

B. Chronic Toxicity Testing. The Discharger shall conduct three species chronic toxicity testing 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 quarterly three species chronic toxicity testing.
2. *Sample Types.* Effluent samples shall be flow proportional 24-hour composites and shall be representative of the volume and quality of the discharge. The effluent samples shall be taken at the effluent monitoring location specified in the Monitoring and Reporting Program. The receiving water control shall be a grab sample obtained from the RSW-001 sampling location, as identified in the 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:
 - The cladoceran, water flea, *Ceriodaphnia dubia* (survival and reproduction test);
 - The fathead minnow, *Pimephales promelas* (larval survival and growth test); and
 - 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-4, below. The receiving water control shall be used as the diluent (unless the receiving water is toxic).

If the receiving water is toxic, laboratory control water may be used as the diluent, in which case, the receiving water should still be sampled and tested to provide evidence of its toxicity.

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 Special Provisions VI. C.2.a.iii.)

Table E-4. Chronic Toxicity Testing Dilution Series

Sample	Dilutions (%)					Controls	
	100	75	50	25	12.5	Receiving Water	Laboratory Water
% Effluent	100	75	50	25	12.5	0	0
% Receiving Water	0	25	50	75	87.5	100	0
% Laboratory Water	0	0	0	0	0	0	100

C. WET Testing Notification Requirements. The Discharger shall notify the Regional Water Board within 24-hrs 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 Regional Water Board within 30 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 monthly discharger self-monitoring reports 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 discharger self-monitoring reports and reported as percent survival.
3. **TRE Reporting.** Reports for Toxicity Reduction Evaluations shall be submitted in accordance with the schedule contained in the Discharger's approved TRE Work 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

Not Applicable.

VII. RECLAMATION MONITORING REQUIREMENTS

Not Applicable.

VIII. RECEIVING WATER MONITORING REQUIREMENTS – SURFACE WATER AND GROUNDWATER

A. Monitoring Location RSW-001 and RSW-002

1. The Discharger shall monitor Old River at RSW-001 and RSW-002 as follows:

Table E-5. Receiving Water Monitoring Requirements^[1]

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Hardness ^[2]	mg/L CaCO ₃	Grab	1/month	[3]
Dissolved Oxygen	mg/L	Grab	1/month	[3]
pH	pH units	Grab	1/month	[3]
Turbidity	NTUs	Grab	1/month	[3]
Temperature	°F (°C)	Grab	1/month	[3]
Fecal Coliform	MPN/100 mL	Grab	1/quarter	[3]
Electrical Conductivity @ 25°C	µmhos/cm	Grab	2/month	[3]
Total Dissolved Solids	mg/L	Grab	2/month	[3]
Chloride	mg/L	Grab	2/month	[3]
Direction of Old River flow	North / South	Observation	Whenever sampling	
Standard Observations	---	---	1/month	[4]

- [1] Sampling at RSW-001 and RSW-002 shall occur concurrently.
- [2] Samples must be collected concurrently with metals sampling for EFF-001.
- [3] Pollutants shall be analyzed using the analytical methods described in 40 CFR 136; for priority pollutants the methods must meet the lowest minimum levels (MLs) specified in Attachment 4 of the SIP. Where no methods are specified for a given pollutant, the pollutant analysis must be conducted using methods approved by this Regional Water Board or State Water Board.
- [4] Standard observations of the reach of Old River bounded by RSW-001 and RSW-002 noting the presence or absence of floating or suspended matter; discoloration; bottom deposits; aquatic life; visible films, sheens, or coatings; fungi, slimes, or objectionable growths; and potential nuisance conditions shall be recorded in a log, and conditions shall be summarized in the monitoring report.

IX. OTHER MONITORING REQUIREMENTS

A. Biosolids

1. Monitoring Location BIO-001

- a. A composite sample of sludge shall be collected annually at Monitoring Location BIO-001 in accordance with EPA's POTW Sludge Sampling and Analysis Guidance Document, August 1989, and tested for priority pollutants listed in 40 CFR section 122 Appendix D, Tables II and III (excluding total phenols).
- b. A composite sample of dried sludge from the drying beds shall be collected when sludge is removed for disposal in accordance with USEPA's POTW Sludge Sampling and Analysis Guidance Document, August 1989, and tested for the metals listed in Title 22.
- c. Sampling records shall be retained for a minimum of **five years**. A log shall be kept of sludge quantities generated and of handling and disposal activities. The frequency of entries is discretionary; however, the log should be complete enough to serve as a basis for part of the annual report.
- d. Upon removal of sludge, the Discharger shall submit characterization of sludge quality, including sludge percent solids and quantitative results of chemical analysis for the priority pollutants listed in 40 CFR 122 Appendix D, Tables II and III (excluding total phenols). Suggested methods for analysis of sludge are provided in USEPA publications titled "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods" and "Test Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater". Recommended analytical holding times for sludge samples should reflect those specified in 40 CFR 136.6.3(e). Other guidance is available in USEPA's POTW Sludge Sampling and Analysis Guidance Document, August 1989.

B. Municipal Water Supply

1. Monitoring Location SPL-001

The Discharger shall monitor the Municipal Water Supply at SPL-001 as follows. A sampling station shall be established where a representative sample of the municipal water supply can be obtained. Municipal water supply samples shall be collected at approximately the same time as effluent samples. Municipal water supply samples collected and analyzed by other agencies may be submitted, provided the required information is provided.

Table E-6. Municipal Water Supply Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Total Dissolved Solids	mg/L	Grab	1/year	[3]
Electrical Conductivity @ 25°C ^[1]	µmhos/cm	Grab	1/year	[3]
Chloride	mg/L	Grab	1/year	[3]
Standard Minerals ^[2]	mg/L	Grab	1/year	[3]

[1] If the water supply is from more than one source, the EC shall be reported as a weighted average and include copies of supporting calculations.

[2] Standard minerals shall include all major cations and anions and include verification that the analysis is complete (i.e., cation/anion balance).

[3] As specified in 40 CFR Part 136.

C. Groundwater Monitoring Plan – RGW-001 – RGW-003

1. Prior to the construction and/or sampling of any new groundwater monitoring well, the Discharger shall submit plans and specifications to the Regional Water Board for review and approval. Once installed, all new wells shall be added to the MRP and shall be sampled and analyzed according to the schedule below.

Prior to sampling, the wells shall be pumped until the temperature, specific conductivity and pH have stabilized to ensure representative samples.

Table E-7. Groundwater Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Groundwater Elevation	feet	---	1/quarter	Observation
Depth to Groundwater	feet	---	1/quarter	Observation
Nitrate	mg/L	Grab	1/quarter	[1]
Total Coliform Bacteria	MPN/100 mL	Grab	1/quarter	[1]
Electrical Conductivity	µmhos/cm	Grab	1/quarter	[1]
pH	pH units	Grab	1/quarter	[1]

[1] As specified in 40 CFR Part 136.

2. Groundwater monitoring results shall be submitted monthly; the monthly report shall include a site map showing the location and surveyed elevation (to the nearest one-hundredth of foot above mean sea level) of the wells and the current direction of groundwater flow.
3. A groundwater report shall be submitted annually. The report shall contain a brief written description of any groundwater investigation and sampling work completed for the year, a site map showing the location of all monitoring wells, and tables showing all groundwater monitoring data collected during the previous calendar year, including groundwater depth and elevation data, pH, EC, and all other monitored parameters.

D. Ultraviolet Disinfection System

1. Monitoring Location UVS-001

1. The Discharger shall monitor USV-001 as follows:

Table E-8. Ultraviolet Disinfection System Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Flow rate	mgd	Meter	Continuous
Turbidity ¹	NTU	Meter	Continuous
Number of UV banks in operation	Number	Meter	Continuous
UV Transmittance	Percent (%)	Meter	Continuous
UV Power Setting	Percent (%)	Meter	Continuous
UV Dose ²	MW-sec/cm ²	Calculated	Continuous

¹ Report daily average turbidity and maximum. If the influent exceeds 10 NTU, collect a sample for total coliform and report the duration of the turbidity exceedance.

² Report daily minimum UV dose, daily average UV dose, and weekly average UV dose. For the daily minimum UV dose, also report associated number of banks, gallons per minute per lamp, power settings, and UV transmittance used in the calculation. If effluent discharge has received less than the minimum UV dose and is not diverted from discharging to Old River, report the duration and dose calculation variables associated with each incident.

X. REPORTING REQUIREMENTS

A. General Monitoring and Reporting Requirements

1. The Discharger shall comply with all Standard Provisions (Attachment D) related to monitoring, reporting, and recordkeeping.
2. Upon written request of the Regional Water Board, the Discharger shall submit a summary monitoring report. The report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous year(s).
3. **Compliance Time Schedules.** For compliance time schedules included in the Order, the Discharger shall submit to the Regional Water Board, on or before each compliance due date, the specified document or a written report detailing compliance or noncompliance with the specific date and task. If noncompliance is reported, the Discharger shall state the reasons for noncompliance and include an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Regional Water Board by letter when it returns to compliance with the compliance time schedule.
4. The Discharger shall report to the Regional Water Board any toxic chemical release data it reports to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to section 313 of the "Emergency Planning and Community Right to Know Act of 1986.
5. **Reporting Protocols.** The Discharger shall report with each sample result the applicable Reporting Level (RL) and the current Method Detection Limit (MDL), as determined by the procedure in 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:

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

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

- iii. Sample results less than the laboratory's MDL shall be reported as "Not Detected," or ND.
 - iv. Dischargers are to instruct laboratories to establish calibration standards so that the ML value (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no time is the Discharger to use analytical data derived from *extrapolation* beyond the lowest point of the calibration curve.
6. **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.

B. Self Monitoring Reports (SMRs)

1. At any time during the term of this permit, the State or Regional Water Board may notify the Discharger to electronically submit Self-Monitoring Reports (SMRs) using the State Water Board's California Integrated Water Quality System (CIWQS) Program Web site (<http://www.waterboards.ca.gov/ciwqs/index.html>). Until such notification is given, the Discharger shall submit hard copy SMRs. The CIWQS Web site will provide additional directions for SMR submittal in the event there will be service interruption for electronic submittal.
2. Monitoring results shall be submitted to the Regional Water Board by the **first day** of the second month following sample collection. Quarterly and annual monitoring results shall be submitted by the **first day of the second month following each calendar quarter, semi-annual period, and year**, respectively.
3. In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner to illustrate clearly whether the discharge complies with waste discharge requirements. The highest daily maximum for the month, monthly and weekly averages, and medians, and removal efficiencies (%) for BOD and Total Suspended Solids, shall be determined and recorded as needed to demonstrate compliance.

4. With the exception of flow, all constituents monitored on a continuous basis (metered), shall be reported as daily maximums, daily minimums, and daily averages; flow shall be reported as the total volume discharged per day for each day of discharge.
5. If the Discharger monitors any pollutant at the locations designated herein more frequently than is required by this Order, the results of such monitoring shall be included in the calculation and reporting of the values required in the discharge monitoring report form. Such increased frequency shall be indicated on the discharge monitoring report form.
6. A letter transmitting the self-monitoring reports shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions.
7. SMRs must be submitted to the Regional Water Board, signed and certified as required by the Standard Provisions (Attachment D), to the address listed below:

Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Dr., Suite #200
Rancho Cordova, CA 95670-6114

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

Table E-9. 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
Weekly	Sunday following permit effective date or on permit effective date if on a Sunday	Sunday through Saturday	Submit with monthly SMR
Monthly	First day of calendar month following permit effective date or on permit effective date if that date is first day of the month	1 st day of calendar month through last day of calendar month	Submit with monthly SMR
Quarterly	Closest of January 1, April 1, July 1, or October 1 following (or on) permit effective date	January 1 through March 31 April 1 through June 30 July 1 through September 30 October 1 through December 31	Submit with monthly SMR the first day of the second month following each calendar quarter

Semiannually	Closest of January 1 or July 1 following (or on) permit effective date	January 1 through June 30 July 1 through December 31	Submit with monthly SMR the first day of the second month following each calendar half year
Annually	January 1 following (or on) permit effective date	January 1 through December 31	Submit with monthly SMR the first day of the second month following each calendar year

C. Discharge Monitoring Reports (DMRs)

- As described in Section X.B.1 above, at any time during the term of this permit, the State or Regional Water Board may notify the Discharger to electronically submit SMRs that will satisfy federal requirements for submittal of Discharge Monitoring Reports (DMRs). Until such notification is given, the Discharger shall submit DMRs in accordance with the requirements described below.
- DMRs must be signed and certified as required by the standard provisions (Attachment D). The Discharger shall submit the original DMR and one copy of the DMR to the address listed below:

Standard Mail	FedEx/UPS/ Other Private Carriers
State Water Resources Control Board Division of Water Quality c/o DMR Processing Center PO Box 100 Sacramento, CA 95812-1000	State Water Resources Control Board Division of Water Quality c/o DMR Processing Center 1001 I Street, 15 th Floor Sacramento, CA 95814

- All discharge monitoring results must be reported on the official USEPA pre-printed DMR forms (EPA Form 3320-1). Forms that are self-generated cannot be accepted unless they follow the exact same format as EPA form 3320-1.

D. Other Reports

- Progress Reports.** As specified in the compliance time schedules required in Special Provisions VI, 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-10. Reporting Requirements for Special Provisions Progress Reports

Special Provision	Reporting Requirements
Mercury Source Reduction Program	1 December, annually
Salinity Reduction Goal	1 June, annually

2. Within **60 days** of permit adoption, the Discharger shall submit a report outlining minimum levels, method detection limits, and analytical methods for approval, with a goal to achieve detection levels below applicable water quality criteria. At a minimum, the Discharger shall comply with the monitoring requirements for CTR constituents as outlined in Section 2.3 and 2.4 of the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California*, adopted 2 March 2000 by the State Water Resources Control Board. All peaks identified by analytical methods shall be reported.

3. The Discharger's sanitary sewer system collects wastewater using sewers, pipes, pumps, and/or other conveyance systems and directs the raw sewage to the wastewater treatment plant. A "sanitary sewer overflow" is defined as a discharge to ground or surface water from the sanitary sewer system at any point upstream of the wastewater treatment plant. Sanitary sewer overflows are prohibited by this Order. All violations must be reported as required in Standard Provisions. Facilities (such as wet wells, regulated impoundments, tanks, highlines, etc.) may be part of a sanitary sewer system and discharges to these facilities are not considered sanitary sewer overflows, provided that the waste is fully contained within these temporary storage facilities.

4. **Annual Operations Report.** By **30 January** of each year, the Discharger shall submit a written report to the Executive Officer containing the following:
 - i. The names, certificate grades, and general responsibilities of all persons employed at the Facility.
 - ii. The names and telephone numbers of persons to contact regarding the plant for emergency and routine situations.
 - iii. A statement certifying when the flow meter(s) and other monitoring instruments and devices were last calibrated, including identification of who performed the calibration.
 - iv. 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.

- v. The Discharger may also be requested to submit an annual report to the Regional 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.

ATTACHMENT F – FACT SHEET

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ATTACHMENT F – FACT SHEET

As described in section II of this Order, this Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order.

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

I. PERMIT INFORMATION

The following table summarizes administrative information related to the facility.

Table F-1. Facility Information

WDID	5B070105003
Discharger	Town of Discovery Bay CSD
Name of Facility	Discovery Bay Wastewater Treatment Plant
Facility Address	1800 Willow Lake Road
	Discovery Bay, CA 94505
	Contra Costa
Facility Contact, Title and Phone	Virgil Koehne, General Manager Town of Discovery Bay CSD , 925-634-1131
Authorized Person to Sign and Submit Reports	Facility Manager, 925-634-8818
Mailing Address	SAME
Billing Address	SAME
Type of Facility	POTW
Major or Minor Facility	Major
Threat to Water Quality	2
Complexity	C
Pretreatment Program	N
Reclamation Requirements	N/A
Facility Permitted Flow	2.1 million gallons per day (mgd)
Facility Design Flow	2.1 mgd (maximum daily dry weather flow)
Watershed	San Joaquin Delta Hydrologic Unit
Receiving Water	Old River
Receiving Water Type	Sacramento-San Joaquin Delta

A. Southwest Water Company is the operator of Discovery Bay Wastewater Treatment Plant, a POTW. The Town of Discovery Bay CSD owns the property at 1800 Willow

Lake Road on which the Facility is located. The Town of Discovery Bay CSD is hereinafter referred to as Discharger.

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 Old River, a water of the United States, and is currently regulated by Order R5-2003-0067, which was adopted on April 25, 2003 and expired on April 1, 2008. The terms and conditions of the current Order have been automatically continued and remain in effect until new Waste Discharge Requirements and NPDES permit are adopted pursuant to this Order.
- C.** The Discharger filed a report of waste discharge and submitted an application for renewal of its Waste Discharge Requirements (WDRs) and National Pollutant Discharge Elimination System (NPDES).

II. FACILITY DESCRIPTION

The Discharger provides sewerage service for the community of Discovery Bay and serves a population of approximately 16,000. The WWTF design dry weather daily average flow capacity is 2.1 mgd.

A. Description of Wastewater and Biosolids Treatment or Controls

The treatment system at the Facility includes two plants (Plant 1 and Plant 2), which each consist of a Hycor headworks screen, an oxidation ditch, two secondary clarifiers, and a shared UV disinfection system. Plant 1 also includes a flow equalization and storage basin (labeled "Emergency Overflow Basin" on Attachment C). The influent is split between the two plants, and treated effluent reconvenes at the shared UV disinfection system at Plant 2.

Sludge handling takes place at Plant 2 and consists of an aerated, clay lined lagoon (referred to as an aerobic digester), two clay lined sludge lagoons, a belt filter press, and two greenhouse solar drying beds. After processing, samples are taken of the dried biosolids to ensure they conform to Class A standards based on the regulations found at 40 CFR Part 503. Sludge is stored on site in the solar drying bed building or adjacent to the building.

B. Discharge Points and Receiving Waters

Plant 1 is located in Section 31, T1N, R3E, MDB&M, and Plant 2 is located in Section 31, T1N, R4E, MDB&M, as shown in Attachment B (Figure B-1), a part of this Order.

Treated municipal wastewater is discharged at Discharge Point 001 to Old River, a water of the United States at a point Latitude 37° 53' 08" N and longitude 121° 34' 30" W.

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

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

Table F-2. Historic Effluent Limitations and Monitoring Data

Parameter	Units	Effluent Limitation			Monitoring Data (1/1/04 – 7/31/07)
		Average Monthly	Average Weekly	Maximum Daily	Highest Daily Discharge
BOD	mg/L	20	40	50	25
	lbs/day	350	700	875	357
TSS	mg/L	30	40	50	60
	lbs/day	525	700	875	756
Total Ammonia	mg/L as N	[1]	---	[1]	4.9
	lbs/day	[1]	---	[1]	51
Chloride	mg/L	650	---	860	400
	lbs/day	11390	---	15071	5711
Copper	mg/L	[2]	---	[2]	110
	lbs/day	[2]	---	[2]	1.28
Electrical Conductivity	µmhos/ cm	2925	---	---	2197
Nitrate (as N)	mg/L	87	---	---	91
	lbs/day	1525	---	---	1147
Nitrate (as NO ₃)	mg/L	392	---	---	403
	lbs/day	6870	---	---	5078
Settleable Solids	mL/L	0.1	---	0.2	0.7
Total Coliform Bacteria	MPN/ 100 mL	---	23 ^[3]	240	1600
TDS	mg/L	1990	---	---	1330
	lbs/day	34874	---	---	20703

[1] Effluent limitations for ammonia in Order No. R5-2003-0067 expressed the USEPA recommended criteria as sliding limits, dependent on pH and temperature. The effluent limitations under the worst case scenario with a pH of 8.1 and a temperature of 26°C were the acute criterion 4.64 mg/L with salmonids present and a 30-day average chronic criterion of 1.00 mg/L.

[2] Effluent limitations for copper in Order R5-2003-0067 were expressed as sliding limits, dependent on hardness up to a hardness of 135 mg/L, at which point the effluent limit was fixed at 165 µg/L. The effluent limitation for copper under the worst case condition of a minimum hardness of 61 mg/L were 55 µg/L as an maximum daily and 30 µg/L as a monthly average.

[3] The total coliform limit is expressed as seven day median.

D. Compliance Summary

The Discharger has been subject to two Administrative Civil Liability Complaints during the term of the previous permit. The first, issued as Order R5-2004-0523, cited 24 serious violations of effluent limitations on copper, and two non-serious violations of effluent limitations for copper and total coliform between April 1, 2002 and March 31, 2004. The second, Order R5-2008-0511, listed 20 non-serious violations of total coliform, copper, and TSS effluent limitations between April 1 2004 and December 31, 2007.

Two sanitary sewer overflows (SSOs) were reported during the term of the previous permit. The first SSO occurred on January 6, 2005 due to a blocked main, which resulted in the release of approximately 5000 gallons to Harbor Bay. The second occurred on June 21, 2005, which was the result of a plugged main. Approximately 700 gallons were released, 5-10 of which entered Indian Bay. Approximately 600 gallons of the overflow were pumped and removed, and the area was sprayed with chlorine solution.

E. Planned Changes

Planning is underway to expand the treatment facility to a design flow of 3.0 mgd.

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

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

A. Legal Authority

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

B. California Environmental Quality Act (CEQA)

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

C. State and Federal Regulations, Policies, and Plans

- 1. Water Quality Control Plans.** The Regional Water Board adopted a *Water Quality Control Plan, Fourth Edition (Revised August 2006), for the Sacramento and San Joaquin River Basins* (Basin Plan) that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. In addition, State Water Board Resolution No. 88-63 requires that, with certain exceptions, the Regional Water Board assign the municipal and domestic supply use to water bodies that do not have beneficial uses listed in the Basin Plan. The beneficial uses of Old River

downstream of the discharge are municipal and domestic supply, agricultural irrigation, agricultural stock watering, industrial process water supply, industrial service supply, water contact recreation, other non-contact water recreation, warm freshwater aquatic habitat, cold freshwater aquatic habitat, warm fish migration habitat, cold fish migration habitat, warm spawning habitat, wildlife habitat, and navigation.

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

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

2. **Thermal Plan.** The State Water Board adopted a *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Water and Enclosed Bays and Estuaries of California* (Thermal Plan) on May 18, 1972, and amended this plan on September 18, 1975. This plan contains temperature objectives for surface waters, including estuaries. The Thermal Plan applies to all discharges to the Sacramento-San Joaquin Delta. Requirements of this Order implement the Thermal Plan.
3. **Bay-Delta Plan.** The State Water Board *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (Bay-Delta Plan) was most recently revised in December 2006. The Bay-Delta Plan identifies the beneficial uses of the estuary and includes objectives for flow, salinity, and endangered species protection. The water quality objectives of the Bay-Delta Plan are implemented as part of this Order.
4. **Antidegradation Policy.** Section 131.12 requires that the state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water.

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

5. **Anti-Backsliding Requirements.** Sections 402(o)(2) and 303(d)(4) of the CWA and federal regulations at title 40, Code of Federal Regulations section 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require that effluent limitations in a reissued permit must be as stringent as those in the previous permit, with some exceptions in which limitations may be relaxed. Compliance with anti-backsliding requirements is discussed in Section IV.D.3.
6. **Emergency Planning and Community Right to Know Act.** Section 13263.6(a), California Water Code, requires that "the Regional Water Board shall prescribe effluent limitations as part of the waste discharge requirements of a POTW for all substances that the most recent toxic chemical release data reported to the state emergency response commission pursuant to Section 313 of the Emergency Planning and Community Right to Know Act of 1986 (42 U.S.C. Sec. 11023) (EPCRA) indicate as discharged into the POTW, for which the State Water Board or the Regional Water Board has established numeric water quality objectives, and has determined that the discharge is or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to, an excursion above any numeric water quality objective".

The Regional Water Board has adopted numeric receiving water objectives for arsenic, barium, copper, cyanide, iron, silver, and zinc applicable to the Sacramento-San Joaquin Delta in the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins* (Basin Plan). As detailed elsewhere in this Permit, available effluent quality data indicate that effluent concentrations of copper and iron do have reasonable potential to cause or contribute to an excursion above numeric water quality objectives included within the Basin Plan. The most recent toxic chemical data report does not indicate any reportable off-site releases or discharges to the collection system for this facility. Therefore, a reasonable potential analysis based on information from Emergency Planning and Community Right to Know Act (EPCRA) cannot be conducted. Based on information from EPCRA, there is no reasonable potential to cause or contribute to an excursion above any numeric water quality objectives included within the Basin Plan or in any State Water Board plan, so no effluent limitations are included in this permit pursuant to CWC section 13263.6(a).

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

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

7. **Stormwater Requirements.** USEPA promulgated Federal Regulations for storm water on 16 November 1990 in 40 CFR Parts 122, 123, and 124. The NPDES Industrial Storm Water Program regulates storm water discharges from wastewater treatment facilities. Wastewater treatment plants are applicable industries under the stormwater program and are obligated to comply with the Federal Regulations.
8. **Endangered Species Act.** This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the Federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). This Order requires compliance with effluent limits, receiving water limits, and other requirements to protect the beneficial uses of waters of the state. The Discharger is responsible for meeting all requirements of the applicable Endangered Species Act.

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

1. Under Section 303(d) of the 1972 Clean Water Act, states, territories and authorized tribes are required to develop lists of water quality limited segments. The waters on these lists do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. On July 25, 2003 USEPA gave final approval to California's 2002 Section 303(d) List of Water Quality Limited Segments. The Basin Plan references this list of Water Quality Limited Segments (WQLSs), which are defined as "...those sections of lakes, streams, rivers or other fresh water bodies where water quality does not meet (or is not expected to meet) water quality standards even after the application of appropriate limitations for point sources (40 CFR 130, et seq.)." The Basin Plan also states, "Additional treatment beyond minimum federal standards will be imposed on dischargers to [WQLSs]. Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment." Old River between the San Joaquin River and the Delta Mendota Canal is 303(d) listed for low dissolved oxygen – this segment of Old River is south of the discharge location. The southern portion of the Delta Waterways, which includes Old River, is also listed for chlorpyrifos, DDT, diazinon, electrical conductivity, exotic species, Group A pesticides, mercury, and unknown toxicity.
2. **Total Maximum Daily Loads.** The USEPA requires the Regional Water Board to develop total maximum daily loads (TMDLs) for each 303(d) listed pollutant and water body combination. The TMDL for mercury for the Sacramento-San Joaquin Delta is currently being developed, and TMDL development for Group A pesticides and DDT is scheduled for completion on 2011. The remaining constituents are scheduled for a proposed TMDL completion in 2019.

E. Other Plans, Policies and Regulations

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

The State Water Board adopted the *Water Quality Control Policy for the Enclosed Bays and Estuaries of California*. The requirements within this Order are consistent with the Policy.

IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

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

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

The CWA requires point source discharges to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations

and other requirements in NPDES permits. There are two principal bases for effluent limitations: 40 CFR §122.44(a) requires that permits include applicable technology-based limitations and standards, and 40 CFR §122.44(d) requires that permits include water quality-based effluent limitations to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water where numeric water quality objectives have not been established. The Regional Water Board's Basin Plan, page IV-16.00, contains an implementation policy ("Policy for Application of Water Quality Objectives") that specifies that the Regional Water Board "will, on a case-by-case basis, adopt numerical limitations in orders which will implement the narrative objectives." This Policy complies with 40 CFR §122.44(d)(1). With respect to narrative objectives, the Regional Water Board must establish effluent limitations using one or more of three specified sources, including (1) 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 Regional Water Board's "Policy for Application of Water Quality Objectives")(40 CFR 122.44(d)(1)(vi) (A), (B) or (C)), or (3) an indicator parameter. The Basin Plan contains a narrative objective requiring that: "All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life" (narrative toxicity objective). The Basin Plan requires the application of the relevant and appropriate objectives necessary to ensure that surface water and groundwater do not contain chemical constituents, discoloration, toxic substances, radionuclides, or taste and odor producing substances that adversely affect beneficial uses. The Basin Plan states that material and relevant information, including numeric criteria, and recommendations from other agencies and scientific literature will be utilized in evaluating compliance with the narrative toxicity objective. The Basin Plan also limits chemical constituents in concentrations that adversely affect surface water beneficial uses. For waters designated as municipal, the Basin Plan specifies that, at a minimum, waters shall not contain concentrations of constituents that exceed Maximum Contaminant Levels (MCL) of CCR Title 22. The Basin Plan further states that, to protect all beneficial uses, the Regional Water Board may apply limits more stringent than MCLs.

A. Discharge Prohibitions

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

B. Technology-Based Effluent Limitations

1. Scope and Authority

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

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

Based on this statutory requirement, USEPA developed secondary treatment regulations, which are specified in Part 133. These technology-based regulations apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by secondary treatment in terms of biochemical oxygen demand (BOD₅), total suspended solids (TSS), and pH.

2. Applicable Technology-Based Effluent Limitations

- a. **BOD₅ and TSS.** Federal Regulations, 40 CFR, Part 133, establish the minimum weekly and monthly average level of effluent quality attainable by secondary treatment for BOD₅ and TSS. A daily maximum effluent limitation for BOD₅ and TSS is also included in the Order to ensure that the treatment works are not organically overloaded and operate in accordance with design capabilities. In addition, 40 CFR 133.102, in describing the minimum level of effluent quality attainable by secondary treatment, states that the 30-day average percent removal shall not be less than 85 percent. This Order contains a limitation requiring an average of 85 percent removal of BOD₅ and TSS over each calendar month. The previous Order required BOD₅ and TSS effluent limitations more stringent than required by 40 CFR Part 133, because the receiving water is listed for low dissolved oxygen. The more stringent effluent limit on BOD₅ effectively prevents the discharge from further contributing to low dissolved oxygen levels in Old River. To satisfy anti-backsliding requirements, this Order retains these effluent limitations. The Discharger's level of treatment has maintained compliance with these effluent limitations during the term of the previous permit.
- b. **pH.** Secondary treatment requirements at 40 CFR Part 133 limit pH between 6.0 and 9.0. The previous Order contained a more stringent limit for pH of 6.5 and 8.5 to protect beneficial uses of the receiving water, and has been retained in the current Order.
- c. **Flow.** The Discovery Bay Wastewater Treatment Plant was designed to provide a secondary level of treatment for up to a design flow of 2.1 mgd. Therefore, this Order contains an Average Daily Discharge Flow effluent limit of 2.1 mgd.

Table F-3. Summary of Technology-based Effluent Limitations

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
BOD ₅ @ 20°C	mg/L	20	40	50	---	---
	lbs/day ^[1]	350	700	875	---	---
TSS	mg/L	30	40	50	---	---
	lbs/day ^[1]	525	700	875	---	---
pH	pH units	---	---	---	6.5	8.5

^[1] Based on a flow of 2.1 mgd.

C. Water Quality-Based Effluent Limitations (WQBELs)

1. Scope and Authority

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

2. Applicable Beneficial Uses and Water Quality Criteria and Objectives

- a. **Receiving Water.** The receiving water for this discharge is Old River, within the San Joaquin Delta Hydrologic Unit. The beneficial uses for the receiving water are described in Section III.C. 1 of this Fact Sheet.
- b. **Hardness.** While no effluent limitation for hardness is necessary in this Order, hardness is critical to the assessment of the need for, and the development of, effluent limitations for certain metals. The *California Toxics Rule* and the *National Toxics Rule* contain water quality criteria for seven metals that vary as a function of hardness, i.e., as the hardness value decreases, the corresponding water quality criteria also decrease. The hardness-dependent metal criteria include cadmium, copper, chromium III, lead, nickel, silver, and zinc. Effluent limitations for the discharge must be set to protect the beneficial uses of the receiving water for all discharge conditions. In the absence of the option of including condition-dependent, "floating" effluent limitations that are reflective of actual hardness conditions at the time of discharge, effluent limitations must be set using a reasonable worst-case condition in order to protect beneficial uses for all discharge conditions. The SIP does not address how to determine hardness for application to the equations for the protection of aquatic life when using

hardness-dependent metals criteria. It simply states, in Section 1.2, that the criteria shall be properly adjusted for hardness using the hardness of the receiving water. The CTR requires that, for waters with a hardness of 400 mg/L (as CaCO₃), or less, the actual ambient hardness of the surface water must be used. It further requires that the hardness values used must be consistent with the design discharge conditions for design flows and mixing zones.¹ The CTR does not define whether the term "ambient," as applied in the regulations, necessarily requires the consideration of upstream as opposed to downstream hardness conditions. The point in the receiving water affected by the discharge is downstream of the discharge. As the effluent mixes with the receiving water, the hardness of the receiving water can change. Therefore, it is appropriate to use the ambient hardness downstream of the discharge that is a mixture of the effluent and receiving water for the determination of the CTR hardness-dependent metals criteria. Recent studies indicate that using the lowest recorded receiving water hardness for establishing water quality criteria is not always protective of the receiving water under various mixing conditions (e.g. when the effluent hardness is less than the receiving water hardness). The studies evaluated the relationships between hardness and the CTR metals criterion that is calculated using the CTR metals equation. The equation describing the total recoverable regulatory criterion is as follows:

Total Recoverable Criterion = $e^{m[\ln(H)] + b}$, where
m = criterion specific constant,
H = effluent hardness, and
b = criterion specific constant

The constants "m" and "b" are specific to both the metal under consideration, and the type of total recoverable criterion, i.e. acute or chronic.

Effluent limitations for the discharge must be set to protect the beneficial uses of the receiving water for all discharge conditions. The State Water Board, in footnote 19 to Water Quality Order No. 2004-0013, stated: "We note that...the Regional Water Board...applied a variable hardness value whereby effluent limitations will vary depending on the actual, current hardness values in the receiving water. We recommend that the Regional Water Board establish either fixed or seasonal effluent limitations for metals, as provided in the SIP, rather than 'floating' effluent limitations."

In the absence of the option of including condition-dependent, "floating" effluent limitations that are reflective of actual conditions at the time of discharge, effluent limitations must be set using a reasonable worst-case condition in order to protect beneficial uses for all discharge conditions. Recent studies indicate that using the receiving water lowest hardness for establishing water quality criteria is not the most protective for the receiving water. The Regional Water Board has evaluated these studies and concurs that for some parameters the beneficial uses of the receiving water are best protected using the lowest hardness value of the effluent, while for some parameters, the use of both the lowest hardness

value of the receiving water and the lowest hardness value of the effluent is most protective.

Because of the non-linearity of the Total Recoverable Criterion equation, the relationship can either be concave upward or concave downward depending in the criterion-specific constants. For those contaminants whereby the regulatory criteria exhibit a concave downward relationship as a function of hardness (e.g., acute and chronic copper, chromium(III), nickel, and zinc; and chronic cadmium), the use of the lowest recorded effluent hardness for establishment of water quality objectives is fully protective of all beneficial uses regardless of whether the effluent or receiving water hardness is higher. For purposes of establishing water quality-based effluent limitations, a reported minimum effluent hardness value of 204 mg/L as CaCO₃ and a minimum receiving water hardness of 32.3 mg/L as CaCO₃ were used.

- c. Assimilative Capacity/Mixing Zone.** The SIP in section 1.4.2 states that dilution credits may be granted to dischargers in calculating effluent limitations. During the term of the previous Order, the Discharger initiated discharge into Old River through a diffuser. Old River in the vicinity of the discharge is influenced by natural tide cycles, and by Delta water exports. The previous Order required a study to verify that the new diffuser achieved the dilution levels the diffuser was designed to achieve, confirm that Old River has sufficient assimilative capacity for the constituents of concern, and examine flow reversals in the receiving water and evaluate conditions during the ten-year, worst-case, low-flow condition within the receiving water. The complete study can be found in the Discharger's Report of Waste Discharge. The mixing zone allowed is 105 feet wide, 13.5 feet deep, and 5 feet in longitudinal diameter. Flow Science conducted a dye study on 6 and 7 December 2005 and conducted diffuser modeling using the Visual Plumes dilution model to determine assimilative capacity of the receiving water for the discharge and initial dilution of the effluent.

The dye study was conducted on those dates due to the results of flow modeling done using the Fischer Delta Model. The dye study was scheduled for a time when the river would be bi-directional and when slack tides would be most likely to occur. Data collected during the study were used to verify model predictions of plume behavior. Prior to the study, a tide/velocity gauge was installed approximately 100 meters south of the diffuser. On the first day of the dye study, a mixture of fluorescent dye and a conservative tracer (lithium, as lithium chloride) were added to the effluent stream. The resulting plume was measured by a boat mounted fluorometer. Periodic grab samples were taken to measure the lithium chloride concentration. On the second day of testing, a second fluorescent dye was added to the effluent. The sampling boat stayed near the diffuser during this test to evaluate diffuser performance.

Field measurements demonstrated the effluent was diluted rapidly after discharge. Measurements of the lithium chloride concentrations were generally consistent with the fluorescent measurements.

The results indicate that for the 10-year worst case concentration of effluent, Old River has an assimilative capacity to provide a dilution of 13.2:1 for the acute condition and a dilution of 23:1 for the chronic condition. Assumed conditions for the worst case scenario included an effluent flow rate of 3.0 mgd, zero river velocity, and low tide. The acute and chronic dilution factors above were utilized in determining effluent limitations for pollutants with reasonable potential. The results of the studies and modeling confirm the mixing zone established in the previous Order are protective and that performance is greater than estimated in the initial mixing zone study (see Order No. R5-2003-0067 for a description of the Zone of Initial Dilution and Assimilative Capacity Analysis). The size of the mixing zone is consistent with that found in Order No. R5-2003-0067.

3. Determining the Need for WQBELs

- a. CWA section 301 (b)(1) requires NPDES permits to include effluent limitations that achieve technology-based standards and any more stringent limitations necessary to meet water quality standards. Water quality standards include Regional Water Board Basin Plan beneficial uses and narrative and numeric water quality objectives, State Water Board-adopted standards, and federal standards, including the CTR and NTR. The Basin Plan includes numeric site-specific water quality objectives and narrative objectives for toxicity, chemical constituents, and tastes and odors. The narrative toxicity objective states "All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life." (Basin Plan at III-8.00.) With regards to the narrative chemical constituents objective, the Basin Plan states that waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. At minimum, "...water designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs)" in Title 22 of CCR. The narrative tastes and odors objective states "Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses."
- b. Federal regulations require effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numerical water quality standard. Based on information submitted as part of the application, in studies, and as directed by monitoring and reporting programs, the Regional Water Board finds that the discharge has a reasonable potential to cause or contribute to an in-stream excursion above a water quality standard for copper, aluminum, salinity, iron, ammonia, and nitrate. Water quality-based effluent limitations (WQBELs) for most of these constituents are included in this Order. A summary of the reasonable potential analysis (RPA) is provided in Attachment G, and a detailed discussion of the RPA for each constituent is provided below.

- c. The Regional Water Board conducted the RPA in accordance with Section 1.3 of the SIP. Although the SIP applies directly to the control of CTR priority pollutants, the State Water Board has held that the Regional Water Board may use the SIP as guidance for water quality-based toxics control.¹ The SIP states in the introduction "The goal of this Policy is to establish a standardized approach for permitting discharges of toxic pollutants to non-ocean surface waters in a manner that promotes statewide consistency." Therefore, except when specified, this Order uses the RPA procedures from the SIP to evaluate reasonable potential for CTR constituents and uses the RPA procedures from the SIP when applicable and appropriate to evaluate reasonable potential for non-CTR constituents.
- d. WQBELs were calculated in accordance with section 1.4 of the SIP, as described in Attachment F, Section IV.C.4.
- e. **Aluminum.** USEPA developed National Recommended Ambient Water Quality Criteria for protection of freshwater aquatic life for aluminum. The recommended 4-day average (chronic) and 1-hour average (acute) criteria for aluminum are 87 µg/L and 750 µg/L, respectively. The Secondary Maximum Contaminant Level - Consumer Acceptance Limit for aluminum is 200 µg/L. During the effective timeframe of the current Order, the Discharger constructed a diffuser and commenced discharging to the Old River. There have been additional upgrades to the treatment system.

Footnote L to the National Recommended Ambient Water Quality Criteria summary table for aluminum indicates that the chronic aquatic life criterion is based on studies conducted under specific receiving water conditions with a low pH (6.5 to 6.8 pH units) and low hardness (<10 mg/L as CaCO₃). Monitoring data demonstrates that these conditions are not similar to those in Old River, which consistently has an upstream pH greater than 7.0 and hardness concentrations ranging from 32 to 156 mg/L. Thus, it is unlikely that application of the chronic criterion of 87 µg/L is necessary to protect aquatic life in Old River.

The MEC for aluminum was 490 µg/L. In the absence of an applicable chronic aquatic life criterion, the most stringent water quality criterion is the Secondary MCL - Consumer Acceptance Limit for aluminum of 200 µg/L. An annual average effluent limitation of 200 µg/L is being established. Based on the Discharger's effluent data, it is feasible for the Discharger to comply immediately with these limitations.

- f. **Ammonia.** Untreated domestic wastewater contains ammonia. Nitrification is a biological process that converts ammonia to nitrite and nitrite to nitrate. Denitrification is a process that converts nitrate to nitrite or nitric oxide and then to nitrous oxide or nitrogen gas, which is then released to the atmosphere. The

¹ See, Order WQO 2001-16 (Napa) and Order WQO 2004-0013 (Yuba City)

Discharger currently uses nitrification and denitrification to remove ammonia from the waste stream. The oxidation ditches at both plants operate for nitrification and denitrification, and discharge low concentrations of ammonia. Inadequate or incomplete nitrification may result in the discharge of ammonia to the receiving stream. Ammonia is known to cause toxicity to aquatic organisms in surface waters. Discharges of ammonia would violate the Basin Plan narrative toxicity objective. Applying 40 CFR section 122.44(d)(1)(vi)(B), it is appropriate to use USEPA's Ambient National Water Quality Criteria for the Protection of Freshwater Aquatic Life for ammonia, which was developed to be protective of aquatic organisms.

USEPA's *Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life*, for total ammonia, recommends acute (1-hour average; criteria maximum concentration) standards based on pH and chronic (30-day average, criteria continuous concentration) standards based on pH and temperature. It also recommends a maximum four-day average concentration of 2.5 times the criteria continuous concentration. USEPA found that as pH increased, both the acute and chronic toxicity of ammonia increased. Salmonids were more sensitive to acute toxicity effects than other species. However, while the acute toxicity of ammonia was not influenced by temperature, it was found that invertebrates and young fish experienced increasing chronic toxicity effects with increasing temperature. USEPA's recommended criteria are shown below:

$$CCC_{30\text{-day}} = \left(\frac{0.0577}{1 + 10^{7.688 - pH}} + \frac{2.487}{1 + 10^{pH - 7.688}} \right) \times \text{MIN}(2.85, 1.45 \cdot 10^{0.028(25 - T)}), \text{ and}$$
$$CMC = \left(\frac{0.275}{1 + 10^{7.204 - pH}} + \frac{39.0}{1 + 10^{pH - 7.204}} \right),$$

where T is in degrees Celsius

The maximum permitted effluent pH is 8.5. In order to protect against the worst-case short-term exposure of an organism, a pH value of 8.5 was used to derive the acute criterion. The resulting acute criterion is 2.14 mg/L.

The maximum observed rolling 30-day average temperature and the maximum observed pH of the effluent and receiving water during the period when the maximum observed rolling 30-day average temperature occurred were used to calculate the 30-day CCC. The maximum observed effluent 30-day rolling average temperature was 26.6°C. The maximum observed effluent pH value during the period when the maximum observed rolling 30-day average temperature was 7.8.

Using a pH value of 7.8 and the highest temperature value of 26.6°C on a rolling 30-day basis, the resulting 30-day CCC is 1.46 mg/L (as N). The 4-day average concentration is derived in accordance with the USEPA criterion as 2.5 times the