CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 00-026
NPDES PERMIT NO. CA0037699

WASTE DISCHARGE REQUIREMENTS FOR:

VALLEJO SANITATION AND FLOOD CONTROL DISTRICT, VALLEJO, SOLANO COUNTY

April 19, 2000

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The California Regional Water Quality Control Board, San Francisco Bay Region, hereinafter called the Board, finds that:

1. *Discharger and Permit Application.* The Vallejo Sanitation and Flood Control District (hereinafter called the discharger), has applied to the Board for reissuance of waste discharge requirements and a permit to discharge treated wastewater to waters of the State and the United States under the National Pollutant Discharge Elimination System (NPDES).

FACILITY DESCRIPTION

2. *Discharge Facility.* The discharger owns and operates the Vallejo Sanitation and Flood Control District Wastewater Treatment Plant, located at 450 Ryder Street, Vallejo, Solano County, California. The plant provides secondary level treatment of wastewater from domestic and commercial sources within the City of Vallejo, a small amount of adjacent unincorporated area, and the former Mare Island Naval Facility. The discharger's service area has a present population of about 115,000. The plant has an average dry weather flow design capacity of 15.5 million gallons per day (mgd), and a wet weather capacity of 30 mgd for full secondary treatment with an additional 30 mgd capacity for primary treatment. The total maximum wet weather daily plant flow is 37 million gallons. The plant presently discharges an average dry weather flow of 11.4 mgd, and an annual average flow of 13.3 mgd (five-year averages, 1993 through 1997). A location map of the discharger facilities is included as Attachment A of this Order.

3. *Discharges - Carquinez Strait, all year.* Treated wastewater is discharged to waters of Carquinez Strait through a submerged outfall in the vicinity of the north end of the Carquinez Bridge. This point of discharge is identified as the Carquinez Strait Discharge outfall (CS outfall; E-001) and is located at Latitude 38 degrees, 03 minutes, 53 seconds; Longitude 122 degrees, 13 minutes, 42 seconds. The discharge is through a submerged diffuser 400 feet from the north shore of Carquinez Strait and about 75 feet below the water surface. The discharge receives a receiving water to effluent initial dilution of about 200:1, and is classified by the Board as a deepwater discharge.

4. *Discharges - Mare Island Strait, wet weather.* During wet weather secondary treated wastewater is also discharged intermittently to the waters of Mare Island Strait though a submerged outfall in the vicinity of the west end of Ryder Street, Vallejo. This point of discharge is identified as the Ryder Street Wet Weather outfall (RSWW outfall; E-002), and is located at: Latitude 38 degrees, 05 minutes, 32 seconds; Longitude 122 degrees, 14 minutes, 57 seconds. The discharge is through a submerged diffuser about 100 feet from the east shore of Mare Island Strait. This discharge is expected to receive an effluent to receiving water initial dilution of at least 10:1. This discharge occurs only intermittently during the wet weather season, when plant flows exceed about 30 mgd, which is the hydraulic capacity of the CS outfall.

5. These discharges were previously governed by Waste Discharge Requirements Order No. 88-153, adopted by the Board on October 19, 1988.

6. The U.S. Environmental Protection Agency (USEPA) and the Board have classified this discharge as a major discharge.

COLLECTION SYSTEM AND TREATMENT PROCESS DESCRIPTION

7. *Collection System and Pump Stations.* The discharger's wastewater collection system includes about 370 miles of sanitary sewer lines, and 16 pump stations. The discharger has an ongoing program of maintenance and capital improvements for these sewer lines and pump stations in order to ensure adequate capacity and reliability of the collection system.

8. *Treatment Process.* The treatment process consists of aerated grit removal, primary sedimentation by circular and rectangular clarifiers, biological treatment using a trickling filter/solids contact process, secondary clarification and disinfection by ultraviolet light. A treatment process schematic diagram is included as Attachment B of this Order.

9. D*isinfection Process.* Effluent discharged to Carquinez Strait is disinfected by a UV system which was completed in 1997 and designed to produce effluent quality equivalent to the proposed effluent limits for normal operating flows (e.g., dry weather flows). The UV system replaced the previous chlorination based disinfection system. One of the objectives of the UV system was to reduce discharges of chlorine residuals and chlorinated compounds resultant from the chlorination process. The use of the UV System for disinfection reduces usage of chlorine and discharge of chlorinated by-products (chlorinated organic compounds such as trihalomethanes). The UV system is designed to provide disinfection of all dry weather flows and to meet fecal coliform effluent limits for bacteriological quality as included in this permit. For peak wet weather flows, additional disinfection capacity is provided using hypochlorite for disinfection and sodium bisulfite for dechlorination. During normal operating conditions, discharges to Carquinez Strait are disinfected by the UV system, or by the UV system supplemented by the hypochlorite/sodium bisulfite system. Intermittent wet weather discharges to Mare Island Strait are disinfected and dechlorinated by the hypochlorite/ sodium bisulfite process.

10. *Discharge Process.* Treated effluent is pumped from the treatment plant through a force main and gravity flow pipe about 2.4 miles to the CS outfall. The CS outfall has a maximum hydraulic capacity of 30 mgd. During wet weather conditions treated effluent is also discharged to Mare Island Strait through the RSWW outfall, as further described below.

11. *Solids Handling and Disposal.* Solids removed from the wastewater stream are treated by lime stabilization, gravity thickening and dewatering by belt filter presses. Stabilized, dewatered biosolids are hauled away for off-site disposal through land application at the discharger's Biosolids Utilization Project on Tubbs Island, Sonoma County. Biosolids are temporarily stockpiled at the Tubbs Island site, and subsequently spread and incorporated into the soil as a soil amendment on land that is used for agricultural crop production. In 1996, the discharger completed construction of a new solids handling facility after a study in 1992 determined that reliable treatment capacity of 15.5 mgd could be ensured with improvements to the solids handling process. Federal regulations governing the land application of municipal wastewater biosolids are found in 40 CFR 503 (Standards for the Use or

Disposal of Sewage Sludge), published as a final rule on February 19, 1993. The District's Biosolids Utilization Project is regulated by USEPA under the 40 CFR 503 regulations.

Wet Weather Flow Management - Facilities, Treatment and Discharge Process Descriptions

12. *Design Basis of Wet Weather Facilities*
    a. *Wet Weather Design Criteria.* The discharger's current wet weather treatment facilities and collection system improvements are based on wet weather design criteria. These criteria were defined in the discharger's 1987 *Sewer System Evaluation Survey* (*1987 SSES*; Draft, January 1987; Final, January 1988). These criteria include a design storm event, projected wastewater flows associated with the design storm event and background conditions such as service area, population served, infrastructure and environmental conditions. The design storm event was identified in the *1987 SSES* as a single storm during a 24 hour period consisting of 1.6 inches of rainfall in a four-hour period with saturated soil conditions, resulting in flow amounts as shown in Table 1 in Attachment D of this Order.

    Design wet weather flows were identified in the *1987 SSES* as 60 mgd, based on a projected wet weather flow of 75 mgd and elimination of 15 mgd of Infiltration and Inflow (I/I) flows through collection system improvements.

    b. *Board Approval of Wet Weather Design Criteria and Facility Improvements Program.* In the mid 1980s, in compliance with Board requirements, the discharger evaluated existing facilities and developed plans to reduce and control wet weather overflows. In 1987, the discharger set forth a program of cost effective treatment and collection system improvements, in the discharger's *1987 SSES* and *Wastewater Facilities Master Plan* (*1987 Master Plan*; Draft, June 1987), based on the wet weather design criteria. Development of this program included consideration of the Board's wet weather overflow control strategy, cost-effective evaluations, and consultations with Board staff. The proposed criteria and program would provide control of overflows for at least a design storm event. Prior to implementation, the discharger requested Board consideration of the proposed program and associated wet weather design criteria.

    In August 1987, the Board considered this matter and approved the use of the wet weather design criteria as described in the 1987 SSES for treatment and collection system improvements in the near future (20-year plan period). The Board also approved the proposed program of collection, treatment and discharge facility improvements (discussed further below).

    c. *Current Wet Weather Design Criteria*
    The current design criteria for the discharger's wet weather flow management program includes a design rainfall event and design wet weather flows. The design rainfall event is a single 4 hour 5-year storm event with no other rainfall within a 24-hour period, as determined from the current Solano County Rainfall Depth Duration Table for a 5-year rainfall event. The design wet weather flow is 60 mgd, which is based on projected wet weather flow of 75 mgd and elimination of 15 mgd through I/I reduction. For purposes of this permit, these criteria are the current applicable design criteria for the discharger's wet weather flow management program.

13. *Wet Weather Treatment Facilities*
    a. *Facilities.* In 1991, the discharger completed construction of wet weather treatment facilities to handle peak wet weather flows of about 60 mgd and a total daily plant flow of 37 million gallons.

The all-season secondary level treatment plant has a wet weather treatment capacity of 30 mgd. The wet weather treatment facilities supplement the all-season treatment plant, by providing primary treatment, disinfection and dechlorination for flows in excess of 30 mgd, up to 60 mgd. The wet weather treatment facilities include additional influent pumping, screening, grit removal, primary sedimentation, disinfection (chlorination), dechlorination, effluent pumping and flow routing, and the Ryder Street Wet Weather outfall (RSWW outfall).

b. *Discharge - Split Flow Process.* When wet weather flows exceed 30 mgd, treated effluent is discharged through both the CS outfall and the RSWW outfall, using an automated split flow process. When plant effluent flows exceed 30 mgd, discharges to Mare Island Strait through the RSWW outfall occur. The discharges to Mare Island Strait are equal in volume to the amount of the total plant flow that exceeds the CS outfall capacity. By means of automated flow splitting, the discharges to Mare Island Strait consist of only fully secondary-treated, disinfected, dechlorinated effluent, while the discharges through the CS outfall consist of a blend of disinfected primary and secondary treated effluents.

c. *Purpose of Split Flow Process.* The purpose of the split flow process is to minimize potential receiving water impacts. The discharges to Carquinez Strait receive greater initial dilution than the discharges to Mare Island Strait. With the split flow process, potentially lesser quality effluent is discharged to the CS outfall and the outfall is used at maximum hydraulic capacity, while discharges to Mare Island Strait consist of only the highest quality effluent, in the least volume necessary.

d. *Discharge Quality.* Discharges to Mare Island Strait through the RSWW outfall are expected to meet all standard secondary treatment effluent limitations, with the possible exception of the monthly average percent removal rates ($\geq$ 85 %) for Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS), due to reduced influent values caused by storm water-diluted influent. The blended discharges to Carquinez Strait are expected to meet weekly and monthly average effluent concentration limitations, but may periodically exceed the monthly average percent removal limitations for these parameters. [Requirement under the Clean Water Act for secondary treatment]

14. *Ryder Street Wet Weather Outfall*

a. *Original Design and Minimum Initial Dilution.* The RSWW outfall was constructed in 1988. Original design evaluations found that the initial dilution was expected to be greater than 10:1 at least 50 percent of discharge time, but due to varying receiving water conditions, initial dilution may vary between 10:1 and 5:1 at some times. The Basin Plan states that an exception to the 10:1 minimum initial dilution may be considered for discharges where an inordinate burden would be placed on the discharger relative to beneficial uses protected, and an equivalent level of environmental protection can be achieved by alternate means, such as higher level of treatment and/or improved treatment reliability.

b. *Basin Plan Exception.* The Board previously found that an exception to the 10:1 minimum dilution requirement is warranted for intermittent discharges through the RSWW outfall to Mare Island Strait of fully secondary-treated effluent during peak wet weather flows. Rationale included (1) the inordinate cost burden of the alternative -- constructing a new 2.4 mile force main and gravity line parallel to the existing discharge line to the CS outfall; (2) minimal expected increase in environmental protection of the alternative -- discharges to Mare Island Strait occur only during peak wet weather flows when urban runoff is at its greatest, and mass pollutant loadings from urban runoff are greater than loadings from the secondary effluent

discharges; and (3) that improved treatment reliability is provided by providing emergency stand-by power for the entire secondary treatment process, to ensure that discharges to Mare Island Strait receive full secondary treatment at all times.

Based on the above rationale, the Board previously granted an exception to the 10:1 minimum dilution requirement and permitted the use of the RSWW outfall for intermittent discharges to Mare Island Strait of fully secondary-treated effluent during peak wet weather flows. This permit continues this exception, although future discharges are expected to achieve a minimum initial dilution of at least 10:1, as discussed below. This permit also requires that the discharger continues to provide emergency stand-by power for the entire secondary treatment process, and that the treatment facility is operated in a manner to ensure that discharges to Mare Island Strait receive full secondary treatment at all times.

c. *Current Outfall Design and Initial Dilution.* In 1997, the discharger conducted an evaluation of the outfall in order to define conditions under which the outfall discharges would achieve an initial dilution of at least 10:1. The study included discharge modeling under various discharge and receiving water characteristics such as flow rates, outfall diffuser configurations, flow currents and water elevations. The results of the study were reported in a technical memorandum from the discharger's consultant titled, *Mare Island Outfall Dilution Study*, March 19, 1997. This study found that, with appropriate modifications to the outfall diffuser, the discharge could achieve an initial dilution of at least 10:1 under most if not all expected operating conditions. The study identified several possible outfall modifications and that initial dilution achieved could be monitored by measurement of the depth of water over the outfall diffuser.

In July 1997, the discharger completed modification of the outfall diffuser and discharge ports. Modifications included installation of 12-inch variable width 'Tideflex' port valves, and orientation of discharge ports at a downward angle of 11.5 degrees from horizontal. As identified by the evaluation study discussed above, these modifications will provide an initial dilution of greater than 10 to 1 when the outfall line is submerged. This permit requires monitoring of the depth of water over the outfall line in order to monitor minimum initial dilution achieved.

The modified outfall is expected to achieve a minimum initial dilution of at least 10:1 under most operating conditions. This permit includes effluent limits based on a minimum initial dilution of 10:1 and monitoring of dilution achieved during discharges. Effluent limits based on a dilution of less than 10:1 are also included and are applicable in the event that dilution of at least 10:1 is not demonstrated.

15. *Infiltration/Inflow Correction and Collection System Improvement Program.*
    a. *Collection System Improvement Program.* The discharger has an on-going program of collection system improvements to reduce excessive infiltration and inflow (I/I) and increase the collection system capacity in order to contain and convey wet weather design flows (60 mgd). The goal of this program is to eliminate 15 mgd of I/I flows, thereby reducing collection system wet weather flows to the 60 mgd level. The 15 mgd identified as needing removal from the system was based on 1.6 inches-in-four-hours rainfall event during a 24 hour period having no other rainfall. The discharger's *1987 SSES* and *1987 Master Plan* were the basis for an initial program of cost effective I/I corrections. Most of the major projects identified in the initial program have been completed (see section c. below).

b. *Updated Collection System Improvement Program.* Ongoing I/I source detection and collection system evaluations have allowed for refinement of the I/I correction program. In 1992 the discharger completed a *Wastewater Facilities Master Plan 1992 Interim Update (1992 Interim Plan)* which included an updated program of collection system improvements. In 1992, the discharger completed preparation of its current Infiltration/Inflow Correction Plan, which it continues to implement. In 1997, the discharger initiated further review of its program to evaluate the success of projects completed to date and more clearly identify necessary future programs. This current planning effort has resulted in a draft document titled *1997 Wastewater Facilities Master Plan/Action Plan (1997 Master Plan*, February 4, 1998). The *1997 Master Plan* identifies ongoing programs of collection system improvements including flow monitoring, performance evaluation and capital improvement projects. The objective of the programs is to reduce I/I and control wet weather overflows by providing adequate and reliable collection and transport of wastewater flows in accordance with wet weather design criteria.

c. *Sears Point Pump Station Projects.* Two of the major collection system improvement projects identified in the 1987 *Master Plan* were the renovation of the Sears Point Pump Station (SPPS), and replacement of the sewer line upstream and influent to this pump station. These projects have been hindered by uncertainties in the planning and implementation of the proposed reconstruction of the adjacent Highway 37, a state highway project over which the discharger does not have control. In 1996, despite continued uncertainty about the Highway 37 project, the discharger proceeded with reconstruction of the SPPS at a new location to the east, outside of the Highway 37 alignment. The new SPPS is located south of White Slough and Austin Creek, on the north side of Sacramento Street about 1000 feet east of the intersection with current Highway 37. The new SPPS was designed and constructed to accommodate peak wet weather flows of 21.5 mgd. This project was completed in early 1998.

d. *Sears Point Pump Station Collection System.* The collection system in the vicinity of the SPPS has been identified by the discharger's collection system programs to be in need of improvements. The improvements are necessary to provide adequate flow capacity during wet weather conditions as well as to realign certain existing pipelines in association with the Highway 37 reconstruction projects. Given the current understanding that the Highway 37 project will be initiated by the State (Cal Trans) by the year 2000, it is anticipated that the collection system improvements in the vicinity of the SPPS will be completed by 2001, or shortly thereafter. Improvements identified in the *1987 Master Plan* have not yet all been completed. At present, as identified in the draft *1997 Master Plan*, the discharger is proposing to reevaluate collection system capacities and necessary improvements through a program of additional flow monitoring and modeling based on current operating conditions including operation of the new SPPS, as well as the wet weather design criteria and program objectives. Identified improvements will be implemented in accordance with the discharger's collection system improvements program and requirements of this Order.

16. *Wet Weather Overflows.* The discharger's wet weather treatment facilities, I/I correction projects and collection system improvements are intended to contain and treat peak wet weather design flows of 60 mgd with a total daily flow not exceeding 37 million gallons. When wet weather flows exceed the design flow, overflows of storm water-diluted raw sewage may occur. The major known points of overflow are as follows:

Code	Name	Location (Lat.; Long.)	Receiving Water
OV-003	Sears Point Pump Station Overflow	38° 07' 37"; 122° 16' 00"	Napa River
OV-004	Ryder Street Overflow	38° 05' 33"; 122° 14' 55"	Mare Island Strait

The Sears Point Pump Station Overflow is described below. Estimated overflow frequency is 3 to 10 times per year. The Ryder Street Overflow is a collection system overflow structure at which overflows will occur automatically if the local collection system becomes surcharged due to peak flows. Estimated overflow frequency is 1 to 10 times per year.

17. *Sears Point Pump Station Overflows*
    a. The Sears Point Pump Station Overflow (SPPS Overflow) is an overflow, which can be automatically activated during periods of peak flow when the collection system becomes surcharged. When the SPPS overflow is activated, storm water-diluted raw sewage overflows from the collection system in the vicinity of the SPPS into the adjacent Austin Creek storm water channel, which discharges to the Napa River. Estimated overflow frequency is less than 6 times per year. This overflow is only used when the collection system is at its peak carrying capacity. This overflow reduces public exposure and potential public health threats by providing a single controlled overflow and thereby minimizing multiple overflows that would otherwise occur at various locations from collection system manholes in residential neighborhoods in the pump station collection system area.

    b. The SPPS Overflow discharge point is currently located at the old pump station site, which is downstream of the new SPPS. When the new SPPS was constructed in 1997, the SPPS Overflow point was not relocated but was retained at its historic location at the old pump station site. The SPPS Overflow facility includes equipment for measuring overflow flow rates or volumes. The discharger has also installed flow meters in the collection system upstream and downstream of the pump station as part of the current I/I flow monitoring studies

18. *Collection System Rainfall Monitoring.* The discharger conducts ongoing monitoring of precipitation within its service area. The service area is comprised of 21 hydrologic sub-basins. The discharger maintains eight rain gauges within its service area which are representative of different hydrologic areas. For purposes of evaluating collection system performance during wet weather flows, rainfall event determinations are based on rainfall occurring within the hydrologic area that is hydraulically tributary to the given collection system facility or segment that may be affected by the rainfall. Data shall include rainfall depth and duration measurements for the rainfall event.

19. *Wet Weather Flow Management Program.* The discharger's program for managing wet weather flows and controlling overflows, described in Findings 13 through 19 above, includes the wet weather treatment facilities completed in 1991, provision for emergency stand-by power for the entire secondary treatment process, the split flow discharge process for wet weather discharges of treated effluent, operation of the Sears Point Pump Station Overflow facility, and the ongoing program for collection system improvements to reduce inflow/infiltration and minimize raw sewage overflows. This Order requires continued implementation of this program, and maintenance of its Wet Weather Facilities Operation Plan that will be used to assess compliance with the requirements of this Permit.

20. *Wet Weather Flow Management Program Evaluation.* The Basin Plan sets forth a conceptual approach for managing collection system overflows during wet weather. The Basin Plan states in part that collection systems should be designed to contain different flow return periods depending on the level of water quality protection required. Costs are significantly higher for construction of collection systems to contain greater flow return periods. The discharger's current Wet Weather Facilities Operation Plan includes a management program developed in consideration of the Basin Plan's approach. The discharger is currently conducting a study to evaluate costs relative to

beneficial uses protected for different flow return periods and from this will develop a recommended collection system peak wet weather flow design criteria. This study will include evaluation of 1-year, 5-year, 10-year and 20-year flow return periods and the different receiving water bodies affected. The Executive Officer may review these recommendations and determine the appropriate level of protection to be provided to prevent controllable adverse impacts to beneficial uses.

STORM WATER

21. *Treatment Plant Storm Water Discharges.*
    a. *Regulations.* Federal Regulations for storm water discharges were promulgated by the USEPA on November 19, 1990. The regulations [40 CFR Parts 122, 123, and 124] require specific categories of industrial activity (industrial storm water) to obtain a NPDES permit and to implement Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) to control pollutants in industrial storm water discharges.

    b. *Exemption from Coverage under Statewide Storm Water General Permit.* The State Board adopted a statewide NPDES permit for storm water discharges associated with industrial activities (NPDES General Permit CAS000001, adopted November 19,1991, amended September 17, 1992, and reissued April 17, 1997). Coverage under the general permit are not required because all storm water from within the treatment plant area are routed through the headworks. All other storm water discharges are regulated under the discharger's NPDES Storm Water permit.

REGIONAL MONITORING PROGRAM

22. On April 15, 1992, the Board adopted Resolution No. 92-043 directing the Executive Officer to implement the Regional Monitoring Program (RMP) for the San Francisco Bay. Subsequent to a public hearing and various meetings, Board staff requested major permit holders in this region, under authority of section 13267 of California Water Code, to report on the water quality of the estuary. These permit holders, including the Discharger, responded to this request by participating in a collaborative effort, through the San Francisco Estuary Institute (formerly the Aquatic Habitat Institute). This effort has come to be known as the San Francisco Bay Regional Monitoring Program for Trace Substances. This Order specifies that the Discharger shall continue to participate in the RMP, which involves collection of data on pollutants and toxicity in water, sediment and biota of the estuary. Annual reports from the RMP are referenced elsewhere in this Order.

APPLICABLE PLANS, POLICIES AND REGULATIONS

23. *Basin Plan.* The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin on June 21, 1995 (Basin Plan). This updated and consolidated plan represents the Board's master waster quality control planning document. The revised Basin Plan was approved by the State Water Resources Control Board (SWRCB) and the Office of Administrative Law on July 20 and November 13, respectively, of 1995. A summary of regulatory provisions is contained in Title 23 of the California Code of Regulations at Section 3912. The Basin Plan identifies beneficial uses for waters of the state in the Region, including surface waters and ground waters. The Basin Plan also identifies water quality objectives, discharge prohibitions and effluent limitations intended to protect beneficial uses. This Order implements the plans, policies and provisions of the Board's Basin Plan.

24. *Beneficial Uses.* Beneficial uses for the Carquinez Strait (CS) and Mare Island Strait (MIS) receiving waters, as identified in the Basin Plan and based on known uses of the receiving waters in the vicinity of the discharges, are:

a.	Industrial Service Supply	CS
b.	Navigation	CS, MIS
c.	Water Contact Recreation	CS, MIS
d.	Non-contact Water Recreation	CS, MIS
e.	Ocean Commercial and Sport Fishing	CS
f.	Wildlife Habitat	CS, MIS
g.	Preservation of Rare and Endangered Species	CS, MIS
h.	Fish Migration	CS, MIS
i.	Fish Spawning	CS, MIS
j.	Estuarine Habitat	CS, MIS

25. Effluent limitations in this permit are based on the plans, policies and water quality objectives and criteria of the Basin Plan, *Quality Criteria for Water* (EPA 440/5-86-001, 1986 and subsequent amendments, "USEPA Gold Book"), applicable Federal Regulations (40 CFR Parts 122 and 131), the National Toxics Rule (57 FR 60848, 22 December 1992 and 40 CFR Part 131.36(b), "NTR"), NTR Amendment (Federal Register Volume 60, Number 86, 4 May 1995, pages 22229-22237), and Best Professional Judgment (BPJ) as defined in the Basin Plan. Where numeric effluent limitations have not been established in the Basin Plan, 40 CFR 122.44(d) specifies that water quality based effluent limits may be set based on USEPA criteria and supplemented where necessary by other relevant information to attain and maintain narrative water quality criteria to fully protect designated beneficial uses. Discussion of the specific bases and rationale for effluent limits are given in the associated Fact Sheet for this Permit, which is incorporated as part of this Order.

BASIS FOR EFFLUENT LIMITATIONS

General Basis

26. Effluent limitations and toxic effluent standards are established pursuant to sections 301 through 305, and 307 of the Federal Water Pollution Control Act and amendments thereto are applicable to the discharges herein.

27. *Applicable Water Quality Objectives.* The Basin Plan includes numeric WQOs as well as a narrative WQO for toxicity in order to protect beneficial uses: "All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms". The Basin Plan also directs that ambient conditions shall be maintained until site-specific objectives are developed. Effluent limitations and provisions contained in this Order are designed to implement these objectives, based on available information.

28. *Receiving Water Salinity.* The receiving waters for the discharges regulated by this Order are the waters of Carquinez and Mare Island Straits. Mare Island Strait is the tidally influenced estuary of the Napa River. The waters of Carquinez Strait and Mare Island Strait are both tributary to San Pablo Bay. The receiving waters for the subject discharges are tidally influenced salt waters, with significant fresh water inflows during the wet weather season. The Basin Plan states that the salinity characteristics (i.e., fresh water vs. marine water) of the receiving water shall be considered in establishing water quality objectives. Freshwater effluent limitations shall apply to discharges to waters with salinities lower than 5 parts per thousand (ppt) at least 75 percent of the time. Marine (saltwater) effluent limitations shall apply to discharges to waters with salinities greater than 5 ppt at

least 75 percent of the time in a normal water year. For discharges to waters with salinities in between these two categories, or to tidally-influenced fresh waters that support estuarine beneficial uses, effluent limitations shall be the lower of the marine or freshwater effluent limitation, based on ambient hardness, for each substance. Data indicate that the receiving waters of subject discharge are primarily marine in character. Previous permit limits were based on marine (saltwater) standards. Therefore, this Order's effluent limitations are based on the marine water quality objectives (WQOs) based on the receiving waters having salinities above 5 ppt more than 75% of the time.

29. *Technology Based Effluent Limits*. Permit effluent limits for conventional pollutants are technology based. Limits in this permit are the same as in the prior permit for the following constituents: Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), settleable matter, oil and grease, and chlorine residual. Technology-based effluent limitations are put in place to ensure that full secondary treatment is achieved by the wastewater treatment facility. Federal regulations allow the parameter BOD to be substituted with the parameter Carbonaceous BOD (CBOD). The previous permit included limits for BOD only. This permit includes technology based effluent limits for CBOD as well as BOD.

30. *Water Quality Based Effluent Limitations.* Toxic substances are regulated by water quality based effluent limitations derived from USEPA national water quality criteria listed in the Basin Plan Tables 3-3 and 3-4, the National Toxics Rule, or USEPA Gold Book, and/or best professional judgment. Further details about the effluent limitations are given in the associated Fact Sheet, which is incorporated as part of this Order. The limits for these constituents in this Order are revised and updated from the limits in the previous permit order based on the statistical evaluation of the discharger's data as described below under the Reasonable Potential Analysis.

Specific Basis

Constituents Identified in the 303(d)-List

31. On May 12, 1999, the USEPA approved a revised list of impaired waterbodies prepared by the State. The list (hereinafter referred to as the 303(d) list) was prepared in accordance with section 303(d) of the federal Clean Water Act to identify specific water bodies where water quality standards are not expected to be met after implementation of technology-based effluent limitations on point sources. Carquinez Strait and San Pablo Bay are listed as impaired water bodies. The pollutants impairing the Carquinez Strait and San Pablo Bay include copper, mercury, nickel, selenium, exotic species, PCBs total, dioxin and furan compounds, chlordane, DDT, Dieldrin, Diazinon, and dioxin-like PCBs.

Total Maximum Daily Loads (TMDLs) and Waste Load Allocations (WLAs)

32. Based on the 303(d) list of pollutants impairing Carquinez Strait and San Pablo Bay, the Board plans to adopt Total Maximum Daily Loads (TMDLs) for these pollutants no later than 2010. However, future review of the 303(d) list for Carquinez Strait and San Pablo Bay may result in revision of the schedules and/or provide schedules for other pollutants.

33. The TMDLs will establish waste load allocations (WLAs) and load allocations for point sources and non-point sources, respectively, and will result in achieving the water quality standards for the waterbody. The final effluent limitations for this discharge will be based on WLAs that are derived from the TMDLs.

34. The following summarizes the Board's strategy to collect water quality data and to develop TMDLs:
    a. Data collection – The Board will request dischargers collectively assist in developing and implementing analytical techniques capable of detecting 303(d)-listed pollutants to at least their

respective levels of concern or water quality objectives. The Board will require dischargers to characterize the pollutant loads from their facilities into the water-quality limited waterbodies. The results will be used in the development of TMDLs, but may also be used to update/revise the 303(d) list and/or change the water quality objectives for the impaired waterbodies including Carquinez Strait and San Pablo Bay.

b. Funding mechanism – The Board has received, and anticipates continuation to receive, resources from federal and state agencies for the development of TMDLs. To ensure timely development of TMDLs, the Board intends to supplement these resources by allocating development costs among dischargers through the RMP or other appropriate funding mechanisms.

Reasonable Potential (RP)

35. When a discharge causes, has the reasonable potential to cause, or contributes to a receiving water excursion above a narrative or numeric criteria within a State water quality standard, federal law and regulations, as specified in 40 CFR 122.44(d) (1) (i), require the establishment of WQBELs that will protect water quality. Pollutants exhibiting RP in the discharge authorized by this Order are identified below. The Board plans to adopt TMDLs that will include WLAs for the 303(d)-listed pollutants. When each TMDL is complete, the Board will adopt a WQBEL consistent with the corresponding WLA. If authorized, a time schedule may be included in the revised permit to require compliance with the final WQBELs.

Interim Limits

36. In the interim, until final WQBELs are adopted, state and federal antibacksliding and antidegradation policies require that the Board retain effluent concentration limits from the Previous Order (or the bases for those limits as derived from the current Basin Plan) to ensure that the waterbody will not become further degraded. In addition to these interim concentration limits, interim performance-based mass limits are required to limit discharge of 303(d)-listed pollutants' mass loads to their current levels. These interim mass limits are based on recent discharge data. Where pollutants have existing high detection limits (such as for PCBs total, Chlordane, DDT, Dieldrin, Dioxins and Furans, etc.), interim mass limits are not required because meaningful performance-based limits cannot be calculated for those pollutants with non-detectable concentrations. However, the dischargers, through participation in the RMP, are required to investigate alternative analytical procedures that result in lower detection limits.

37. In the event that a TMDL is not adopted by this Regional Board by 2010, and an extension of the schedule has not been granted by the USEPA, the Board will impose one of the following alternative final limits:
    a. For a 303(d)-listed bioaccumulative pollutant, the final alternative limit will be no net loading. No net loading means that the actual loading from the discharge must be offset by at least equivalent loading of the same pollutant achieved through mass offset. In the absence of a TMDL, any loading to the impaired waterbody has the reasonable potential to cause or contribute to an excursion of the narrative toxicity criterion. Additionally, the existing numeric objective may not be adequate to ensure safe levels of the pollutant in sediment and/or fish. This is because in the case of fish tissue, the bioconcentration factor (BCF), on which the criterion was based, was measured in the laboratory and, therefore, reflects uptake from the water only. Bioaccumulative factors (BAFs) on the other hand, are measured in the field where the uptake in fish is through both food and water. Thus, the bioaccumulation rate in the system may be greater than the bioconcentration rate used to calculate the national water quality criteria. Another reason that the existing water quality objectives may not be adequate is that the criteria they are based on do not always account for routes of exposure, for site-specific circumstances that may

render the pollutant more bioavailable, for accumulation in sediment, or for concentrating effects resulting from evaporation.

b. For 303(d)-listed non-bioaccumulative pollutants, the alternative final mass limit will be based on water quality objectives applied at the end of the discharge pipe (i.e., without a dilution factor used to calculate the limit).

Reasonable Potential Analysis

38. As specified in 40 CFR 122.44(d) (1) (i), permits are required to include WQBELs for all pollutants "which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard." Using the method described in the USEPA's Technical Support Document for Water Quality-based Toxics Control (TSD), Board staff have analyzed the effluent data to determine if the discharges which are the subject of this Permit and Order have a reasonable potential to cause or contribute to an excursion above a State water quality standard ("Reasonable Potential Analysis" or "RPA").

a. *Reasonable Potential Determination.* The RPA involves calculation of the projected Maximum Downstream Concentration (MDC) for each non-impairing constituent, based on effluent concentration data, dilution factors and, if applicable, receiving water background concentrations. The MDC is then compared with the WQO. If the MDC is greater than the WQO, then there is reasonable potential for that constituent to cause or contribute to an excursion above the WQO. For constituents that are on the 303(d) list and for which reasonable potential can be determined, a dilution factor of zero is used in the RPA determination. The projected effluent concentration (PEQ) obtained for each impairing constituent is then compared with the WQO, and, if greater, then RP exists for that impairing pollutant. This same method is also used for determining RP for all constituents discharged to Mare Island Strait that does not receive at least a 10:1 dilution. For all parameters that have reasonable potential to cause or contribute to an exceedance of a WQO, numeric water quality-based effluent limitations (WQBELs) are required. For 303(d) listed pollutants, until completion of the TMDLs, upon which final WQBELs will be based, interim concentration and performance-based mass limits are established. WQBELs are based on USEPA water quality criteria and the Basin Plan objectives. In the absence of state-adopted numeric WQOs, the RPA is based on the narrative WQO for toxicity. The RPA compares the effluent data with numeric and narrative WQOs in the Basin Plan, numeric WQOs from the USEPA Gold Book and the NTR, and, for copper, a 1992 site-specific WQO based on a limited Board site-specific study.

b. *RPA Data.* The RPA was based on effluent monitoring data for 1993 through 1999, for both the year-round discharges to Carquinez Strait and the wet weather discharges to Mare Island Strait. Review of the data found that the following constituents have been observed in the discharged effluent at concentrations greater than respective analytical detection limits: arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, zinc, cyanide, and phenols. The RPA was conducted for these constituents. PAHs have not been detected at levels greater than analytical detection limits used. However, these detection limits are numerically greater than the applicable WQOs, so relative assessment cannot be made. Therefore, the RPA was not conducted for PAHs.

c. *Constituents Identified in the 303 (d) List.* Constituents on the 303(d) list for which RP determinations are made for this permit are copper, mercury, nickel and selenium. The RPA for these constituents is based on zero dilution and zero background concentrations. For other constituents identified on the 303(d) list, final determination of reasonable potential and the need

for effluent limits cannot be determined at this time since current analytical data cannot detect the constituent down to the level of the objective.

d. *Discharges to Carquinez Strait*

(1) *Constituents and Dilution Factors.* For discharges to Carquinez Strait, the RPA was conducted using a conservatively assumed dilution of 10:1 (dilution factor=9), and for the following constituents: arsenic, cadmium, chromium, lead, silver, zinc, cyanide, and phenols, and dilution factor of zero for the following constituents: copper, mercury, nickel, selenium.

(2) *Reasonable Potential.* Based on the RPA, the following constituents have been found to have reasonable potential to cause or contribute to an excursion above water quality objectives: copper, mercury, nickel, selenium and cyanide. Based on the RPA, numeric effluent limits are required to be included in the permit for these constituents.

(3) *No Reasonable Potential.* Based on the RPA, the following constituents have been found to not show reasonable potential to cause or contribute to excursion above applicable water quality objectives: arsenic, cadmium, chromium, lead, silver, zinc, and phenols. Based on the RPA and continued consistent plant performance, effluent limits for these constituents are not needed and are not included in this permit.

e. *Wet Weather Discharges to Mare Island Strait*

(1) *Constituents and Dilution Factors.* For wet weather discharges to Mare Island Strait, the RPA was conducted using discharge dilution ratios of both 10:1 (dilution factor=9) and less than 10:1 (zero dilution), for the following constituents: arsenic, cadmium, chromium, lead, silver, zinc, cyanide and phenols. The final RP determination is based on zero dilution for the following constituents: copper, mercury, nickel, selenium.

(2) *Reasonable Potential.* Based on the RPA, the following constituents have been found to have reasonable potential to cause or contribute to an excursion above applicable water quality objectives: (a) for dilution of 10:1: copper, mercury, nickel and cyanide; (b) for dilution of less than 10:1: cadmium, copper, lead, mercury, nickel, zinc, and cyanide. Based on the RPA and BPJ, numeric effluent limits for these constituents are needed and are included in this permit.

(3) *No Reasonable Potential.* Based on the RPA, the following constituents have not been found to show reasonable potential to cause or contribute to excursion above applicable water quality objectives: (a) for dilution of 10:1: arsenic, cadmium, chromium, lead, selenium, silver, zinc and phenols; (b) for dilution of <10:1: arsenic, chromium, selenium, silver and phenols. Based on the RPA and continued consistent plant performance, effluent limits for these constituents are not needed and are not included in this permit.

f. *Summary of Reasonable Potential Analysis (RPA) Determinations*

The WQOs, calculated MDCs (based on 99% confidence level) and reasonable potential conclusions from the RPA are listed in the following table for each constituent analyzed.

Table A: RPA		Carquinez Strait > 10:1 dilution		Mare Island Strait >10:1 dilution		Mare Island Strait < 10:1 dilution	
Constituent	WQO (µg/L)	MDC/PEQ* (µg/L)	RP	MDC/PEQ* (µg/L)	RP	PEQ (µg/L)	RP
Arsenic	36	0.48	no	0.6	no	5.6	no
Cadmium	9.3	3.9	no	5.2	no	51	yes
Chromium	50	1.6	no	0.9	no	9.5	no
Copper *	4.9	57	yes	225	yes	225	yes
Lead	5.6	1.6	no	1.9	no	16	yes
Mercury *	0.025	0.28	yes	0.26	yes	0.26	yes
Nickel *	7.1	11	yes	14	yes	14	yes
Selenium *	5.0	5.2	yes	3	no	3	no
Silver	2.3	0.11	no	0.1	no	1.2	no
Zinc	58	12	no	16	no	143	yes
Cyanide	1	1.0	yes	49	yes	486	yes
Phenol	500	2.7	no	5.2	no	52	no

* Constituents identified in the 303 (d) list; PEQs in RP determinations based on zero dilution.

The MDC was calculated based on effluent discharge data for 1993 through 1999. For discharges to Carquinez Strait, a dilution ratio of 10:1 was used, except that for copper, mercury, nickel and selenium, zero dilution was used. For discharges to Mare Island Strait, dilution ratios of both 10:1 and less than 10:1 were used, except that for copper, mercury, nickel and selenium, zero dilution was used. For a dilution ratio of less than 10:1, the assumed dilution is zero. For dilution ratios of 10:1, the MDC calculation includes receiving water background concentrations as given in the Basin Plan for the following constituents: cadmium, lead, silver and zinc. For phenol, the MDC is compared with the effluent limit for phenol as given in the Basin Plan (500 µg/L), because there is no numeric WQO for protection of salt water aquatic life, and the numeric WQO for protection of human health (NTR criteria for organism consumption) is 4,600,000 µg/L.

g. *Polynuclear Aromatic Hydrocarbons (PAHs).* For PAHs, reasonable potential evaluation can not be made at this time. Review of effluent data has found that PAHs were not detected in the effluent, but detection levels used were numerically greater than applicable water quality objectives and WQBELs. Thus, reasonable potential cannot be determined. The discharger will continue to monitor for PAH constituents, including the use of commercially and reasonably available analytical techniques employing the lowest detection limits reliably achievable. If detection limits improve to the point where it is feasible to evaluate compliance with applicable water quality objectives, a new RPA will be conducted to determine whether there is a need to add numeric effluent limits to the permit for these constituents.

h. *Organic Constituents with Limited Data.* Reasonable Potential cannot be determined for various organic constituents (e.g., PCBs, semi-volatile organic compounds) because accurate estimations are not possible for a majority of the constituents due to water quality objectives or effluent limitations that are lower than current analytical techniques can measure. The Discharger will continue to monitor for these constituents using analytical methods that provide the best detection limits reasonably feasible. If detection limits improve to the point where it is feasible to evaluate compliance with applicable water quality criteria, a reasonable potential analysis will be conducted to determine whether there is need to add numeric effluent limits to the permit or to continue monitoring.

i. Based on the RP results, the following effluent limitations in the previous permit are excluded in this Order as they do not pose reasonable potential to cause, or contribute to an excursion above any numeric or narrative water quality objectives:

(1) Carquinez Strait: Daily maximum effluent concentration limits for Arsenic, Cadmium, Hexavalent Chromium, Lead, Silver, Zinc, Phenols, and PAHs;

(2) Mare Island Strait: Daily maximum concentration limits for Arsenic, Hexavalent Chromium, Silver, Phenols, and PAHs.

j. *Monitoring.* For constituents that do not show a reasonable potential to cause or contribute to exceedance of applicable water quality objectives, effluent limits are not included in the permit but continued monitoring is required as identified in the self-monitoring program of the permit. If significant increases occur in the concentrations of these constituents, the Discharger will be required to investigate the source of the increases and establish remedial measures if the increases pose a threat to water quality.

k. *Permit Reopener.* The permit includes a reopener provision to allow numeric effluent limits to be added for any constituent that in the future exhibits reasonable potential to cause or contribute to exceedance of a water quality objective. This determination, based on monitoring results, will be made by the Board.

Copper

39. a. *Copper Water Quality Objectives.* In 1984 the USEPA promulgated a national saltwater and freshwater copper criterion of 2.9 µg/L, measured as total recoverable copper. The Board developed a proposed Bay-wide site-specific water quality objective for copper for San Francisco Bay of 4.9 µg/L in 1991. The site-specific objective for copper employed the "water effect ratio" (WER) approach developed by the USEPA. This approach provides a measure of the binding capacity of natural waters (dependent on particulate matter) relative to the binding capacity of reference waters (filtered oceanic water). In the best professional judgment of the Board, from a technical standpoint, the Bay-wide site-specific objective was protective of the most sensitive designated beneficial use of San Francisco Bay water with respect to copper: habitat for aquatic organisms.[1] The Board amended the Basin Plan on October 21, 1992 to adopt a site-specific water quality objective for copper for San Francisco Bay of 4.9 µg/L. The SWRCB did not approve this amendment after the court remanded the State Plans (Enclosed Bays and Estuaries Plan and Inland Surface Waters Plan). Since the Basin Plan does not include a water quality objective for toxic pollutants to salt water (Table 3-3), the WQO for copper, 4.9 µg/L, is based on an interpretation of the narrative toxicity objective in the Basin Plan and BPJ.

b. In 1996, the USEPA promulgated a revised national saltwater, dissolved copper criteria of 3.1 µg/L in recognition that the dissolved fraction may be a better representation of the biologically active portion of the metal than is the total or total recoverable fraction. In order for the Board to consider application of the dissolved criteria to the discharge, an appropriate translator based on effluent and receiving water data must be developed. USEPA published guidance in June 1996 on using metal translators, derived from site specific receiving water data, to calculate total

[1] The study and associated staff analysis are described in a September 25, 1992 Board staff report entitled "Revised Report on Proposed Amendment to Establish a Site Specific Objective for Copper for San Francisco Bay".

recoverable effluent limits necessary to achieve dissolved receiving water criteria. This Order requires the discharger to conduct a study to generate data that may be considered by the Board for translation of the dissolved criteria to a total recoverable effluent limit.

c. *Effluent Limits.* As copper has been determined to be an impairing pollutant on the 303(d) list, and since a RPA has determined there is reasonable potential for the discharge to contribute to a water quality exceedance, a WQBEL is required in this permit. The final WQBEL will be consistent with the wasteload allocation derived from a TMDL. In the interim, this order establishes an interim performance-based concentration limit of 16 µg/L for discharges to Mare Island Strait that do not receive at least a 10:1 dilution, an interim concentration limit of 36 µg/L for deep water discharges to both Mare Island Strait and Carquinez Strait, and an interim performance-based mass limit of 15 kg/month that is based on maximum moving average loading from last 3 years data from both outfalls. The discharger shall also report mass emissions of copper each month on a year-round basis from both their influent and effluent. This data shall be used to develop a mass-emission study as part of a region-wide TMDL effort for copper. In the event that a TMDL is not adopted by 2010, and an extension of the schedule has not been granted by the USEPA, the Board will impose an alternative final limit at end of pipe.

d. *Copper Source Reduction Program.* Due to the uncertainties about the quantities of copper that could be a stress to the ecosystem, particularly in mediums other than the water column (such as sediments, and/or organisms that take in particulate matter), the discharger is required to initiate efforts to reduce influent copper concentrations. Implementation of a source control program will also provide information that can be used to assess the discharger's ability to comply with a new water quality based limit.

Mercury

40. a. *Mercury Water Quality Objectives and TMDL.* For mercury, the national chronic criterion is based on protection of human health. The criterion is intended to limit the bioaccumulation of methyl-mercury in fish and shellfish to levels that are safe for human consumption. As described in the Gold Book, the fresh water criterion is based on the Final Residual Value of 0.012 µg/L derived from the bioconcentration factor (BCF) of 81,700 for methyl mercury with the fathead minnow, which assumes that essentially all discharged mercury is methylmercury. The saltwater criterion of 0.025 µg/L was similarly derived using the BCF of 40,000 obtained for methylmercury with the eastern oyster. Although these criteria are below levels that have produced acute and chronic toxicity in both fresh and salt-water aquatic species, the Carquinez Strait and San Pablo Bay are listed as impaired for mercury because of fish tissue level exceedances. Therefore, though these criteria were meant to limit bioaccumulation of methyl-mercury in fish and shellfish, they have clearly not succeeded in accomplishing this. The Board intends to work toward the derivation of a TMDL that will lead towards overall reduction of mercury mass loadings in the watershed. Based on these studies, the Board may amend this permit to specify a different limit for mercury.

b. *Mercury as a Persistent, Bioaccumulative Pollutant.* Mercury is listed on the 303(d) list for impairing the Carquinez Strait and San Pablo Bay due to fish tissue level exceedances. For pollutants that cause impairment due to accumulations in the sediment or food chain, and for which a TMDL has not been established, the final effluent limitation will be no net loading. This would mean, that if a TMDL is not established by the scheduled date or that date has not been extended, the discharger will have the option of proposing a Mass Offset program that would

offset their mercury loads with source reductions which are not already required elsewhere in the system.

The rationale for this is that there is no acceptable level of loading for bioaccumulative pollutants which have fish tissue and/or sediment as the basis for impairment, regardless of the concentration of that pollutant. Any loading of bioaccumulative pollutants has the reasonable potential to cause or contribute to an excursion of the narrative criteria, and is, therefore, unacceptable. Additionally, the narrative criterion, which for mercury is based on the existing numeric objective, may not be adequate to ensure safe levels of the pollutant in sediment and/or fish tissue. One reason for this is that, in the case of fish tissue, the bioconcentration factor (BCF), on which the criterion was based, was measured in the laboratory and, therefore, reflects uptake from the water only. Bioaccumulation factors (BAFs), on the other hand, are measured in the field where the uptake in fish is through both food and water. Thus, the bioaccumulation rate in the system may be greater than the bioconcentration rate used to calculate the national water quality criteria, which is based on a laboratory-derived bioconcentration factor (BCF). Another reason that the water quality criteria may not be adequate is that the criteria do not always account for routes of exposure, for site-specific circumstances that may render the pollutant more bioavailable (such as biomethylating estuarine and wetland environments), for accumulation in sediment, or for concentrating effects resulting from evaporation. Mass based limits should be derived as the result of a TMDL analysis. In the absence of this analysis, however, the only WQBEL that would assure that the discharge does not cause or contribute to an exceedance of the narrative criteria is a net loading of zero.

c. *Mercury Strategy.* Board staff are in the process of developing a plan to address control of mercury levels in San Francisco Bay including development of a TMDL. Presently, for discharges with initial dilution of 10:1 or greater, interim limits include credit for 10:1 dilution and background concentrations as given in the Basin Plan. The resultant 'deep water' limits for mercury, using the Basin Plan dilution equation, would be 0.214 µg/L for salt water and 0.048 µg/L for fresh water. For discharges with initial dilution of less than 10:1, effluent limits are based on zero dilution credit. The resultant 'shallow water' limits for mercury are equal to the WQOs: 0.025 µg/L for salt water and 0.012 µg/L for fresh water. There is uncertainty about the ability of municipal treatment plants to achieve consistent compliance with these limits. This is in part due to limited effluent monitoring data since until recently many analyses have been conducted using analytical detection limits that are numerically greater than the applicable limits.

At present, it appears that the appropriate course of action is to apply mass loading limits to these discharges, and focus mercury reduction efforts on more significant and controllable sources. While site-specific objectives and Total Maximum Daily Loads (TMDLs) are being developed, the discharger will be held accountable for maintaining ambient conditions to the receiving water by complying with performance-based mass emission limits for mercury. This permit includes effluent concentration and mass emission loading limits and a mass emission trigger for mercury, as described below. The discharger is required to maximize control over influent mercury sources, with consideration of relative costs and benefits. The discharger is encouraged to continue working with other municipal dischargers to optimize both source control and pollution prevention efforts and to assess alternatives for reducing mercury loading to, and protecting beneficial uses of, receiving waters.

d. *Treatment Plant Performance and Compliance Attainability.* Effluent mercury concentrations during 1993-1997 were consistently below the detection limit used (typically 0.2 µg/L), with the

exception of two out of 61 samples (0.02 µg/L in April 1995 and 0.2 µg/L in July 1995). Effluent analyses since May 1998 have used a lower analytical detection limit, 0.01 µg/L. Effluent concentrations during May 1998 through December 1999 range from 0.02 to 0.04 µg/L (20 samples) for Carquinez Strait and 0.03 to 0.06µg/L (2 samples) for Mare Island Strait. The effluent discharged to Carquinez Strait has been in consistent compliance with the previous permit limit of 1 µg/L.

e. *Effluent Concentration Limit.* This Order establishes deep-water interim daily maximum and monthly average concentration effluent limits for mercury of 1.0 and 0.2 µg/L, respectively, based on the Basin Plan and the previous permit. This Order also establishes an shallow-water interim daily maximum and monthly average concentration limits for mercury of 1.0 and 0.06 µg/L, respectively, for Mare Island Strait discharges that do not receive at least a 10:1 dilution. The shallow-water interim monthly average limit is based on the maximum value of effluent mercury concentrations from monitoring data for 1997 through December 1999. The interim limit shall apply to the discharges until a TMDL and WLA for mercury are completed. The final limit will be based on the WLA derived from the TMDL.

f. *Mass Emission Limit.* A mass-based loading limit (mass emission limit) for mercury of 0.35 kilograms per month is established in this Order (Effluent Limitation B.5.a). This limit is the maximum moving average value of calculated total mercury mass loading from discharges to Carquinez Strait and wet weather discharges to Mare Island Strait, based on effluent data from 1997 through December 1999. The loadings were calculated using 12-month moving averages for effluent flows and concentrations for each discharge outfall, and the sum of these two loadings as the total monthly load. This mass limit is designed to hold the discharger to current loadings until a TMDL is established and is intended to address anti-degradation concerns. The final effluent limit will be based on the WLA derived from the mercury TMDL. When a final WLA is approved for the discharger, the permit may be reopened. If a TMDL is not established by 2010, and the date for completion is not extended, then the final WLA for mercury as a bioaccumulative substance is required to be no net loading, according to the above rationale.

g. *Mass Emission Trigger.* A mass-based loading 'trigger' (mass emission trigger) for mercury of 0.058 kilograms per month is established in this Order (Effluent Limitation B.5.b). This mass emission trigger is the maximum moving average value of calculated total mercury mass loading from discharges to Carquinez Strait and wet weather discharges to Mare Island Strait, based on effluent data from 1997 through December 1999. This data includes concentration values only for those analyses conducted using a low detection limit (0.01 µg/L). If the mass emission trigger is exceeded, the discharger is required to initiate additional actions to control mercury loading, as specified in the Provisions of this Order. Compliance is based on the running 12-month average loads derived from discharged flow and ultra-clean concentration data. The rationale for the trigger is to encourage greater pollution prevention and reclamation efforts.

h. *Source Control and Special Studies.* This Order requires the discharger to develop and implement a source control program as necessary to comply with the mercury concentration and mass loading limits, and to reduce any significant, controllable sources that may be contributing to mercury impairment in the receiving waters. The Board intends to work toward the derivation of control measures and effluent limitations that will lead towards overall reduction of mercury mass loadings in the watershed. This permit will be revised after additional information on such factors as attainability, impacts on beneficial uses, mass loadings, and site-specific limits is developed. This permit contains a time schedule for the mercury source control program. The

discharger will also participate in watershed based activities and studies, as directed by Board staff, that are aimed at mercury source identification and reduction.

i. *Option for a Mass Offset.* This Order contains requirements to prevent further degradation of the impaired waterbody. Such requirements include provisions for aggressive source control and pollution prevention, mass limits calculated based on current treatment plant performance, feasibility studies for upland wastewater reclamation and treatment plant optimization. However, the toxic pollutant reduction achieved by complying with the above provision will eventually reach a point that is no longer cost effective. In most instances, the stormwater discharge into the same receiving waterbody may have contributed or continue to be contributing the same listed pollutants at a much higher loading than the wastewater discharge. This loading may be more cost-effectively reduced by implementing certain best management practices (BMPs) to remove future load or by removing historically polluted creek sediment. Since wastewater, stormwater and sediment discharge into the same waterbody, a net reduction of mass load can be achieved by giving the discharger the option to propose a mass offset program. Reduction of the stormwater mass load that would not otherwise be required, such as the removal of polluted creek sediment, can be used to offset the wastewater mass load in excess of the mass limits specified in this Order. A ratio of at least 1.5 (mass in stormwater or creek sediment) to 1 (mass in wastewater) for any listed pollutant of the same form or bioavailability may be used. A higher ratio might be appropriate if the pollutants in the stormwater or creek sediment are in a less soluble or bioavailable form than those in the wastewater.

Mass Emission Limits for Copper, Nickel and Selenium

41. Copper, Nickel and Selenium are identified in the 303(d) list as constituents contributing to impairment of Carquinez Strait. To prevent further impairment of receiving water by these constituents while TMDLs are developed, mass-based loading limits (mass emission limits) for Copper, Nickel and Selenium are established in this permit (Effluent Limitation B.6). These limits are the maximum moving average value of calculated total mass loadings for the respective constituents from discharges to Carquinez Strait and to Mare Island Strait, based on effluent data from January 1997 through December 1999. The loadings were calculated using 12-month moving averages for effluent flows and concentrations for each discharge outfall, and the sum of these two loadings as the total monthly load.

Whole Effluent Acute Toxicity

42. This Order includes effluent limits for whole-effluent acute toxicity. Compliance evaluation is based on 96-hour flow-through bioassays. USEPA promulgated updated test methods for acute and chronic toxicity bioassays on October 16, 1995, in 40 CFR Part 136. Dischargers have identified several practical and technical issues that need to be resolved before implementing the new procedures. The primary issue is that the use of younger, possibly more sensitive, fish, may necessitate a reevaluation of permit limits. In 1996, SWRCB staff recommended to the regional boards that new or renewed permit holders be allowed a time period in which new laboratories can become proficient in conducting the new tests. A provision is included in the Self-Monitoring Program allowing the discharger to continue using the current test protocols until further guidance is provided by SWRCB or Board staff on conducting the new tests and interpreting the compliance results compared to current test results.

Whole Effluent Chronic Toxicity

43. a. *Program History.* The Basin Plan contains a narrative toxicity objective stating that "All waters shall be maintained free of toxic substances in concentrations that are lethal to or produce other detrimental responses to aquatic organisms" and that "there shall be no chronic toxicity in ambient waters." The 1986, the Board initiated the Effluent Toxicity Characterization Program (ETCP), with the goal of developing and implementing toxicity limits for each discharger based on actual characteristics of both receiving waters and waste streams. Dischargers were required to monitor their effluent using critical life stage toxicity tests to generate information on toxicity test species sensitivity and effluent variability to allow development of appropriate chronic toxicity effluent limitations. Two rounds of effluent characterization were conducted by selected dischargers beginning in 1988 and in 1991. A second round was completed in 1995, and the Board is evaluating the need for a third round. Board guidelines for conducting toxicity tests and analyzing results were published in 1988 and last updated in 1991. The discharger participated in the ETCP.

The Board adopted Order No. 92-104 in August 1992 amending the permits of eight dischargers to include numeric chronic toxicity limits. However, due to the court decision which invalidated the California Enclosed Bays and Estuaries Plan and Inland Surface Waters Plan, on which Order No. 92-104 was based, the SWRCB stated, by letter dated November 8, 1993, that the Board will have to reconsider the order. This letter also committed to providing the regional boards with guidance on issuing permits in the absence of the State Plans (*Guidance for NPDES Permit Issuance,* February 1994).

b. *SWRCB Toxicity Task Force Recommendations.* The SWRCB Toxicity Task Force provided several consensus-based recommendations in their October 1995 report to the SWRCB for consideration redrafting the State Plans. A key recommendation was that permits should include narrative rather than numeric limits. The numeric test values should then be used as toxicity "triggers" to first accelerate monitoring and then initiate Toxicity Reduction Evaluations (TREs).

c. *Regional Board Program Update.* The Board intends to reconsider Order No. 92-104 as directed by the SWRCB, and to update, as appropriate, the Board's Whole Effluent Toxicity (chronic and acute) program guidance and requirements. This will be done based on analysis of discharger routine monitoring and ETCP results, and in accordance with current USEPA and SWRCB guidance. In the interim, decisions regarding the need for and scope of chronic toxicity requirements for individual dischargers will continue to be made based on BPJ as indicated in the Basin Plan.

d. *Discharge Monitoring.* The discharger participated in the second round of ETCP screening and variability testing in 1991-1993. During the course of ETCP monitoring, the discharger did not detect a significant pattern of chronic toxicity. During Variability Phase testing, a pattern of acute toxicity was identified with one of the test species, *Ceriodaphnia dubia.* In mid-1993, after completing nine of twelve testing events, variability phase testing was suspended while a Toxicity Identification Evaluation (TIE) was pursued to identify the cause of observed acute toxicity. TIE Phase 1 and 2 results (January 24, 1994 report) were variable but suggested that indirect-acting organophosphorous insecticides were the cause of observed acute toxicity in many of the samples evaluated. Variability phase testing, resumed in mid-1994, concluded with a total of 18 testing events from September 1992 through December 1994. The results (June 12, 1995 report) were similar to earlier testing - no pattern of chronic toxicity, but patterns of observed acute toxicity for both *Ceriodaphnia dubia* and *Mysidopsis bahia.* This permit requires the discharger to initiate routine chronic toxicity monitoring using critical life stage tests.

e. *Permit Requirements.* In accordance with USEPA and SWRCB Task Force guidance, and based on BPJ, this Permit includes requirements for chronic toxicity monitoring based on the Basin Plan narrative toxicity objective. This Permit includes the Basin Plan narrative toxicity objective as the applicable effluent limit, implemented via monitoring with numeric values as "triggers" to initiate accelerated monitoring and to initiate a chronic TRE as necessary.

f. *Permit Reopener.* The Board will consider amending this Permit to include numeric toxicity limits if the discharger fails to aggressively implement all reasonable control measures included in its approved TRE workplan, following detection of consistent significant non-artifactual toxicity.

OTHER DISCHARGE CHARACTERISTICS AND PERMIT CONDITIONS

44. *Increase in Permitted Discharge Flow.*

a. *Proposal.* The discharger has requested an increase in the permitted treatment plant capacity and discharge flow from 12.5 mgd to 15.5 mgd, average dry weather flow. The discharger has submitted documentation regarding the treatment plant capacity and an anti-degradation assessment.

b. *Approval.* The permitted discharge is consistent with the anti-degradation provisions of 40 CFR 131.12 and State Water Resources Control Board's Resolution No. 68-16. This order allows an increase in the permitted dry weather capacity, provided that current mass loading of impairing pollutants discharged is maintained. The increase will not unreasonably affect present and anticipated beneficial uses of water given that the discharger will continue to comply with the effluent limitations, including mass limits, and water quality control policies prescribed in the Basin Plan. The increase in the treatment capacity allows wastewater utility service necessary to accommodate housing and economic expansion in the area. However increases in dry weather flow beyond 12.5 mgd due to increase in sewer hook-ups shall be contingent upon the successful completion of the milestones in Provision 5.

45. *Optional Mass Offset.* This Order contains requirements to prevent further degradation of the impaired waterbody. Such requirements include the adoption of mass limits that are based on the treatment plant performance, provisions for aggressive source control and waste minimization, feasibility studies for wastewater reclamation, and treatment plant optimization. After implementing these efforts, the Discharger may find that further net reductions of the total mass loadings of the 303(d)-listed pollutants to the receiving water can be achieved through a mass offset program. This Order includes an optional provision for a mass offset program.

46. *Pretreatment Program.* The discharger has implemented and is maintaining a USEPA approved pretreatment program in accordance with Federal pretreatment regulations (40 CFR 403) and this Board's Order No. 95-015.

47. *O & M Manual.* An Operations and Maintenance Manual is maintained by the discharger for purposes of providing plant and regulatory personnel with a source of information describing all equipment, recommended operation strategies, process control monitoring, and maintenance activities. In order to remain a useful and relevant document, the manual shall be kept updated to reflect significant changes in treatment facility equipment and operation practices.

48. *NPDES Permit.* This Order serves as an NPDES Permit, adoption of which is exempt from the provisions of Chapter 3 (commencing with Section 21100) of Division 13 of the Public Resources Code [California Environmental Quality Act (CEQA)] pursuant to Section 13389 of the California Water Code.

9. *Notification.* The discharger and interested agencies and persons have been notified of the Board's intent to reissue requirements for the existing discharge and have been provided an opportunity to submit their written views and recommendations.

50. *Public Hearing.* The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to the provisions of Division 7 of the California Water Code and regulations adopted thereunder, and to the provisions of the Clean Water Act and regulations and guidelines adopted thereunder, that the Vallejo Sanitation and Flood Control District (discharger) shall comply with the following:

A. DISCHARGE PROHIBITIONS

1. Discharge of treated wastewater at a location or in a manner different from that described in this Order is prohibited.

2. Discharge of wastewater at any point where it does not receive an initial dilution of at least 10:1 is prohibited, except for wet weather discharges to Mare Island Strait of secondary-treated, disinfected and dechlorinated effluent consisting of that portion of the treatment plant flow which exceeds the hydraulic capacity of the Carquinez Strait Discharge outfall.

3. The bypass or overflow of untreated or partially treated wastewater to waters of the State, either at the treatment plant or from the collection system or pump stations tributary to the treatment plant, is prohibited, except as provided for bypasses under the conditions stated in 40 CFR 122.41 (m)(4) and (n).

4. The discharge of average dry weather flows greater than 15.5 mgd is prohibited. The average dry weather flow shall be determined over three consecutive dry weather months each year.

5. Discharges of water, materials, or wastes other than storm water, which are not otherwise authorized by an NPDES permit, to a storm drain system or waters of the State are prohibited.

B. EFFLUENT LIMITATIONS

The term "effluent" in the following limitations means the treated wastewater effluent from the discharger's wastewater treatment facility, as discharged to receiving waters.

Conventional Pollutants

The following effluent limitations (B.1, 2, 3, 4, 5 and 6) apply to effluent discharged to Carquinez Strait through the Carquinez Strait Discharge outfall (Sampling Station E-001), and to effluent discharged to Mare Island Strait intermittently through the Ryder Street Wet Weather outfall (Sampling Station E-002):

1. The effluent shall not exceed the following limits:

Constituent	Units	Monthly Average	Weekly Average	Daily Maximum	Instantaneous Maximum
a. Biochemical Oxygen Demand (BOD) or Carbonaceous BOD	mg/L	30 25	45 40	60 --	--
b. Total Suspended Solids (TSS)	mg/L	30	45	60	--
c. Oil & Grease	mg/L	10	--	20	--
d. Settleable Matter	mg/L	0.1	--	--	0.2
e. Total Chlorine Residual (1)	mg/L	--	--	--	0.0

(1) Requirement defined as below the limit of detection in standard test methods defined in the latest edition of *Standard Methods for the Examination of Water and Wastewater*. The Discharger may elect to use a continuous on-line monitoring system(s) for measuring flows, chlorine and sodium bisulfite dosage (including a safety factor) and concentration to prove that chlorine residual exceedances are false positives. If convincing evidence is provided, Board staff may conclude that these false positive chlorine residual exceedances are not violations of this permit limit.

2. pH:

The following effluent limitations apply only to effluent discharged to Carquinez Strait through the Carquinez Strait Discharge outfall (Sampling Station E-001).

The pH of the effluent shall not exceed 9.0 nor be less than 6.0[(1)].

The following effluent limitations apply only to effluent discharged to Mare Island Strait, intermittently through the Ryder Street Wet Weather outfall (Sampling Station E-002):

a. For a receiving water-to-wastewater dilution ratio of less than 10:1:
The pH of the effluent shall not exceed 8.5 nor be less than 6.5[(1)].

b. For a receiving water-to-wastewater dilution ratio of greater than or equal to 10:1:
The pH of the effluent shall not exceed 9.0 nor be less than 6.0[(1)].

(1) Pursuant to 40 CFR 401.17, pH effluent limitations under continuous monitoring, the Discharger shall be in compliance with the pH limitation specified herein, provided that both of the following conditions are satisfied: (i) The total time during which the pH values are outside the required range of pH values shall not exceed 7 hours and 26 minutes in any calendar month; and (ii) No individual excursion from the range of pH values shall exceed 60 minutes.

3. 85 Percent Removal, BOD and TSS:
The arithmetic mean of the biochemical oxygen demand (BOD_5 20°C) and total suspended solids (TSS) values, by weight, for effluent samples collected in each calendar month shall not exceed 15 percent of the arithmetic mean of the respective values, by weight, for influent samples collected at approximately the same times during the same period.

4. Coliform Bacteria:
The treated wastewater, at some point in the treatment process prior to discharge, shall meet the following limits of bacteriological quality:

a. The log mean value for all samples analyzed for fecal coliform within each calendar month shall not exceed a Most Probable Number (MPN) of fecal coliform bacteria of 200 MPN/100 ml; and

b. No more than ten percent (10 %) of all samples collected within each calendar month shall exceed a fecal coliform bacteria level of 400 MPN/100 ml.

5. **Whole Effluent Acute Toxicity**
Representative samples of the effluent shall meet the following limits for acute toxicity. Compliance with these limits shall be achieved in accordance with Provision E.9. of this Order.

a. The survival of bioassay test organisms in 96-hour bioassays of undiluted effluent shall be:
(1) an 11-sample median value of not less than 90 percent survival [b(1)] ; and
(2) an 11-sample 90th percentile value of not less than 70 percent survival [b(2)] .

b. These acute toxicity limits are further defined as follows:
(1) 11-sample median limit:
Any bioassay test showing survival of 90 percent or greater is not a violation of this limit. A bioassay test showing survival of less than 90 percent represents a violation of this effluent limit, if five or more of the past ten or fewer bioassay tests also show less than 90 percent survival.
(2) 90th percentile limit:
Any bioassay test showing survival of 70 percent or greater is not a violation of this limit. A bioassay test showing survival of less than 70 percent represents a violation of this effluent limit, if one or more of the past ten or fewer bioassay tests also shows less than 70 percent survival.

Toxic Pollutants

Mercury – Mass Emission Limit and Mass Emission Trigger

6. Until TMDL and Waste Load Allocation (WLA) efforts for mercury provide enough information to establish a different WQBEL, the discharger shall demonstrate that the total mercury mass loading from discharges to both Carquinez Strait and to Mare Island Strait has not increased by complying with the following:

a. Mass emission limit: **The mass emission limit for mercury is 0.357 kilograms per month (kg/month).** The total mercury mass load shall not exceed this limit. Compliance with this limit shall be evaluated using 12-month moving average loads calculated from average monthly plant flows and effluent concentrations for both the discharges to Carquinez Strait and wet weather discharges to Mare Island Strait.

b. Mass emission trigger: **The mass emission trigger for mercury is 0. 058 kg/month.** If the total mercury mass load exceeds this trigger level, then the actions specified in Provision E.10 of this Order shall be initiated. Comparison with this trigger shall be evaluated using 12-month moving average loads from monthly flows and concentrations for both discharges to Carquinez Strait and wet weather discharges to Mare Island Strait.

c. These mass emission limit and trigger values will be superseded upon completion of a TMDL and WLA. According to the antibacksliding rule in the Clean Water Act, Section 402(o), the

permit may be modified to include a less stringent requirement following completion of a TMDL and WLA, if the bases for an exception to the rule are met.

d. The total mass load for mercury to be used for evaluating compliance with the mass emission limit and for comparison with the mass emission trigger shall be calculated as follows:
(1) Carquinez Strait Outfall (E-001):
Flow 1 (mgd) = Average of monthly plant effluent flows in mgd.

Mercury Concentration 1 (µg/L) = Average monthly effluent mercury concentration measurements in µg/L for samples taken at E-001. If more than one measurement is obtained in a calendar month, the average of these measurements is used as the monthly value for that month. If test results are less than the method detection limit used, the measurement value is assumed to be equal to the method detection limit.

Mass Loading 1 (kg/month) = (Flow 1) x (Mercury Concentration 1) x (0.1151).

Running Average Mass Load 1 = Average of Mass Loading 1 for previous 12 months.

(2) Wet Weather Discharges to Mare Island Strait (E-002):
Flow 2 (mgd) = Average of monthly discharge flows, given as an equivalent daily flow in mgd. Equivalent daily flow in mgd = (Total volume discharged in the calendar month, in million gallons) x (12/365).

Mercury Concentration 2 (µg/L) = same calculation as in d.(1) above, for samples taken at E-002.

Mass Loading 2 (kg/month) = (Flow 2) x (Mercury Concentration 2) x (0.1151).

Running Average Mass Load 2 = Average of Mass Loading 1 for previous 12 months.

(3) Total Mass Load (kg/month) = (Running Average Mass Loading 1) + (Running Average Mass Loading 2).

Mass Emission Limits for Copper, Nickel and Selenium.

7. Until TMDL and Waste Load Allocation (WLA) efforts for copper, nickel and selenium are completed, the discharger shall demonstrate that the total mass loadings for these conditions from discharges to both Carquinez Strait and to Mare Island Strait have not increased by complying with the following:

Constituent	Mass emission limit (kilograms per month)
a. Copper	15
b. Nickel	6.5
c. Selenium	2.0

d. The total mass loads for the above constituents shall not exceed the respective limits. Compliance with these limits shall be evaluated using 12-month moving averages of plant flows and effluent concentrations for both the discharges to Carquinez Strait and wet weather discharges to Mare Island Strait.

e. The total mass load to be used for evaluating compliance with the mass emission limit shall be calculated as follows:

(1) Carquinez Strait Outfall (E-001):

Flow 1 (mgd) = Average of monthly plant effluent flows in mgd.

Constituent Concentration 1 (µg/L) = Average of monthly effluent concentration measurements in µg/L for samples taken at E-001. If more than one measurement is obtained in a calendar month, the average of these measurements is used as the monthly value for that month. If test results are less than the method detection limit used, the measurement value is assumed to be equal to the method detection limit.

Mass Loading 1 (kg/month) = (Flow 1) x (Constituent Concentration 1) x (0.1151).

Running Average Mass Load 1 = Average of Mass Loading 1 for previous 12 months.

(2) Wet Weather Discharges to Mare Island Strait (E-002):

Flow 2 (mgd) = Average of monthly discharge flows, given as an equivalent daily flow in mgd, for the past 12 months. Equivalent daily flow in mgd = (Total volume discharged in the calendar month, in million gallons) x (12/365).

Constituent Concentration 2 (µg/L) = same calculation as in d.(1) above, for samples taken at E-002.

Mass Loading 2 (kg/month) = (Flow 2) x (Constituent Concentration 2) x (0.1151).

Running Average Mass Load 2 = Average of Mass Loading 1 for previous 12 months.

(3) Total Mass Load (kg/month) = (Running Average Mass Loading 1) + (Running Average Mass Loading 2).

Discharges to Carquinez Strait (Carquinez Strait Outfall)

The following effluent limitations under B.8 apply only to effluent discharged to Carquinez Strait through the Carquinez Strait Discharge outfall (Sampling Station E-001):

8. Toxic Substances: The effluent shall not exceed the following limits (1):

Constituent	***Daily Maximum***	***Interim Daily Maximum***	***Interim Monthly Average (2)***	***Units***	***Notes***
a. Copper	--	36	--	µg/L	(1)
b. Mercury	--	1.0	0.2	µg/L	(1), (2)
c. Nickel	--	53	--	µg/L	(1)
d. Selenium	--	50	--	µg/L	(1)
e. Cyanide	10	--	--	µg/L	(1), (3)

Footnotes :

(1) (a) Compliance with these limits is intended to be achieved through secondary treatment and, as necessary, pretreatment and source control.

(b) All analyses shall be performed using current USEPA methods, or equivalent methods approved in writing by the Executive Officer. Method Detection Limits, Practical Quantitation Limits, and quantitative levels will be taken into account in determining compliance with effluent limitations.

(c) Limits apply to the average concentration of all samples collected during the averaging period (Daily = 24-hour period; Monthly = calendar month).

(2) Mercury: The monthly average interim limit of 0.2 µg/L shall apply to the discharges until a TMDL and WLA for mercury are completed. Effluent mercury monitoring shall be performed by using ultra-clean sampling and analysis techniques, with a method detection limit of 0.01 µg/L, or lower.

(3) Cyanide: Compliance may be demonstrated by measurement of weak acid dissociable cyanide.

Discharges to Mare Island Strait (Ryder Street Wet Weather Outfall)

The following effluent limitations (B.9) apply only to effluent discharged to Mare Island Strait, intermittently through the Ryder Street Wet Weather outfall (Sampling Station E-002):

9. Toxic Substances:
The effluent shall not exceed the following limits (1). Compliance with these limits shall be achieved in accordance with Provision E.18. of this Order.

Constituent	***Shallow Water Daily Max (2)***	***Interim Shallow Water Daily Max (2)***	***Deep Water Daily Max (2)***	***Interim Deep Water Daily Max (2)***	***Units***	***Notes***
a. Cadmium	9.3	--	92	--	µg/L	
b. Copper	--	16	--	36	µg/L	
c. Lead	5.6	--	53	--	µg/L	
d. Mercury	--	1.0 (0.06)	--	1.0 (0.2)	µg/L	(3), (5)
e. Nickel	--	7.1	--	53	µg/L	
f. Zinc	58	--	562	--	µg/L	
g. Cyanide	1.0	--	10	--	µg/L	(1), (4)

Footnotes :

(1) (a) Compliance with these limits is intended to be achieved through secondary treatment and, as necessary, pretreatment and source control.

(b) All analyses shall be performed using current USEPA methods, or equivalent methods approved in writing by the Executive Officer. Method Detection Limits, Practical Quantitation Limits, and quantitative levels will be taken into account in determining compliance with effluent limitations.

(c) Limits apply to the average concentration of all samples collected during the averaging period (Daily = 24-hour period; Monthly = calendar month).

(2) Shallow Water Daily Average limits apply to discharges with a receiving water-to-effluent dilution ratio of less than 10:1. Deep Water Daily Average limits apply to discharges with a receiving water-to-effluent dilution ratio of greater than or equal to 10:1.

(3) Mercury: The shallow and deep water daily maximum interim limits of 1.0 µg/L, and shallow and deep water monthly average interim limits of 0.06 and 0.2 µg/L, respectively, shall apply to the discharges until a TMDL and WLA for mercury are completed. Monitoring shall be performed by using ultra-clean sampling and analysis techniques, with a method detection limit of at least 0.01 µg/L.

(4) Cyanide: Compliance with this limit may be demonstrated by measurement of weak acid dissociable cyanide.

(5) Mercury: Limits in parenthesis are interim **monthly** average limits.

C. RECEIVING WATER LIMITATIONS

1. The discharge of waste shall not cause the following conditions to exist in waters of the State at any place:
   a. Floating, suspended, or deposited macroscopic particulate matter or foam;
   b. Bottom deposits or aquatic growths to the extent that such deposits or growths cause nuisance or adversely affect beneficial uses;
   c. Alteration of temperature, turbidity, or apparent color beyond present natural background levels;
   d. Visible, floating, suspended, or deposited oil or other products of petroleum origin; and
   e. Toxic or other deleterious substances to be present in concentrations or quantities which will cause deleterious effects on wildlife, waterfowl, or other aquatic biota, or which render any of these unfit for human consumption, either at levels created in the receiving waters or as a result of biological concentration.

2. The discharge of waste shall not cause the following limits to be exceeded in waters of the State anyone place within one foot of the water surface:

   a. Dissolved Oxygen: 5.0 mg/L, minimum
      The median dissolved oxygen concentration for any three consecutive months shall not be less than 80% of the dissolved oxygen content at saturation. When natural factors cause concentrations less than that specified above, then the discharge shall not cause further reduction in ambient dissolved oxygen concentrations.
   b. Dissolved Sulfide: 0.1 mg/L, maximum
   c. pH: Variation from normal ambient pH by more than 0.5 pH units.
   d. Un-ionized Ammonia: 0.025 mg/L as N, annual median; and
      0.16 mg/L as N, maximum.
   e. Nutrients: Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.

3. The discharge shall not cause a violation of any particular water quality standard for receiving waters adopted by the Board or the State Board as required by the Clean Water Act and regulations adopted thereunder. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Clean Water Act, or amendments thereto, the Board will revise and

modify this Order in accordance with such more stringent standards.

D. SLUDGE MANAGEMENT PRACTICES

1. a. The discharger presently disposes of all stabilized, dewatered biosolids (sewage sludge) from the discharger's wastewater treatment plant by land application at the discharger's Biosolids Utilization Project on Tubbs Island, Sonoma County.

   b. This disposal practice is regulated by the USEPA under the 40 CFR 503 regulations (Standards for the Use or Disposal of Sewage Sludge; February 19, 1993 final rule).

   c. All the requirements in 40 CFR 503 are enforceable by USEPA whether or not they are stated in an NPDES permit or other permit issued to the discharger.

2. The discharger is required to submit an annual report to the USEPA regarding its sewage sludge disposal practices in accordance with the requirements of 40 CFR 503. The discharger shall include a summary of this information in the Self Monitoring Program Annual Report submitted to the Board.

3 Sludge treatment, storage, and disposal or reuse shall not create a nuisance, such as objectionable odors or flies, or result in groundwater contamination.

4. The treatment and temporary storage of sewage sludge at the discharger's wastewater treatment facility shall not cause waste material to be in a position where it will be carried from the sludge treatment and storage site and deposited in the waters of the State.

5. Permanent on-site storage or disposal of sewage sludge at the discharger's wastewater treatment facility is not authorized by this permit. A report of Waste Discharge shall be filed and the site brought into compliance with all applicable regulations prior to commencement of any such activity by the discharger.

6. The Board may amend this permit prior to expiration if changes occur in applicable state and federal sludge regulations.

E. PROVISIONS

1. **Compliance with this Order.**
   The discharger shall comply with all sections of this Order immediately upon adoption.

2. **Rescission of Previous Waste Discharge Requirements.**
   Requirements prescribed by this Order supersede the requirements prescribed by Order No. 88-153. Order No. 88-153 is hereby rescinded.

3. **Self-Monitoring Program.**
   The discharger shall comply with the Self-Monitoring Program (SMP) for this Order as adopted by the Board. Self-Monitoring Reports (SMRs) shall be received by the Board no later than 45 days after the end of the reporting month.

4. Standard Provisions and Reporting Requirements.
The discharger shall comply with all applicable items of the *Standard Provisions and Reporting Requirements for NPDES Surface Water Discharge Permits, August 1993* (attached), or any amendments thereafter. Where provisions or reporting requirements specified in this Order are different from equivalent or related provisions or reporting requirements given in 'Standard Provisions', the specifications of this Order shall apply.

5. Collection System Overflow Study and Schedule.
In order to ensure full compliance with Prohibitions A.1., A.2., and A.3. of this Order for wet weather flows, the discharger shall implement collection system improvements and programs in accordance with the following:

a. 1992 Inflow/Infiltration Correction Plan. The discharger shall continue to implement the 1992 Inflow/Infiltration Correction Plan, according to the following schedule:

	Begin	Complete [ii]
Northern Basin Storm Water Inflow reduction measures	immediately	12/2002
Southern Basin Storm Water Inflow reduction measures	7/2001	12/2004
District wide sewer rehabilitation [i]	7/2001	12/2005

[i] The beginning date shall not include development of a work program. Rehabilitation includes grouting, lining, and replacement of sewer lines and laterals. A work plan is to be presented to the Executive Officer at least six months prior to the Begin date. Otherwise a work program may begin after the begin date but shall be presented to the Executive Officer within four months of the begin date.

[ii] Completion of the specific items of work identified in the Plan shall include reference to one of the following having occurred:
a) The item is determined not to be a current source of inflow or infiltration resulting in prohibited overflows;
b) The item has been corrected as required by the Plan;
c) The item has been repaired so that it is not a current source of inflow or infiltration; or
d) Actions (including legal actions or fines as necessary) are being pursued in order to effect the repair.

The three milestones identified above in the Inflow/Infiltration Correction Plan shall coincide with a permitted increase of one mgd for each milestone. Therefore, an increase in permitted flow from 12.5 to 13.5 mgd shall be granted contingent upon the successful completion of the Northern Basin Storm Water Inflow reduction measures. When District wide sewer rehabilitation is completed, the permitted dry weather capacity shall be 15.5 mgd.

b. Sanitary Sewer Overflow Elimination Study. The discharger is currently conducting a Sanitary Sewer Overflow Elimination Study ("Study") to evaluate other means of reducing sanitary sewer overflows from its system. The completed Study shall be presented to the Executive Officer by 12/15/2000 for review. The Study as presented shall contain the following elements 1) actual capacities of the publicly owned collection system, each treatment unit, and the disposal system; 2) flow return period probabilities for the specific facility location; 3) cost of providing complete storage or treatment capacity and disposal capacity for flow return periods of 1, 5, 10, and 20 years; 4) quality of the polluted stormwater and wastewater for flow return periods of 1, 5, 10, and 20 years; and 5) beneficial uses that may be affected by such dischargers. A status report

shall be presented May 15, 2000. The Board may revise this permit, in whole or in part, in response to the results of this study and may in so doing revise the schedule in a) above.

The monthly Self-Monitoring Reports submitted to the Executive Officer shall include a schedule report regarding the Study that is current to 15 days prior to the report date.

c. Wet Weather Facilities Operation Plan. The discharger shall prepare a Wet Weather Facilities Operation Plan. This plan shall describe operation and maintenance procedures for existing collection system, treatment and discharge facilities, and planned improvement projects and programs that are collectively intended to control wet weather overflows. This plan shall be consistent with the following objective:

Maintain and operate the collection system in a manner to optimize control and conveyance of wastewater flows to the wastewater treatment facilities, consistent with facility hydraulic and treatment capacities, and minimize collection system overflows.

Submit Technical Report, Wet Weather Facilities Operation Plan: July 15, 2000.

6. Facility Operations during Wet Weather Conditions

a. The discharger shall maintain and operate the collection system in a manner to optimize control and conveyance of wastewater flows to the treatment plant facility and minimize collection system overflows.

b. The discharger shall maintain and operate the treatment plant facility in a manner to optimize treatment performance and ensure that discharges through the Ryder Street Wet Weather outfall to Mare Island Strait receive full secondary treatment at all times.

c. In order to provide adequate overall reliability of the treatment process, especially during wet weather conditions, the discharger shall at all times provide emergency stand-by power for all treatment units necessary to provide full secondary treatment, including disinfection processes.

7. Receiving Water Study and Schedule

The discharger shall conduct a receiving water beneficial use study to assess the appropriateness of testing for fecal instead of total coliform concentrations in compliance with Basin Plan coliform objectives. Depending on the results of the final study, the permit may be amended to specify either total or fecal coliform limits.

Task	Compliance Date
(1) Receiving Water Study Plan. Develop a study plan, acceptable to the Executive Officer, to include, but not be limited to, a receiving water coliform study, and tasks and schedules necessary to assess the beneficial uses attributed to the outfall location.	September 30, 2000
(2) Study Commencement. Following approval by the Executive Officer commence work in accordance with the study plan and time schedule submitted pursuant to the approved plan.	January 31, 2001
(3) Interim Report commencement	6 months after Study

Submit results of the receiving water coliform study and document adverse impacts, if any, on attributed beneficial uses of the outfall location by discharging fecal coliform per Effluent Limitation B.3.

(4) Final Report January 31, 2002
Submit a final report, acceptable to the Executive Officer, documenting the results of the beneficial use investigation described above.

8. Compliance with BOD & TSS Effluent Limits during Wet Weather Conditions.
In reviewing compliance with the 85 % Removal limits for BOD and TSS as given in this Order (Effluent Limitation B.2.) and considering potential enforcement actions for exceeding these limits, the Board will take special note of difficulties encountered in achieving compliance during wet weather periods when ordinary treatment capabilities are impeded by peak flows and storm water-diluted influent, provided that all wastewater facilities are operated in a manner to optimize treatment performance and compliance with these requirements.

9. Compliance with Whole Effluent Acute Toxicity Effluent Limits (Effluent Limitation B.4)
Compliance with acute toxicity requirements of this Order shall be achieved in accordance with the following:

a. Compliance with the acute toxicity effluent limits of this Order shall be evaluated by measuring survival of test organisms exposed to undiluted effluent for 96 hours conducted on effluent discharged to Carquinez Strait and to Mare Island Strait. For discharges to Carquinez Strait, bioassays shall be flow-through bioassays. For discharges to Mare Island Strait, bioassays may be conducted as static-renewal bioassays.
b. Test organisms shall be three-spine stickleback unless specified otherwise in writing by the Executive Officer.
c. All bioassays shall be performed according to protocols approved by the USEPA or State Board, or published by the American Society for Testing and Materials (ASTM) or the American Public Health Association, unless specified otherwise in writing by the Executive Officer.

10. Mercury Mass Loading Reduction Study and Schedule
If mass loading for mercury exceeds the mass emission trigger level specified in Effluent Limitation B.5. of this Order, then the following actions shall be initiated by the discharger:

a. Notification: Any event when the mass emission trigger is exceeded shall be reported to the Board in accordance with Section E.6.b. in the Board's Standard Provisions and Reporting Requirements for NPDES Surface Water Discharge Permits, August, 1993.

b. Verification: Resample to verify the increase in loading. If re-sampling confirms that the mass loading trigger has been exceeded, initiate Mercury Source Control and Reduction Program as described below.

c. Mercury Source Control and Reduction Program.
The discharger shall implement an aggressive source control and pollution prevention program to identify sources and evaluate options for control and reduction of mercury loadings. Objectives of the program shall include maintaining loadings at or below the mass emission trigger level specified in this Order, and the feasibility of attaining effluent mercury concentrations at or below the USEPA national saltwater mercury criterion of 0.025 µg/L. This program shall consider reductions in mercury effluent concentrations achieved through source control and

economically feasible optimization of treatment plant processes. If necessary, alternative control strategies shall be investigated, through participation with the Board and other North Bay dischargers in identifying cross media watershed-wide sources of mercury impacting the receiving water, and potential control measures. This program shall be developed and implemented in accordance with the following time schedule.

Task	Compliance Date
(1) Mercury Source and Reduction Study Plan.	60 days after trigger exceedance verification.

Submit a proposed Study Plan, acceptable to the Executive Officer, to investigate mercury sources and reduction measures. The investigation shall include 1) sampling for mercury in residential and commercial wastewater at representative locations in the collection system over a reasonable period of time, 2) investigating means of optimizing mercury removal by treatment plant processes, 3) characterization of industrial and commercial contributions to mercury loadings, and 4) evaluating possible means by which any significant sources can be reduced. This Study Plan shall include proposed actions and a time schedule for their implementation.

(2) Study Commencement. 60 days after submittal of Study Plan.
Commence work in accordance with Study Plan and time schedule submitted pursuant to Task (1) above.

(3) Interim report. 6 months after Study commencement.
Submit an interim report, acceptable to the Executive Officer, documenting the initial findings of source reduction options, and past and proposed efforts to encourage minimization of mercury discharges to the collection system.

(4) Final Report. 18 months after Study commencement.
Submit a final report, acceptable to the Executive Officer, documenting the findings of source reduction work and efforts made to minimize mercury in the collection system and treated effluent. This report shall include assessment of the feasibility of controlling effluent mercury loadings through: improving education and outreach; reducing infiltration and inflow, and increasing reclamation and reuse of treated effluent.

(5) Mercury Loading Control Plan. 26 months after Study commencement.
Develop a plan and time schedule, acceptable to the Executive Officer, based on the results of the report submitted pursuant to Task (4) above, to implement all reasonable actions to maintain mercury mass loadings at or below the mass emission trigger level specified in this Order.

11. Copper Source Control and Reduction Study and Schedule

The discharger shall document current copper reduction and control activities, evaluate the feasibility of potential enhancements to those activities, including enhancement of copper corrosion control in the water supply system, and develop and implement a source identification and reduction plan for sources of copper. This program shall be aimed at taking all reasonable and economical steps to reduce influent copper concentrations and shall be developed and implemented in accordance with the following time schedule.

Task	Compliance Date
a. Copper Source and Reduction Study Plan.	September 15, 2000

The discharger shall submit a report, acceptable to the Executive Officer, documenting past, on-going, and future efforts to reduce influent copper concentrations, including, but not limited to,

details of past measures taken by the local water agencies to reduce corrosion in the supply system. This report may be prepared and submitted in conjunction with other wastewater facilities served by the same water purveyors.

b. Final Report March 15, 2003
The discharger shall submit a report, acceptable to the Executive Officer, documenting efforts to identify any other significant copper sources in the community. Assessment of options for source reduction shall be provided for any identified sources. Time schedules for anticipated actions associated with implementing a source reduction plan shall be included.

12. Optional Copper Translator Study and Schedule

In order to develop information that may be used to establish a water quality based effluent limit based on dissolved copper criteria, the discharger may utilize RMP data from stations nearest the discharger's outfall and/or implement a sampling plan to collect data for development of a dissolved to total copper translator. If the discharger chooses to proceed with the study, this work shall be performed in accordance with the following tasks:

Task

a. Copper Translator Study Plan.
The discharger shall submit a study plan, acceptable to the Executive Officer, for collection of data that can be used for establishment of a dissolved to total copper translator, as discussed in the Findings. After Executive Officer approval or within 60 days of submission of the Study Plan, the discharger shall begin implementing the study plan. The study plan shall provide for development of translators in accordance with EPA guidelines and any relevant portions of the Basin Plan, as amended.

b. Copper Translator Final Report
The discharger shall conduct the translator study by utilizing field sampling data approximate to the discharge point and in the vicinity of the discharge point and shall submit a report, acceptable to the Executive Officer, documenting the results of the copper translator study, which may also include any other site specific information that the discharger would like the Board to consider in development of a water quality based effluent limitation for copper.

13.Reclamation Study and Schedule

The discharger shall conduct a study to maximize the use of reclaimed water. The study must at a minimum include the potential for landscape irrigation and dust control. The study shall be conducted in accordance with the following tasks and time schedule:

Task	Compliance Date
a. Study Plan Develop a study plan, acceptable to the Executive Officer, to maximize the use of reclaimed water.	July 31, 2001
b. Commencement of Plan Following approval by the Executive Officer commence work in accordance with the study plan and time schedule submitted pursuant to the above Study Plan.	January 31, 2002
c. Final Report Submit a final report, acceptable to the Executive Officer, documenting the results of the complete study as described above.	August 15, 2003

14. Optional Mass Offset

If the discharger wishes to pursue a mass offset program, a mass offset plan for reducing mercury to the same receiving waterbody needs to be submitted for Board approval. The Board will consider any proposed mass offset plan and amend this Order accordingly.

15. Compliance Schedule for Detection-Limited Pollutants

The Discharger shall consistently use the lowest possible detection limits commercially available to analyze all required chemical parameters in its waste discharges. If the analytical methods for some pollutants (e.g. PCBs, TCDD Equivalents) are improved or new methods developed which improves (or lowers) the analytical quantification limit beyond those specified in the Self-Monitoring Program, and the discharger using the new or improved methods finds the above pollutants present at levels above the new detection limits but below the former analytical quantification limits established, the discharger shall notify the Executive Officer, accelerate monitoring for the pollutant of concern to characterize the discharge, and within 60 days develop and initiate a source identification and reduction investigation acceptable to the Executive Officer. Until this Order is revised, compliance with the tables in Effluent Limitations B.8 and B.9 of this Order shall be determined at the former analytical quantification limits specified in the Self-Monitoring Program.

16. Regional Monitoring Program

The discharger shall continue to participate in the Regional Monitoring Program (RMP) for trace substances in San Francisco Bay in lieu of more extensive effluent and receiving water self-monitoring requirements that may be imposed.

17. Whole Effluent Chronic Toxicity Requirements:

The discharger shall monitor and evaluate effluent discharged to the Carquinez Strait Discharge outfall for chronic toxicity in order to demonstrate compliance with the Basin Plan narrative toxicity objective. Compliance with this requirement shall be achieved in accordance with the following.

a. The discharger shall conduct routine chronic toxicity monitoring in accordance with the SMP of this Order.

b. If data from routine monitoring exceed either of the following evaluation parameters, then the discharger shall conduct accelerated chronic toxicity monitoring. Accelerated monitoring shall consist of monitoring at frequency intervals of one half the interval given for routine monitoring in the SMP of this Order.

c. Chronic toxicity evaluation parameters:
   (1) a three sample median value of 10 TU_c [3]; and
   (2) a single sample maximum value of 20 TU_c [3].
   (3) These parameters are defined as follows:
      (a) Three-sample median: A test sample showing chronic toxicity greater than 10 TU_c represents an exceedance of this parameter, if one of the past two or fewer tests also show chronic toxicity greater than 10 TU_c.
      (b) TU_c (chronic toxicity unit): A TU_c equals 100/NOEL (e.g., If NOEL = 100, then toxicity = 1 TUc). NOEL is the no observed effect level determined from IC, EC, or NOEC values [c].
      (c) The terms IC, EC, NOEL and NOEC and their use are defined in Attachment C of this Order.

d. If data from accelerated monitoring tests are found to be in compliance with the evaluation parameters, then routine monitoring shall be resumed.

e. If accelerated monitoring tests continue to exceed either evaluation parameter, then the discharger shall initiate a chronic toxicity reduction evaluation (TRE).

f. The TRE shall be conducted in accordance with the following:

(1) The discharger shall prepare and submit to the Board for Executive Officer approval a TRE work plan. An initial generic workplan shall be submitted within 120 days of the date of adoption of this Order. The workplan shall be reviewed and updated as necessary in order to remain current and applicable to the discharge and discharge facilities.
(2) The TRE shall be initiated within 30 days of the date of completion of the accelerated monitoring test observed to exceed either evaluation parameter.
(3) The TRE shall be conducted in accordance with an approved work plan.
(4) The TRE needs to be specific to the discharge and discharger facility, and be in accordance with current technical guidance and reference materials including US EPA guidance materials. TRE shall be conducted as a tiered evaluation process, such as summarized below:
    (a) Tier 1 consists of basic data collection (routine and accelerated monitoring).
    (b) Tier 2 consists of evaluation of optimization of the treatment process including operation practices, and in-plant process chemicals.
    (c) Tier 3 consists of a toxicity identification evaluation (TIE).
    (d) Tier 4 consists of evaluation of options for additional effluent treatment processes.
    (e) Tier 5 consists of evaluation of options for modifications of in-plant treatment processes.
    (f) Tier 6 consists of implementation of selected toxicity control measures, and follow-up monitoring and confirmation of implementation success.
(5) The TRE may be ended at any stage if monitoring finds there is no longer consistent toxicity.
(6) The objective of the TIE shall be to identify the substance or combination of substances causing the observed toxicity. All reasonable efforts using currently available TIE methodologies shall be employed.
(7) As toxic substances are identified or characterized, the discharger shall continue the TRE by determining the source(s) and evaluating alternative strategies for reducing or eliminating the substances from the discharge. All reasonable steps shall be taken to reduce toxicity to levels consistent with chronic toxicity evaluation parameters.
(8) Many recommended TRE elements parallel required or recommended efforts of source control, pollution prevention and storm water control programs. TRE efforts should be coordinated with such efforts. To prevent duplication of efforts, evidence of complying with requirements or recommended efforts of such programs may be acceptable to comply with TRE requirements.
(9) The Board recognizes that chronic toxicity may be episodic and identification of causes of and reduction of sources of chronic toxicity may not be successful in all cases. Consideration of enforcement action by the Board will be based in part on the discharger's actions and efforts to identify and control or reduce sources of consistent toxicity.

h. Chronic Toxicity Monitoring Screening Phase Requirements, Critical Life Stage Toxicity Tests and definitions of terms used in the chronic toxicity monitoring are identified in Attachment C of this Order. The discharger shall comply with these requirements as applicable to the discharge.
i. Board staff are in the process of evaluating data from previous ETCP chronic toxicity testing, and may revise the above chronic toxicity requirements based on the results of this evaluation.

18. Compliance with Effluent Limits for Intermittent Discharges to Mare Island Strait

The discharger shall ensure compliance with the effluent limits specified in this Order for pH and Toxic Substances for intermittent discharges to Mare Island Strait (Effluent Limitations B.9 and B.10) in accordance with the following:

a. The discharger shall monitor the receiving water-to-wastewater dilution ratio achieved during discharge events, by measurement of the receiving water elevation with respect to the outfall pipeline elevation (e.g., depth of water above the outfall pipeline). Demonstration of

submergence of the outfall pipeline shall be considered demonstration of initial dilution of at least 10:1.

b. In the absence of demonstration of submergence of the outfall pipeline, discharges to Mare Island Strait through the Ryder Street Wet Weather outfall shall be considered to have a dilution ratio of less than 10:1 and the respective effluent limits for dilution ratios of less than 10:1 shall apply.

19. Special Study - Effluent Characterization for Selected Constituents

The discharger shall monitor and evaluate effluent discharged to the Carquinez Strait Outfall for the constituents listed in Table 2 of the SMP of this Order (SMP Table 2 Constituents). Compliance with this requirement shall be achieved in accordance with the following:

a. This effluent monitoring shall include a minimum of six effluent sampling and analysis events, with at least three sampling events conducted in the wet weather season and at least three sampling events conducted in the dry weather season.

b. This report shall include analytical procedures used and achieved for each constituent, including the limit of quantitation (LOQ), method detection limit (MDL) and practical quantitation limit (PQL). For each constituent, the applicable analytical measurement levels should be adequate to evaluate observed effluent concentrations with respect to the effluent concentration objective given in SMP Table 2, where technically and reasonably feasible.

c. This report shall include an evaluation of observed effluent concentrations with respect to the effluent concentration objectives given in SMP Table 2, and an assessment of the costs of monitoring the effluent for these constituents.

d. The SMP of this Order may subsequently be revised to include routine monitoring for all or some of the SMP Table 2 Constituents.

e. The discharger shall submit technical reports acceptable to the Executive Officer documenting status and results of the study in accordance with the following:

Interim Report:	Submit report no later than:	December 15, 2000.
Final Report:	Submit report no later than:	August 31, 2001.

f. If the Final Report results indicate exceedances of any constituent above the effluent level of concern listed in Table 2 of SMP Section VII.B., then the discharger shall develop and implement a source control and reduction plan for that constituent within 3 months.

20. Pretreatment Program.

The discharger shall continue to implement and enforce its approved pretreatment program in accordance with Board Order 95-015 and its amendments or revisions thereafter. The discharger's responsibilities include, but are not limited to:

a. Enforcement of National Pretreatment Standards in accordance with 40 CFR 403.5 and Section 307(b) and (c) of the Clean Water Act.

b. Implementation of the pretreatment program in accordance with legal authorities, policies, procedures and financial provisions described in the General Pretreatment regulations (40 CFR 403) and the discharger's approved pretreatment program.

c. Submission of reports to USEPA, the State Board and the Board as described in Board Order 95-015 and its amendments or revisions thereafter.

21. Pollution Prevention Program.

a. The discharger shall continue to participate in the Pollution Prevention Program (previously known as Waste Minimization Program) as described in Chapter IV of the Basin Plan under 'Waste Minimization'.

b. The discharger shall continue to implement its Pollution Prevention Program in order to reduce pollutant loadings to the treatment plant and, subsequently, to receiving waters.
c. The discharger shall submit to the Board reports that are acceptable to the Executive Officer in the form of an Annual Report and a semi-annual Progress Report. These reports should include the following:
   (1) Documentation of the discharger's efforts and progress;
   (2) Evaluation of the program's accomplishments; and
   (3) Identification of specific tasks and associated time schedules for future efforts.
d. The reports described above shall be submitted as follows:

Annual Report:	Submit report no later than:	August 15, annually, and
Progress Report:	Submit report no later than:	February 15, annually.

e. Modification of these requirements may be authorized, in writing, by the Executive Officer.

22. Wastewater Facilities, Review and Evaluation, and Status Reports.

a. The discharger shall operate and maintain its wastewater collection, treatment and disposal facilities in a manner to ensure that all facilities are adequately staffed, supervised, financed, operated, maintained, repaired, and upgraded as necessary, in order to provide adequate and reliable transport, treatment, and disposal of all wastewater from both existing and planned future wastewater sources under the discharger's service responsibilities.
b. The discharger shall regularly review and evaluate its wastewater facilities and operation practices in accordance with section a. above. Reviews and evaluations shall be conducted as an ongoing component of the discharger's administration of its wastewater facilities.
c. Annually, the discharger shall submit to the Board a report describing the current status of its wastewater facility review and evaluation. This report shall include a description or summary of review and evaluation procedures, and applicable wastewater facility programs or capital improvement projects. This report shall be submitted in accordance with Provision E.25 below.

23. Operations and Maintenance Manual, Review and Status Reports.

a. The discharger shall maintain an Operations and Maintenance Manual (O & M Manual) as described in the findings of this Order for the discharger's wastewater facilities. The O & M Manual shall be maintained in useable condition, and available for reference and use by all applicable personnel.
b. The discharger shall regularly review, and revise or update as necessary, the O & M Manual(s) in order for the document(s) to remain useful and relevant to current equipment and operation practices. Reviews shall conducted annually, and revisions or updates shall be completed as necessary. For any significant changes in treatment facility equipment or operation practices, applicable revisions shall be completed within 90 days of completion of such changes.
c. Annually, the discharger shall submit to the Board a report describing the current status of its O & M Manual review and updating. This report shall include an estimated time schedule for completion of any revisions determined necessary, a description of any completed revisions, or a statement that no revisions are needed. This report shall be submitted in accordance with Provision E.25 below.

24. Contingency Plan, Review and Status Reports.

a. The discharger shall maintain a Contingency Plan as required by Board Resolution 74-10 (attached), and as prudent in accordance with current municipal facility emergency planning. The discharge of pollutants in violation of this Order where the discharger has failed to develop and/or adequately implement a contingency plan will be the basis for considering such discharge a willful and negligent violation of this Order pursuant to Section 13387 of the California Water Code.

b. The discharger shall regularly review, and update as necessary, the Contingency Plan in order for the plan to remain useful and relevant to current equipment and operation practices. Reviews shall be conducted annually, and updates shall be completed as necessary.
c. Annually, the discharger shall submit to the Board a report describing the current status of its Contingency Plan review and update. This report shall include a description or copy of any completed revisions, or a statement that no changes are needed. This report shall be submitted in accordance with Provision E.25 below.

25. Annual Status Reports.

The reports identified in Provisions E.22.c., E.23.c. and E.24.c. above shall be submitted to the Board annually, by June 30 of each year. Modification of report submittal dates may be authorized, in writing, by the Executive Officer.

26. New Water Quality Objectives.

As new or revised water quality objectives come into effect for the San Francisco Bay estuary and contiguous water bodies (whether statewide, regional or site-specific), effluent limitations in this permit will be modified as necessary to reflect updated water quality objectives. Adoption of effluent limitations contained in this permit is not intended to restrict in any way future modifications based on legally adopted water quality objectives.

27. Change in Control or Ownership.

a. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the discharger, the discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to the Board.
b. To assume responsibility of and operations under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order (see *Standard Provisions & Reporting Requirements*, August 1993, Section E.4.). Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code.

28. Permit Reopener.

The Board may modify, or revoke and reissue, this Order and Permit if present or future investigations demonstrate that the discharge(s) governed by this Order will or have the potential to cause or contribute to adverse impacts on water quality and/or beneficial uses of the receiving waters.

29. NPDES Permit.

This Order shall serve as a National Pollutant Discharge Elimination System (NPDES) permit pursuant to Section 402 of the Clean Water Act or amendments thereto, and shall become effective 10 days after the date of its adoption provided the USEPA Regional Administrator has no objection. If the Regional Administrator objects to its issuance, the permit shall not become effective until such objection is withdrawn.

30. Order Expiration and Reapplication.

a. This Order expires five years from the date of adoption, on April 19, 2005 (expiration date).
b. In conformance with Title 23, section 2235.1, of the California Code of Regulations and the applicable federal regulations, the discharger must file a report of waste discharge no later than 180 days before the expiration date of this Order as application for reissue of this permit and waste discharge requirements.

I, Lawrence P. Kolb, Acting Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on April 19, 2000 (adoption date).

LAWRENCE P. KOLB
Acting Executive Officer

Attachments:	# pages	page #
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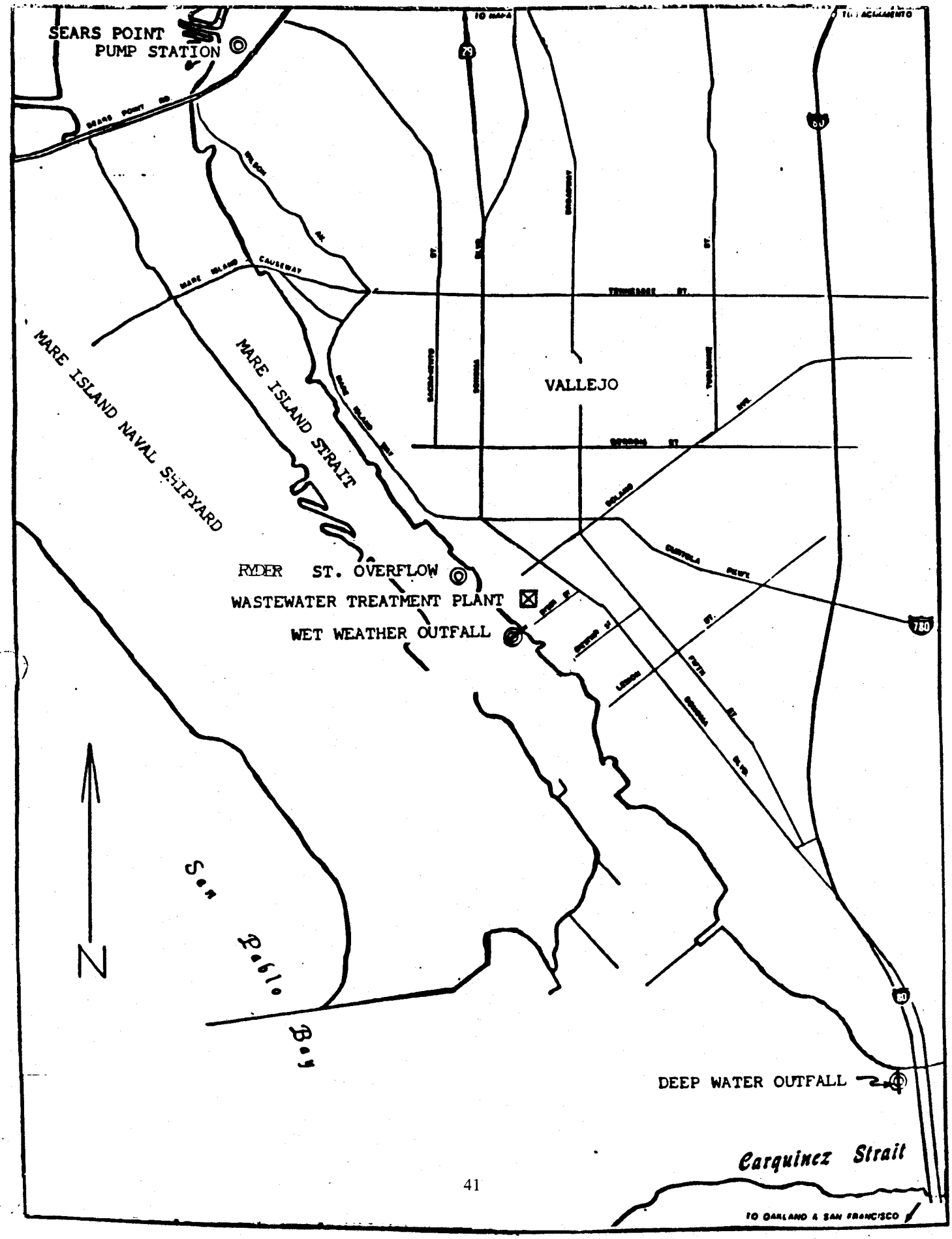
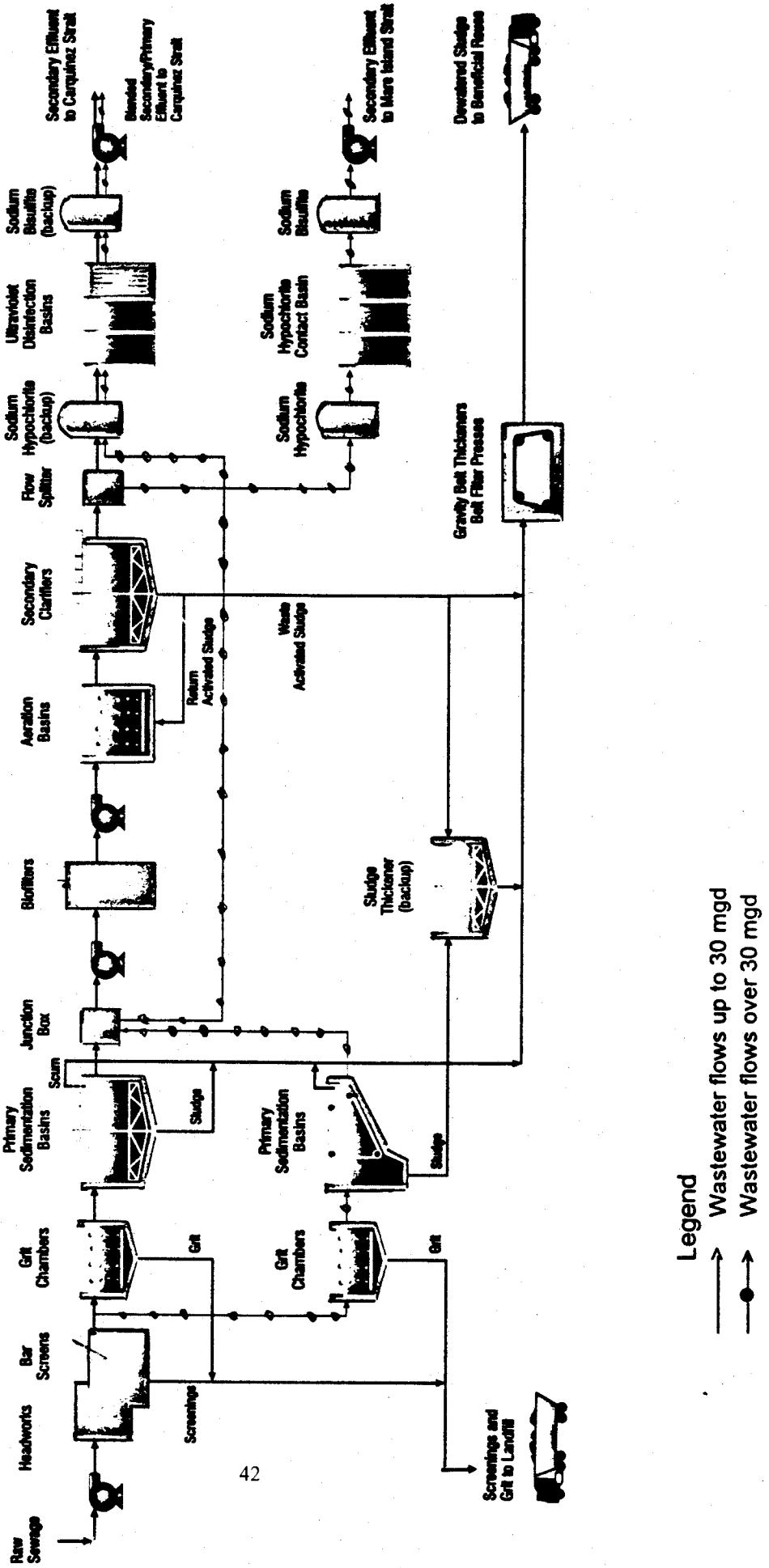
B. Discharge Facility Treatment Process Diagram	1	42
C. Table 1, from Table 3-2 and Figure 3-5 of VSFCD's SSES Report, 1988	1	43
Self-Monitoring Program, Part B	18	44-63
Self-Monitoring Program, Part A	11	
Standard Provisions and Reporting Requirements, August 1993	13	
Board Resolution No. 74-10	2	


SEARS POINT
PUMP STATION
MARE ISLAND CAUSEWAY
MARE ISLAND NAVAL SHIPYARD
MARE ISLAND STRAIT
VALLEJO
RYDER ST. OVERFLOW
WASTEWATER TREATMENT PLANT
WET WEATHER OUTFALL
DEEP WATER OUTFALL
N
San Pablo Bay
Carquinez Strait
TO OAKLAND & SAN FRANCISCO


Raw Sewage
Headworks
Bar Screens
Grit Chambers
Primary Sedimentation Basins
Junction Box
Blowers
Aeration Basins
Secondary Clarifiers
Flow Splitter
Sodium Hypochlorite (backup)
Ultraviolet Disinfection Basins
Sodium Bisulfite (backup)
Secondary Effluent to Carquinez Strait
Blended Secondary/Primary Effluent to Carquinez Strait
Sodium Hypochlorite
Sodium Hypochlorite Contact Basin
Sodium Bisulfite
Secondary Effluent to Mare Island Strait
Gravity Belt Thickeners
Belt Filter Presses
Dewatered Sludge to Beneficial Reuse
Sludge Thickener (backup)
Return Activated Sludge
Waste Activated Sludge
Scum
Sludge
Grit
Screenings
Screenings and Grit to Landfill
Legend
Wastewater flows up to 30 mgd
Wastewater flows over 30 mgd

ATTACHMENT C

Table 1
Vallejo Sanitation and Flood Control District
Sewer System Evaluation Survey
COLLECTION SYSTEM DESIGN FLOW
(Sources: Table 3-4 and Figure 3-6, VSFCD SSES Report, Ch_2M Hill, 1988)

Basin	Design Peak Sanitary Flow (mgd)	Infiltration/Inflow: Design GWI (mgd)	Infiltration/Inflow: Design Peak[a] RDI/I (mgd)	Infiltration/Inflow: Design Total (mgd)	Design Total PWWF (mgd)	Design Routed[d] Peak RDI/I (mgd)
N01	0.43	0.38	1.40	1.78	2.21	1.38
N02	0.33	0.05	0.56	0.61	0.94	0.45
N03	0.54	0.04	1.36	1.40	1.94	1.35
N04	0.41	0.65	2.33	2.98	3.39	1.89
N05	0.77	0.53	4.95	5.48	6.25	4.55
N06	0.67	0.04	3.00	3.04	3.71	2.47
N07	0.56	0.01	1.09	1.10	1.66	0.92
N08	0.16	0.11	1.63	1.74	1.90	1.37
N09	0.60	0.01	1.65	1.66	2.26	1.62
N10	0.11	0.17	0.97	1.14	1.25	0.93
N11	0.84	0.93	1.92	2.85	3.69	0.91
S01	1.59	0.76	9.06	9.82	11.41	8.19
S02	0.78	0.43	4.96	5.39	6.17	4.61
S03	0.42	0.42	2.83	3.25	3.67	2.71
S04	0.85	0.05	2.15	2.20	3.05	2.15
S05	0.31	0.24	4.20	4.44	4.75	4.18
S06	0.46	0.02	2.56	2.58	3.04	2.26
S07	0.60	0.02	4.26	4.28	4.88	4.21
S08	0.58	0.20	1.01	1.21	1.79	0.99
S09	0.36	0.16	1.57	1.73	2.09	1.55
TP1	0.13	0.01	0.00	0.01	0.14	
Mare Island[b]	2.19	-	-	-	4.00	-
TOTAL	13.69	5.23	53.46	58.69	74.19[c]	48.69

[a] RDI/ flow developed for the 5-year design storm.
[b] Mare Island flow restricted to the 6.00 mgd peak pump station capacity.
[c] These total flows do not include any effects of routing through the system. Routed flows, which more closely match actual conditions, are provided in Figure 3-6.
[d] Calculated from CH_2M report Figure 3-6.[1]

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

TENTATIVE

SELF-MONITORING PROGRAM

Part B

FOR

VALLEJO SANITATION AND FLOOD CONTROL DISTRICT
WASTEWATER TREATMENT PLANT

VALLEJO, SOLANO COUNTY

NPDES PERMIT NO. CA0037699

ORDER NO. 00-026

CONTENTS:

I. BASIS and PURPOSE

Reporting responsibilities of waste dischargers are specified in Sections 13225(a), 13267(b), 13268 and 13387 (b) of the California Water Code and this Board's Resolution No. 73-16.

The principal purposes of a monitoring program by a waste discharger, also referred to as self-monitoring, are to:

(1) document compliance with waste discharge requirements established by the Board,
(2) facilitate self-policing by the discharger in prevention and abatement of pollution arising from waste discharges,
(3) develop or assist in development of effluent limitations or other waste discharge requirements, pretreatment standards, whole effluent toxicity standards and other regional, state or national standards of performance, and
(4) prepare water and wastewater quality inventories.

II. SAMPLING and ANALYTICAL METHODS

Sample collection, handling, storage and analyses shall be performed in accordance with regulations given in Code of Federal Regulations Title 40, Part 136 (40 CFR 136) or other methods approved and specified by the Board's Executive Officer.

Water and waste analyses shall be performed by a laboratory approved for these analyses by the State Department of Health Services (DOHS) through the DOHS laboratory certification program or by a laboratory for which waiver from such certification has been provided by the Executive Officer.

The director of the laboratory whose name appears on the DOHS laboratory certification, or the director's authorized designee who is directly responsible for analytical work performed shall supervise all analytical work including appropriate quality assurance and quality control procedures, and shall sign all reports of such work conducted as part of this Self-Monitoring Program.

All monitoring instruments and equipment shall be properly calibrated and maintained in order to ensure accuracy of monitoring sampling and measurements.

III. DEFINITION of TERMS

A. Types of Samples

1. *Grab Sample.* A grab sample is defined as an individual sample collected in a short period of time not exceeding fifteen minutes. A grab sample represents only the conditions that exist at the time the sample is collected. Grab samples shall be collected during normal peak loading conditions for the parameter of interest, which may not necessarily correspond with periods of peak hydraulic conditions. Grab samples are used primarily in determining compliance with daily and instantaneous maximum or minimum limits.

2. *Composite Sample.* A composite sample is defined as a sample composed of multiple individual grab samples collected at regular intervals throughout a given period of time, with the individual grab samples mixed in proportion to the instantaneous waste flow rate at the time of each grab sample. For standard composite sampling required by this SMP, grab sample intervals shall not exceed one hour, and sample proportioning shall not vary by more than five percent of the flow rate.

3. *Flow Sample.* A flow sample is defined as the accurate measurement of either a volumetric flow rate or flow volume using a properly calibrated and maintained flow measuring device. Flows are typically

reported as Average Daily Flow which is the average flow rate during a 24-hour calendar day, and typically reported in units of million gallons per day (mgd).

B. Statistical Parameters

1. *Average.* Average is the arithmetic mean; i.e., the sum all values in a given data set, divided by the total number of values. A monthly average applies to samples collected in a calendar month.

2. *Median.* The median is the middle value of an ordered set of values; i.e., the value in the ordered set for which there is an equal number of values both greater than and less than this middle value. If the data set is an even number of values, the median is the arithmetic mean of the two middle values.

3. *Log mean.* The log mean is the summation of the log values of each data set value, divided by the number of values in the set. The log mean is given by the following equation:

$$\text{Log mean} = (1/n)\left(\sum_{i=1}^{i=n} \text{Log}\,(Ci)\right)$$

where: n is the number of data set values; and
Ci is the individual datum value.

4. *Geometric Mean.* The geometric mean is the anit-log of the log mean of a given data set.

C. Standard Observations

1. Wastewater Effluent:
   a. Floating or suspended material of waste origin (eg, oil, grease, algae, and other macroscopic particulate matter): Presence or absence; description of any materials observed.
   b. Nuisance Odors: Presence or absence; characterization description if present; apparent source(s); and distance of travel.

2. Perimeter of wastewater treatment facility:
   a. Nuisance Odors: same as 1.b. above.
   b. Weather conditions:
      (1) General characterization (eg, sunny, cloudy, rainy);
      (2) Air temperature
      (3) Wind: Direction and estimated velocity.
      (4) Precipitation: Total precipitation since previous observation.

IV. DESCRIPTION of SAMPLING and OBSERVATION STATIONS

NOTE: A sketch showing the locations of all sampling and observation stations shall be included in the Annual Report, and in the monthly report if stations change.

Station	Description

A. INFLUENT

A-001	At any point in the treatment facilities headworks at which all waste tributary to the treatment system is present, and preceding any phase of treatment.

B. EFFLUENT

E-001	Carquinez Strait Discharge At a point in the treatment facility following all treatment processes at which all effluent to be discharged through the Carquinez Strait Discharge outfall to Carquinez Strait is present, prior to the point of discharge.

E-001-D Disinfected Effluent
At a point in the treatment facility at which all effluent to be discharged to the Carquinez Strait Discharge outfall is present, and at which point adequate contact with the disinfectant has been achieved. (May be the same as E-001).

E-002 Ryder Street Wet Weather Discharge
At a point in the treatment facility effluent to be discharged through the Ryder Street Wet Weather outfall to Mare Island Strait, at which point all waste tributary to this discharge is present, prior to the point of discharge.

C. OVERFLOWS and BYPASSES

OV-003 Sears Point Pump Station Overflow: At a point at this pump station where all flow discharged from the collection system to receiving waters is present.

OV-004 Ryder Street Overflow structure

OV-'n' At points in the collection or waste treatment system including manholes and pump stations, other than those points described above, where overflows or bypasses occur.

D. TREATMENT PLANT PERIMETER (Land Observations)

P-1 to P='n' Points located along the perimeter of the wastewater treatment facility, at equidistant intervals of about 500 feet.

E. RECEIVING WATERS

C—001 At a point in Carquinez Strait, located over the geometric center of the deepwater diffusers for Effluent Station E-001.

C—002 At a point in the Mare Island Strait, located over the geometric center of the outfall for Effluent Station E-002.

V. SCHEDULE of SAMPLING, ANALYSES and OBSERVATIONS

The schedule of sampling, analysis and observation shall be that given in Table 1 below.

TABLE 1 - SCHEDULE of SAMPLING, ANALYSES and OBSERVATIONS [1]

Sampling Station:			A-001	E-001		E-002		OV-003		P	C-001, C-002	OV
			Influent	Effluent to Carquinez Strait		Effluent to Mare Island Strait		Sears Point Pump Stn. Overflow		wwtp area	Rcvg. Wtr.	over-flows
Type of Sample:			C-24	G	C-24	G	C-X	G	C-X	O	G	O
Parameter	**Units**	**Notes**	[1]			[11]	[11]	[11]	[11]			[12]
Flow Rate	mgd	[2]	Cont/D		Cont/D		Cont/D		Cont/D			Est V
PH	pH units			D		D		D			Q	
Temperature	°C			D		D		D			Q	
Dissolved Oxygen	mg/L			D		D		D			Q	
$BOD_5$20°C	mg/L		2/W		2/W		D		D			
TSS	mg/L		2/W		2/W		D		D			
Oil & Grease	mg/L	[3]		M		M		M				
Settleable Matter	ml/l-hr			D		D		D				
Fecal Coliform	MPN / 100 ml			2/W		D		D				
Sulfides	mg/L										Q	
Unionized Ammonia	mg/L										Q	
Total Dis. Solids	mg/L										Q	
Salinity	mg/L										M	
Hardness as $CaCO_3$	mg/L										M	
UV Dose Power	mw-sec/sq cm	[4]			Cont.							
Chlorine Residual	mg/L	[5]			Cont.		Cont.					
Acute Toxicity	% Surv'l	[6]			M		M					
Chronic Toxicity		[7]			2/Y							
Copper, Nickel, and Selenium	µg/L & kg/mo				M		M					
Mercury	µg/L & kg/mo				M		M					
Metals	µg/L	[8]			M		M					
Cyanide	µg/L			M		M						
PAHs	µg/L	[9]		2/Y		M						
Table 2 Selected Constituents	µg/L	[10]			[10]							
Standard Observations				M		D		D		M		E
Precipitation	inches	[11]								M&D		
Water Elevation	inches	[12]				D						

V. SCHEDULE of SAMPLING, ANALYSES and OBSERVATIONS (continued)

LEGEND FOR TABLE 1

Sampling Stations:

A = treatment facility influent
E = treatment facility effluent
flows)
OV = overflow and bypass points
P = treatment facility perimeter points

Types of Samples:

C-24 = composite sample, 24 hours
(includes continuous sampling, such as for

C-X = composite sample, X hours
G = grab sample
O = observation

Frequency of Sampling:

Cont. = continuous
20 °C
Cont/D = continuous monitoring & daily reporting
D = once each day
E = each occurrence
H = once each hour (at about hourly intervals)
M = once each month
Q = once each calendar quarter
(at about three month intervals)
W = once each week
Y = once each calendar year
2/Y = twice each calendar year
(at about 6 months intervals)
3/W = three times each calendar week
(on separate days)
5/W = five times each calendar week
milliliters
(on separate days)

Parameter and Unit Abbreviations:

BOD_5 20°C = Biochemical Oxygen Demand, 5-day, at

D.O. = Dissolved Oxygen
Est V = Estimated Volume (gallons)
Metals = multiple metals; See SMP Section VI.G.
PAHs = Polynuclear Aromatic Hydrocarbons;
See SMP Section VI.H.
TSS = Total Suspended Solids
UV = ultra violet light
mgd = million gallons per day
mg/L = milligrams per liter
ml/L-hr = milliliters per liter, per hour
µg/L = micrograms per liter
kg/d = kilograms per day
kg/mo = kilograms per month
MPN/100 ml = Most Probable Number per 100

mw-sec/sq cm = milliwatt-seconds per square centimeter

FOOTNOTES FOR TABLE 1

[1] Additional details regarding sampling, analyses and observations are given in Section VI of this SMP, *Specifications for Sampling, Analyses and Observations* (SMP Section VI).

[2]	Flow Monitoring.	See SMP Section:	VI. B.
[3]	Oil & Grease Monitoring.	See SMP Section:	VI. C.
[4]	UV System Dose Power.	See SMP Section:	VI. D.1.
[5]	Chlorine Residual Monitoring.	See SMP Section:	VI. D.2.
[6]	Acute Toxicity Monitoring.	See SMP Section:	VI. E.
[7]	Chronic Toxicity Monitoring.	See SMP Section:	VI. F., and Order Provision E.17.
[8]	Metals	See SMP Section:	VI. G.
[9]	PAHs	See SMP Section:	VI. H.
[10]	Table 2 Selected Constituents	See SMP Section:	VII.
[11]	Wet Weather Discharge Monitoring	See SMP Section:	VI.I.

[12] Overflow monitoring See SMP Section: VIII.E.

VI. SPECIFICATIONS for SAMPLING, ANALYSES and OBSERVATIONS

Sampling, analyses and observations, and recording and reporting of results shall be conducted in accordance with the schedule given in Table 1 of this SMP, and in accordance with the following specifications, as well as all other applicable requirements given in this SMP. All analyses shall be conducted using analytical methods that are commercially and reasonably available, and that provide quantification of sampling parameters and constituents sufficient to evaluate compliance with applicable effluent limits.

A. Influent Monitoring.
Influent monitoring identified in Table 1 of this SMP is the minimum required monitoring. Additional sampling and analyses may be required in accordance with Pretreatment Program or Pollution Prevention/Source Control Program requirements.

B. Flow Monitoring.
Flow monitoring indicated as continuous monitoring in Table 1 shall be conducted by continuous measurement of flows, and reporting of the following measurements:

1. *Influent (A-001), and Effluent (E-001)*:
   a. Daily: (1) Average Daily Flow (mgd)
      (2) Maximum Daily Flow (mgd)
      (3) Minimum Daily Flow (mgd).
   b. Monthly: The same values as given in a. above, for the calendar month.

2. *Wet Weather Discharges (E-002 and OV-003):*
   a. Daily: Total volume (million gallons),
   b. Event: Total volume (million gallons), for entire continuous discharge event.

C. Oil & Grease Monitoring.
Each Oil & Grease sample 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 an accuracy of plus or minus 5 %. Each glass container used for sample collection or mixing shall be thoroughly rinsed with solvent rinsings as soon as possible after use, and the solvent rinsings shall be added to the composite sample for extraction and analysis.

D. Disinfection Process Monitoring.

1. *UV System Dose Power.*
   Performance of the ultra violet light disinfection system (UV System) shall be monitored on a continuous basis in order to ensure optimal disinfection performance. The key parameter for monitoring UV System performance is the power dose achieved. UV System monitoring shall be conducted by continuous measurement of power dose, and Daily reporting of maximum, minimum and average power dose, in milliwatt-seconds per square centimeter (mw-sec/sq cm).

2. *Chlorine Residual Monitoring.*
   During all times when chlorination is used for disinfection of the effluent, effluent chlorine residual concentrations shall be monitored continuously, or by grab samples taken hourly. Chlorine residual concentrations shall be monitored and reported for sampling points both prior to and following dechlorination. Total chlorine dosage (kg/day) shall be recorded on a daily basis.

E. Acute Toxicity Monitoring (Flow-through bioassay tests).

The following parameters shall be monitored on the sample stream used for the acute toxicity bioassays, at the start of the bioassay test and daily for the duration of the bioassay test, and the results reported: pH, Temperature, Dissolved Oxygen, and Ammonia Nitrogen.

F. Chronic Toxicity Monitoring: See **also,** Provision E.17. and Attachment C of this Order.

1. *Chronic Toxicity Monitoring Requirements*

a. Sampling. The discharger shall collect 24-hour composite samples of treatment plant effluent at Sampling Station E-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: Chronic toxicity shall be monitored by using critical life stage test(s) and the most sensitive test specie(s) identified by screening phase testing or previous testing conducted under the ETCP. Test specie(s) shall be approved by the Executive Officer. Two test species may be required if test data indicate that there is alternating sensitivity between the two species.

c. Frequency:
(1) Routine Monitoring: Twice per year, beginning in 2001, and once in 2000.
(2) Accelerated Monitoring: Quarterly, or as otherwise specified by the Executive Officer.

d. Conditions for Accelerated Monitoring: The discharger shall conduct accelerated monitoring when either of the following conditions are exceeded:
(1) three sample median value of 10 TUc, or
(2) single sample maximum value of 20 Tuc.

e. Methodology: Sample collection, handling and preservation shall be in accordance with USEPA protocols. The test methodology used shall be in accordance with the references cited in this Permit, or as approved by the Executive Officer. A concurrent reference toxicant test shall be performed for each test.

f. Dilution Series: The discharger shall conduct tests at 100%, 85%, 70%, 50%, and 25%. The "%" represents percent effluent as discharged.

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.) in percent effluent
7. TUc values (100/NOEC, $100/IC_{25}$, and $100/EC_{25}$)
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 (ex. pH, D.O., temperature, conductivity, hardness, salinity, ammonia)

b. Compliance Summary: The results of the chronic toxicity testing shall be provided in the most recent 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 the items listed above under Section F.2.a, item numbers 1, 3, 5, 6(IC_{25} or EC_{25}), 7, and 8.

c. Reporting Raw Data in Electronic Format: The discharger shall report all chronic toxicity data upon completion of chronic toxicity testing in the format specified in "Suggested Standardized Reporting Requirements for Monitoring Chronic Toxicity," February 1993, SWRCB. The data shall be submitted in high density, double sided 3.5-inch floppy diskettes, or electronically via e-mail.

G. Metals:

1. The parameter 'Metals' in this SMP means all of the following constituents:
   a. Arsenic,
   b. Cadmium,
   c. Chromium VI,
   d. Copper,
   e. Lead,
   f. Mercury,
   g. Nickel,
   h. Selenium,
   i. Silver, and
   j. Zinc.

2. Sampling and Analysis.
   a. The discharger may analyze for total chromium instead of Chromium VI.

H. PAHs:

1. PAH constituents. The parameter 'PAHs' means all of the following PAH constituents:
   benzo(a)anthracene;
   benzo(a)pyrene;
   benzo(b)flouranthene;
   benzo(k)fluoranthene;
   chrysene;
   dibenzo(a,h)anthracene; and
   indeno(1,2,3-cd)pyrene.

2. Sampling and Analysis.

   a. PAHs shall be analyzed using the latest version of USEPA Method 610 (Methods 8100 or 8300).

   b. The discharger shall attempt to achieve the lowest detection limits commercially available.

   c. If an analysis cannot achieve quantification for a particular sample at or below the characterization objective (given below), the discharger shall provide an explanation in the self-monitoring report.

   d. PAH constituent characterization objective: 0.049 µg/L for each constituent identified in H.1 above.

   e. Samples must be collected in amber glass containers. Use of an automatic sampler is acceptable, provided the sampler incorporates glass containers, keeps samples refrigerated at 4°C and keeps samples protected from light during compositing. 24-hour composite samples may consist of eight grab samples collected at three hour intervals, with composite sampled prepared by the flow-proportioned samples from each grab sample vial, in accordance with effluent flows at the time of sampling.

I. Wet Weather Discharge and Precipitation Monitoring (E-002, OV-003, and P sampling stations).

1. *Monitoring Frequency.* Wet weather discharges from the treatment plant to Mare Island Strait (E-002), or from the Sears Point Pump Station overflow structure (OV-003) shall be monitored in

accordance with the schedule given in Table 1. Indicated sampling and analyses are required only during periods when wet weather discharges occur.

2. *Composite Sampling.* For any one discharge event, composite sampling shall be conducted on an hourly basis for the duration of the discharge. If the discharge continues for more than 24 hours, sampling shall be restarted so that any one composite sample does not exceed a 24-hour composite.

3. *Precipitation Monitoring.*
   a. Precipitation shall be monitored in order to characterize and document seasonal and monthly rainfall and, during wet weather, daily rainfall and rainfall intensity-duration of storm events, for the discharger's treatment plant and service area.
   b. Precipitation monitoring identified below shall be conducted at a rainfall monitoring station located within and representative of the discharger's collection system area.
   c. During dry weather months, rainfall may be reported on a monthly basis (monthly total).
   d. During wet weather months, rainfall shall be reported on a daily basis.
   e. In addition, during peak wet weather conditions, rainfall shall be measured on an hourly basis in order to document storm event rainfall intensity and duration with respect to wet weather design criteria.

VII. SELECTED CONSTITUENTS MONITORING

A. Selected Constituents Monitoring - Special Study.

1. Effluent monitoring shall include evaluation for all constituents listed in Table 2 below by sampling and analysis of final effluent, in accordance with Provision E.19 of this Order.

2. Analyses shall be conducted using the lowest commercially available and reasonably achievable detection levels. The objective is to provide quantification of constituents sufficient to allow evaluation of observed concentrations with respect to respective Levels of Concern given below.

B. Table 2 - Selected Constituents

Constituent	Foot-note	Effluent Level of Concern (µg/L) Monthly Average	Daily Average	Detection Limit Goal (µg/L)
1. 1, 2 Dichlorobenzene		180,000		0.5
2. 1, 3 Dichlorobenzene		26,000		0.5
3. 1, 4 Dichlorobenzene		640		0.5
4. 2,.4,6 Trichlorophenol		10		10
5. Aldrin		0.0014		0.005
6. A-BHC		0.13		0.01
7. Benzene		210		0.5
8. B-BHC		0.46		0.005
9. Bis(2-ethylhexyl)phthalate		1.8	5.9	5
10. Chlordane	[1]	0.00081	0.04	0.1
11. Chloroform		4,800		0.5
12. Chlorpyrifos		0.04		0.03
13. DDT	[2]	0.006	0.01	0.01
14. Diazinon		0.04	0.08	0.03
15. Dichloromethane		16,000		0.5

16. Dieldrin		0.0014	0.019	0.01
17. Endosulfan	[3]	20	0.087	0.02/0.01
18. Endrin	[4]	8	0.023	0.01
19. G-BHC (Lindane)		0.062	1.6	0.02
20. Halomethane	[5]	4,800		0.5
21. Heptachlor		0.0017	0.036	0.01
22. Heptachlor Epoxide		0.0007		0.01
23. Hexachorobenzene		0.0069		1.0
24. PCB's	[6]	0.00045	0.3	0.5
25. Pentachlorophenol		82	79	1.0
26. TCDD Equivalents	[7]	0.14×10^{-6}		0.0012
27. Toluene		3,000,000		0.5
28. Toxaphene		0.0069	0.002	0.5
29. Tributyltin		0.05		0.004

FOOT NOTES for TABLE 2

[1] CHLORDANE shall mean the sum of chlordane- , chlordane- , chlordene- , chlordene- , nonachlor- , nonachlor- , and oxychlordane.

[2] DDT shall mean the sum of the p,p' and o,p' isomers of DDT, DDD (TDE), and DDE.

[3] ENDOSULFAN shall mean the sum of endosulfan- , endosulfan- , and endosulfan sulfate. Detection limit goals for endosulfan refer to alpha and beta endosulfan.

[4] ENDRIN shall mean the sum of endrin and endrin aldehyde.

[5] HALOMETHANES shall mean the sum of bromoform, bromomethane (methyl bromide), chloromethane (methyl chloride), chlorodibromomethane, and dichlorobromomethane.

[6] PCBs (polychlorinated biphenyls) shall mean the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, and Aroclor-1260.

[7] TCDD EQUIVALENTS shall mean the sum of the concentrations of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity equivalence factors, as shown in the table below. Analyses shall be conducted using the latest version of US EPA Method 1613, or equivalent. Analyses shall attempt to achieve quantification levels (given in picograms per liter) identified below.

Isomer Group	Toxicity Equivalence Factor	Quantification Level (pg/L)
2,3,7,8-tetra CDD	1.0	5
2,3,7,8-penta CDD	0.5	5
2,3,7,8-hexa CDD	0.1	10
2,3,7,8-hepta CDD	0.01	10
octa CDD	0.001	25
2,3,7,8-tetra CDF	0.1	5
1,2,3,7,8-penta CDF	0.05	5

2,3,4,7,8-penta CDF	0.5	5
2,3,7,8-hexa CDFs	0.1	10
2,3,7,8-hepta CDFs	0.01	10
octa CDFs	0.001	25

VIII. REPORTING REQUIREMENTS

A. General Reporting Requirements are described in Section E of the Board's "*Standard Provisions and Reporting Requirements for NPDES Surface Water Discharge Permits*", dated August 1993.

B. Monthly Self-Monitoring Report (SMR).
For each calendar month, a self-monitoring report (SMR) shall be submitted to the Board in accordance with the following:

1. The purpose of the report is to document treatment performance, effluent quality and compliance with waste discharge requirements prescribed by this Order, as demonstrated by the monitoring program data and the discharger's operation practices.

2. The report shall be submitted to the Board no later than 45 days from the last day of the reporting month.

3. *Letter of Transmittal*
Each report shall be submitted with a letter of transmittal. This letter shall include the following:
(a) Identification of all violations of effluent limits or other discharge requirements found during the monitoring period;
(b) Details of the violations: parameters, magnitude, test results, frequency, and dates;
(c) The cause of the violations;
(d) Discussion of corrective actions taken or planned to resolve violations and prevent recurrence, and dates or time schedule of action implementation. If previous reports have been submitted that address corrective actions, reference to such reports is satisfactory.
(e) Signature: The letter of transmittal shall be signed by the discharger's principal executive officer or ranking elected official, or duly authorized representative, and shall include the following certification statement:
"I certify under penalty of law that this document and all attachments have been prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. The information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information , including the possibility of fine and imprisonment."

4. *Compliance Evaluation Summary*
Each report shall include a compliance evaluation summary. This summary shall include, for each parameter for which effluent limits are specified in the Permit, the number of samples taken during the monitoring period, and the number of samples in violation of applicable effluent limits.

5. *Results of Analyses and Observations.*
(a) Tabulations of all required analyses and observations, including parameter, sample date and time, sample station, and test result.

(b) If any parameter is monitored more frequently than required by this permit and SMP, the results of this additional monitoring shall be included in the monitoring report, and the data shall be included in data calculations and compliance evaluations for the monitoring period.

(c) Calculations for all effluent limits that require averaging of measurements shall utilize an arithmetic mean, unless specified otherwise in this permit or SMP.

6. *Data Reporting for Results Not Yet Available.* The discharger shall make all reasonable efforts to obtain analytical data for required parameter sampling in timely manner. The Board recognizes that certain analyses require additional time in order to complete analytical processes and result reporting. For cases where required monitoring parameters require additional time to complete analytical processes and reporting, and results are not available in time to be included in the SMR for the subject monitoring period, such cases shall be described in the SMR. Data for these parameters, and relevant discussions of any observed violations, shall be included in the next following SMR.

C. Self-Monitoring Program Annual Report (Annual Report).

An Annual Report shall be submitted for each calendar year. The report shall be submitted to the Board by February 15 of the following year. This report shall include the following:

1. Both tabular and graphical summaries of monitoring data collected during the calendar year that characterizes treatment plant performance and compliance with waste discharge requirements.

2. A comprehensive discussion of treatment plant performance and compliance with waste discharge requirements. This discussion should include any corrective actions taken or planned such as changes to facility equipment or operation practices which may be needed to achieve compliance, and any other actions taken or planned that are intended to improve performance and reliability of the discharger's wastewater collection, treatment or disposal practices.

3. A plan view drawing or map showing the dischargers' facility, flow routing and sampling and observation station locations.

D. Spill Reports.

1. A report shall be made of any spill of oil or other hazardous material.
2. The spill shall be reported by telephone as soon as possible and no later than 24 hours following occurrence or discharger's knowledge of occurrence. Spills shall be reported by telephone as follows:
   a. During weekdays, during office hours of 8 am to 5 pm, to the Regional Board:
      Current phone number: (510) 622 - 2300.
      Current Fax number: (510) 622 - 2460
   b. During non-office hours, to the State Office of Emergency Services:
      Current phone number: (800) 852 - 7550.
3. A written report shall be submitted to the Regional Board within five (5) working days following telephone notification, unless directed otherwise by Board staff. A report submitted by facsimile transmission is acceptable for this reporting. The written report shall include the following:
   a. Date and time of spill, and duration if known.
   b. Location of spill (street address or description of location).
   c. Nature of material spilled.
   d. Quantity of material involved.
   e. Receiving water body affected.
   f. Cause of spill.
   g. Observed impacts to receiving waters (eg, discoloration, oil sheen, fishkill).
   h. Corrective actions that were taken to contain, minimize or cleanup the spill.
   i. Future corrective actions planned to be taken in order to prevent recurrence, and time schedule of implementation.
   j. Persons or agencies contacted.

E. Reports of Collection System Overflows.

Overflows of sewage from the discharger's collection system, other than overflows specifically addressed elsewhere in this Order and SMP, shall be reported to the Board in accordance with the following:

1. *Overflows in excess of 1,000 gallons.*

Overflows in excess of 1,000 gallons shall be reported by telephone and written report, as follows:

a. Overflows shall be reported by telephone as soon as possible and no later than 24 hours following occurrence or discharger's knowledge of occurrence. Notification shall be made as follows:
   (1) Notify the current Board staff case handler, by phone call or message, or by facsimile:
   [current staff case handler: Tobi Tyler, phone number (510) 622 - 2431]
   [current Regional Board Fax number: (510) 622 - 2460]; and
   (2) Notify the State Office of Emergency Services at phone number: (800) 852 - 7550.

b. Submit a written report of the incident in follow-up to telephone notification.

c. The written report shall be submitted along with the regular self-monitoring report for the reporting period of the incident, unless directed otherwise by Board staff.

d. The written report for collection system overflow shall include the following:
   (1) Estimated date and time of overflow start and end.
   (2) Location of overflow (street address or description of location).
   (3) Estimated volume of overflow.
   (4) Final disposition of overflowed wastewater (to land, storm drain, surface water body). Include the name of any receiving water body affected.
   (5) Cause of overflow.
   (6) Observed impacts to receiving waters if any (e.g., discoloration, fish kill).
   (7) Corrective actions that were taken to contain, minimize or cleanup the overflow.
   (8) Future corrective actions planned to be taken to prevent recurrence and time schedule of implementation.
   (9) Persons or agencies contacted.

2. *Overflows less than 1,000 gallons.*

Overflows less than 1,000 gallons shall be reported by written report, as follows:

a. The discharge shall prepare and retain records of such overflows, with records available for review by Board staff upon request.

b. The records for these overflows shall include the information as listed in 1.d. above.

c. A summary of these overflows shall be submitted to the Board annually, as part of the discharger's Self-Monitoring Program Annual Report.

F. Reports of Treatment Plant Process Bypass or Significant Non-Compliance.

1. A report shall be made of any incident where the discharger:
   a. experiences or intends to experience a bypass of any treatment process, or

   b. experiences violation or threatened violation of any daily maximum effluent limit contained in this Permit or other incident of significant non-compliance,

   due to:
   (1) maintenance work, power failures or breakdown of waste treatment equipment, or
   (2) accidents caused by human error or negligence, or

(3) other causes such as acts of nature.

2. Such incidents shall be reported to the Regional Board in accordance with the following:
   a. Notify Regional Board staff by telephone:
      (1) within 24 hours of the time the discharger becomes aware of the incident, for incidents that have occurred, and
      (2) as soon as possible in advance of incidents that have not yet occurred.

   b. Submit a written report of the incident in follow-up to telephone notification.

   c. The written report shall be submitted along with regular self-monitoring report for the reporting period of the incident, unless directed otherwise by Board staff.

   d. The written report for a treatment process bypass shall include the following:
      (1) Identification of treatment process bypassed;
      (2) Date and time of bypass start and end;
      (3) Total duration time;
      (4) Estimated total volume;
      (5) Description of, or reference to other report(s) describing, bypass event, cause, corrective actions taken, and any additional monitoring conducted.

   e. The written report for violations of daily maximum effluent limits or similar significant non-compliance shall include information as described in section VIII.B. of this SMP.

3. During any treatment process bypass, the discharger shall conduct additional monitoring as described in Section VI.J. of this SMP (Treatment Process Bypass Monitoring). The results of such monitoring shall be included in the regular SMR for the reporting period of the bypass.

IX. RECORDING REQUIREMENTS - RECORDS TO BE MAINTAINED

Written reports, electronic records, strip charts, equipment calibration and maintenance records, and other records pertinent to demonstrating compliance with waste discharge requirements including self-monitoring program requirements, shall be maintained by the discharger in a manner and at a location (e.g., wastewater treatment plant or discharger offices) such that the records are accessible to Board staff. These records shall be retained by the discharger for a minimum of three years. The minimum period of retention shall be extended during the course of any unresolved litigation regarding the subject discharges, or when requested by the Board or by the Regional Administrator of the US EPA, Region IX.

Records to be maintained shall include the following:

A. Parameter Sampling and Analyses, and Observations.

For each sample, analysis or observation conducted, records shall include the following:

1. Parameter
2. Identity of sampling or observation station, consistent with the station descriptions given in this SMP.
3. Date and time of sampling or observation.
4. Method of sampling (grab, composite, other method)
5. Date and time analysis started and completed, and name of personnel or contract laboratory performing the analysis.
6. Reference or description of procedure(s) used for sample preservation and handling, and analytical method(s) used.
7. Calculations of results.
8. Analytical method detection limits and related quantitation parameters.

9. Results of analyses or observations.

B. Flow Monitoring Data.

For all required flow monitoring (e.g., influent and effluent flows), records shall include the following:

1. Total flow or volume, for each day.
2. Maximum, minimum and average daily flows for each calendar month.

C. Wastewater Treatment Process Solids.

1. For each treatment process unit which involves solid removal from the wastewater stream, records shall include the following:
   a. Total volume and/or mass quantification of solids removed from each unit (e.g., grit, skimmings, undigested sludge), for each calendar month; and
   b. Final disposition of such solids (e.g., landfill, other subsequent treatment unit).

2. For final dewatered sludge from the treatment plant as whole, records shall include the following:
   a. Total volume and/or mass quantification of dewatered sludge, for each calendar month;
   b. Solids content of the dewatered sludge; and
   c. Final disposition of dewatered sludge (point of disposal location and disposal method).

D. Disinfection Process.

For the disinfection process, records shall be maintained documenting process operation and performance, including the following:

1. For bacteriological analyses:
   a. Date and time of each sample collected
   b. Wastewater flow rate at the time of sample collection
   c. Results of sample analyses (coliform count)
   d. Required statistical parameters of cumulative coliform values (eg, moving median or log mean for number of samples or sampling period identified in waste discharge requirements).

2. For chlorination process, at least daily average values for the following:
   a. Chlorine residual in contact basin (mg/L)
   b. Chlorine dosage (kg/day)

3. For ultra violet light disinfection process, at least daily average values for the following:
   a. Power dose in contact basin (mw-sec/sq cm)

E. Treatment Process Bypasses.

A chronological log of all treatment process bypasses, including the following:

1. Identification of treatment process bypassed;
2. Date and time of bypass start and end;
3. Total duration time;
4. Estimated total volume;
5. Description of, or reference to other report(s) describing, bypass event, cause, corrective actions taken, and any additional monitoring conducted.

F. Collection System Overflows

A chronological log of all collection system overflows, including the following:

1. Location of overflow;
2. Date and time of overflow start and end;
3. Total duration time;
4. Estimated total volume;

5. Description of, or reference to other report(s) describing, overflow event, cause, corrective actions taken, and any additional monitoring conducted.

X. SELF-MONITORING PROGRAM CERTIFICATION

I, Lawrence P. Kolb, Acting Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedure set forth in this Board's Resolution No. 73-16 in order to obtain data and document compliance with waste discharge requirements established in Board Order No. 00-026.

2. May be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the discharger, and revisions will be ordered by the Executive Officer.

3. Is effective as of April 19, 2000.

LAWRENCE P. KOLB
Acting Executive Officer

Attachment: # pages

A. Chronic Toxicity - Definition of Terms and Screening Phase Requirements 3

ATTACHMENT C
CHRONIC TOXICITY - DEFINITION OF TERMS & 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% 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 non-lethal, non-quantal biological measurement, such as growth. For example, an IC_{25} is the estimated concentration of toxicant that would cause a 25% reduction in average young per female or growth. IC values may be calculated using a linear interpolation method such as EPA'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 pretreatment, source control, and waste minimization 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 Tables 1 and 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 Table 3 (attached); and
   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; and
4. Concurrent reference toxicant tests.

C. The discharger shall submit a screening phase proposal to the Executive Officer for approval. The proposal shall address each of the elements listed above.

TABLE C 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	5
Giant kelp	(Macrocystis pyrifera)	percent germination; germ tube length	48 hours	3
abalone	(Haliotis rufescens)	abnormal shell development	48 hours	3
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	4
shrimp	(Mysidopsis bahia)	percent survival; growth; fecundity	7 days	5
silversides	(Menidia beryllina)	larval growth rate; percent survival	7 days	5

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. American Society for Testing Materials (ASTM). 1989. Standard Practice for conducting static acute toxicity tests with larvae of four species of bivalve molluscs. Procedure E 724-89. ASTM, Philadelphia, PA.

3. Anderson, B.B. J.W. Hunt, S.L. Turpen, A.R. Coulon, M. Martin, D.L. McKeown, and F.H. Palmer. 1990. Procedures manual for conducting toxicity tests developed by the marine bioassay project. California State Water Resources Control Board, Sacramento.

4. Dinnel, P.J., J. Link, and Q. Stober. 1987. Improved methodology for sea urchin sperm cell bioassay for marine waters. Archives of Environmental Contamination and Toxicology 16:23-32. and S.L. Anderson. September 1, 1989. Technical Memorandum. San Francisco Bay Regional Water Quality Control Board, Oakland, CA.

5. Weber, C.I., W.B. Horning, II, D.J. Klem, T.W. Neiheisel, P.A. Lewis, E.L. Robinson, J. Menkedick, and F. Kessler (eds.). 1988. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to marine and estuarine organisms. EPA-600/4-87/028. National Technical Information Service, Springfield, VA.

TABLE C 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	6
water flea	(Ceriodaphnia dubia)	survival; number of young	7 days	6
alga	(Selenastrum capricornutum)	cell division rate	4 days	6

Toxicity Test Reference:

6. Horning, W.B. and C.I. Weber (eds.). 1989. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to freshwater organisms. Second edition. U.S. EPA Environmental Monitoring Systems Laboratory, Cincinnati, Ohio. EPA/600/4-89/001.

TABLE C 3
TOXICITY TEST REQUIREMENTS FOR STAGE ONE SCREENING PHASE

REQUIREMENTS	RECEIVING WATER CHARACTERISTICS		
	Discharges to Coast	Discharges to San Francisco Bay ‡	
	Ocean	Marine	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 (†): Marine:	0 4	1 or 2 3 or 4	3 0
Total number of tests:	4	5	3

† The fresh water species may be substituted with marine species if:
1) The salinity of the effluent is above 5 parts per thousand (ppt) greater than 75% of the time, or
2) 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.

‡ Marine refers to receiving water salinities greater than 5 ppt at least 75% of the time during a normal water year.

Fresh refers to receiving water with salinities less than 5 ppt at least 75% of the time during a normal water year.