location EFF-001.

3. Effluent monitoring frequencies and sample types for flow (continuous), BOD_5 (daily), pH (continuous), TSS (daily), bis (2-ethylhexyl) phthalate (monthly), carbon tetrachloride (monthly), chlorodibromomethane (monthly), total and dissolved copper (monthly), methylene chloride (monthly), cyanide (monthly), mercury (monthly), alkalinity (monthly), ammonia (monthly), chlorine residual (continuous), *Cryptosporidium* (monthly), dissolved oxygen (continuous), electrical conductivity (weekly), *Giardia* (monthly), hardness (monthly), methylmercury (monthly), nitrate plus nitrite (weekly), oil and grease (monthly), settleable solids (daily), sulphur dioxide or sodium bisulfite (continuous), temperature (continuous), total coliform organisms (daily), total dissolved solids (weekly), total Kjeldahl nitrogen (weekly), and total organic carbon (monthly) have been retained from Order R5-2010-0114-04 to determine compliance with effluent limitations, where applicable, and characterize the effluent for these parameters.

4. Monitoring data collected over the term of Order R5-2010-0114-04 for aluminum, manganese, tetrachloroethylene, pentachlorophenol, dibenzo(a,h)anthracene, and methyl tertiary butyl ether did not demonstrate reasonable potential to exceed water quality objectives/criteria. Thus, specific monitoring requirements for these parameters have not been retained from Order R5-2010-0114-04.

5. Timing, duration and purpose of wastewater diversions, effluent or influent, is a measure of proper operation of the wastewater treatment plant and is required to be reported on a monthly basis. In addition, the Discharger shall submit an annual summary of effluent diversions with the annual self-monitoring report.

6. In accordance with Section 1.3 of the SIP, periodic monitoring is required for priority pollutants for which criteria or objectives apply and for which no effluent limitations have been established. This Order requires effluent monitoring for priority pollutants and other constituents of concern monthly every other calendar year. See section IX.B of the Monitoring and Reporting Program (Attachment E) for more detailed requirements related to performing priority pollutant monitoring.

7. Water Code section 13176, subdivision (a), states: "*The analysis of any material required by [Water Code sections 13000-16104] shall be performed by a laboratory that has accreditation or certification pursuant to Article 3 (commencing with Section 100825) of Chapter 4 of Part 1 of Division 101 of the Health and Safety Code.*" DDW certifies laboratories through its Environmental Laboratory Accreditation Program (ELAP).

   Section 13176 cannot be interpreted in a manner that would violate federal holding time requirements that apply to NPDES permits pursuant to the CWA. (Wat. Code §§ 13370, subd. (c), 13372, 13377.) Section 13176 is inapplicable to NPDES permits to the extent it is inconsistent with CWA requirements. (Wat. Code § 13372, subd. (a).) The holding time requirements are 15 minutes for chlorine residual, dissolved oxygen, and pH, and immediate analysis is required for temperature. (40 C.F.R. § 136.3(e), Table II) The Discharger maintains an ELAP certified laboratory on-site and conducts analysis for chlorine residual, dissolved oxygen, and pH within the required 15 minute hold times.

C. Whole Effluent Toxicity Testing Requirements

1. **Acute Toxicity.** Consistent with Order R5-2010-0114-04, weekly 96-hour bioassay testing is required to demonstrate compliance with the effluent limitation for acute toxicity.

2. **Chronic Toxicity.** Consistent with Order R5-2010-0114-04, monthly chronic whole effluent toxicity testing is required in order to demonstrate compliance with the Basin Plan's narrative toxicity objective.

   Order R5-2010-0114-04 required the Discharger to conduct a study to determine the feasibility of existing laboratory procedures for *Hyalella azteca* to evaluate both acute and chronic toxicity of the discharge. The Discharger submitted the *Hyalella azteca Water-only Whole Effluent Toxicity Testing Feasibility Study Report* on 20 June 2014. Based on the study, the Discharger concluded that multiple methods have been used by various commercial laboratories and research institutions, but there is no U.S. EPA-promulgated water-only method. Additionally, wide variability exists in test conditions among the currently used water-only methods. A water-only *H. azteca* method would need to be approved by EPA through the Alternative Test Procedure (ATP) process before it could be used for compliance purposes. Therefore, this Order continues to require WET testing using *Ceriodaphnia dubia*, *Pimephales promelas*, and *Selenastrum capricornutum*.

D. Receiving Water Monitoring

1. Surface Water

a. **Delta Regional Monitoring Program.** The Central Valley Water Board requires individual dischargers and discharger groups to conduct monitoring of Delta waters and Delta tributary waters in the vicinity of their discharge, known as ambient (or receiving) water quality monitoring. This monitoring provides information on the impacts of waste discharges on Delta waters, and on the extant condition of the Delta waters. However, the equivalent funds spent on current monitoring efforts could be used more efficiently and productively, and provide a better understanding of geographic and temporal distributions of contaminants and physical conditions in the Delta, and of other Delta water quality issues, if those funds were used for a coordinated ambient monitoring effort, rather than continue to be used in individual, uncoordinated ambient water quality monitoring programs. The Delta Regional Monitoring Program will provide data to better inform management and policy decisions regarding the Delta.

   The Discharger has elected to participate in the Delta Regional Monitoring Program. The Discharger submitted a letter dated 2 December 2014 expressing interest in participating in the Delta Regional Monitoring Program. The Discharger's request to reduce receiving water monitoring and participate in the Delta Regional Monitoring Program was approved in a letter signed by the Executive Officer dated 24 December 2014.

   Delta Regional Monitoring Program data is not intended to be used directly to represent either upstream or downstream water quality for purposes of determining compliance with this Permit. Delta Regional Monitoring Program monitoring stations are established generally as "integrator sites" to evaluate the combined impacts on water quality of multiple discharges into the Delta; Delta Regional Monitoring Program monitoring stations would not normally be able to identify the source of any specific constituent, but would be used to identify water quality issues needing further evaluation. Delta Regional Monitoring Program monitoring data may be used to help establish background receiving water quality for an RPA in an NPDES permit after evaluation of the applicability of the data for that purpose. In general, monitoring data from samples collected in the immediate vicinity of the discharge will be given greater weight in permitting decisions than receiving water monitoring data collected at greater distances from the discharge point. Delta Regional

Monitoring Program data, as with all environmental monitoring data, can provide an assessment of water quality at a specific place and time that can be used in conjunction with other information, such as other receiving water monitoring data, spatial and temporal distribution and trends of receiving water data, effluent data from the Discharger's discharge and other point and non-point source discharges, receiving water flow volume, speed and direction, and other information to determine the likely source or sources of a constituent that resulted in exceedance of a receiving water quality objective.

The Discharger shall continue to participate in the Delta Regional Monitoring Program until such time as the Discharger informs the Board that participation in the Delta Regional Monitoring Program will cease. Participation in the Delta Regional Monitoring Program by a Discharger shall consist of providing funds and/or in-kind services to the Delta Regional Monitoring Program at least equivalent to discontinued individual monitoring and study efforts. If a discharger or discharger group fails to maintain adequate participation in the Delta Regional Monitoring Program, as determined through criteria to be developed by the Delta Regional Monitoring Program Steering Committee, the Steering Committee will recommend to the Central Valley Water Board that an individual monitoring program be reinstated for that discharger or discharger group.

Since the Discharger is participating in the Delta Regional Monitoring Program this Order does not require receiving water characterization monitoring for purposes of conducting the RPA. However, the Report of Waste Discharge for the next permit renewal shall include, at minimum, one representative ambient background characterization monitoring event for priority pollutant constituents[2] during the term of the permit. Data from the Delta Regional Monitoring Program may be utilized to characterize the receiving water in the permit renewal. Alternatively, the Discharger may conduct any site-specific receiving water monitoring deemed appropriate by the Discharger and submit that monitoring data with the Report of Waste Discharge. In general, monitoring data from samples collected in the immediate vicinity of the discharge will be given greater weight in permitting decisions than receiving water monitoring data collected at greater distances from the discharge point. Historic receiving water monitoring data taken by the Discharger and from other sources may also be evaluated to determine whether or not that data is representative of current receiving water conditions. If found to be representative of current conditions, then that historic data may be used in characterizing receiving water quality for the purposes of the RPA.

b. Upstream and downstream receiving water monitoring requirements at Monitoring Locations RSWU-001, and RSWD-003 is included for flow (continuous), fecal coliform organisms (quarterly), pH (monthly), ammonia (monthly), dissolved oxygen (monthly), electrical conductivity (monthly), hardness (monthly), temperature (monthly), total nitrogen (monthly), and turbidity (monthly).

c. In accordance with Section 1.3 of the SIP, periodic monitoring is required for priority pollutants for which criteria or objectives apply and for which no effluent limitations have been established. This Order requires the Report of Waste Discharge for the next permit renewal shall include, at minimum, one representative ambient background characterization monitoring event for priority pollutant constituents[3]

[2] Appendix A to 40 C.F.R. part 423.
[3] Appendix A to 40 C.F.R. part 423.

during the term of the permit, in order to collect data to conduct an RPA for the next permit renewal.

2. Groundwater – Not Applicable

E. Other Monitoring Requirements

1. **Filtration System Monitoring.** Effluent monitoring requirements for turbidity at Monitoring Location FIL-001 are retained from Order R5-2010-0114-04 to determine compliance with the operational specifications for turbidity in Special Provision VI.C.4.a of this Order.

2. **Discharge Monitoring Report-Quality Assurance (DMR-QA) Study Program.** Under the authority of section 308 of the CWA (33 U.S.C. § 1318), U.S. EPA requires major permittees under the NPDES Program to participate in the annual DMR-QA Study Program. The DMR-QA Study evaluates the analytical ability of laboratories that routinely perform or support self-monitoring analyses required by NPDES permits. There are two options to satisfy the requirements of the DMR-QA Study Program: (1) The Discharger can obtain and analyze a DMR-QA sample as part of the DMR-QA Study; or (2) Per the waiver issued by U.S.EPA to the State Water Board, the Discharger can submit the results of the most recent Water Pollution Performance Evaluation Study from their own laboratories or their contract laboratories. A Water Pollution Performance Evaluation Study is similar to the DMR-QA Study. Thus, it also evaluates a laboratory's ability to analyze wastewater samples to produce quality data that ensure the integrity of the NPDES Program. The Discharger shall submit annually the results of the DMR-QA Study or the results of the most recent Water Pollution Performance Evaluation Study to the State Water Board. The State Water Board's Quality Assurance Program Officer will send the DMR-QA Study results or the results of the most recent Water Pollution Performance Evaluation Study to U.S. EPA's DMR-QA Coordinator and Quality Assurance Manager.

VIII. PUBLIC PARTICIPATION

The Central Valley Water Board has considered the issuance of WDR's that will serve as an NPDES permit for the Facility. As a step in the WDR adoption process, the Central Valley Water Board staff has developed tentative WDR's and has encouraged public participation in the WDR adoption process.

A. Notification of Interested Parties

The Central Valley Water Board notified the Discharger and interested agencies and persons of its intent to prescribe WDR's for the discharge and provided an opportunity to submit written comments and recommendations. Notification was provided through the following: publication of a notice of public hearing (Notice) in the Sacramento Bee on 10 February 2016, posting of the Notice at the Facility, Citrus Highs City Hall, Elk Grove City Hall, Folsom City Hall, Rancho Cordova City Hall, Sacramento City Hall, West Sacramento City Hall, and US Post Office, and posting of the Notice on the Central Valley Water Board's website.

The public had access to the agenda and any changes in dates and locations through the Central Valley Water Board's website at:
http://www.waterboards.ca.gov/centralvalley/board_info/meetings/

B. Written Comments

Interested persons were invited to submit written comments concerning tentative WDR's as provided through the notification process. Comments were due either in person or by mail to

the Executive Office at the Central Valley Water Board at the address on the cover page of this Order.

To be fully responded to by staff and considered by the Central Valley Water Board, the written comments were due at the Central Valley Water Board office by 5:00 p.m. on 7 March 2016.

C. Public Hearing

The Central Valley Water Board held a public hearing on the tentative WDR's during its regular Board meeting on the following date and time and at the following location:

Date:	21/22 April 2016
Time:	8:30 a.m.
Location:	Regional Water Quality Control Board, Central Valley Region 1685 "E" Street Fresno, CA 93706

Interested persons were invited to attend. At the public hearing, the Central Valley Water Board heard testimony pertinent to the discharge, WDR's, and permit. For accuracy of the record, important testimony was requested in writing.

D. Reconsideration of Waste Discharge Requirements

Any aggrieved person may petition the State Water Board to review the decision of the Central Valley Water Board regarding the final WDR's. The petition must be received by the State Water Board at the following address within 30 calendar days of the Central Valley Water Board's action:

State Water Resources Control Board
Office of Chief Counsel
P.O. Box 100, 1001 I Street
Sacramento, CA 95812-0100

For instructions on how to file a petition for review, see
http://www.waterboards.ca.gov/public_notices/petitions/water_quality/wqpetition_instr.shtml

E. Information and Copying

The Report of Waste Discharge, other supporting documents, and comments received are on file and may be inspected at the address above at any time between 8:30 a.m. and 4:45 p.m., Monday through Friday. Copying of documents may be arranged through the Central Valley Water Board by calling (916) 464-3291.

F. Register of Interested Persons

Any person interested in being placed on the mailing list for information regarding the WDR's and NPDES permit should contact the Central Valley Water Board, reference this facility, and provide a name, address, and phone number.

G. Additional Information

Requests for additional information or questions regarding this order should be directed to Xuan Luo at (916)464-4606.

ATTACHMENT G – SUMMARY OF REASONABLE POTENTIAL ANALYSIS

Constituent	Units	MEC	B	C	CMC	CCC	Water & Org	Org. Only	Basin Plan	MCL	Reasonable Potential
Aluminum, Total Recoverable	µg/L	17[1]	248[1]	200	750[2]	--	--	--	--	200	No
Ammonia Nitrogen, Total (as N)	mg/L	43	0.26	2.45	5.62[2]	2.45[3]	--	--	--	--	Yes
Benzo(a)anthracene	µg/L	0.0067	0.0023	0.0044	--	--	0.0044	0.049	--	--	No[4]
Benzo(b)fluoranthene	µg/L	0.0057	0.0054	0.0044	--	--	0.0044	0.049	--	--	No[4]
Benzo(k)fluoranthene	µg/L	0.0033	0.005	0.0044	--	--	0.0044	0.049	--	--	No[4]
Bis (2-ethylhexyl) Phthalate	µg/L	8.1	1.93	1.8	--	--	1.8	5.9	--	4	Yes
Carbon Tetrachloride	µg/L	2.9	<0.16	0.25	--	--	0.25	4.4	--	0.5	Yes
Chloride	mg/L	110	11	230	860[2]	230[5]	--	--	--	250	No
Chlorodibromomethane	µg/L	0.33	<0.17	0.41	--	--	0.41	34	--	80[6]	Yes[4]
Chlorpyrifos	µg/L	<0.003	0.004	0.015	--	--	--	--	0.015	--	No
Chrysene	µg/L	0.0129	0.0114	0.0044	--	--	0.0044	0.049	--	--	No[4]
Copper, Total Recoverable	µg/L	10	5.8	8.0	12	8.0	1,300	--	10	1,000	Yes
Cyanide, Total (as CN)	µg/L	8.6	0.77	5.2	22	5.2	700	220,000	10	150	Yes
Diazinon	µg/L	<0.004	0.0004	0.10	--	--	--	--	0.10	--	No
Dibenzo(a,h)anthracene	µg/L	<0.001	<0.001	0.0044	--	--	0.0044	0.049	--	--	No
Dichlorobromomethane	µg/L	2.3	<0.16	0.56	--	--	0.56	46	--	80[6]	Yes
1,2-Diphenylhydrazine	µg/L	<0.01184	<0.05	0.040	--	--	0.040	0.54	--	--	No
Electrical Conductivity @ 20°C	µmhos/cm	907[1]	176[1]	450	--	--	--	--	450	900	No[4]
Iron, Total Recoverable	µg/L	235[1]	704[1]	300	--	--	--	--	300	300	No
Manganese, Total Recoverable	µg/L	73[1]	20[1]	50	--	--	--	--	50	50	No[4]
Mercury, Total Recoverable	ng/L	8.2	5.9	50	--	--	50	51	--	2,000	Yes[4]
Methylene Chloride	µg/L	5	<0.2	4.7	--	--	4.7	1,500	--	5	Yes
Methylmercury	ng/L	0.65	0.17	--	--	--	--	--	--	--	Yes[4]
Methyl Tertiary Butyl Ether	µg/L	<0.059	0.3	5	--	--	--	--	--	5	No
Nitrate Nitrogen, Total (as N)	mg/L	0.52	0.34	10	--	--	--	--	--	10	Yes[4]

Constituent	Units	MEC	B	C	CMC	CCC	Water & Org	Org. Only	Basin Plan	MCL	Reasonable Potential
Nitrite Nitrogen, Total (as N)	mg/L	0.084	0.0054	1.0	--	--	--	--	--	1.0	Yes[4]
N-nitrosodimethylamine	µg/L	0.035	<0.05	0.00069	--	--	0.00069	8.1	--	--	No[4]
Pentachlorophenol	µg/L	<0.05	<0.05	0.28	5.3	4.1	0.28	8.2	--	1	No
Sulfate	mg/L	110[1]	7.5[1]	250	--	--	--	--	--	250	No
Tetrachloroethylene	µg/L	<0.19	<0.19	0.8	--	--	0.8	8.85	--	5	No
Total Dissolved Solids	mg/L	435[1]	119[1]	500	--	--	--	--	--	500	No

General Note: All inorganic concentrations are given as a total recoverable.
MEC = Maximum Effluent Concentration
B = Maximum Receiving Water Concentration or lowest detection level, if non-detect
C = Criterion used for Reasonable Potential Analysis
CMC = Criterion Maximum Concentration (CTR or NTR)
CCC = Criterion Continuous Concentration (CTR or NTR)
Water & Org = Human Health Criterion for Consumption of Water & Organisms (CTR or NTR)
Org. Only = Human Health Criterion for Consumption of Organisms Only (CTR or NTR)
Basin Plan = Numeric Site-specific Basin Plan Water Quality Objective
MCL = Drinking Water Standards Maximum Contaminant Level
NA = Not Available
ND = Non-detect

Footnotes:
(1) Represents the maximum observed annual average concentration for comparison with the MCL.
(2) U.S. EPA National Recommended Ambient Water Quality Criteria, Freshwater Aquatic Life Protection, 1-hour average.
(3) U.S. EPA National Recommended Ambient Water Quality Criteria, Freshwater Aquatic Life Protection, 30-day average.
(4) See section IV.C.3 of the Fact Sheet for a discussion of the RPA results.
(5) U.S. EPA National Recommended Ambient Water Quality Criteria, Freshwater Aquatic Life Protection, 4-day average.
(6) Represents the Primary MCL for total trihalomethanes, which includes bromoform, chlorodibromomethane, chloroform, and dichlorobromomethane.

ATTACHMENT H – CALCULATION OF WQBEL'S

Human Health WQBEL's Calculations									
Parameter	**Units**	**Criteria**	**Mean Background Concentration**	**Dilution Factor**	**MDEL/AMEL Multiplier**	**AMEL Multiplier**	**AMEL**	**MDEL**	**AWEL**
Bis (2-ethylhexyl) phthalate	µg/L	1.8	0.32	55	2.2	1.7	8.9[1]	20[2]	--
Carbon Tetrachloride	µg/L	0.25	0.16	55	2.0	1.6	2.9[1]	5.3[2]	--
Methylene Chloride	µg/L	4.7	--	--			4.7	11	--
Chlorodibromomethane	µg/L	0.41	0.17	55	2.0	1.6	14	27	--
Dichlorobromomethane	µg/L	0.56	0.16	55	1.6	1.3	23	36	--
Nitrate Plus Nitrite	mg/L	10	0.34[3]	0	3.0	2.6	10	--	22

1 AMEL calculated using the performance-based MDEL and the AMEL/MDEL multiplier.
2 Reflects the performance-based MDEL.
3 Maximum background concentration.

Aquatic Life WQBEL's Calculations															
Parameter	**Units**	**Criteria**		**Dilution Factors**		**Aquatic Life Calculations**							**Final Effluent Limitations**		
		CMC	**CCC**	**CMC**	**CCC**	**ECA Multiplier$_{acute}$**	**LTA$_{acute}$**	**ECA Multiplier$_{chronic}$**	**LTA$_{chronic}$**	**AMEL Multiplier$_{95}$**	**AWEL Multiplier**	**MDEL Multiplier$_{99}$**	**AMEL[1]**	**AWEL[2]**	**MDEL[3]**
Ammonia Nitrogen, Total (as N) (1 April – 31 October)	mg/L	5.62[4]	1.45[4]	0	0	0.78	4.4	0.96	1.39	1.03	1.25	--	1.5[5]	1.7	--
Ammonia Nitrogen, Total (as N) (1 November – 31 March)	mg/L	5.62[4]	2.43[4]	0	0	0.72	4.1	0.94	2.29	1.04	1.33	--	2.4[5]	3.0	--
Copper, Total Recoverable[10]	µg/L	12[8]	8.0[8]	0	2.45[11]	0.61	7.2	0.77	10.4	1.20	--	1.65	8.6	--	12
Cyanide, Total (as CN)[9]	µg/L	22	5.2	0	[6]	0.42	9.2	[7]	17.3[7]	1.38	--	2.38	13	--	22

1 Average Monthly Effluent Limitations are calculated according to Section 1.4 of the SIP using a 95th percentile occurrence probability.
2 Average Weekly Effluent Limitations are calculated according to Section 1.4 of the SIP using a 98th percentile occurrence probability.
3 Maximum Daily Effluent Limitations are calculated according to Section 1.4 of the SIP using a 99th percentile occurrence probability.
4 Reflects the criteria from Order R5-2010-0114-04.
5 Reflects the AMEL from Order R5-2010-0114-04.
6 Variable, based on dynamic modeling results.
7 $LTA_{chronic}$ based on dynamic modeling results for a 60 foot chronic aquatic life mixing zone.
8 CTR criteria calculated based on an actual measured ambient hardness of 84 mg/L (as $CaCO_3$), see Attachment F Section IV.C.2.e for details.
9 Effluent limitations for cyanide calculated using a dynamic model per Section 1.4.C of the SIP.
10 Effluent limitations for copper calculated using a steady-state model per Section 1.4. B of the SIP.
11 Based on 95th percentile dilution factor estimated at edge of 60 foot chronic aquatic life mixing zone.

ATTACHMENT I – THERMAL PLAN EXCEPTIONS

I. Introduction

The Sacramento Regional County Sanitation District (Discharger) has requested exceptions to temperature objectives contained in the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Water and Enclosed Bays and Estuaries of California (Thermal Plan) for the Sacramento Regional Wastewater Treatment Plant (SRWTP) discharge to the Sacramento River within the Sacramento-San Joaquin Delta (Delta). The Thermal Plan allows regional boards to provide exceptions in accordance with Clean Water Act (CWA) section 316(a) and federal regulations. The exceptions shown in Table I-1, below, have been allowed in this Order in accordance with 40 C.F.R. Section 125.73(a), which provides that, "*Thermal discharge effluent limitations or standards established in permits may be less stringent than those required by applicable standards and limitations if the discharger demonstrates to the satisfaction of the director that such effluent limitations are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made. This demonstration must show that the alternative effluent limitation desired by the discharger, considering the cumulative impact of its thermal discharge together with all other significant impacts on the species affected, will assure the protection and propagation of a balanced indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is to be made.*" To meet the Thermal Plan objectives without exceptions, the Discharger would need to construct chillers with an estimated construction cost of $638 million and annual operating costs of $22 million.[1]

Table I-1. Thermal Plan Exceptions

Thermal Plan Requirements (CWA Section 5.A.(1)a-c)	**NPDES Permit Requirements**
5.A.(1)a The maximum effluent temperature shall not exceed the natural receiving water temperature by more than **20**^{o}F	**Exception from 1 October through 30 April** The maximum temperature of the discharge shall not exceed the natural receiving water temperature by more than: • **25**^{o} F from 1 October through 30 April; or • **20**^{o} F from 1 May through 30 September
5.A.(1)b Elevated temperature waste discharges either individually or combined with other discharges shall not create a zone, defined by water temperatures of more than **1ºF** above natural receiving water temperature, which exceeds 25 percent of the cross-sectional area of a main river channel at any point.	**Exception when the natural receiving water temperature is less than 65º F** • <u>If the natural receiving water temperature is less than 65º F</u>: The discharge shall not create a zone, defined by water temperature of more than **2º 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. • <u>If the natural receiving water temperature is 65º F or greater</u>: The discharge shall not create a zone, defined by water temperature of more than **1º F** above the natural receiving water temperature, which exceeds 25 percent of the cross sectional area of the River at any point

[1] Memorandum submitted by the Discharger on 11 December 2015, "Project Cost and Schedule for Compliance with Thermal Plan without Seasonal Exception".

Thermal Plan Requirements (CWA Section 5.A.(1)a-c)	**NPDES Permit Requirements**
	outside the zone of initial dilution.
5.A.(1)c No discharge shall cause a surface water temperature rise greater than 4°F above the natural temperature of the receiving waters at any time or place.	***No Exception***

Consideration of Thermal Plan Exceptions

Based on all evidence in the record the Central Valley Water Board finds that the Discharger has adequately demonstrated through comprehensive thermal effect studies that the effluent and receiving water limitations based on the Thermal Plan are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made. The Board also finds that the alternative limitations, considering the cumulative impact of its thermal discharge together with all other significant impacts on the species affected, will assure the protection and propagation of a balanced indigenous community of shellfish, fish and wildlife in and on the Sacramento River and Delta. The findings and conclusions relating to Code of Federal Regulations, title 40, section 125.73(a) are based on studies that analyzed the entire thermal effect of the discharge. Following is a summary of the evidence supporting the findings.

- **Continued exceptions would allow minor and transient exceedance of Thermal Plan objectives within a small zone.**

  Exceptions would primarily be needed during three months of the year when river temperatures are below 65ºF. This is the time of year when river flows are highest and ambient temperatures are low.

  The thermal plume quickly assimilates in the receiving water so the thermal impacts are limited to the near-field plume that under worst-case flow conditions is contained in the vicinity of the diffuser. Due to requirements in this Order[1] the worst-case flow conditions occur infrequently and for only a matter of minutes at a time. Under typical conditions (flow ratio of about 46:1), Thermal Plan objective 5.A.(1)a would be met within about 100 feet of the diffuser.

  Under fully mixed conditions (far-field conditions) Sacramento River temperatures would not change measurably with or without the exceptions. In other words, in the far-field (within 3 miles from discharge point where the discharge is completely mixed) thermal impacts would be virtually the same if the Discharger were to upgrade to fully meet the Thermal Plan objectives, versus continuing to operate under the limited exceptions.

- **There are no demonstrable negative impacts to any aquatic organisms when considering population level or local level impacts**

  The thermal exposures in the near-field plume area and far-field downstream areas do not exceed lethal or sub-lethal effect thresholds for aquatic life. Fishes do not hold within the plume area for sufficient periods of time to experience thermal induced toxicity and similarly, floating organisms are exposed to elevated temperatures for only short periods.

[1] The worst-case flow condition is a 14:1 flow ratio (river: effluent). This Order contains Discharge Prohibition III.F that prohibits the discharge when the flow ratio is less than 14:1. The Discharger diverts effluent flow to emergency storage basins until the flow in the river increases.

- **There are sufficient zones of passage and no impairment of fish migration.**

  The thermal plume of the discharge will not result in blockage or significant delay of upstream migration of adult fishes or downstream migration of larval and juvenile fishes.

  The Sacramento River at the point of discharge is 600 feet wide. Under all near-field conditions modeled, a zone of passage approximately 75-100 feet wide occurs along the west bank and 175-200 feet wide occurs along the east bank.

  The warmest part of the thermal plume is located close to the bottom of the river where few fish are exposed and exposure time ranges from seconds to minutes.

- **The thermal plume does not increase predation.**

  Based on the findings of the temperature studies, large numbers of predatory fishes are not holding at the diffuser site due to elevated water temperatures.

  Predatory fishes were not holding in the warmer water plume near the diffuser, where they could prey upon Endangered Species Act (ESA)-listed fishes as they migrate past the diffuser.

- **No demonstrable negative impacts to aquatic organisms when considering cumulative effects**

  The scientific studies to determine whether there are any negative impacts to aquatic life, impairment of fish migration, or increased predation were done in consideration of existing conditions along the river (above and below the discharge). Therefore, any other existing stressors that could combine cumulatively to negatively affect the aquatic community have also been considered. There are no demonstrable negative impacts to aquatic organisms when considering cumulative effects of conditions above and below the discharge.

- **Compliance with the Thermal Plan objectives would substantially increase the carbon footprint of the Facility for no demonstrable water quality improvement.**

  SRWTP currently has an electrical power draw of approximately 12 megawatts (MW). To comply with the Thermal Plan objectives, it is estimated that 70 MW would be SRWTP's draw at full load. This nearly 6 fold increase in power consumption would substantially increase SRWTP's greenhouse gas production and raise energy costs without demonstrable water quality improvements. The increased energy consumption is equivalent to the power needs of approximately 100,000 people.

- **State and federal fishery agencies do not object to allowance of exceptions**

  The United States Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and the California Department of Fish and Wildlife (CDFW) (collectively, fishery agencies) participated during development of the 2013 Temperature study. In addition, USFWS participated in the development of the 2015 Delta Smelt Addendum.

  The fishery agencies have provided technical assistance in reviewing the temperature studies and do not object to allowance of the proposed exceptions. Letters have been provided by the state and federal fishery agencies documenting that the studies are complete, the scientific rationale is sound, and that no further studies are currently needed to evaluate the effects of the thermal discharge (See section II. 4. Permitting/Litigation History for details regarding the fishery agencies comments and recommendations).

- **State Water Board concurrence with Thermal Plan exceptions**

  The Thermal Plan states that, "Regional Boards may, in accordance with Section 316(a) of the Federal Water Pollution Control Act of 1972, and subsequent federal regulations including 40 CFR 122, grant an exception to Specific Water Quality Objectives in this Plan. Prior to

becoming effective, such exceptions and alternative less stringent requirements must receive the concurrence of the State Board." (Thermal Plan, General Water Quality Provisions) To satisfy this requirement, on 14 January 2016, Central Valley Water Board staff provided the rationale and technical justification for allowance of the Thermal Plan exceptions to the State Water Board.[1] State Water Board staff reviewed the information and provided a memorandum on 11 March 2016, stating that, "The information submitted appears adequate to support the need for a Thermal Plan exception for the SRWTP. Therefore, following approval action by the Central Valley Regional Water Quality Control Board (Regional Water Board), State Water Board staff will recommend concurrence by the State Water Board for the Thermal Plan exceptions."[2]

These findings are based on the results of comprehensive thermal effects studies and a synthesis report submitted by the Discharger. The studies and process of development are further described below.

Thermal Effects Studies

The Discharger has conducted several temperature studies to assess the thermal impacts of the discharge on aquatic life of the lower Sacramento River, including:

- **2010 study**: Thermal Plan Exception Justification for the Sacramento Regional Wastewater Treatment Plant, prepared by Robertson-Bryan, Inc, July 2010
- **2013 study**: Temperature Study to Assess the Thermal Impacts of the Sacramento Regional Wastewater Treatment Plan Discharge on Aquatic Life of the Lower Sacramento River, prepared by Robertson-Bryan, Inc, March 2013
- **2015 Delta Smelt addendum**: Temperature Study to Assess the Thermal Impacts of the Sacramento Regional Wastewater Treatment Plan Discharge on Aquatic Life of the Lower Sacramento River: Delta Smelt Addendum, prepared by Robertson-Bryan, Inc, March 2015
- **2015 report**: Regional San Temperature Study: Synthesis, Supplemental Analysis and Findings Report, prepared by Robertson-Bryan, Inc, December 2015

The 2013 study considered six questions developed as part of a working group that included Central Valley Water Board staff and fishery agency representatives. The rationale of the working group was that if the answers to all six questions was "no," then the exceptions, considering the cumulative impact of its thermal discharge together with all other significant impacts on the species affected, will assure the protection and propagation of a balanced indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is to be made. The six questions are summarized below.

- Question 1. Would special-status fishes migrating past the diffuser, or benthic macroinvertebrates or plankton drifting past the diffuser, experience thermal exposures that would exceed lethal or sub-lethal thresholds?
- Question 2. Does the discharge block or delay migration of fishes?

[1] Memorandum from Pamela Creedon, Executive Officer, Central Valley Water Board to Tom Howard, Executive Director, State Water Board, 14 January 2016
[2] Memorandum from Karen Larsen, Deputy Director, State Water Board Division of Water Quality to Pamela Creedon, Executive Officer, Central Valley Water Board, 11 March 2016

- Question 3. Are large numbers of predatory fishes holding at the diffuser site due to elevated water temperatures?
- Question 4. Do fishes (migratory or resident) congregate and hold within the plume area for extended periods of time, thereby resulting in sufficient exposure duration to cause acute or chronic toxicity, based on plume water quality?
- Question 5. Are predatory fishes that hold at the diffuser site consuming listed fishes?
- Question 6. Do discharges from the SRWTP increase river temperatures, upon full mixing, by magnitude and duration that would be of concern for aquatic life?

The 2013 study concluded through a number of comprehensive scientific tests that the answer to the above questions was “no.” The tests included fish tagging and tracking, acoustic monitoring, predatory fish sampling and other techniques to assess whether the thermal discharge is causing any impacts to aquatic resources (including cumulative). This conclusion supports continuation of the Thermal Plan exceptions.

Upon reviewing the 2013 study’s conclusions, USFWS requested more information in regard to a single listed species (Delta Smelt). The Discharger responded to this request with the 2015 Delta Smelt addendum. The 2015 Delta Smelt addendum assessed the potential direct and indirect effects of the thermal discharge on all delta smelt life stages such as adults, larvae, and post-spawn adults, and on delta smelt critical habitat. The study concluded that the discharge “…would not cause lethality to individual delta smelt, result in chronic, adverse sublethal effects, adversely modify delta smelt critical habitat, prevent sustainability or recovery of the delta smelt population, or eliminate access to critical habitat primary constituent elements.” The 2015 Delta Smelt addendum was developed to answer specific questions regarding Delta Smelt. As such, the addendum was never intended to answer all questions needed, but was intended to supplement the 2013 study findings.

The overall approach and logic of these studies is summarized graphically below in Figure I-1 below.

Figure I-1. The Development and Review of Temperature Studies

II. Historical Factual Information

This Order regulates the discharge of secondary treated municipal wastewater and allows an average dry weather discharge flow of 181 million gallons per day (mgd) to the Sacramento River, within the Sacramento-San Joaquin Delta (Delta). SRWTP is a publicly-owned treatment works (POTW) that serves about 1.3 million people in the greater Sacramento area, including the Cities of Folsom, Rancho Cordova, West Sacramento, Sacramento, Elk Grove and Citrus Heights, and urbanized areas of Sacramento County. SRWTP is located in Elk Grove and discharges disinfected secondary treated wastewater to the Sacramento River immediately below the Freeport Bridge. The existing secondary treatment at the facility consists of preliminary screening and grit removal, primary sedimentation, a pure oxygen activated sludge treatment system, and chlorination for disinfection and dechlorination. SRWTP's current permitted discharge is 181 mgd (average dry weather flow) and current flows average 120 mgd. The Discharger is currently upgrading the SRWTP to replace the pure oxygen activated sludge system with a biological nutrient removal activated sludge system in order to meet new effluent limits for ammonia and nitrate by 11 May 2021. In addition, tertiary filtration facilities and chlorine contact chamber will be added to meet new disinfection requirements by 9 May 2023.

SRWTP 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 Sacramento River at point of discharge is 600 feet wide. At times, the river flows in the reverse direction northeast towards the City of Sacramento, due to tidal activity during low river flows. The Discharger diverts its discharge to emergency storage basins whenever these conditions exist. The Discharger has determined in studies that river flows of at least 1,300 cubic feet per second (cfs) and providing a flow ratio of at least 14 to 1 (river:effluent) are required to allow for adequate mixing of the effluent through the outfall diffuser.

1. Thermal Plan

For purposes of the Thermal Plan, the Discharger is considered to be an Existing Discharger of Elevated Temperature Waste. The Thermal Plan in section 5.A. contains the following temperature objectives for surface waters that are applicable to this discharge:

"*5. Estuaries*
A. Existing discharges
(1) Elevated temperature waste discharges shall comply with the following:
a. The maximum temperature shall not exceed the natural receiving water temperature by more than 20°F.
b. Elevated temperature waste discharges either individually or combined with other discharges shall not create a zone, defined by water temperatures of more than 1°F above natural receiving water temperature, which exceeds 25 percent of the cross-sectional area of a main river channel at any point.
c. No discharge shall cause a surface water temperature rise greater than 4°F above the natural temperature of the receiving waters at any time or place.
d. Additional limitations shall be imposed when necessary to assure protection of beneficial uses."

2. Thermal Plan Exceptions

The Thermal Plan allows regional boards to provide exceptions to specific water quality objectives in the Thermal Plan so long as the exceptions comply with CWA section 316(a) and federal regulations. The applicable exception is promulgated in 40 CFR Section 125.73(a),

which provides that, "*Thermal discharge effluent limitations or standards established in permits may be less stringent than those required by applicable standards and limitations if the discharger demonstrates to the satisfaction of the director that such effluent limitations are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made. This demonstration must show that the alternative effluent limitation desired by the discharger, considering the cumulative impact of its thermal discharge together with all other significant impacts on the species affected, will assure the protection and propagation of a balanced indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is to be made.*"

The Central Valley Water Board, after consideration of the Discharger's temperature studies conducted in 2010, 2013, and 2015, and coordination with the fishery agencies, grants the following exceptions to the Thermal Plan:

- **Thermal Plan Objective 5.A.(1)a Exception:**

  The maximum temperature of the discharge shall not exceed the natural receiving water temperature by more than:

  25º F from 1 October through 30 April;

  No exception to Thermal Plan Objective 5.A.(1)a is proposed from 1 May through 30 September.

- **Thermal Plan Objective 5.A.(1)b Exception:**

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

  If the natural receiving water temperature is 65ºF or greater, no exception to Thermal Plan Objective 5.A.(1)b is proposed.

The Thermal Plan, however, requires that the State Water Board concur with any exceptions prior to them becoming effective. On 14 January 2016, Central Valley Water Board staff provided technical justification for the Thermal Plan exceptions to the State Water Board for their review. On 11 March 2016, State Water Board staff agreed there was adequate support for the exceptions and following adoption of this Order by the Central Valley Water Board will recommend concurrence by the State Water Board for the Thermal Plan exceptions.

3. Characterization of the Thermal Plume and Science-based Findings

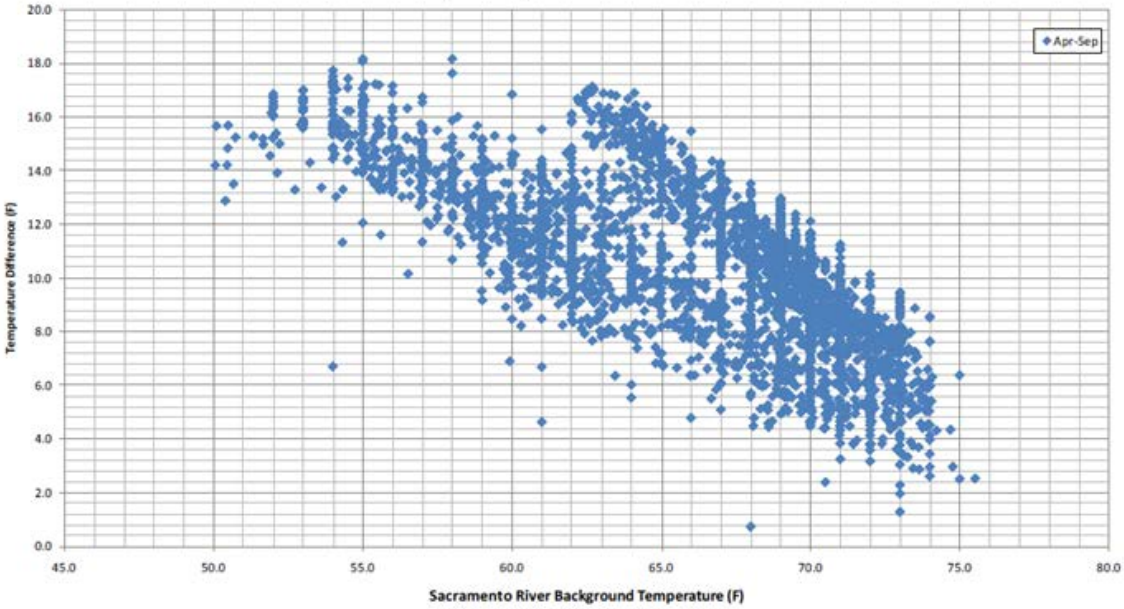
- **Continued exceptions would allow minor and transient exceedance of thermal plan objectives within a small zone.**

  The exception to Thermal Plan objective 5.A.(1)a[1] would mostly be needed during three months of the year when river temperatures are below 65ºF. The Discharger's evaluation of effluent and Sacramento River temperature data from 1993 to 2010 are shown in the figures

[1] The maximum temperature shall not exceed the natural receiving water temperature by more than 20°F.

below. The Discharger has historically complied with Thermal Plan objective 5.A.(1)a April through September annually as shown in Figure I-2a. [1]

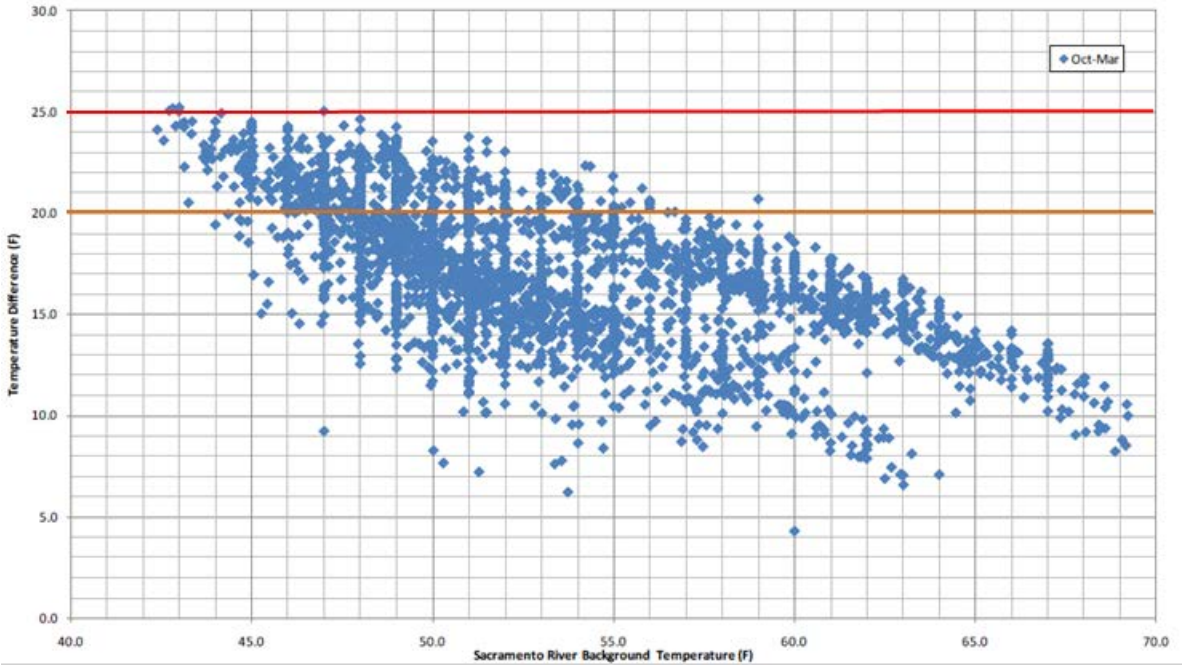
Figure I-2a. Daily Average Effluent –River Temperature Differences vs. Daily Average Sacramento River Background Temperatures (April –September 1993-2010)



The period during which an exception to Thermal Plan objective 5.A.(1)a is needed is primarily October through March, with the greatest need occurring when the river temperature drops below 65ºF (typically during November through January) as shown in Figure I-2b. [2] The thermal plume quickly assimilates in the receiving water so the area of thermal impact is small. For example under typical flow conditions Thermal Plan objective 5.A.(1)a is met within about 100 feet of the diffuser. Graphical depictions of the impact area can be seen in Figures I-3a, I-3b, I-4a, and I-4b, below.

[1] 2010 study, Appendix B, Attachment A
[2] 2010 study, Appendix B, Attachment A

Figure 2b. Daily Average Effluent –River Temperature Differences vs. Daily Average Sacramento River Background Temperatures (October –March 1993-2010)



- **There are no demonstrable negative impacts to aquatic organisms when considering population level or local level impacts.**

  Key findings from the temperature studies indicate that fish, invertebrates, and algae that swim or drift past the SRWTP diffuser under current permitted discharge conditions would not experience thermal exposures that would be lethal nor would they experience thermal exposures that would cause sub-lethal adverse thermal effects. The primary reasons for these finding are that: 1) organisms drifting or swimming through the warmest portion of the plume have exposure to elevated temperatures that are sufficiently short in duration in all cases that organism-specific acute thermal tolerances are not exceeded, 2) the highest temperatures always exists immediately adjacent to the diffuser ports and are very rapidly attenuated with distance downstream due to rapid effluent mixing with river water, and 3) adult and juvenile fishes that are strong swimmers can avoid thermal exposures that they do not prefer.

  Thermal exposures in the near-field plume area and far-field downstream areas do not exceed lethal or sub-lethal effect thresholds for aquatic life. Fishes do not hold within the plume area for sufficient periods of time to experience thermal induced toxicity.

- **There are sufficient zones of passage and no impairment of fish migration.**

Near-Field Thermal Plume Modeling

Thermal Plan Objective 5.A.(1)b requires that, "*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.*" The purpose of restricting the cross-sectional area of elevated temperatures is to ensure an adequate zone of passage for fishes, particularly migratory fishes. The only way to truly evaluate compliance with this objective is through modeling. Based on the Discharger's water quality model, the requested exception to 5.A.(1)b would be necessary when the ambient receiving water temperature is less than 65°F, which typically occurs from October to early May. The Discharger has argued that, "This objective is more stringent than necessary to assure fish passage and to protect aquatic resources. In fact, the river channel temperature, unaffected by the discharge, typically varies by 1°F or more both diurnally and spatially (i.e., right bank to left bank, and top to bottom)."

Based on modeling and dye studies there are adequate zones of passage on either side and above the diffuser. The Sacramento River at the point of discharge is a channelized river with a width of 600 feet at the surface and 400 feet at the bottom. The river at high tide is approximately 20-25 feet deep. Under all near-field conditions modeled, a zone of passage approximately 75-100 feet wide occurs along the west bank and 175-200 feet wide occurs along the east bank. Furthermore, the warmest part of the thermal plume is located close to the bottom of the river so a zone of passage also exists above the plume. Actively swimming fishes can readily avoid unfavorable temperatures within the plume by swimming around or over the portions of the plume. Therefore, a thermally tolerable zone of passage exists for all actively swimming fish species that pass the diffuser and the thermal plume would not cause lethality to migrating fishes or have adverse population- or community-level effects to the anadromous or resident fishes. For details regarding the zones of passage see the 2010 study, pages 32-34.

The zones of passage can be seen in the following figures. The thermal plumes were illustrated through two-dimensional, color graphics. These graphics were developed for the 218 mgd build-out discharge scenario with a maximum temperature differential of 25ºF, for the worst-case flow ratio of 14:1 and the typical flow condition of 46:1. At the time the 2010 study was developed the Discharger was seeking increased capacity to 218 mgd, but subsequently concluded that the increase was not necessary. This Order only allows a flow of 181 mgd. Therefore, the 2010 model results overstate the thermal effects of the permitted discharge. However, as shown in the graphics below, even under this conservative approach zones of passage exist.

The graphics show a centerline longitudinal profile and plan-view of temperature conditions downstream from the diffuser to 700 feet (Figures I-3a and I-3b), and river cross-section views at 60 feet, 175 feet, and 700 feet downstream of the diffuser (Figures I-4a and I-4b). These figures show zones of passage on either side of the diffuser and above the diffuser. The figures also demonstrate that under typical flow conditions the thermal plume is very small, and that even under worst-case conditions, the thermal plume quickly assimilates in the receiving water.

Figure I-3a. Sacramento River Downstream of Freeport Bridge Simulated Temperature changes with the plume 14:1 dilution ration and 25°F temperature difference[1] (Worst-Case Condition[2])

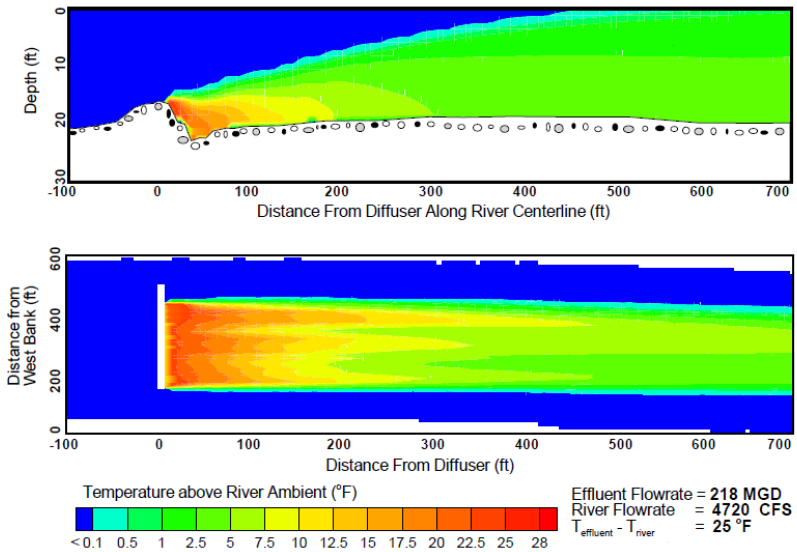
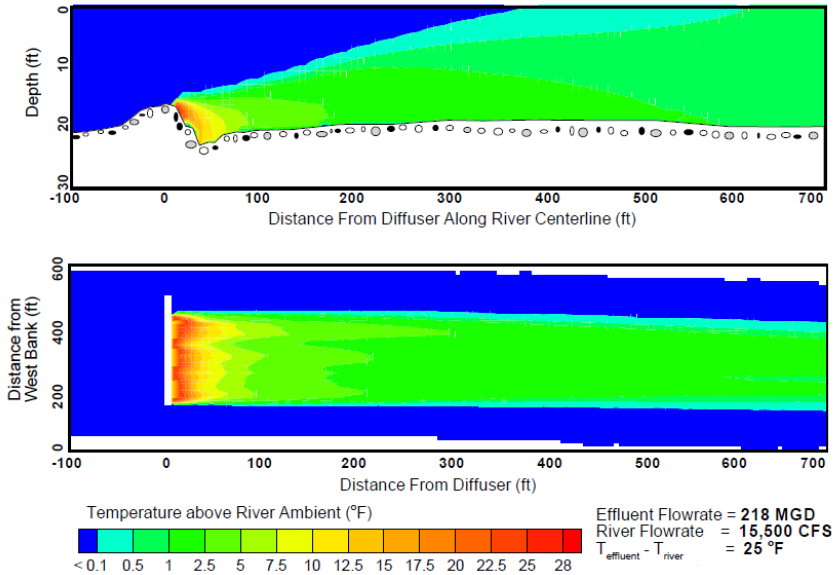


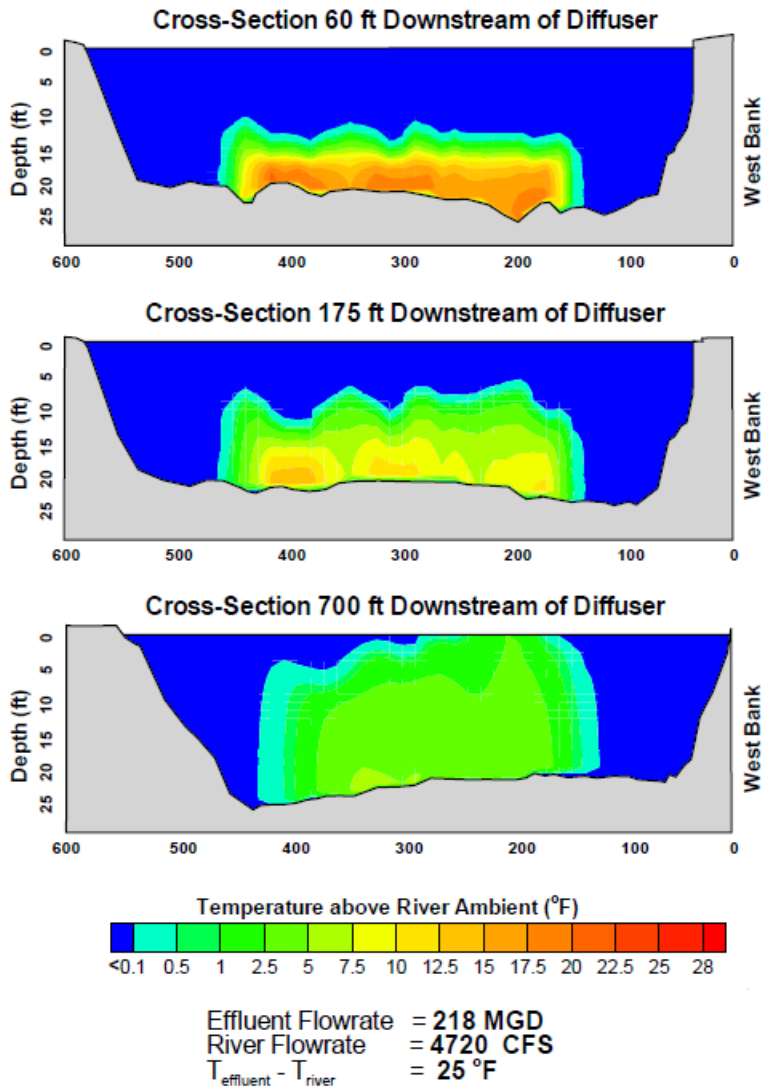
Figure I-3b. Sacramento River Downstream of Freeport Bridge Simulated Temperature changes with the plume 46:1 dilution ration and 25°F temperature difference[6] (Typical Condition)



[1] 2010 study, Appendix B, Attachment A

[2] "Worst-case is based on the minimum 14:1 (river:effluent) flow ratio and the maximum instantaneous effluent-river temperature differential for each month. The 14:1 flow ratio is expected to occur <1% of the time over the long term." 2010 study, pg. 26

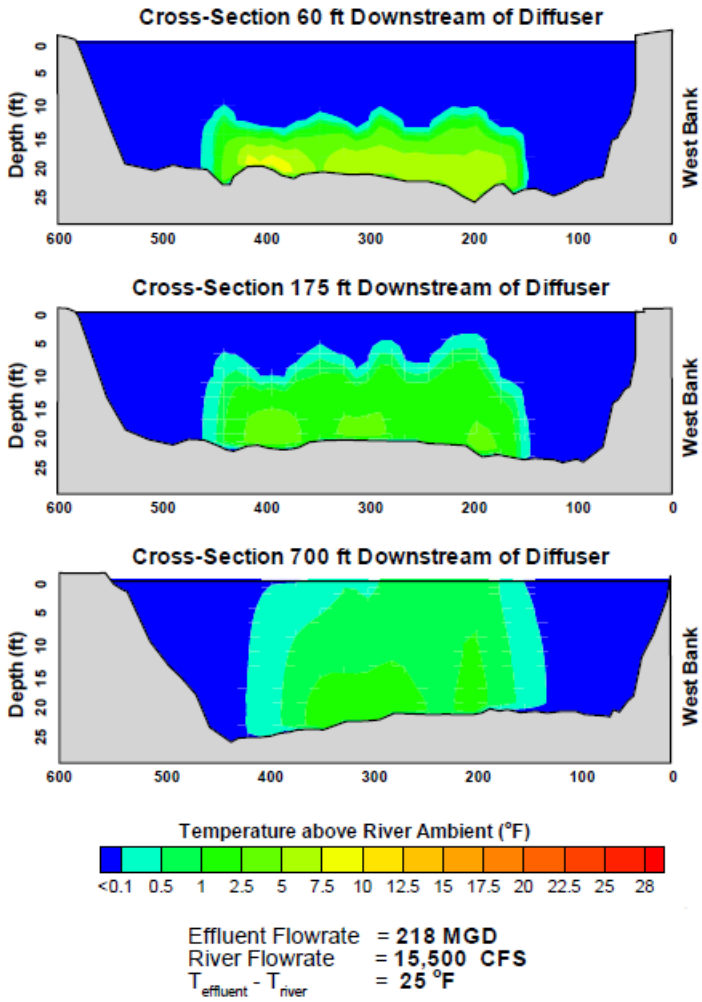
Figure I-4a. Sacramento River Downstream of Freeport Bridge Simulated Temperature changes with the plume 14:1 dilution ration and 25°F temperature difference [1](Worst-Case Condition[2])



[1] 2010 study, Appendix B, Attachment A

[2] "Worst-case is based on the minimum 14:1 (river:effluent) flow ratio and the maximum instantaneous effluent-river temperature differential for each month. The 14:1 flow ratio is expected to occur <1% of the time over the long term." 2010 study, pg. 26

Figure I-4b. Sacramento River Downstream of Freeport Bridge Simulated Temperature changes with the plume 46:1 dilution ration and 25°F temperature difference [1] (Typical Condition)[2]



Far-Field Thermal Plume Modeling

Thermal Plan Objective 5.A.(1)c requires that, "*No discharge shall cause a surface water temperature rise greater than 4°F above the natural temperature of the receiving waters at any time or place.*" SRWTP complies with this objective. While Thermal Plan Objectives 5.A.(1)a and 5.A.(1)b have been established to protect aquatic life from near-field thermal effects, Thermal Plan Objective 5.A.(1)c is required to guard against far-field temperature changes.

Under fully mixed conditions in the far-field, Table I-2 demonstrates that Sacramento River temperatures would not change measurably whether SRWTP is operated to meet the Thermal Plan objectives or with the exceptions. In the 2013 study, incremental temperature changes

[1] 2010 study, Appendix B, Attachment A

[2] "Typical is based on the median (50th percentile) or near-median flow ratio of 46:1 and the median monthly or period effluent-river temperature differential based on data collected by the SRCSD from February 13, 1993 through June 30, 2010. This condition approximates conditions that would occur on a regular basis." 2010 study, pg. 26

were modeled for the 82-year (1922-2003) hydrologic period of record when complying with the Thermal Plan objective 5.A.(1)a year-round (20°FΔT) and the proposed exception (25°F ΔT) at a 181 mgd (ADWF) SRWTP discharge condition. The modeling demonstrated there were minimal changes in temperature whether SRWTP complied with the Thermal Plan objective or if the exception was allowed. At the 50th percentile there was no change in downstream temperature whether complying with the 20°FΔT objective or with the 25°F ΔT exception. At the 99.91 percentile the maximum differential was only 0.09ºF (December). [1]

Table I-2. Percent exceedance of modeled lower Sacramento River water temperatures for the 82-year (1922-2003) hydrologic period of record when complying with the Thermal Plan objective 5.A.(1)a year-round (20°FΔT) and the current exception (25°F ΔT) at a 181 mgd (ADWF) SRWTP discharge condition. [2]

	River Temperature (°F)			
Percent Exceedance	20°F ΔT Instantaneous	25°F ΔT, Instantaneous	Background Temperature	Change from Background[1]
January				
50%	47.93	47.93	47.66	0.27
99.91%	41.64	41.70	41.11	0.59
February				
50%	49.07	49.07	48.88	0.19
99.91%	41.87	41.88	41.77	0.11
March				
50%	54.20	54.20	54.00	0.20
99.91%	44.73	44.73	44.62	0.11
April				
50%	58.03	58.03	57.82	0.21
99.91%	50.02	50.02	49.89	0.13
October				
50%	62.10	62.10	61.72	0.38
99.91%	54.84	54.84	54.37	0.47
November				
50%	55.30	55.30	54.90	0.40
99.91%	47.80	47.84	47.40	0.44
December				
50%	49.64	49.64	49.27	0.37
99.91%	41.73	41.82	41.28	0.54

[1] Change from background is resultant fully mixed river temperature minus background temperature when operating to the current exception to Thermal Plan objective 5.A.(1)a when it applies during the months October through April.

[1] The findings and conclusions relating to Code of Federal Regulations, title 40, section 125.73(a) are based on the entire thermal effect of the discharge.

[2] 2013 study, Table 11.

- **The thermal plume does not increase predation.**

  The relative abundance of predatory fishes was highest at the diffuser and plume sites compared to other reference sites. However, a very low percentage of the predatory fish hold for more than a few hours at the diffuser; rather, most fish were determined to be moving through the area rather rapidly. Overall, only a small proportion of tagged predators occurred in the boundary of the SRWTP thermal plume, of which only one striped bass (i.e., <1% of all tagged predators tracked in the array) held in the boundary of the thermal plume for an extended period of time.

  Based on the findings of the temperature studies, large numbers of predatory fishes are not holding at the diffuser site due to elevated water temperatures. Predatory fishes present near the SRWTP diffuser are typically not holding for extended periods of time and their numbers and location within the channel cannot be explained by SRWTP discharge rate or plume temperatures.

  Any predation that may be occurring on ESA-listed fishes near the SRWTP diffuser is occurring at rates no higher than elsewhere in the lower Sacramento River, upstream and downstream of the diffuser site.

- **No demonstrable negative impacts to aquatic organisms when considering cumulative effects**

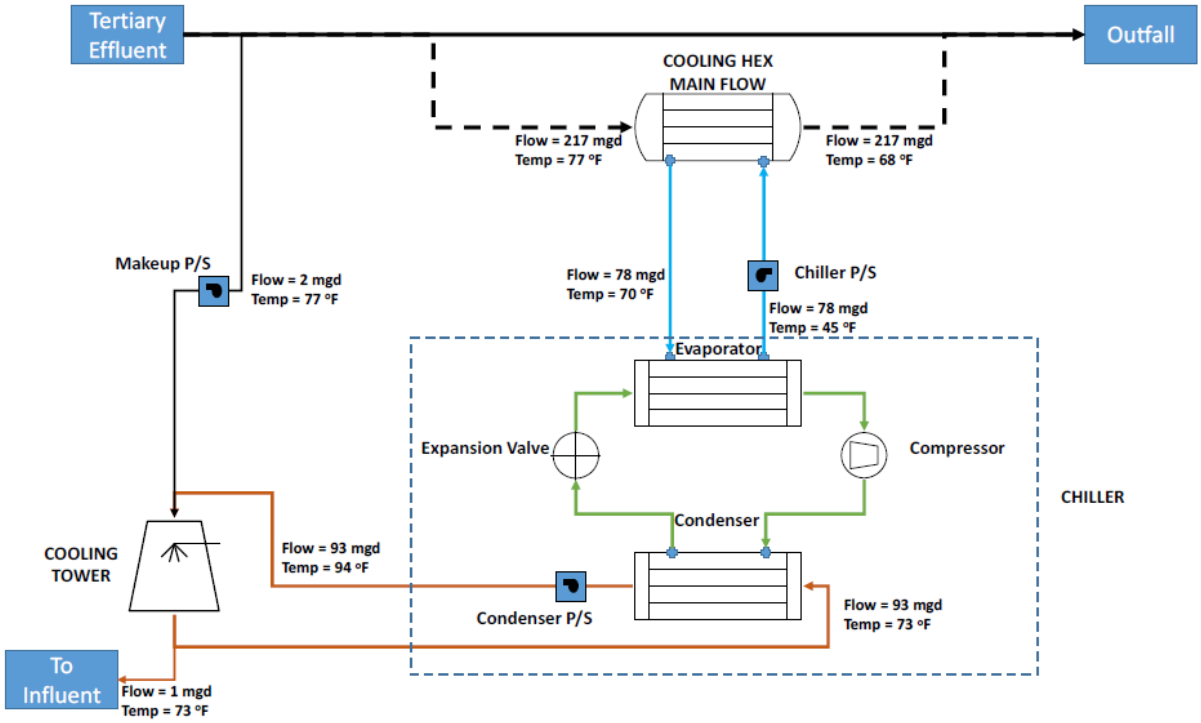
  Consideration of cumulative effects of all stressors presently acting upon the aquatic species assessed is inherent in the temperature studies as the analyses are based on the environment in which the species assessed exist, including actual river temperatures resulting from all actions that affect temperature. In addition, the assessments and findings have taken into account all other environmental stressors acting upon the populations of aquatic organisms within the lower Sacramento River (including the ESA-listed status of certain species), into which SRWTP discharges.

  Aquatic organisms passing through the near-field thermal plume area would not experience any chronic, adverse thermal effects when SRWTP is operating under the current Thermal Plan exceptions and alternate effluent and receiving water limitations included in this Order. Because no chronic adverse thermal effects to any of the representative, sensitive, and important species assessed would occur when passing through the near-field plume area, there are no effects to cumulate with other adverse effects or stressors to the aquatic organisms. Similarly, in the far-field area, at and downstream of where the SRWTP effluent discharge initially becomes fully mixed with lower Sacramento River flow, the negligible thermal changes in the river from operating under the alternative temperature limitations would not exacerbate or cumulate with other stressors to aquatic life in the far-field and thus would not make other stressors worse (e.g., water quality stressors, predation, food web dynamics).

- **Compliance with the Thermal Plan objectives would substantially increase the carbon footprint of the Facility for no demonstrable water quality improvement.**

  A water-cooled chiller system would be needed to comply with the Thermal Plan objectives. Evaporative coolers are generally used in these situations, but in this case would not work. Evaporative coolers rely on evaporative cooling to reduce the temperature of the discharge. However, the time of year when the cooling is needed for SRWTP is during cooler months, which would make the evaporative coolers ineffective. A schematic of a chiller system including water cooled chillers, cooling towers, and effluent heat exchangers is shown in Figure I-5.

Figure I-5. Process Flow and Temperature Schematic for Effluent Cooling



The total project costs for thermal compliance are estimated to be approximately $638,000,000 escalated to the midpoint of construction.

The largest operating cost for the project is electric power, estimated to be 70 MW at full load. SRWTP currently has an electrical power draw of approximately 12 MW. The estimated energy cost is approximately $5 million per year.[1]

- **State and federal fishery agencies do not object to allowance of exceptions**

  The fishery agencies participated during development of the 2013 and 2015 Temperature studies. The fishery agencies technically assisted the Discharger in developing the proper goals, questions, and objectives to be addressed by the Temperature Studies, and to design the field study elements to obtain the needed information for the study questions.

  After the Temperature Studies were completed, the fishery agencies provided technical assistance for the review of the studies and do not object to allowance of the exceptions. See section 4. Permitting/Litigation History for details regarding the fishery agencies comments and recommendations.

- **State Water Board concurrence with Thermal Plan exceptions**

  The Thermal Plan states that, "Regional Boards may, in accordance with Section 316(a) of the Federal Water Pollution Control Act of 1972, and subsequent federal regulations including 40 CFR 122, grant an exception to Specific Water Quality Objectives in this Plan. Prior to becoming effective, such exceptions and alternative less stringent requirements must receive

[1] Memorandum submitted by the Discharger on 11 December 2015, "Project Cost and Schedule for Compliance with Thermal Plan without Seasonal Exception".

the concurrence of the State Board." (Thermal Plan, General Water Quality Provisions) To satisfy this requirement, on 14 January 2016, Central Valley Water Board staff provided the rationale and technical justification for allowance of the Thermal Plan exceptions to the State Water Board.[1] State Water Board staff reviewed the information and provided a memorandum on 11 March 2016, stating that, "The information submitted appears adequate to support the need for a Thermal Plan exception for the SRWTP. Therefore, following approval action by the Central Valley Regional Water Quality Control Board (Regional Water Board), State Water Board staff will recommend concurrence by the State Water Board for the Thermal Plan exceptions."

4. Permitting/Litigation History

a. 2010 Permit Renewal with Thermal Plan Exceptions

i. Background

- The Central Valley Water Board, on 26 May 1989, adopted Resolution 89-094 granting exceptions to objectives 5A(1)(a) and 5A(1)(b) of the Thermal Plan. Objective 5A(1)(a) was relaxed such that the temperature of the discharge shall not exceed the natural receiving water temperature by more than 25°F from 1 October through 30 April. Objective 5A(1)(b) was waived.

- The State Water Board, on 20 September 1990, adopted Resolution 90-103 approving and modifying Central Valley Water Board Resolution 89-094. State Water Board Resolution 90-103 approved the exception to objective 5A(1)(a), but deferred a decision on the exception to 5A(1)(b). It required the Discharger to study the feasibility of meeting objective 5A(1)(b). The Discharger submitted the required study in a report in October 1991, with supplements in November and December 1991. Based on the study, the State Water Board found that the heat load contributed by the Dischargers effluent did not pose a threat to aquatic life, including salmon, at any season. The State Water Board adopted Resolution 92-82 on 22 October 1992, granting the Discharger a conditional exception to objective 5A(1)(b) for five years. Specifically, the exception allowed a maximum increase of 2 °F in a zone that does not exceed 25 percent of the cross sectional area of the main river channel at any point. The exception also limited any excursion of objective 5A(1)(b) to no more than one hour per day as an average in any thirty-day period when the upstream temperature of the Sacramento River is 65 °F or greater. The Central Valley Water Board adopted Resolution 5-00-192 approving use of these exceptions. These requirements were implemented in Waste Discharge Requirements Order 5-00-188 adopted in August 2000.

- As a condition of Order 5-00-188, the Discharger completed and submitted a study assessing the thermal impacts of its discharge in the Sacramento River to the National Marine Fisheries Services (NMFS), titled "Thermal Effects of Sacramento Regional Wastewater Treatment Plant Discharges on Migrating Fishes of the Sacramento River, February 2005." The thermal impact assessment recommended continuation of the existing thermal plan exceptions. The 2005 Thermal Study was reviewed by NMFS staff and they did not indicate any concerns with the Thermal Plan exceptions.

[1] Memorandum from Pamela Creedon, Executive Officer, Central Valley Water Board to Tom Howard, Executive Director, State Water Board, 14 January 2016

ii. 2010 Temperature Study

- In July 2010, the Discharger submitted a temperature study developed by Robertson-Bryan, Inc., "Thermal Plan Exception Justification for the Sacramento Regional Wastewater Treatment Plant", (2010 study), and requested revised Thermal Plan exceptions. The study consisted of thermal assessment and fisheries assessment. The thermal assessment characterized the temperatures in the vicinity and downstream of the diffuser at the design flow rate under worse-case and typical flow conditions, and evaluated the temperature conditions against the thermal tolerances, exposure times, and migration paths of fishes that pass the diffuser. The fisheries assessment addressed 1) the potential for blockage/significant delay of upstream spawning migrations of adult anadromous fish that could be caused by the near-field thermal plume, 2) potential for population-level effects resulting from mortality in fish caused by acute exposure, and 3) potential for population or community-level effects on fish resulting from far-field thermal effects.

  Based on the dynamic model performed by Flow Science, under all near-field conditions modeled, a zone of passage approximately 75-100 feet wide occurs along the west bank and 175-200 feet wide occurs along the east bank. Also the warmest part of the thermal plume is located close to the bottom of the river where few fish are expected to be exposed and exposure time ranges from seconds to minutes. Actively swimming fishes can readily avoid unfavorable temperatures within the plume by swimming around or over the portions of the plume. Therefore, a thermally tolerable zone of passage exists for all actively swimming fish species that pass the diffuser and the thermal plume would not cause lethality to emigrating fishes or have adverse population- or community-level effects to the anadromous or resident fishes. In addition, far-field temperature modeling results indicate that under fully-mixed conditions the discharge would not adversely affect aquatic life resources of the Sacramento River.

iii. Fishery Agencies Comments/Recommendations

- During the 2010 permit renewal process, Central Valley Water Board staff coordinated with the fishery agencies regarding the Discharger's proposed Thermal Plan exceptions. Staff issued a public scoping document regarding aquatic life and wildlife preservation related issues and provided the scoping document for public review and comment on 28 April 2010.

  NMFS[1] stated, "…listed species have sufficient swimming abilities to readily avoid the thermal component of this stressor." However, NMFS expressed concerns that the area of thermal mixing at the outfall diffuser had a potential to attract non-native predators of the listed species under the Endangered Species Act (ESA)[2] and recommended a predation study be performed. USFWS[3] recommended the exception from Order 5-00-188 be retained and no further exception be permitted. Additionally, USFWS recommended the Discharger initiate planning to address future

[1] Letter from NMFS to the Central Valley Water Board dated 12 September 2010 (NMFS 2010).
[2] Specifically, Sacramento River winter-run Chinook Salmon (*Oncorhynchus tshawytscha*), Central Valley spring-run Chinook salmon (*O. tshawytscha*), California Central Valley steelhead (*O. mykiss*), and the Southern distinct population segment of North American green sturgeon (*Acipenser medirostris*).
[3] Letter from USFWS to Central Valley Water Board dated 18 August 2010 (USFWS 2010).

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. USFWS was also concerned about the potential of thermal discharges to create winter thermal refugia for non-native predators and the lack of information for the protection of delta smelt, and recommended the renewed 2010 permit include a temperature study requirement.

- The recommendations from the fishery agencies were incorporated into the tentative NPDES permit that was issued on 3 September 2010. The tentative permit continued the Thermal Plan exceptions from Order 5-00-188 and required the Discharger to conduct a new temperature study to evaluate the concerns regarding predation. NMFS, USFWS, and CDFW concurred with the temperature requirements in the tentative permit. In their comments to the tentative Order, NFMS reiterated its recommendation about the predation study; USFWS acknowledged the incorporation of the thermal study and consented the permit provisions were protective of fish and wildlife related beneficial uses; and CDFW supported the inclusion of the temperature study to evaluate the protection of delta smelt and the Sacramento River biota.

b. California Sportfishing Protection Alliance (CSPA) Litigation

Following the 2010 permit renewal, CSPA filed a petition with the State Water Resources Control Board (State Water Board). The State Water Board reviewed the permit and issued Water Quality Order WQ-2012-0013 in December 2012 that for the most part upheld the permit with minimal revisions required. The State Water Board Order did not address or require changes to thermal limitations. CSPA subsequently filed a lawsuit with the Sacramento Superior Court (Court). One of the issues raised by CSPA was related to the allowance of Thermal Plan exceptions in the 2010 Permit.

In October 2014, the Court ruled that the 2010 Permit failed to include the proper findings for a Thermal Plan exception and ordered the Central Valley Water Board to vacate the Thermal Plan exceptions and reconsider the issue of whether Thermal Plan exceptions may be granted.

c. Permit Amendment in 2015 continuing Thermal Plan Exceptions

i. 2013 Temperature Study and Fishery Agencies Comments

- After adoption of the 2010 Order, the Discharger contracted with Robertson-Bryan, Inc. to begin development of a work plan for conducting the temperature study. The fishery agencies participated in the development of the study work plan, and in March 2013, the Discharger submitted the required temperature study, “Temperature Study to Assess the Thermal Impacts on the Sacramento Regional Wastewater Treatment Plant Discharge on Aquatic Life of the Lower Sacramento River” (2013 study), to address the concerns of the fishery agencies. The study determined that:

  - Fish species (Chinook salmon, steelhead, delta smelt, green sturgeon, longfin smelt, Sacramento splittail, hardhead, Pacific lamprey, or river lamprey), phytoplankton, zooplankton, and benthic macroinvertebrates (BMI) would not experience thermal exposures that would exceed lethal or sub-lethal thresholds.

  - The thermal plume near the diffuser did not block/delay upstream migration of adult fishes or downstream migration of larval and juvenile fishes. The discharge

upon its full mixing with river flow would not block upstream adult migration of Chinook salmon or other migratory fish species.

- Large numbers of predatory fishes were not holding at the diffuser site due to elevated water temperatures. The study found that predation rates on Chinook salmon smolts emigrating past the diffuser were no higher than elsewhere in the lower Sacramento River, upstream and downstream of the diffuser site.

- The migratory and resident predatory fishes tracked did not congregate and hold within the plume for continuous periods of time sufficient to result in exposure durations that would cause acute or chronic toxicity, based on plume water quality.

- Discharges did not increase river temperatures, upon full mixing, by magnitude and duration that would be of concern for aquatic life in the lower Sacramento River or Delta.

- NMFS[1] reviewed the study in June 2014 and found that, "…Chinook salmon, steelhead, green sturgeon, as well as the other aquatic species examined migrating past the diffuser location and within the thermal plume would not experience thermal exposure that would exceed lethal or sub-lethal thresholds… " , "…juvenile Chinook salmon are not delayed or blocked by the thermal plume in their downstream migration and that based on the tracks of the individual fish, do not exhibit any apparent erratic behavior when encountering the thermal plume.", and "…the predation upon juvenile Chinook salmon within the close vicinity of the diffuser appeared to be minimal to nonexistent."

- USFWS[2] reviewed the study and provided comments on 18 December 2013, which stated, "The final report of the temperature study is generally complete and is mostly consistent with the Work Plan developed with stakeholders that was completed in June 2011. There are, however, a few omissions in the study which prevent the Service from fully evaluating the thermal effects of the facility on delta smelt." The USFWS recommended that the Discharger modify the current study or provide additional analyses on delta smelt. In response, the Discharger provided an amendment to the analysis in May 2015 as discussed below.

ii. 2015 Delta Smelt Addendum

- In May 2015, the Discharger submitted an addendum developed by Robertson-Bryan, Inc, "Temperature Study to Assess the Thermal Impacts on the Sacramento Regional Wastewater Treatment Plant Discharge on Aquatic Life of the Lower Sacramento River: Delta Smelt Addendum" (2015 Delta Smelt addendum). This addendum assessed the potential direct and indirect effects of the thermal discharge on all delta smelt life stages such as adults, larvae, and post-spawn adults, and on delta smelt critical habitat. The study concluded that the discharge "…would not cause lethality to individual delta smelt, result in chronic, adverse sublethal effects, adversely modify delta smelt critical habitat, prevent sustainability or recovery of the delta smelt population, or eliminate access to critical habitat primary constituent elements."

[1] Letter from NFMS to Central Valley Water Board dated 2 June 2014 (NMFS 2014).
[2] Letter from USFWS to Central Valley Water Board dated 18 December 2013 (USFWS 2013).

iii. Central Valley Water Board's Findings in July 2015 Amended Order

The federal regulations do not require approval of the Thermal Plan exceptions by the fishery agencies. In this case however, the Central Valley Water Board coordinated with the fishery agencies to provide additional support for the Central Valley Water Board's findings. The Central Valley Water Board found the Discharger's studies adequately demonstrate the following:

- The thermal plume from the discharge will show no direct acute or chronic thermal effects on fishes (including larval and juvenile life stages), benthic macroinvertebrates, or plankton. The thermal exposures, either in the near-field plume area or far-field downstream areas would not exceed lethal or sub-lethal effect thresholds for aquatic life.

- There is a sufficient zone of passage such that the thermal plume from the discharge will not result in blockage or significant delay upstream migration of adult fishes or downstream migration of larval and juvenile fishes. The discharge upon its full mixing with river flow would not block or delay upstream adult migration of fish species.

- Predatory fishes were not holding in the warmer water plume near the diffuser, where they could prey upon ESA-listed fishes as they migrate past the diffuser.

- Fishes were not holding within the plume area due to the elevated water temperature for sufficient periods of time to experience toxicity, based on plume water quality. Drifting organisms were also not exposed to elevated temperatures to experience toxicity.

The Discharger had demonstrated that Effluent and Receiving Water Limitations based on the Thermal Plan are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish, and wildlife in and on the body of water into which the discharge is made. This demonstration had shown the Effluent and Receiving Water Limitations for temperature are sufficient, considering the cumulative impact of the thermal discharge together with all other significant impacts on the species affected, to assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made.

In July 2015, the Central Valley Water Board adopted the above findings and Thermal Plan exceptions based on studies required by Order R5-2010-0114-04 completed in March 2013 and May 2015, and comments received from USFWS, CDFW and NMFS.

iv. Court Ruling in October 2015

Following the permit amendments and additional Thermal Plan findings adopted by the Central Valley Water Board in July 2015, CSPA challenged the Board's continued use of the Thermal Plan exceptions. In October 2015, the Court found that the 2013 study met the federal regulatory standard and supported continued use of the exceptions. The Court however, found the 2015 Delta Smelt addendum failed to conclude that the exceptions would support the protection and propagation of a balanced indigenous community of shellfish, fish, and wildlife, and did not contain a finding that the Thermal Plan is more stringent than necessary.

As a result, the Court ordered the Central Valley Water Board to again consider whether the Thermal Plan exceptions are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made. The Court also noted that the record contained no evidence showing whether State Water Board concurrence with the exceptions was obtained, or not required.

v. Temperature Study: Synthesis, Supplemental Analysis and Findings Report

In December 2015, the Discharger submit a report, "Regional San Temperature Study: Synthesis, Supplemental Analysis and Findings Report " (2015 report). The report provided the science-based findings that directly address the regulatory standard (40 CFR section 125.73(a)) for the granting of exceptions to the Thermal Plan for SRWTP and alternative limitations. In addition to the conclusions of the previous temperature studies, the report included characterization of a balanced, indigenous community of aquatic organisms in the lower Sacramento River, and factors that affect such a community. It established a context for analyses and conclusions regarding the thermal effects of the SRWTP discharge, and the adequacy of exceptions and alternative limitations under applicable federal regulatory standards.

The 2015 Addendum and 2015 Supplemental Report show that the thermal plume as permitted does not: 1) have lethal or sublethal effects; 2) block or delay migration of fishes due to thermal conditions; 3) attract predatory fishes; 4) cause acute or chronic toxicity to fish; 5) increase river temperatures that would be of concern for aquatic life. Therefore, these conclusions support the Central Valley Water Board's staff finding that the Thermal Plan objectives are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of fish, shellfish, and wildlife in and on the Sacramento River and Delta. The studies further support the Central Valley Water Board's finding that the alternative limitation, considering the cumulative impact of the thermal discharge together with all other significant impacts on species affected, will assure the protection and propagation of a balanced, indigenous community of fish, shellfish, and wildlife in and on the Sacramento River and Delta.

vi. Fishery Agency Comments on 2015 Delta Smelt Addendum

- In December 2015, USFWS[1] reviewed the addendum and found that the addendum addressed the areas of information that were previously omitted, referenced all relevant and up-to-date scientific literature on the ecology and thermal tolerance of Delta smelt, and the conclusions provided in the addendum were clear, logical and supported by the modeling outputs. Therefore, USFWS completed the technical review of the thermal effects of SRWTP and would not require any additional information or studies.

- In January 2016, CDFW[2] reviewed the addendum and supported both the purpose and development of the study. Based on the data gathered during the study, CDFW agreed with the conclusions that the thermal plumes resulting from discharges from the SRWTP would not cause a blockage of the river channel, related to fish passage.

[1] Letter from USFWS to Central Valley Water Board dated 28 December 2015 (USFWS 2015).
[2] Letter from CDFW to Central Valley Water Board dated 19 January 2016 (CDFW 2016).

No additional studies would be needed to evaluate SRWTP's thermal plume impacts at the point of discharge.