CTR #	Constituent	Types of Analytical Methods (1) Minimum Levels (µg/L)											
		GC	GCMS	LC	Color	FAA	GFAA	ICP	ICPMS	SPGFAA	HYDRIDE	CVAF	DCP
---	Tributyltin(3)	0.005											
---	Total Ammonia	0.2 mg/L (as N) using titration method											

Footnotes for Table E-1:

(1) Analytical Methods / Laboratory techniques are defined as follows:

Color	=	Colorimetric;
CVAF	=	Cold Vapor Atomic Fluorescence.
DCP	=	Direct Current Plasma
FAA	=	Furnace Atomic Absorption;
GC	=	Gas Chromatography
GCMS	=	Gas Chromatography Mass Spectroscopy
GFAA	=	Graphite Furnace Atomic Absorption;
ICP	=	Inductively Coupled Plasma
ICPMS	=	Inductively Coupled Plasma/Mass Spectrometry;
LC	=	Liquid Chromatography
SPGFAA	=	Stabilized Platform Graphite Furnace Atomic Absorption (i.e. EPA 200.9)

(2) Use USEPA Method 1613. Minimum Levels (MLs) shall be those specified by Table 8 of this Order for each congener.

(3) Analysis of tributyltin shall be by GC-FPD, GS-MS, or a USEPA approved method; the method shall be capable of speciating organotins and have limits of detection for tributyltin of 5 nanograms per liter (ng/L). Alternative methods of analysis must be approved by the Executive Officer.

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-2. Monitoring Station Locations

Type of Sampling Location	Monitoring Location Name	Monitoring Location Description
Influent	INF-001	At any point in the treatment facility headworks at which all waste tributary to the treatment system is present, and proceeding any phase of treatment, and exclusive of any return flows or process side streams that would significantly impact the quantity or quality of the influent.
Effluent	EFF-001	At any point in the outfall from the treatment facility, following treatment, including disinfection, and before contact with receiving water, where all waste streams tributary to Discharge Point 001 are present.
Effluent (flow only station)	EFF-002	At the point after filtration but before chlorination where all effluent flows are present (after flow diversion for filter backwash and Plant No. 3 water)

III. INFLUENT MONITORING REQUIREMENTS

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

Table E-3. Influent Monitoring

Parameter	Units	Sample Type	Minimum Sampling Frequency
Flow[(1)]	MGD/MG	Cont/D	Cont
$CBOD_5$	mg/L	C-24	1/week
	kg/day	Calculate	1/week
TSS	mg/L	C-24	1/week
	kg/day	Calculate	1/week
Cyanide	µg/L	Grab	1/month

Legends for Table E-3

(1) Unit Abbreviations
MGD = million gallons per day
MG = million gallons
mg/L = milligrams per liter
kg/day = kilograms per day
µg/L = micrograms per liter

(2) Sample type
Cont = continuous monitoring
Cont/D = measured continuously and recorded and reported daily
C-24 = 24-hour composite

(3) Sampling frequency
1/week = once per week
1/month = once per month

Footnote for Table E-3:

(1) Flows shall be monitored continuously and the following shall be reported in monthly self-monitoring reports:
a. Daily average flow rate (MGD)
b. Daily total flow volume (MG)
c. Monthly average flow rate (MGD)
d. Monthly total flow volume (MG)
e. Average daily maximum and average daily minimum flow rates (MGD) in a month

(2) The Discharger may elect to monitor CBOD as BOD, as defined in the latest edition of *Standard Methods for the Examination of Water and Wastewater*.

IV. EFFLUENT MONITORING REQUIREMENTS

The Discharger shall monitor treated effluent discharged from the Plant at EFF-001 and EFF-002 (flow only) as follows.

Table E-4. Effluent Monitoring

Parameter	Units	Sample Type	Minimum Sampling Frequency
Flow Rate[1]	MGD/MG	Cont/D	Cont
$CBOD_5$	mg/L	C-24	1/week
	kg/day	C-24	1/week
TSS	mg/L	C-24	1/week
	kg/day	C-24	1/week
$CBOD_5$ and TSS percent removal[2]	%	Calculate	1/month
pH[3]	s.u.	Grab	1/day
Oil and Grease[4]	mg/L	Grab composites	1/quarter
	kg/day	Grab	1/quarter
Turbidity	NTU	Grab	1/day
Total Chlorine Residual[5]	mg/L	Cont/H	1/hour
	kg/day	Calculate	1/hour
Enterococcus Bacteria	cfu/100 mL	Grab	5/week
Temperature	°C	Grab	1/day
Dissolved Oxygen (DO)	mg/L	Grab	1/day
	% Saturation	Grab	1/day
Dissolve Sulfides (if DO < 5 mg/L)[6]	mg/L	Grab	1/day
Total Ammonia Nitrogen	mg/L as N	C-24	[7]
	kg/day as N	C-24	[7]
Unionized Ammonia Nitrogen	mg/L as N	Calculate	[7]
Acute Toxicity[8]	% survival	Flow through	1/month
Chronic Toxicity[9]	TUc	C-24	[9]
Copper	µg/L	C-24	1/month
Nickel	µg/L	C-24	1/month
Cyanide	µg/L	Grab	1/month
Dioxin-TEQ[10]	µg/L	Grab	2/year
Endrin	µg/L	Grab	1/quarter
Tributyltin	µg/L	Grab	1/quarter
Remaining Priority Pollutants[11]	µg/L	[10]	2/year
Standard Observations[12]	---	---	1/week

Legends for Table E-4:

(1) Unit Abbreviations
- MGD = million gallons per day
- MG = million gallons
- mg/L = milligrams per liter
- µg/L = micrograms per liter
- s.u. = standard units
- NTU = Nephelometric turbidity units
- ml/L-hr = milliliters per liter, per hour
- kg/day = kilograms per day
- °C = degrees Celsius
- cfu/100 mL = colony-forming units per 100 milliliters
- TUc = chronic toxic units

(2) Sample Type Abbreviations
- Cont = measured continuously
- Cont/D = measured continuously, and recorded and reported daily

Cont/H = measured continuously, and recorded and reported hourly
C-24 = 24-hour composite
Flow-through = continuously pumped sample during duration of toxicity test

(3) Sampling frequency
1/hour = once per hour
1/day = once per day
5/week = five times per week
1/week = once per week
1/month = once per month
1/quarter = once per quarter
2/year = twice per year

Footnotes for Table E-4:

(1) **Flow.** Flows shall be monitored continuously and the following shall be reported in monthly self-monitoring reports for both EFF-001 and 002 unless otherwise specified:
a. Daily average flow rate (MGD) (averaging period is 24 hours)
b. Daily average flow rate while discharging to Moffett Channel and daily discharge duration in hours (averaging period is the actual discharge duration) (EFF-001 only)
c. Average daily maximum and average daily minimum flow rates (MGD) in a month (averaging period is 24 hours),
d. Average daily maximum and average daily minimum flow rates (MGD) in a month while discharging to Moffett Channel (averaging period is the actual discharge duration) (EFF-001 only),
e. Daily total Moffet Channel discharge flow volume (EFF-001) or daily total effluent flow volume (EFF-002) (MG),
f. Monthly total Moffet Channel discharge flow volume (MG) (EFF-001)
g. Monthly total duration when discharging to Moffet Channel (hour) (EFF-001 only)
h. Monthly total flow volume (MG) (EFF-002)
i. Monthly average discharge flow rate to Moffet Channel based on (f) and (g) above (EFF-001) and monthly effluent flow rate (EFF-002) (MGD)

(2) **$CBOD_5$ and TSS.** The percent removal for $CBOD_5$ and TSS shall be reported for each calendar month in accordance with Effluent Limitation IV.A.2. Samples for $CBOD_5$ and TSS shall be collected simultaneously with influent samples.

(3) **pH.** If pH is monitored continuously; the minimum and maximum pH values for each day shall be reported in monthly self-monitoring reports.

(4) **Oil and Grease.** Each oil and grease sampling event shall consist of a composite sample comprised of three grab samples taken at equal intervals during the sampling date, with each grab sample being collected in a glass container. The grab samples shall be mixed in proportion to the instantaneous flow rates occurring at the time of each grab sample, within the accuracy of plus or minus 5%. Each glass container used for sample collection or mixing shall be thoroughly rinsed with solvent as soon as possible after use, and the solvent rinsate shall be added to the composite sample for extraction and analysis.

(5) **Total Chlorine Residual.** Effluent chlorine concentrations shall be monitored continuously. Chlorine residual concentrations shall be monitored and reported for sampling points both before and after dechlorination. The Discharger shall report the maximum residual chlorine concentration observed following dechlorination on a daily basis. Total chlorine dosage (kg/day) shall be recorded on a daily basis.

Alternatively, the Discharger may evaluate compliance with this requirement by recording discrete readings from the continuous monitoring every hour on the hour, or by collecting grab samples every hour, for a total of 24 readings or samples per day if the following conditions are met: (a) The Discharger shall retain continuous monitoring readings for at least three years; (b) The Discharger shall acknowledge in writing that the Regional Water Board reserves the right to use all other continuous monitoring data for discretionary enforcement; (c) The Discharger must provide in writing the brand name(s), model number(s), and serial number(s) of the equipment used to continuously monitor dechlorinated final effluent chlorine residual. If the identified equipment is replaced, the Discharger shall provide the Regional Water

Board in writing, within 72 hours of the successful startup of the new equipment, the new equipment's brand name, model number, and serial number. The written notification identified in items (a) through (c) shall be in the form of a letter addressed to the Regional Water Board's Executive Officer with a certification statement as listed in the October 19, 2004, Regional Water Board letter re: *Chlorine Compliance Strategy for Dischargers Using Continuous Monitoring Devices***.**

(6) **Dissolved Sulfides.** Monitoring for dissolved sulfides shall occur when D.O. concentrations are less than 5 mg/L.

(7) **Total Ammonia Nitrogen and Un-ionized Ammonia Nitrogen**. Sampling frequency shall be 1/week (once per week) during October-April and 1/month (once per month) during May-September.

(8) **Acute Toxicity.** Acute bioassay tests shall be performed in accordance with Section V.A of this MRP.

(9) **Chronic toxicity.** Critical life stage toxicity tests shall be performed and reported in accordance with the Chronic Toxicity Requirements specified in Section V.B of the MRP. Sampling frequency is specified in V.B.1.c., except during the period when the Discharger is conducting the "Chronic Toxicity Identificationa and Toxicity Reduction Study" as required by Provision VI.C.2.d *i*, when the sampling frequency would be those specified for the study.

(10) **Dioxin-TEQ.** Chlorinated dibenzodioxins and chlorinated dibenzofurans shall be analyzed using the latest version of USEPA Method 1613; the analysis shall be capable of achieving one half the USEPA method 1613 Minimum Levels. Alternative methods of analysis must be approved by the Executive Officer. In addition to reporting results for each of the 17 congeners, the dioxin-TEQ shall be calculated and reported using 1998 USEPA Toxicity Equivalent Factors for dioxin and furan congeners.

(11) **Remaining priority pollutant.** The sample type and analytical method should be as described in the Regional Standard Provisions (Attachment G) or as amended and subsequently approved by the Executive Officer.

(12) **Standard observations.** As specified in the Regional Standard Provisions (Attachment G).

V. WHOLE EFFLUENT TOXICITY TESTING REQUIREMENTS

The Discharger shall monitor acute and chronic toxicity at EFF-001 as follows.

A. Whole Effluent Acute Toxicity

1. Compliance with the acute toxicity effluent limitations of this Order shall be evaluated by measuring survival of test organisms exposed to 96-hour continuous flow-through bioassays.

2. Test organisms shall be rainbow trout (*Onchorhynchus mykiss*) unless specified otherwise in writing by the Executive Officer.

3. All bioassays shall be performed according to the most up-to-date protocols in 40 CFR 136, currently in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms,* 5th Edition.

4. If specific identifiable substances in the discharge can be demonstrated by the Discharger as being rapidly rendered harmless upon discharge to the receiving water, compliance with the acute toxicity limit may be determined after the test samples are adjusted to remove the influence of those substances. Written approval from the Executive Officer must be obtained to authorize such an adjustment.

5. Effluent used for fish bioassays must be dechlorinated prior to testing. Monitoring of the bioassay water shall include, on a daily basis, the following parameters: pH, dissolved oxygen, total ammonia, un-ionized ammonia (by calculation, if toxicity is observed), temperature, hardness, and alkalinity. These results shall be reported. If a violation of acute toxicity requirements occurs or if the control fish survival rate is less than 90 percent, the bioassay test shall be restarted with new batches of fish and shall continue back to back until compliance is demonstrated.

B. Whole Effluent Chronic Toxicity

1. Chronic Toxicity Monitoring Requirements

a. Sampling. The Discharger shall collect 24-hour composite samples of the effluent at monitoring location EFF-001, for critical life stage toxicity testing as indicated below. For toxicity tests requiring renewals, 24-hour composite samples collected on consecutive days are required.

b. Test Species. The test species shall be *Americamysis bahia.* The Discharger shall conduct a screening chronic toxicity test as described in Appendix E-1 following any significant change in the nature of the effluent. The most sensitive species shall be used for routine chronic toxicity monitoring. The Executive Officer may change to another test species if data suggest that another test species is more sensitive to the discharge.

c. Frequency. The frequency of routine and accelerated chronic toxicity monitoring shall be as specified below, except during the period when the Discharger is conducting the "Chronic Toxicity Identification and Toxicity Reduction Study" as required by Provision VI.C.2.d *i*, when the sampling frequency would be those specified for the study:

(1) Routine Monitoring: Monthly

(2) Accelerated Monitoring: Twice/Month

The Discharger shall conduct accelerated monitoring twice per month after exceeding a three-sample median of 1 TUc or a single sample maximum of 2 TUc for discharges via Discharge Point 001, or as otherwise specified by the Executive Officer.

Monitoring conducted pursuant to a TIE/TRE effort shall satisfy the requirements for routine and accelerated monitoring while the TIE/TRE investigation is underway.

d. Methodology. Sample collection, handling, and preservation shall be in accordance with USEPA protocols. In addition, bioassays shall be conducted in compliance with the most recently promulgated test methods, as shown in Appendix E-1. These are *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms,* currently third edition (EPA-821-R-02-014), and *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms,* currently fourth Edition (EPA-821-R-02-013), with exceptions granted the Discharger by the Executive Officer and the Environmental Laboratory Accreditation Program (ELAP).

e. Dilution Series. The Discharger shall conduct tests with a control and five effluent concentrations (including 100% effluent) and using a dilution factor ≥ 0.5. Test sample pH in each dilution in the series may be controlled to the level of the effluent sample as received prior to being salted up.

2. Chronic Toxicity Reporting Requirements

a. Routine Reporting. Toxicity test results for the current reporting period shall include, at a minimum, for each test:

(1) Sample date(s)

(2) Test initiation date

(3) Test species

(4) End point values for each dilution (e.g., number of young, growth rate, percent survival)

(5) NOEC value(s) in percent effluent

(6) IC_{15}, IC_{25}, IC_{40}, and IC_{50} values (or EC_{15}, EC_{25} ... etc.) as percent effluent

(7) TUc values (100/NOEC, $100/IC_{25}$, or $100/EC_{25}$)

(8) Mean percent mortality (±s.d.) after 96 hours in 100% effluent (if applicable)

(9) NOEC and LOEC values for reference toxicant test(s)

(10) IC_{50} or EC_{50} value(s) for reference toxicant test(s)

(11) Available water quality measurements for each test (pH, D.O., temperature, conductivity, hardness, salinity, ammonia)

b. Compliance Summary. The results of the chronic toxicity testing shall be provided in the self-monitoring report and shall include a summary table of chronic toxicity data from at least eleven of the most recent samples. The information in the table shall include items listed above under 2.a, specifically item numbers (1), (3), (5), (6) (IC_{25} or EC_{25}), (7), and (8).

VI. LAND DISCHARGE MONITORING REQUIREMENTS

Not Applicable.

VII. RECLAMATION MONITORING REQUIREMENTS

Not Applicable.

VIII. RECEIVING WATER MONITORING REQUIREMENTS – SURFACE WATER

The Discharger shall continue to participate in the Regional Monitoring Program (RMP), which involves collection of data on pollutants and toxicity in water, sediment and biota of the Estuary. The Discharger's participation and support of the RMP is used in consideration of the level of receiving water monitoring required by this Order.

IX. PRETREATMENT AND BIOSOLIDS MONITORING REQUIREMENTS

The Discharger shall comply with the pretreatment requirements specified in Table E-5 for influent (at Monitoring Location INF-001), effluent (at Monitoring Location EFF-001), and biosolids monitoring.

Table E-5. Pretreatment and Biosolids Monitoring Requirements

Constituents	Sampling Frequency			Sample Type[5]	
	Influent INF-001	Effluent[3] EFF-001	Biosolids[4]	INF-001 & EFF-001	Biosolids[5d]
VOC	2/year	2/year	---	multiple grabs[5a]	grabs
BNA	2/year	2/year	---	multiple grabs[5a]	grabs
Metals[1]	1/month	1/month	2/year	24-hour composite[5b]	grabs
Hexavalent Chromium[2]	1/month	1/month	2/year	multiple grabs[5a]	grabs
Mercury	1/month	1/month	2/year	24-hour composite[5b,5c]	grabs
Cyanide	1/month	1/month	2/year	multiple grabs[5a]	grabs

Legends for Table E-5:

VOC = volatile organic compounds
BNA = base/neutrals and acids extractable organic compounds
N/A = not applicable
1/month = once per month
2/year = twice per year

Footnotes for Table E-5:

(1) The parameters are arsenic, cadmium, copper, lead, nickel, silver, zinc, and selenium.

(2) The Discharger may elect to run total chromium instead of hexavalent chromium. Sample collection for total chromium measurements may also use 24-hour composite sampling.

(3) Effluent monitoring conducted in accordance with Table E-4 can be used to satisfy these pretreatment monitoring requirements.

(4) Sample types:

a. Multiple grabs samples for VOC, BNA, hexavalent chromium, and cyanide, must be made up of a minimum of four (4) discrete grab samples, collected equally spaced over the course of a 24-hour period, with each grab analyzed separately and the results mathematically flow-weighted or with grab samples combined (volumetrically flow-weighted) prior to analysis.

b. 24-hour composite sample may be made up discrete grab samples and may be combined (volumetrically flow-weighted) prior to analysis, or they should be mathematically flow-weighted. If automatic compositor is used, 24-hour composite samples must be obtained through flow-proportioned composite sampling.

c. Automatic compositors are allowed for mercury if either 1) the compositing equipment (hoses and containers) comply with ultraclean specifications, or 2) appropriate equipment blank samples demonstrate that the compositing equipment has not contaminated the sample. This direction is consistent with the Regional Water Board's October 22, 1999, letter on this subject.

d. Biosolids collection should comply with those requirements for sludge monitoring specified in Attachment H, Appendix H-3 of this of the Order for sludge monitoring. The biosolids analyzed shall be a composite sample of the biosolids for final disposal. The Discharger shall also comply with biosolids monitoring requirements required by 40 CFR 503.

X. REPORTING REQUIREMENTS

A. General Monitoring and Reporting Requirements

The Discharger shall comply with the federal Standard Provisions (Attachment D) and the Regional Standard Provisions (Attachment G) related to monitoring, reporting, and recordkeeping.

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 SMRs using the State Water Board's California Integrated Water Quality System (CIWQS) Program website (http://www.waterboards.ca.gov/ciwqs/index.html). Until such notification is given, the Discharger shall submit hard copy SMRs. The CIWQS website will provide additional directions for SMR submittal in the event there will be service interruption for electronic submittal.

2. The Discharger shall report in the SMR the results for all monitoring specified in this MRP under sections III through VIII. The Discharger shall submit monthly SMRs, including the results of all required monitoring using USEPA-approved test methods or other test methods specified in this Order. Monthly SMRs shall be due 30 days after the end of each calendar month. 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. Annual SMRs shall be due by February 1 of each year, covering the previous calendar year. The report shall contain the items described in the Regional Standard Provisions (Attachment G).

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

Table E-6. Monitoring Periods

Sampling Frequency	Monitoring Period Begins On…	Monitoring Period
Continuous	Permit effective date	All
1/hour	Permit effective date	Every hour on the hour
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.
1/week	Permit effective date	Sunday through Saturday
1/month	Permit effective date	First day of calendar month through last day of calendar month
1/quarter	Permit effective date	Once during January 1 – March 31, April 1- June 30, July 1 – September 30, and October 1 – December 31
2/year	Permit effective date	Once during wet season (typically November 1 through April 30), once during dry season (typically May 1 through October 31)

4. The Discharger shall report with each sample result the applicable reported ML and the current Method Detection Limit (MDL), as determined by the procedure in 40 CFR 136. The

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

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

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

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

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

d. Dischargers are to instruct laboratories to establish calibration standards so that the ML value (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no time is the Discharger to use analytical data derived from extrapolation beyond the lowest point of the calibration curve.

e. Compliance Determination. Compliance with effluent limitations for priority pollutants shall be determined using sample reporting protocols defined above, Attachment A, and Table E-1, priority pollutant MLs of this Order. For purposes of reporting and administrative enforcement by the Regional and State Water Boards, the Discharger shall be deemed out of compliance with effluent limitations if the concentration of the priority pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the RL.

f. When determining compliance with an average monthly effluent limit (AMEL) (or an average weekly effluent limit) 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 DNQ or ND. In those cases, the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:

   (1) 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.

   (2) 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.

5. The Discharger shall submit SMRs in accordance with the following requirements:
   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.

   The Discharger shall attach a cover letter to the SMR. The information contained in the cover letter shall (1) clearly identify violations of the WDRs, (2) discuss corrective actions taken or planned, and (3) propose time schedule for corrective actions. Identified violations must include a description of the requirement that was violated and a description of the violation.

   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:

   Executive Officer
   California Regional Water Quality Control Board
   San Francisco Bay Region
   1515 Clay Street, Suite 1400
   Oakland, CA 94612
   ATTN: NPDES Permit Division

C. Discharge Monitoring Reports (DMRs)

1. As described in Section XI.B.1 above, at any time during the term of this Order, the State or Regional Water Board may notify the Discharger to electronically submit SMRs that will satisfy federal requirements for submittal of DMRs. Until such notification is given, the Discharger shall submit DMRs in accordance with the requirements described below.

2. DMRs must be signed and certified as required by the standard provisions (Attachment D). The Discharge shall submit the original DMR and one copy of the DMR to one of the addresses 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, 15th Floor Sacramento, CA 95814

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

D. Other Reports

In the first monthly SMR following the respective due dates, the Discharger shall report the results of any special studies, monitoring, and reporting required by Section VI.C.2 (Special Studies, Technical Reports, and Additional Monitoring Requirements) of this Order. The Discharger shall include a report of progress towards meeting compliance schedules established by Section VI.C.7 of this Order.

APPENDIX E-1

CHRONIC TOXICITY
DEFINITION OF TERMS AND SCREENING PHASE REQUIREMENTS

I. Definition of Terms

A. No observed effect level (NOEL) for compliance determination is equal to IC_{25} or EC_{25}. If the IC_{25} or EC_{25} cannot be statistically determined, the NOEL shall be equal to the NOEC derived using hypothesis testing.

B. Effective concentration (EC) is a point estimate of the toxicant concentration that would cause an adverse effect on a quantal, "all or nothing," response (such as death, immobilization, or serious incapacitation) in a given percent of the test organisms. If the effect is death or immobility, the term lethal concentration (LC) may be used. EC values may be calculated using point estimation techniques such as probit, logit, and Spearman-Karber. EC_{25} is the concentration of toxicant (in percent effluent) that causes a response in 25 percent of the test organisms.

C. Inhibition concentration (IC) is a point estimate of the toxicant concentration that would cause a given percent reduction in a nonlethal, nonquantal biological measurement, such as growth. For example, an IC_{25} is the estimated concentration of toxicant that would cause a 25 percent reduction in average young per female or growth. IC values may be calculated using a linear interpolation method such as USEPA's Bootstrap Procedure.

D. No observed effect concentration (NOEC) is the highest tested concentration of an effluent or a toxicant at which no adverse effects are observed on the aquatic test organisms at a specific time of observation. It is determined using hypothesis testing.

II. Chronic Toxicity Screening Phase Requirements

A. The Discharger shall perform screening phase monitoring:

1. Subsequent to any significant change in the nature of the effluent discharged through changes in sources or treatment, except those changes resulting from reductions in pollutant concentrations attributable to source control efforts, or

2. Prior to permit reissuance. Screening phase monitoring data shall be included in the NPDES permit application for reissuance. The information shall be as recent as possible, but may be based on screening phase monitoring conducted within 5 years before the permit expiration date.

B. Design of the screening phase shall, at a minimum, consist of the following elements:

1. Use of test species specified in Appendix E-2, attached, and use of the protocols referenced in those tables, or as approved by the Executive Officer.

2. Two stages:
   a. Stage 1 shall consist of a minimum of one battery of tests conducted concurrently. Selection of the type of test species and minimum number of tests shall be based on Appendix E-2 (attached).

   b. Stage 2 shall consist of a minimum of two test batteries conducted at a monthly frequency using the three most sensitive species based on the Stage 1 test results and as approved by the Executive Officer.

3. Appropriate controls.

4. Concurrent reference toxicant tests.

5. Dilution series with a control and five effluent concentrations (including 100% effluent) and using a dilution factor ≥ 0.5.

C. The Discharger shall submit a screening phase proposal acceptable to the Executive Officer. The proposal shall address each of the elements listed above. If within 30 days, the Executive Officer does not comment, the Discharge shall commence with screening phase monitoring.

APPENDIX E-2

SUMMARY OF TOXICITY TEST SPECIES REQUIREMENTS

Table AE-1. Critical Life Stage Toxicity Tests for Estuarine Waters

Species	(Scientific Name)	Effect	Test Duration	Reference
Alga	(Skeletonema costatum) (Thalassiosira pseudonana)	Growth rate	4 days	1
Red alga	(Champia parvula)	Number of cystocarps	7–9 days	3
Giant kelp	(Macrocystis pyrifera)	Percent germination; germ tube length	48 hours	2
Abalone	(Haliotis rufescens)	Abnormal shell development	48 hours	2
Oyster Mussel	(Crassostrea gigas) (Mytilus edulis)	Abnormal shell development; percent survival	48 hours	2
Echinoderms - Urchins Sand dollar	(Strongylocentrotus purpuratus, S. franciscanus) (Dendraster excentricus)	Percent fertilization	1 hour	2
Shrimp	(Mysidopsis bahia)	Percent survival; growth	7 days	3
Shrimp	(Holmesimysis costata)	Percent survival; growth	7 days	2
Topsmelt	(Atherinops affinis)	Percent survival; growth	7 days	2
Silversides	(Menidia beryllina)	Larval growth rate; percent survival	7 days	3

Toxicity Test References:

1. American Society for Testing Materials (ASTM). 1990. Standard Guide for Conducting Static 96-Hour Toxicity Tests with Microalgae. Procedure E 1218-90. ASTM, Philadelphia, PA.
2. Short-term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to West Coast Marine and Estuarine Organisms. EPA/600/R-95/136. August 1995.
3. Short-term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to Marine and Estuarine Organisms. EPA/600/4-90/003. July 1994.

Table AE-2. Critical Life Stage Toxicity Tests for Fresh Waters

Species	(Scientific Name)	Effect	Test Duration	Reference
Fathead minnow	(Pimephales promelas)	Survival; growth rate	7 days	4
Water flea	(Ceriodaphnia dubia)	Survival; number of young	7 days	4
Alga	(Selenastrum capricornutum)	Final cell density	4 days	4

Toxicity Test Reference:

4. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, fourth Edition Chronic manual (EPA-821-R-02-013, October 2002).

Table AE-3. Toxicity Test Requirements for Stage One Screening Phase

Requirements	Receiving Water Characteristics		
	Discharges to Coast	Discharges to San Francisco Bay[2]	
	Ocean	Marine/Estuarine	Freshwater
Taxonomic diversity	1 Plant 1 invertebrate 1 fish	1 Plant 1 invertebrate 1 fish	1 Plant 1 invertebrate 1 fish
Number of tests of each salinity type: Freshwater[1] Marine/Estuarine	0 4	1 or 2 3 or 4	3 0
Total number of tests	4	5	3

1. The freshwater species may be substituted with marine species if:
   a. The salinity of the effluent is above 1 part per thousand (ppt) greater than 95 percent of the time, or
   b. The ionic strength (TDS or conductivity) of the effluent at the test concentration used to determine compliance is documented to be toxic to the test species.
2. a. Marine/Estuarine refers to receiving water salinities greater than 1 ppt at least 95 percent of the time during a normal water year.
   b. Fresh refers to receiving water with salinities less than 1 ppt at least 95 percent of the time during a normal water year.

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	2 438018001
CIWQS Place ID	259507
Discharger	City of Sunnyvale
Name of Facility	Sunnyvale Water Pollution Control Plant and its sewage collection system
Facility Address	1444 Borregas Avenue Sunnyvale, CA 94088 Santa Clara County
Facility Contact, Title, Phone	Lorrie Gervin, Environmental Division Manager, (408) 730-7268
Authorized Person to Sign and Submit Reports	Lorrie Gervin, Environmental Division Manager, (408) 730-7268, or Marvin Rose, Director of Public Works, (408) 730-7441
Mailing Address	P.O. Box 3707, Sunnyvale, CA 94088
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, under Order No. 94-069
Mercury Discharge Requirements	Yes, under Order No. R2-2007-0077
Reclamation Requirements	Yes
Facility Permitted Flow	29.5 million gallons per day (MGD)
Facility Design Flow	29.5 MGD (average dry weather flow design capacity) with full advanced-secondary treatment 40 MGD (peak wet weather flow design capacity) with full secondary treatment
Watershed	Santa Clara Hydrologic Unit
Receiving Water	Moffett Channel (flows to South San Francisco Bay via Guadalupe Slough)
Receiving Water Type	Estuarine
Service Areas	City of Sunnyvale, Rancho Rinconada, and Moffett Field
Service Area Population	136, 000

A. The City of Sunnyvale owns and operates the Sunnyvale Water Pollution Control Plant (Plant) and its sewage collection system (collectively the facility). The facility provides advanced-secondary treatment of the wastewater collected from its service areas and discharges to Moffett Channel, a tributary to South San Francisco Bay via Guadalupe Slough.

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 discharge of treated wastewater from the Plant to Moffett Channel, a water of the United States, has been regulated by Order No. R2-2003-0079 (previous Order) and NPDES Permit No. CA0037621, which was adopted on November 1, 2003, and expired on September 30, 2008.

C. The Discharger filed a Report of Waste Discharge (ROWD) and submitted an application for reissuance of its Waste Discharge Requirements (WDRs) and NPDES permit on April 2, 2008. The application was deemed complete and the previous Order has been administratively extended.

II. FACILITY DESCRIPTION

A. Description of Wastewater and Biosolids Treatment or Controls

1. Wastewater Treatment Processes

The Discharger owns and operates the Plant, which provides primary, secondary, and advanced-secondary treatment of domestic and commercial wastewater collected from its service areas as indicated in Table F-1. The Discharger's current service area population is approximately 136,000.

Wastewater treatment processes at the Plant include grinding and grit removal, primary sedimentation, secondary and advanced secondary treatment through the use of oxidation ponds, fixed-film reactor nitrification, dissolved air flotation, dual-media filtration, disinfection (chlorine gas), and dechlorination (sulfur dioxide).

Influent Flow Management. The Plant has sufficient capacity for influent pumping, primary treatment, and flow equalization (in the oxidation ponds) to meet any expected maximum flow condition. Three main influent pumps have a total capacity of 45 MGD, and an auxiliary pump provides an additional capacity of 25 MGD, which provides a combined pumping capacity that exceeds the capacity of the influent sewer. In addition, an emergency gravity flow bypass line exists to route influent flows around the influent pumps to the oxidation ponds; however, the bypass line has not been used since its construction in 1984. Such use would be a bypass and would be subject to all restrictions and requirements applicable to a bypass.

Preliminary Treatment. Preliminary treatment consists of grinders located 30 feet below ground, removal of large debris from the raw sewage, followed by grit removal.

Primary Treatment. Following preliminary treatment, wastewater is pumped into rectangular primary clarifiers for the removal of floatable and settled material. The floatable material is skimmed off, the settled primary solids are removed from the bottom of the clarifiers, and primary sludge is pumped to the anaerobic digesters.

Biological Treatment. All wastewater flow receives biological (secondary) treatment. Primary effluent flows by gravity into 440 acres of mechanically aerated oxidation ponds.

As wastewater circulates through the pond system, aerobic and anaerobic mechanisms degrade the organic material. The average detention time for wastewater in the pond system is 30 to 45 days. The oxidation ponds simultaneously provide flow equalization for primary effluent so advanced treatment processes can be operated at a constant flow rate. The flow equalization capacity varies with pond depth, but is typically in the range of 50-100 million gallons.

Advanced Secondary Treatment. Following biological treatment, the wastewater is pumped to the fixed growth reactors (FGRs) for advanced secondary treatment. FGRs, or trickling filters, are a biological treatment process consisting of a tank filled with corrugated plates or plastic media on which a film of microorganisms (i.e., fixed growth) is allowed to develop. At the top of the tank a large wand rotates and trickles wastewater over the plates, where ammonia in the wastewater is converted to nitrate by the microorganism film. The effluent from the FGRs flows by gravity to the dissolved air flotation tanks (DAFTs). In this step, air and polymer are injected to coagulate and flocculate residual algae and other particulate matter, which rises to the top of the tank and is skimmed off. Skimmed material is sent to the anaerobic digesters or returned to the oxidation ponds. As a final polishing step, effluent from the DAFTs is percolated through dual media filters, which provide removal of remaining algae and particulate matter via gravity filtration. The filters are periodically backwashed, and the backwash water is returned to the oxidation ponds for treatment. The average dry weather design capacity of 29.5 MGD of the Plant reflects advanced-secondary treatment capacity; peak flow capacities of the primary and secondary treatment processes are greater than 40 MGD.

Disinfection. Effluent from the filters flows to the chlorine contact channels, where chlorine gas is added as a disinfectant. The contact time is at least one hour to achieve disinfection. Sulfur dioxide is then added to achieve dechlorination before discharging to Moffett Channel through an outfall pipe.

Recycled Water Production. The Plant may enter into two different treatment modes – slough discharge wastewater treatment and recycled water production. During periods of recycled water production in high recycled water demand seasons (typically 12–16 hours a day), the DAFT polymer dose, chlorine dose, and chlorine contact time are adjusted to meet Title 22 requirements (recycled water effluent turbidity needs to be below 2 NTU versus 10 NTU for slough discharge). The portion of the effluent that is diverted to the recycled water pump station is partially dechlorinated using sodium bisulfite. During recycled water production, there is no discharge to Moffett Channel.

Effluent Flow Measuring. There is no flow meter installed at the end of the treatment process (i.e., EFF-001 as described in the MRP [Attachment E]). Discharge flow is continuously metered by eight (8) flow meters installed after filtration and before disinfection and discharge. Diverted flows, which consist of tertiary recycled water and water used on site, are also continuously monitored. The total flow, minus the diverted flow, is used to calculate the discharge flow.

Solids Management. Solids removed from wastewater by primary treatment and floc skimmed from the DAFTs are treated in the primary anaerobic digesters for approximately 37-41 days at a temperature of 100ºF, followed by an additional 16 days in an unheated

secondary digester. In the digesters, anaerobic bacteria consume the solid material, and produce methane gas, carbon dioxide, stabilized organic solids, and water as products of this process. Methane gas produced in the digesters is then used as fuel to generate the Plant's engines and generators. The biosolids that remain after treatment in the digesters are conditioned with a polymer and pumped to dewatering beds, which are beds of slotted tiles that allow water to drain by gravity back into the treatment system. The sludge is dried for 1-5 days to approximately 15-20 % solids, and is then spread on a tarmac to dry to approximately 50-70% solids. The biosolids are then hauled off-site by a contractor for land application or disposal at the City of Sunnyvale's Biosolids Monofill.

Plant Electricity Generation. Methane gas generated by the digesters is used to fuel the three engine-driven pumps and an on-site cogeneration facility that produces about 50-60% of the electricity used by the Plant. The cogeneration facility has two 16 cylinder engine generator sets (each one is capable of 800 kW power generation). The Plant also uses methane gas produced by an adjacent landfill to generate 20-30% of the electrical power. The rest is supplemented by PG&E natural gas.

2. Collection System.

The Discharger's collection system is 100 % separate sanitary sewer, and includes approximately 327 miles of sanitary sewer mains and one lift station.

3. Reclamation

A fraction of tertiary treated water is recycled and used by numerous businesses throughout the service area and by the Discharger for irrigation of landscape and golf courses, and in decorative ponds. Recycled water is also available for construction use at remote locations. Currently about 10 percent of the daily flow is diverted for reuse. Disinfected secondary recycled water is used at the facility for landscape irrigation. Water recycling is accomplished in accordance with Regional Water Board Order No. 94-069, Water Reclamation Requirements for the Discharger.

4. Storm Water Discharges

All storm water from within the Plant is directed to the headworks of the Plant; therefore, this Order regulates the discharges of storm water that originate on the grounds of the Plant, and coverage under the Statewide permit for discharges of storm water associated with industrial activities (NPDES General Permit No. CAS000001) is not required.

B. Discharge Point and Receiving Water

The location of the discharge point and the receiving water are shown in Table F-2 below.

Table F-2. Outfall Location

Discharge Point	Effluent Description	Discharge Point Latitude	Discharge Point Longitude	Receiving Water
001	Advanced-secondary treated municipal wastewater	37º 25′ 13″ N	122º 01′ 00″ W	Moffett Channel

Moffett Channel is located in the Palo Alto Hydrologic Area of the Santa Clara Hydrologic Unit and is tributary to South San Francisco Bay via Guadalupe Slough.

South San Francisco Bay is a unique and sensitive portion of the San Francisco Bay Estuary, in part due to the freshwater inflow being lower there than in the greater portion of San Francisco Bay. Tributaries to South San Francisco Bay are small in number and size. It is characterized by higher, more uniform salinities and is generally shallow, except for a deep central channel. Surrounding South San Francisco Bay is an extensive network of tidal mudflats, tidal sloughs, coastal salt marshes, diked salt marshes, brackish water marshes, salt ponds, and freshwater marshes. In general, water quality in the entire San Francisco Bay can be characterized as a concentration gradient, with the lowest concentrations in Central Bay and highest concentrations in South San Francisco Bay and the southern sloughs, due to less tidal mixing and flushing in South San Francisco Bay and the southern sloughs than elsewhere in San Francisco Bay.

C. Summary of Previous Requirements and Self-Monitoring Data

Effluent limitations contained in the previous Order for discharges to Moffett Channel and representative monitoring data from the term of the previous Order are presented in the following tables.

Table F-3. Previous Effluent Limitations and Monitoring Data for Conventional and Non-Conventional Pollutants

Parameter	(units)	Effluent Limitations			Monitoring Data (1/2003-1/2008)		
		Monthly Average	Weekly Average	Daily Maximum	Highest Monthly Average	Highest Weekly Average	Highest Daily Discharge
$CBOD_5$	mg/L	10	---	20	7.9	---	11
TSS	mg/L	20	---	30	15.5	---	23.5
pH	standard units	6.5 – 8.5			Minimum – 6.5 Maximum – 8.1		
Oil and Grease	mg/L	5	---	10	3.9	---	3.9
Enterococci	colonies/ 100 mL	35(1)	---	276(2)	23(1)	---	488.4(2)
Total Chlorine Residual	mg/L	---	---	0.0 (3)	---	---	0.0
Settleable Matter	mL/L-hr.	0.1	---	0.2	---	---	<0.1
Turbidity	NTU	---	---	10	---	---	9.92
Acute Toxicity	% survival	11-sample median value of not less than 90 percent survival and an 11-sample 90th percentile value of not less than 70 percent survival.			Minimum 11-sample median – 95% Minimum 11-sample 90th percentile – 100%		
Ammonia-N	mg/L	2(4)	---	5(4)	17.4	---	24.1

Footnotes for Table F-3:

"<" Analyte not detected in effluent; value given is the MDL as reported by the analytical laboratory.

(1) As a 30-day geometric mean.

(2) As a single sample maximum.

(3) Requirement defined as below the limit of detection in standard test methods defined in the latest USEPA approved edition of *Standard Methods for the Examination of Water and Wastewater*.

(4) Ammonia effluent limitations apply June through September only. Effluent data during June through September were in compliance with these effluent limits.

Table F-4. Previous Effluent Limitations and Monitoring Data for Toxic Pollutants

Parameter	Units	Final Limits		Interim Limits		Monitoring Data (From 1/2003 to 1/2008)
		Daily Maximum	Monthly Average	Daily Maximum	Monthly Average	Highest Daily Concentration
Copper	µg/L	20	10	---	---	6.9
Mercury	µg/L	---	---	2.1	0.012	0.007
Nickel	µg/L	40	24	---	---	5.1
Cyanide	µg/L	---	---	32	---	10
Chlorodibromomethane	µg/L	---	---	58	---	37.2
Dichlorobromomethane	µg/L	---	---	68	---	36
Tributyltin	µg/L	0.03	0.01	---	---	0.016
4,4'-DDE	µg/L	---	---	0.05	---	<0.002
Dieldrin	µg/L	---	---	0.01	---	<0.002
Heptachlor Epoxide	µg/L	---	---	0.01	---	<0.002
Benzo(b)Fluoranthene	µg/L	---	---	10.0	---	<0.02
Indeno(1,2,3-cd)Pyrene	µg/L	---	---	0.05	---	<0.02

"<" Analyte not detected in effluent; value given is the minimum detection limit (MDL) as reported by the analytical laboratory.

D. Compliance Summary

1. **Compliance with Previous Numeric Effluent Limits.** Exceedances of numeric effluent limitations for tributyltin and enterococci were observed during the previous permit term. The exceedances are summarized in Table F-5, below.

Table F-5. Compliance with Numeric Effluent Limitations

Date of Violation	Parameter	Units	Effluent Limitation	Reported Effluent Concentration
August 31, 2004	Tributyltin	µg/L	Monthly Average – 0.01	0.02
November 30, 2007	Tributyltin	µg/L	Monthly Average – 0.01	0.016
February 2, 2008	Enterococci	MPN/100 mL	Daily Maximum – 276	2,400

A mandatory minimum penalty of $3,000 was assessed for the two tributyltin violations, in Order R2-2004-0091 (for the August 2004 violation), and in State Water Board Order SWB-2008-2-0030 (for the November 2007 violation). No enforcement action has yet been taken for the February 2008 enterococci violation.

2. **Compliance with Chronic Toxicity Trigger.** The chronic toxicity trigger of 2.0 chronic toxicity units (TUc) as a single-sample maximum was exceeded on 20 occasions (out of 97 samples), and the trigger of 1.0 TUc as a three-sample median was exceeded on 44 occasions out of 92 3-sample median values during the previous permit term (November 2003-March 2009). This Order imposes additional requirements for the Discharger to reduce chronic toxicity. See more discussed in Fact Sheet Sections IV.D.6.

3. **Compliance with Previous Provisions.** A list of special activities required by the previous Order and the status of those requirements are shown in Table F-6, below.