California Regional Water Quality Control Board

Central Valley Region

Steven T. Butler, Chair

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

Sacramento Main Office
Internet Address: http://www.swrcb.ca.gov/~rwqcb5
3443 Routier Road, Suite A, Sacramento, California 95827-3003
Phone (916) 255-3000 • FAX (916) 255-3015

11 August 2000

CERTIFIED MAIL
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Mr. Robert F. Shanks
Director of District Engineering
Sacramento Regional County Sanitation District
827 7th Street, Room 304
Sacramento, CA 95814

NOTICE OF ADOPTION
RENEWED WASTE DISCHARGE REQUIREMENTS
AND
RESOLUTION FOR THERMAL PLAN EXCEPTION
FOR
SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT,
SACRAMENTO REGIONAL WASTEWATER TREATMENT PLANT
SACRAMENTO COUNTY

Waste Discharge Requirements Order No. 5-00-188 and Thermal Plan Exemption Resolution No. 5-00-192 for the above named discharger were adopted by the California Regional Water Quality Control Board, Central Valley Region, on 4 August 2000 meeting.

If you have any questions, please contact Mark Gowdy at (916) 255-3033.

Kenneth D. Landau for
PATRICIA H. LEARY, P.E.
Chief, NPDES Unit, Delta Watershed

MJG:lm

Enclosure Adopted Order
Adopted Resolution, Thermal Plan Exception
Standard Provisions (Discharger only)

cc: List Attached

cc w/Encl: U.S. Environmental Protection Agency, Region IX, San Francisco
U.S. Army Corps of Engineers, Sacramento
U.S. Fish and Wildlife Service, Sacramento
U.S. National Marine Fisheries Service, Santa Rosa
Department of Water Resources, Sacramento
Office of Drinking Water, Department of Health Services, Sacramento
Environmental Management Branch, Department of Health Services, Sacramento
Department of Fish and Game, Region II, Rancho Cordova
Heather McIntire, California Department of Fish and Game, Stockton
Office of Chief Counsel, State Water Resources Control Board, Sacramento
Division of Water Quality, State Water Resources Control Board, Sacramento
Office of Historic Preservation, Sacramento
Sacramento County Health Department, Sacramento
Sacramento County Planning Department, Sacramento
Solano County Health Department, Fairfield
Yolo County Health Department, Woodland
California Urban Water Agencies, Sacramento
Contra Costa County Water District, Concord
Metropolitan Water District, Los Angeles
Mr. Bill Jennings, Delta Keepers, Stockton
Mr. Stan Dean, Sacramento Regional Wastewater Treatment Plant, Elk Grove
Mr. Paul Marshall, CalFed Bay-Delta Program, Sacramento
Mr. James Sequeira, Director, Department of Utilities, Sacramento
Mr. Joe Luchi, Director, Department of Public Works, Folsom
Mr. Wendell Kido, Sacramento Regional County Sanitation District, Elk Grove
Mr. Robert Seyfried, Sacramento Regional County Sanitation District, Elk Grove
Mr. Michael Mulkerin, Sacramento Regional County Sanitation District, Sacramento
Mr. Larry Nash, City of Sacramento, Department of Utilities, Sacramento
Mr. Milton Presler, City of West Sacramento, Department of Utilities, West Sacramento
Ms. Marjit Aramburu, Delta Protection Commission, Walnut Grove
Mr. Morris Allen, Director of Municipal Utilities, City of Stockton, Stockton

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

RESOLUTION NO. 5-00-192

GRANTING AN EXCEPTION TO THE WATER QUALITY CONTROL PLAN
FOR THE CONTROL OF TEMPERATURE
IN THE COASTAL AND INTERSTATE WATERS
AND ENCLOSED BAYS AND ESTUARIES OF CALIFORNIA
FOR THE SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT'S (DISTRICT)
WASTEWATER DISCHARGE INTO THE SACRAMENTO RIVER

WHEREAS, Objective 5A(1), Water Quality Control Plan for the Control of Temperatures in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (the Thermal Plan) prohibits:

a. a waste discharge to estuaries that exceeds the natural receiving water temperature by more than 20 degrees F;
b. a waste discharge which causes more than a 1 degree F (0.56 degrees C) rise in more than 25 percent of the receiving water cross section at the discharge location; and
c. no discharge shall cause a surface water temperature rise greater than 4 degrees F above the natural temperature of the receiving waters at any time or place; and

WHEREAS, the District has an existing discharge of an elevated temperature municipal wastewater into the Sacramento River at a location in the San Francisco Bay-Delta Estuary; and

WHEREAS, the District requests exception to Specific Water Quality Objective 5A(1)a from 1 October through 30 April and exception to Specific Water Quality Objective 5A(1)b throughout the entire year, of the Thermal Plan; and

WHEREAS, the Board granted exceptions to objectives 5A(1)a and 5A(1)b of the Thermal Plan in 1989; and

WHEREAS, the State Water Resources Control Board (State Board) reviewed the exceptions and granted an exception to objective 5A(1)a and postponed action on objective 5A(1)b. In 1992 the State Board granted a five year exception to objective 5A(1)b, which expired in October 1997; and

WHEREAS, an exception of the Thermal Plan is available under General Water Quality Provision No. 4, in accordance with Section 316(a) of the Clean Water Act, and subsequent federal regulations; and

WHEREAS, the District has completed a Supplemental Environmental Impact Report (SEIR) that has evaluated the potential impacts of the elevated thermal discharge on the beneficial uses and aquatic environment of the receiving water; and

WHEREAS, the Regional Board has reviewed and concurs with the findings of the SEIR that Objectives 5A(1)a. and b. are more stringent than necessary to assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife in and on the Sacramento River; and

WHEREAS, the Department of Fish and Game has stated that water temperatures of the Sacramento River may not be suitable for specific life stages of the Chinook salmon at all times and in all areas of the river, that little information is available to determine the temperature regime in the river which minimizes impairment to this fishery, and that if subsequent studies identify that the elevated temperature discharge is resulting and/or contributing to impacts to this fishery, the District will remain accountable and may need to participate in mitigation measures for the protection and propagation of a balanced indigenous population of fish; and

WHEREAS, studies have shown that differential temperature areas may not be the only parameter necessary to protect Chinook Salmon. Total temperature may be more critical than differential temperature and higher temperatures can stop adult salmon immigration. Immigrating adults have been found to remain in the San Francisco Bay until the river temperatures were 70 degrees F or below. When water temperatures dropped to 66 degrees F the fish resume immigration. This information does not affect the District's compliance with the requirements of the Thermal Plan; and

WHEREAS, the District will continue to restrict discharges to the Sacramento River under low-flow conditions to prevent inadequate dispersion and mixing of elevated temperature wastewater that could result in short-term blockage of passage of migrating anadromous fish; and

WHEREAS, the alternatives to ensure compliance by the District with Specific Water Quality Objectives 5A(1)a and 5A(1)b would require modifications not commensurate with benefit to the aquatic environment; and

WHEREAS, the District shall comply with Specific Water Quality Objective 5A(1)c; and

WHEREAS, the Board, on 4 August 2000, held a hearing in Sacramento and considered all evidence concerning this matter: Therefore be it

RESOLVED, that the California Regional Water Quality Control Board, Central Valley Region, grants an exception to Specific Water Quality Objectives 5A(1)a and 5A(1)b of the Water Quality Control Plan for the Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California for the District's municipal wastewater discharge into the Sacramento River; and be it further

RESOLVED, that this action waiving Specific Water Quality Objective 5A(1)a is applied to the period of 1 October through 30 April , and in the period of 1 October through 30 April, the temperature shall not exceed that natural receiving water temperature by more than 25 degrees F; and be it further

RESOLVED, that this exception is conditional and may be terminated at any time.

I, GARY M. CARLTON, Executive Officer, do hereby certify that foregoing is a full, true, and correct copy of a Resolution adopted by the California Regional Water Quality Control Board, Central Valley Region, on 4 August 2000.

GARY M. CARLTON, Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. 5-00-188

NPDES NO. CA0077682

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

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

1. The Sacramento Regional County Sanitation District (hereafter Discharger), submitted a Report of Waste Discharge, dated 21 December 1994 (along with additional effluent and receiving water information as listed in Attachment A as submitted by the Discharger) and applied for a revised permit to discharge wastewater under the National Pollutant Discharge Elimination System (NPDES) for the Sacramento Regional Wastewater Treatment Plant (hereafter Regional Plant). The discharge is presently governed by Waste Discharge Requirements Order No. 94-006, adopted by the Board on 28 January 1994.

2. The Regional Plant is owned and operated by the Sacramento Regional County Sanitation District. The Regional Plant is in Elk Grove, approximately eight miles south of the City of Sacramento, and one mile east of Freeport, in Section 19, T7N, R5E, MDB&M. The facility location is shown on Attachment B, which is incorporated herein and made a part of this Order.

3. The service area covered by the Regional Plant collection system is generally defined as the Sacramento Metropolitan area, including the cities of Sacramento, Citrus Heights, and Folsom, and the urbanized areas of the County of Sacramento. The City of Folsom is responsible for collection system operation and maintenance within its city limits. The City of Sacramento is responsible for operation and maintenance of portions of the collection system within its city limits, and Sacramento County Sanitation District No. 1 is responsible for the remainder. Sacramento County Sanitation District No. 1 is also responsible for collection system operation and maintenance in the City of Citrus Heights and in the unincorporated areas of Sacramento County. These entities are neither owners nor operators of the Regional Plant and are not named in this permit as dischargers. However, they have been assigned operating and maintenance responsibilities for their respective portions of the collection system as delineated in the December 1996 Sacramento Regional Wastewater Management Program Master Interagency Agreement (MIA). In addition, the Sacramento Regional County Sanitation District Sewer Use Ordinance applies to all portions of the collection system tributary to the Regional Plant regardless of who has operation and maintenance responsibility. Among other things, the Sewer Use Ordinance gives the Discharger authority to administer its pretreatment program throughout the entire collection system.

4. During wet weather the Regional Plant is contracted to accept up to 60 mgd of wastewater and storm runoff from the downtown Sacramento combined collection system. Combined collection flows in excess of 60 mgd are managed by the Combined Wastewater Control System (CWCS) operated by the City of Sacramento. The CWCS discharge is governed by Waste Discharge Requirements Order No. 96-090 that was issued to the City of Sacramento and the Sacramento Regional County Sanitation District. Depending on treatment and conveyance capacity, flow in excess of 60 mgd may be received at the Regional Plant.

5. The Regional Plant provides secondary level wastewater treatment consisting of mechanical bar screens, aerated grit removal, primary sedimentation, pure oxygen activated sludge aeration, secondary clarification, chlorine disinfection with dechlorination, and a diffuser for River discharge. Solids are processed using dissolved air flotation thickeners, gravity belt thickeners, two blending digesters, nine other digesters, solids storage basins, and biosolids disposal. Discharge to the River can be ceased for short periods of time by storage of raw wastewater, primary or secondary undisinfected effluent, or disinfected effluent in the Emergency Storage Basins (ESBs).

6. The discharge from the Regional Plant to the Sacramento River (hereafter River), a water of the United States, is in proximity and south of the town of Freeport, in Section 14, T7N, R4E, MDB&M. Discharge of final effluent in the River is achieved with a multi-port diffuser approximately 400 feet in length, transverse to the River, and anchored to the River bottom. During periods of adequate River flow conditions, the diffuser provides jet diffusion and rapid mixing of the effluent and receiving water within a short distance of the discharge. The Sacramento River in the vicinity of the discharge is influenced by tides. As a result slack flows and flow reversals can occur on occasion. To prevent a breakdown in jet diffusion, and to prevent double dosing of the River with effluent during flow reversals, the Discharger diverts effluent to the on-site ESBs when the River flow conditions of Discharge Prohibition No. A.3 are not met. Once adequate River flows resume, discharge of effluent can also resume. Flows in the River can vary drastically during the course of a day and throughout the year. River flow conditions near those of Discharge Prohibition No.A.3 (which prohibit discharge to the River when river:effluent flow ratios are less than 14:1 or River flow is less than 1300 cfs) typically last for less than an hour. The discharge location is shown on Attachment B.

7. The Discharger has determined in previous studies that River flows of at least 1,300 cubic feet per second (cfs) and providing a flow ratio of at least 14 to 1 (river:effluent) are required to allow for adequate mixing of the effluent. However, based on comments received in previous versions of the tentative permit, the Regional Board has as part of this Order required that the Discharger evaluate the likelihood of double-dosing of effluent into the River under these flow reversal conditions. The Discharger has already begun this study, but was not able to complete it prior to adoption of this permit. The scope and time schedule for this study is in Provision E.4. If after review of this study any adjustments to the minimum operating dilution ratio are required to avoid double dosing concerns in the River, then the Regional Board may reopen the permit accordingly.

Although the permit does not allow discharge to the River when flow velocity and dilution are less than above, as a proactive precautionary measure, the Discharger has developed a set of emergency operating procedures in their April 1990 Plan of Operation which define how the plant shall be operated in response to a combination of influent/effluent and River flow conditions beyond their control that may force operation of the Regional Plant beyond the above limits. (Such events are contemplated in Standard Provision A.14.) These emergency procedures were designed with the intent of minimizing any negative water quality impacts from such an event while preventing damage to or overflow from Regional Plant treatment processes. The Discharger has indicated that there has not been a need to implement these emergency operating procedures since their inception.

8. The Report of Waste Discharge and later monitoring reports describe the Sacramento Regional Wastewater Treatment Plant discharge as follows:

Monthly Average (seasonal dry weather) Flow:	146	million gallons per day (mgd)
Design Flow (seasonal average dry weather):	181	mgd
Average Temperature:	80.2 °F Summer; 68.3 °F Winter	

Constituent	mg/l	lbs/day[1)]
BOD[2)]	11 mg/l	13,394
Total Suspended Solids	6 mg/l	7,306
Arsenic	2.2 µg/l (average)	
Copper	5.6 µg/l (average)	
Lead	0.81 µg/l (average)	
Silver	0.34 µg/l (average)	
Zinc	30.9 µg/l (average)	
Mercury	0.01 µg/l (average)	
Cyanide	3.16 µg/l (average)	
Bis (2-ethylhexyl)Phthalate	1.4 µg/l (average of EPA Method 625 detections)	
Chlorpyrifos	0.03 µg/l (average)	
Diazinon	0.12 µg/l (average)	
Lindane	0.04 µg/l (average)	

(footnotes)
1) Based on seasonal dry weather flow concentrations and monthly average discharge of 146 mgd. These values are discharge quantities, not discharge limitations.
2) 5-Day, 20°C biochemical oxygen demand.

9. The design capacities of the Regional Plant are: (1) seasonal average dry weather flow of 181 million gallons per day (mgd); and (2) peak wet weather flow of 392 mgd.

10. The Regional Plant will have a tertiary treated wastewater system for unrestricted use of reclaimed wastewater. The tertiary plant is expected to be in operation in 2001. The capacity of the tertiary plant is 5.0 mgd (10 mgd ultimate) and shall be governed by Waste Discharge Requirements

No. 97-146. Reclaimed wastewater from the tertiary plant may be used at the Regional Plant and on landscape at various sites within the Laguna Creek community. Attachment C contains a site map.

11. The Discharger has requested permission to use disinfected secondary effluent for various on-site activities. This Order allows such uses as described in Discharge Prohibition A.1.

12. The Discharger operates three major waste management facilities for biosolids storage and disposal. These include: (1) the Solids Storage Basins (SSBs); (2) Dedicated Land Disposal areas (DLDs); and (3) a landfill (closed in 1994). Waste Discharge Requirements Order No. 98-087 regulates operation of these facilities. Biosolids may also be land applied at agronomic rates at on-site locations as regulated by Waste Discharge Requirements Order No. 95-140 (General Order for Reuse of Biosolids) or at off-site locations as regulated by their respective permits and applicable regulations.

13. As part of the Waste Discharge Requirements (WDR) Order No. 98-087, a corrective action program (CAP) was initiated by the Discharger. The CAP is to address elevated constituent concentrations that were observed in samples from groundwater monitoring wells downgradient of the DLDs and the Class III landfill when compared to upgradient groundwater monitoring wells. Extraction wells shall be used for hydraulic control of the site Characterization of the groundwater aquifer is documented in the reports submitted twice annually pursuant to WDR Order No. 98-087. The Discharger proposes to convey the extracted groundwater from the CAP extraction wells, estimated at approximately 1.0 MGD, to the Regional Plant effluent channel downstream of the secondary clarifiers and upstream of the plant chlorination station. The first phase of this project has already been completed and 0.25 MGD of extracted groundwater is being discharged to the headworks of the Regional Plant. Discharging water from the CAP system downstream of the secondary clarifiers is acceptable and does not decrease the amount of treatment as the treatment processes upstream of this discharge point are not designed for removal of the CAP discharge constituents of concern. Furthermore, based on the extracted groundwater sampling, estimates of CAP discharge constituent concentrations are either below current Regional Plant effluent concentrations or do not have a reasonable potential to violate water quality objectives in the receiving water. Based on these considerations, the Board finds disposal of CAP discharge as described above and in Provision E.2 to be acceptable. This permit may be reopened if later data or other information is significantly different from that assumed above.

14. The Discharger has developed, implemented and maintained an effective U.S. EPA approved pretreatment program in accordance with Federal pretreatment regulations (40 CFR 403). The Discharger continues annually to evaluate the effectiveness of its source control programs and to investigate additional reasonable control measures the programs might implement to further reduce influent loadings.

15. The U.S. Environmental Protection Agency (EPA) and the Regional Board have classified this discharge as a major discharge.

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

17. Previous expansion of the facility to 181 MGD was covered under a supplemental Environmental Impact Report (EIR), dated February 1988. The supplemental EIR concluded that the expansion of the Regional Plant would not result in significant impacts to water quality if the discharge is in compliance with waste discharge requirements issued by the Board. This Order does not provide for an increase in the permitted flow of 181 MGD as an average dry weather flow allowed under Order 94-006.

18. The Board adopted a Water Quality Control Plan, Fourth Edition, for the Sacramento and San Joaquin River Basin (hereafter Basin Plan) in 1995. The Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve water quality objectives for all water of the Basin. These requirements implement the Basin Plan.

19. The beneficial uses of the Sacramento-San Joaquin Delta downstream of the discharge as identified in Table II-1 of the Basin Plan are municipal and domestic supply, agricultural irrigation, agricultural stock watering, industrial process water supply, industrial service supply, body contact and other non-body contact water recreation, warm and cold freshwater aquatic habitat, warm and cold fish migration habitat, warm spawning habitat, wildlife habitat, and navigation.

20. The State Water Resources Control Board (SWRCB), on 16 May 1974, adopted Resolution No. 74-43 titled "Water Quality Control Policy for the Enclosed Bays and Estuaries of California". The Regional Plant discharges to the Sacramento River, an estuarine water of the state, through a multi-port diffuser in compliance with Resolution No. 74-43.

21. The U.S. EPA adopted the California Toxics Rule (CTR) in April 2000 which, together with the U.S. EPA National Toxics Rule (NTR), provides numeric water quality criteria for priority pollutants. The *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California*, hereafter referred to as the State Implementation Plan, was adopted in March 2000 by the State Board. It provides guidance on implementing the CTR and NTR and was followed as appropriate in the development of this permit.

22. After further evaluation and numerous comments from the U.S. EPA and other designated parties during the current permit renewal process, the Regional Board has determined that the existing chlorine limits alone may not adequately address the potential impacts to water column and benthic organisms from intermittent combinations of high concentration, short-duration chlorine discharges for which the Regional Plant has a history. To better protect beneficial uses against these possible situations, the Regional Board intends to consider a new limit to address short-term discharges of chlorine, such as a one-hour average limitation, in addition to possible modifications to the daily maximum and average monthly limitations already in place. However, before the Regional Board

can establish protective quantitative limits there are a number of uncertainties related to 1) selecting an appropriate criterion concentration that properly addresses short-duration chlorine exposures and 2) the consideration of a mixing zone/dilution credits for the applicable criteria. Therefore, this Order requires further studies to analyze potential impacts to beneficial uses and to develop more appropriate site-specific criteria as described in Provision E.4. Based on the improved performance of the chlorination-dechlorination system and the fact that there are numerous technical uncertainties regarding a specific numeric limit, interim modifications to the existing chlorine effluent limits shall not be required while the above study is being performed. Once the studies in Provision E.4 have been completed by the Discharger and evaluated by Regional Board staff, the permit will be reopened to incorporate the final determination of appropriate criteria, dilution credit/mixing zone allowances and additional short-duration average limits as appropriate. Also, modifications to the existing maximum daily and average monthly limits may be required.

23. The daily maximum and worst-case monthly average ammonia concentrations in Regional Plant effluent measured between March 1999 and February 2000 both exceeded the most stringent U.S. EPA ambient water quality criteria for ammonia. Although there appears to be adequate ambient assimilative capacity to keep receiving water concentrations below the applicable criteria at the edge of a mixing zone, there has been no mixing zone or dynamic analysis performed by the Discharger demonstrating that granting such a mixing zone would be protective of aquatic life. Of particular concern are the facts that 1) ammonia toxicity increases drastically as a function of increasing pH, 2) the Regional Plant has a history of intermittent excursions of elevated pH in its effluent associated with flow diversions and other events and 3) both of these considerations are important in determining if acute or chronic toxic conditions exist in the mixing zone. Also, the physical dimensions of a pH/ammonia mixing zone need to be defined. Therefore, this Order requires the Discharger to perform a mixing zone study and possibly dynamic analysis as described in Provision E.4. Based on the results of an acceptable study, the Regional Board will re-evaluate its findings and reopen the permit as necessary to make any necessary modifications to the Discharge Limitations.

    To be assured of protection against increased ammonia toxicity that may be caused in the interim by upward excursions of pH, a interim upper effluent pH limit of 7.5 as a 1-hour average of continuously monitored pH is being imposed as described in the Discharge Limitations. With this interim limit in place and based on the fact that ammonia concentrations have not been identified through past whole effluent toxicity testing as causing acute or chronic toxicity, the Regional Board finds this interim limit to be adequate assurance of aquatic life protection. This is being imposed during the period that the studies and permit revisions are being completed. If the requested studies support elimination of the interim pH limit, it is the intent of the Regional Board that the new information in these studies would be the basis for doing so and that this would not constitute back-sliding. If the Discharger fails to conduct the studies as required in Provision E.4, the Board will reopen this Permit and impose final effluent limits following US EPA procedures, based on criteria as calculated in Section 6.3 of the Information Sheet and without consideration of dilution credits.

24. Occasionally the Regional Plant dechlorination facility experiences difficulty in controlling effluent chemistry associated with events such as flow diversion to the ESBs. These difficulties sometimes

cause a pH excursion in the effluent. To address these situations, Effluent Limitation B.3 requires that the discharge shall not a pH value of less than 6.0 nor greater than 8.5 as calculated by a running 20-minute average of continuously monitored effluent pH. The 20-minute averaging period provides adequate protection against excursions above or below the stated limits. The pH limitation also restricts pH from being greater than 7.5 as calculated by a running 1-hour average of continuously monitored effluent pH based on issues regarding ammonia toxicity as described in Finding 23. To comply with the Basin Plan, Receiving Water Limitation D.8 requires that pH of the discharge cannot cause the pH in the receiving water to be less than 6.5 nor exceed 8.5 outside of the zone of initial dilution. This permit also requires the study of pH as it affects ammonia toxicity in the mixing zone (see Finding 23 and Provision E.4). If the results of these studies find the need for modifications to these effluent pH limitations, the permit will be reopened accordingly. As discussed regarding ammonia, the upper effluent pH limit of 7.5 as a 1-hour average is an interim limit only and may be eliminated if the above studies and Regional Board analysis find that the lower pH limit is not needed to prevent ammonia toxicity. It is the intent of the Regional Board that the new information in these studies would be the basis for doing so and that this would not constitute back-sliding. Also, definition of the physical dimensions of a pH mixing zone shall be included when the permit is reopened.

25. Based on Regional Plant effluent data collected between 1994 and 1998, the maximum effluent concentrations of copper, lead, silver, zinc, and cyanide exceeded at least one of the applicable CTR aquatic life criteria. Therefore, according to the SIP Section 1.3 there is reasonable potential for each of these constituents to cause or contribute to an excursion above applicable water quality criteria which then requires effluent limits to be established. Based on the steady-state modeling approach in SIP Section 1.4.B effluent limits have been calculated, however, because no mixing zone studies have been performed yet for these constituents by the Discharger, these effluent limits do not include any dilution credits or mixing zone considerations. Based on historical effluent data, the Regional Plant will not likely be able to comply with effluent limits calculated without the consideration of dilution credits. However, taking into consideration the likelihood that mixing zone analysis and/or dynamic modeling techniques could lead to less stringent, yet defensible and protective effluent limits, this permit is allowing the Discharger a time schedule in accordance with SIP, Section 2.2 to perform these studies. The studies and associated time schedules are described in Provision E.4. Once the studies are completed by the Discharger, Regional Board staff will evaluate the new information and reopen the permit to incorporate final effluent limits. Interim performance-based effluent limits as shown in Effluent Limit B.1 will be in effect until such time as the studies are completed and the permit is reopened to incorporate final effluent limits as needed. It is the intent of the Regional Board that the new information in these studies would be the basis for reconsideration of these effluent limits and that if final effluent limits are less stringent than interim limits this would not constitute back-sliding. If the Discharger fails to conduct the studies as required in Provision E.4, the Board will reopen this Permit and impose final effluent limits as calculated in Table 10.1 of the Information Sheet.

26. The Delta waterways are 303(d) listed for mercury and lindane based on bioaccumulation in fish tissue. Although the Regional Plant effluent contains concentrations of mercury and lindane below

CTR priority pollutant criteria, the fact that the assimilative capacity of the receiving water is exceeded for a certain pollutant (leading to bioaccumulation in fish tissue), any loading of that pollutant from the discharger may have the reasonable potential to cause or contribute to an excursion above the criteria. Furthermore, the Basin Plan requires that organochlorine pesticides shall not be present in the water column in detectable concentrations. Therefore, water quality based effluent limits for mercury and lindane that properly address bioaccumulation and the non-detect Basin Plan standard are required. TMDLs for mercury and lindane are currently scheduled to be completed by December 2005 and December 2011, respectively. For situations like this, the SIP recommends that limiting mass loading of the bioaccumulative pollutant(s) should be considered in the interim at representative, current levels pending development of applicable water quality standards. Based on calculations presented in the Information Sheet, interim mass load limits are being established in this permit for mercury at 5.1 lbs/year and for lindane at 19.0 lbs/year. As described in Effluent Limitation B.8 and providing that the Discharger is in compliance with the terms of its compliance schedule, actual mass loading above or below this interim mass limit can be "banked" until such time a discharge specific offset program is adopted by the Board into the permit to provide a means for offsetting these loads.

Based on the provisions of the SIP, this Order contains a compliance schedule for mercury. Also, based on the provisions of the Basin Plan, this Order contains a compliance schedule for lindane. As part of the compliance schedules for both of these constituents, the Discharger shall develop and implement a pollution prevention program in compliance with California Water Code Section 13263.3(d)(3), perform engineering feasibility studies, and develop an offset program as described in Provisions E.5, 6, and 7. These plans and studies, among other things, will provide the Regional Board staff with site- and watershed- specific information necessary to prepare terms for a final offset program. This permit will be reopened to provide for public comment and Regional Board approval of the final offset program. An effluent limit of non-detectable lindane concentrations is imposed in this permit and must be met at the end of the 10-year lindane compliance schedule. The final effluent limits (mass load allocations) for mercury in the Regional Plant effluent shall come from the TMDLs. The interim mass limits shall remain in effect until that time. Once the mercury TMDL has been adopted, any mass discharge over and above the TMDL shall be banked and addressed by the offset program. If the mercury TMDL is not completed on schedule, future permits shall impose a "zero-net discharge" for the facility. If an offset program is considered infeasible, the Board will reconsider the interim mass cap.

27. Regional Plant effluent was sampled and analyzed by the Discharger for diazinon and chlorpyrifos between December 1996 and May 1999. Based on U.S. EPA guidance for reasonable potential analysis, both of these constituents shall require effluent limits. Also, due to the fact that the River is listed as a 303(d) impaired water body for these types of constituents, no mixing zone/dilution credit could be granted in the determination of reasonable potential or derivation of effluent limits. The Regional Plant does not currently have treatment processes designed to meet effluent limits based on these criteria applied end-of-pipe. However, as the above criteria for chlorpyrifos and diazinon were released after the Basin Plan narrative toxicity criteria were issued, the Basin Plan allows for a compliance schedule of up to ten years from the adoption date of the new criteria in March 2000. As

a result, a time schedule for compliance with the new corresponding effluent limitation is allowable. The compliance schedule includes developing and implementing a pollution prevention plan in compliance with CWC 13263.3(d)(3) and performing a feasibility study as described in Provisions E.5 and 6. Implementation of the pollution prevention plan shall commence immediately upon approval of the plan by the Executive Officer. The findings of the feasibility study will be used in developing the remainder of the compliance schedule and final discharge limitations as appropriate in the next permit renewal. If the Discharger fails to conduct the studies as required in Provisions E.5 and E.6, the Board will reopen this permit and impose final effluent limits as indicated in Section 9.1 of the Information Sheet.

28. There were five organic compounds present in the Regional Plant effluent above the CTR one-in-a-million incremental cancer risk criteria for water and fish consumption. These constituents are dichloromethane, chloroform, tetrachloroethylene, dichlorobromomethane, and bis-2 ethylhexyl phthalate. Based on data summarized in Table 13.1 of the Information Sheet and the reasonable potential calculations of SIP Section 1.3, these five constituents shall require effluent limits. Following effluent limit calculation procedures in SIP Section 1.4, which were then modified as described in Information Sheet Item No. 13.3 to prevent unnecessary granting of assimilative capacity, final effluent limits for these constituents were calculated and included in Effluent Limitations B.1.

    Based on historical data the Regional Plant can meet these limits. Therefore, taking into consideration CWC Section 13241 and 13263 the Regional Board does not find there to be significant economic impacts associated with the more stringent interpretation of the SIP used in the calculation of these final effluent limits. The Board finds, on the balance, that these requirements are necessary to protect the beneficial uses of the Sacramento-San Joaquin Delta. Although no hydraulic analysis has been performed by the Discharger yet to delineate the extent of the associated mixing zones for these constituents, the Regional Board finds the nature of the discharge is such that protective final effluent limits can be established. However, a mixing zone analysis of the effluent discharge into the River performed at the appropriate critical flow conditions (harmonic mean of receiving water flow) to delineate the extent of the corresponding mixing zone is required in Provision E.4.

29. In May and June of 1999, in response to a Regional Board request, the Discharger collected four samples of prechlorinated effluent and analyzed them for the following oxygenates: di-isopropyl ether (DIPE), ethyl tertiary butyl ether (ETBE), tertiary amyl methyl ether (TAME), and methyl tertiary butyl ether (MTBE). The first three of these oxygenate compounds were not detectable in any of the four samples (<1.0 µg/l in three of the samples and <0.5 µg/l in the fourth). MTBE, however, was detected above the 1.0 µg/l reporting limit, with values of 1.4, 1.9, and 2.2 µg/l. As of this time, however, only a secondary MCL has been established by the California Department of Health Services at 5 µg/l. Due to the very limited number of effluent data and the fact that criteria for MTBE are still being developed, the Board shall not establish an effluent limitation at this time. However, the attached Monitoring and Report Program No. 5-00-188 requires monitoring of these oxygenates to better assess reasonable potential against developing water quality objectives.

30. To better assess and understand the nature of potential chronic toxicity in the effluent and the receiving water, a revised protocol for three species chronic toxicity monitoring has been included in this Order. Three species chronic toxicity tests have been performed by the Discharger since 1993 and although some chronic toxicity was observed in these previous tests, it is uncertain to what extent these results are indicative of impact to on the River. The new protocol shall use ambient receiving water for dilution series of effluent samples to better understand the chronic toxicity of the actual mixture of ambient receiving water and effluent. At the same time concurrent tests shall be run on undiluted upstream and downstream samples to better assess ambient chronic toxicity and any increase in receiving water chronic toxicity downstream of the discharge. In addition, other concurrent tests shall be run to help identify factors that may be contributing to unknown toxicity in the River, which is 303(d) listed. Trigger levels for the performance of TRE's have also been revised. This protocol is described in the Monitoring and Reporting Program No.5-00-188, and Provision No. E.11 and shall be implemented in two phases. Phase I shall be a 12-month toxicity characterization with the new protocol being performed on monthly samples. This phase shall start within 3 months of adoption of this permit. Phase II shall be the same as Phase I except it shall consist of quarterly monitoring beginning with the second year of the monitoring program.

31. The SWRCB Water Quality Control Plan for Control of Temperatures in Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (the Thermal Plan) is applicable to this discharge. The Board, on 26 May 1989, adopted Resolution No. 89-094 granting an exception to objectives 5A(l)(a) (from 1 October to 30 April) and 5A(l)(b) of the Thermal Plan. Additionally, Resolution 89-094 requires that the temperature of the discharge shall not exceed the natural receiving water temperature by more than 25°F from 1 October through 30 April. The SWRCB, on 20 September 1990, adopted Resolution No. 90-103 approving and modifying Board Resolution No. 89-094. SWRCB Resolution No. 90-103 approved the exception to objective 5A(1)(a), but not the one to 5A(1)(b). It further required a study of the feasibility of meeting the existing objective, 5A(l)(b). The Discharger submitted the required study in a report in October 1991, with supplements in November and December 1991. Based on the study, the SWRCB adopted Resolution No. 92-82 on 22 October 1992, granting the Discharger an exception to objective 5A(l)(b). Specifically, the exception allows a maximum increase of 2 °F in a zone that does not exceed 25 percent of the cross-sectional area of the main River channel at any point. The exception also limited any excursion of objective 5A(l)(b) to no more than one hour per day as an average in any thirty-day period when the upstream temperature of the Sacramento River is 65 °F or greater. These limitations are found in Receiving Water Limitations D.10, 11, and 12. The Board adopted Resolution No.5-00-192 on 4 August 2000 granting continued exception to the Thermal Plan in conjunction with requiring the Discharger to study the impacts of its discharge on the fishery.

32. Studies by the National Marine Fisheries Service and the U.S. Bureau of Reclamation have identified the Sacramento Chinook Salmon as a species that is affected by elevated temperatures in the Sacramento River. There are four runs of salmon in the Sacramento River and there are adults and juveniles in portions of the River every month of the year. Juvenile salmon show signs of adverse effects at River temperatures of 65 °F. Migration of adults is usually delayed when River

temperatures reach 70 °F. At 72 °F, adult mortality may occur. In a Department of Water Resources Study, adult salmon will cease migration if water temperatures are above 70 °F. The Thermal Plan does not protect aquatic life from high temperature wastewater being discharged to an elevated temperature River. However, the Thermal Plan limits incremental increases in temperature. Discharge from the wastewater treatment plant of treated effluent with an elevated temperature may affect salmon and other migrating fish in the Sacramento River. In so far as elevated temperature is deleterious to Chinook salmon, effluent temperature must be limited so as not to cause the receiving water to be harmful to the salmon. When the assimilative capacity of the River is diminished, effluent temperature must be held to the water quality criteria. This permit contains Provision E.4 requiring the Discharger to study (among other issues) the potential impacts to the fishery associated with a discharge of treated effluent with elevated temperatures. Resolution No. 5-00-192 may be revised accordingly after review of the study to incorporate Regional Board findings and requirements as appropriate.

33. Coliform limits are imposed to protect the beneficial uses of the receiving water, including public health through contact recreation and drinking water pathways. According to California Department of Health Services (DHS) guidelines, a median 23 MPN/100 ml limitation is applicable to discharges with flow ratios (river:effluent) greater than or equal to 20:1 based on "an average over a period of time and not the instantaneous minimum low flow of the year". Based on historical River flow data between January 1970 and September 1998 the Regional Board found more than 20:1 flow ratio on a 7-day average basis for all but three minor exceptions. Therefore, the 23 MPN/100 ml limitation is found to be appropriate. However, based on comments from DHS in February 2000 and further technical evaluation, compliance with this limit shall be based on a 7-day median as opposed to the 30-day median in the previous permit.

    Based on a review of the most recent three years of effluent monitoring, the Discharger is already able to meet the 7-day median. Therefore, taking into consideration CWC Section 13241 and 13263 the Regional Board does not find there to be significant economic impacts associated with the more stringent interpretation of the SIP used in the calculation of these final effluent limits. The Board finds, on the balance, that these requirements are necessary to protect the beneficial uses of the Sacramento-San Joaquin Delta. Based in part on limitations of the Regional Plant chlorination system, the previous permit also specified an effluent limitation for total coliform at 500 MPN/100 ml as daily maximum, which was not to be exceeded on two consecutive days. DHS was consulted on the applicability of this limitation in March 1997 and again in February 2000. They concluded that the current daily maximum total coliform limitation is sufficient for the protection of human health.

34. The Board has considered anti-degradation pursuant to 40 CFR 131.12 and SWRCB Resolution No. 68-16 and finds that the permitted discharge is consistent with those provisions. This Order does not allow for any increase in the volume or mass of pollutants discharged as compared to Order No. 94-006. To the extent an increase results under this Order (by an increase up to the existing volume or effluent concentration limitations) the impact on water quality will either be localized or insignificant. To the extent that any increase is regarded as occurring as a result of this Order, it will

allow wastewater utility service necessary to accommodate economic expansion in the Sacramento Metropolitan area, and there is no evidence to indicate it will cause significant impacts on aquatic life beneficial uses, which are the primary uses affected by the pollutants discharged (BOD, suspended solids, chlorine residual, temperature, and metals).

35. The action to adopt an NPDES permit is exempt from the provisions of the California Environmental Quality Act (Public Resources Code Section 21000, et seq.) requiring preparation of an environmental impact report or negative declaration, in accordance with Section 13389 of the California Water Code.

36. The Board has considered the information in the attached Information Sheet in developing the Findings of this Order. The attached Information Sheet is part of this Order.

37. The Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

38. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

39. This Order shall serve as an NPDES permit pursuant to Section 402 of the CWA, and amendments thereto, and shall take effect upon the date of adoption, provided EPA has no objections.

IT IS HEREBY ORDERED that Order No. 94-006 is rescinded and Sacramento Regional County Sanitation District, its agents, successors and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, and the provisions of the Clean Water Act and regulations and guidelines adopted thereunder, shall comply with the following:

A. Discharge Prohibitions:

1. Discharge from the Regional Plant at any point other than through the discharge manifold in the Sacramento River downstream of the Freeport Bridge is prohibited, with the following exceptions. Disinfected secondary effluent may be reclaimed for dust control and compaction on construction projects, landscape irrigation, wash down water, vehicle washing and grounds maintenance within the Regional Plant boundaries. It may also be used for in-plant process water and fire protection and used in the tertiary treatment plant and distribution system. Any use of reclaimed Regional Plant disinfected secondary effluent must meet the requirements of Title 22, California Code of Regulations, Section 60301, et seq. and the associated DHS guidelines as applicable. However, no runoff from such projects is allowed except as regulated by the Master Water Reclamation Permit, Regional Board Order 97-146.

2. The by-pass or overflow of wastes to surface waters is prohibited, except as allowed by Standard Provision A.13 in "Standard Provisions and Reporting Requirements for Waste Discharge Requirements (NPDES)" and as described in Finding No. 13.

3. As described in Finding No. 7, discharge to the Sacramento River is prohibited unless there is a minimum of 1300 cfs River flow and a 14:1 (river:effluent) flow ratio available in the River.

B. Effluent Limitations:

1. The discharge of effluent in excess of the following limits is prohibited:

Constituents (Units)	Yearly Total	Monthly Average	Weekly Average	Daily Average	Daily Maximum
BOD[1] (mg/l)	--	30	45	60	--
(lbs/day)[2]	--	45,286	67,929	90,572	--
(lbs/day)[3]	--	98,078	147,118	196,157	--
Total Suspended Solids (mg/l)	--	30	45	60	--
(lbs/day)[2]	--	45,286	67,929	90,572	--
(lbs/day)[3]	--	98,078	147,118	196,157	--
Chlorine Residual (mg/l)	--	0.011	--	0.018	--
(lbs/day)[2]	--	17	--	27	--
(lbs/day)[3]	--	36	--	59	--
Settleable Matter (ml/l)	--	0.1	--	--	0.5
Total Coliform (MPN/l00 ml)	--	--	23 (median)	--	500[4]
Oil & Grease (mg/l)	--	10	--	--	--
(lbs/day)[2]	--	15,095	--	--	--
(lbs/day)[3]	--	32,693	--	--	--
Copper (µg/l)[5]	--	--	--	(9.7) 22.8	--
(lbs/day)[2]	--	--	--	34	--
(lbs/day)[3]	--	--	--	75	--
Lead (µg/l)[5]	--	--	--	(5.1) 7.8	--
(lbs/day)[2]	--	--	--	12	--
(lbs/day)[3]	--	--	--	26	--
Silver (µg/l)[5]	--	--	--	(0.57) 0.72	--
(lbs/day)[2]	--	--	--	1.1	--
(lbs/day)[3]	--	--	--	2.3	--
Zinc (µg/l)[5]	--	--	--	(46.7) 69.8	--
(lbs/day)[2]	--	--	--	105	--
(lbs/day)[3]	--	--	--	228	--
Cyanide (µg/l)[5]	--	--	--	(6.1) 10.8	--
(lbs/day)[2]	--	--	--	16	--
(lbs/day)[3]	--	--	--	35	--
Lindane (lbs/yr)	19.0[6]	--	--	--	ND[7]
Mercury (lbs/yr)	5.1[6]	--	--	--	--

Methylene chloride (µg/l)	--	14.3	--	32.1	--
(lbs/day)2)	--	22	--	48	--
(lbs/day)3)	--	47	--	105	--
Chloroform (µg/l)	--	37.3	--	55.3	--
(lbs/day)2)	--	56	--	83	--
(lbs/day)3)	--	122	--	181	--
Tetrachloroethylene (µg/l)	--	14.1	--	35.6	--
(lbs/day)2)	--	21	--	54	--
(lbs/day)3)	--	46	--	116	--
Dichlorobromomethane (µg/l)	--	3.6	--	7.2	--
(lbs/day)2)	--	5.4	--	11	--
(lbs/day)3)	--	12	--	24	--
Bis-2 ethylhexyl phthalate (µg/l)		8.6	--	19.1	--
(lbs/day)2)	--	13	--	29	--
(lbs/day)3)	--	28	--	62	--

(footnotes)

1) 5-day, 20°C biochemical oxygen demand.
2) Based upon a design average dry weather flow capacity of 181 mgd, applicable from May through October
3) Based upon design peak wet weather flow capacity of 392 mgd, applicable from November through April
4) Daily Maximum limit, shall not be exceeded in any two (2) consecutive days.
5) Trigger concentrations (in parenthesis) and interim limits per Effluent Limit B.9 and Information Sheet Item No. 10.6. Trigger concentrations are not subsequently expressed as mass limits.
6) As calculated per Effluent Limit B.8
7) Not applicable if Discharger is in compliance with time schedules of Provisions Nos. E.5, E.6, and E.7 and Finding No. 26. Non-detectable (ND). The Discharger shall use EPA standard analytical techniques that have the lowest practical level for lindane with a minimum acceptable reporting level of 0.02 µg/l. Detectable concentrations of lindane less than 0.02 µg/l shall be considered in compliance with this effluent limit.

2. The arithmetic mean of 20°C BOD (5-day) and total suspended solids in effluent samples collected over a monthly period shall not exceed 15 percent of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85 percent removal).

3. The discharge shall not have a pH value of less than 6.0 nor greater than 8.5 as calculated by a running 20-minute average of continuously monitored effluent pH nor have a pH value greater than 7.5 as calculated by a running 1-hour average of continuously monitored effluent pH. As discussed in Finding 23 and 24 the upper limit of 7.5 as 1-hour average is an interim limit until completion of further studies at which time its necessity will be reassessed. Per Provision E.9, this limitation shall become effective **1 November 2000**. In the interim, the effluent limits and monitoring and reporting requirements of the rescinded Order No. 94-006 will remain in effect.

4. The 30-day average dry weather flow shall not exceed 181 mgd.

5. The daily peak wet weather flow shall not exceed 392 million gallons per day.

6. The effluent shall not cause acute toxicity to test fish in 96-hour continuous flow-through bioassays of undiluted waste performed as described in Monitoring and Reporting Program No._____. Tests resulting in survival less than the following criteria shall be considered violations of this limitation:

   a) Minimum for any one bioassay ---------- 70%

   b) Median for any three or more consecutive bioassays -------- 90%

7. The maximum temperature of the discharge shall not exceed the natural receiving water temperature by more than 25°F from 1 October through 30 April or by more than 20°F from 1 May through 30 September.

8. The total annual mass discharge of mercury and lindane shall not exceed 5.1 lbs and 19.0 lbs., respectively, per year. These are an interim performance-based limit that shall be in effect until a final TMDL is established for both of these constituents. Actual mass loading over or under these limits shall be banked for future offset and shall not be considered a violation as long as the Discharger is in compliance with Provision No. E.7. The procedures for calculating mass loadings and banking are as follows:

   a) The total mercury mass load for each individual month shall be determined using an average of all concentration data collected that month and the corresponding average monthly flow. All monitoring data collected under the monitoring and reporting program, pretreatment program and any special studies shall be used for these calculations.

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

   c) The Discharger shall submit a cumulative total of mass loadings for the most recent twelve months in accordance with the Monitoring & Reporting Program No.5-00-188. The amount of this 12-month total over or under the interim limit shall be banked (added or subtracted) against a running net total of the same figures from all previous months.

   If mercury is found to be causing toxicity based on chronic toxicity test results, or if a TMDL (Total Mass Daily Loading) program is adopted, this permit shall be reopened and the mercury mass effluent limit shall be modified (higher or lower) or an effluent concentration limitation imposed.

9. The effluent limits shown above in Effluent Limit B.1 for copper, lead, silver, zinc, and cyanide are interim limits as required by SIP Section 2.2.2. Once the Discharger has completed the studies in Provision E.4, the permit will be reopened to incorporate final limits, as needed, and the interim limits will be eliminated. Exceedance of the lower trigger concentration is not a violation of this Order, however, if the trigger concentration is exceeded in the effluent then an investigation into the cause of the exceedance shall be performed by the Discharger and the

Regional Board notified of the results within **30 days**. Upon review of the results of the investigation the Regional Board may require an action plan to address the cause of the exceedance.

C. Solids Disposal:

1. Collected screenings, biosolids, and other solids removed from liquid wastes shall be disposed of in accordance with Waste Discharge Requirements Order No. 98-087 or subsequently adopted order, or as otherwise approved by the Executive Officer.

2. Any proposed programmatic change in biosolids use or disposal practice from a previously approved practice shall be reported to the Executive Officer and EPA Regional Administrator at least 90 days in advance of the change.

3. Use and disposal of biosolids shall comply with existing Federal and State laws and regulations, including permitting requirements and technical standards included in 40 CFR 503. Use and disposal of biosolids is currently regulated by 40 CFR 503. If the State Water Resources Control Board and the Regional Water Quality Control Boards are given the authority to implement regulations contained in 40 CFR 503, this Order may be reopened to incorporate appropriate time schedules and technical standards. However, at a minimum, the Discharger must always comply with the standards and time schedules contained in 40 CFR 503.

D. Receiving Water Limitations:

Receiving Water Limitations are based upon water quality objectives contained in the Basin Plan. As such, they are a required part of this permit. The following receiving water limitations apply to the entire River unless an exception for a mixing zone has been granted. However, a receiving water condition not in conformance with the limitation is not necessarily a violation of this Order. If it is determined that such a condition exists, the Board will require the Discharger to conduct an investigation to confirm and characterize the water quality condition. Based on the outcome of this investigation, the Board may then take appropriate action.

1. Dissolved oxygen concentrations in the Sacramento River to fall below 7.0 mg/l.

2. Oils, greases, waxes, or other materials that cause nuisance, result in a visible film or coating on the water surface or on objects in the water, or otherwise adversely affect beneficial uses.

3. Oils, greases, waxes, floating material (liquids, solids, foams, and scum) or suspended material to create a nuisance or adversely affect beneficial uses.

4. Aesthetically undesirable discoloration that causes nuisance or adversely affects beneficial uses.

5. Biostimulatory substances that promote aquatic growths in concentrations that cause nuisance or adversely affect beneficial uses.

6. An increase of the monthly average turbidity to exceed the following:
   a) More than 1 Nephelometric Turbidity Unit (NTU) if background is between 0 and 5 NTUs.
   b) More than 20 percent where natural turbidity is between 5 and 50 NTUs.
   c) More than 10 NTUs where natural turbidity is between 50 and 100 NTUs.
   d) More than 10 percent where natural turbidity is greater than 100 NTUs.

7. The normal ambient pH to fall below 6.5, exceed 8.5, or change by more than 0.5 units outside of the zone of initial dilution.

8. Deposition of material that causes nuisance or adversely affects beneficial uses.

9. The discharge shall not cause the receiving water temperature to increase more than 4°F above the ambient temperature of the receiving water at any time or place outside the zone of initial dilution.

10. The discharge shall not create a zone, defined by water temperature of more than 2.0°F above natural receiving water temperature, which exceeds 25 percent of the cross sectional area of the River at any point outside the zone of initial dilution.

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

12. Radionuclides to be present in concentrations that exceed maximum contaminant levels specified in the California Code of Regulations, Title 22; that harm human, plant, animal or aquatic life; or that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.

13. Toxic substances to be present in the water column, sediments, or biota in concentrations that adversely affect beneficial uses; that produce detrimental response in human, plant, animal, or aquatic life; or that bioaccumulate in aquatic resources at levels which are harmful to human health.

14. Taste or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin or that cause nuisance or adversely affect beneficial uses.

15. The Clean Water Act and regulations adopted thereunder provide that discharge shall not cause a violation of any applicable water quality standard for receiving waters adopted by the Board or the State Water Resources Control Board. Accordingly if more stringent applicable water quality standards are approved pursuant to Section 303 of the Clean Water Act, or amendments thereto, the Board may reopen and revise or modify this Order in accordance with such more stringent standards and may consider the inclusion of a compliance time schedule if the Discharger is not able to meet a discharge requirement.

16. The fecal coliform concentration in any 30-day period to exceed a geometric mean of 200 MPN/100 ml or cause more than 10 percent of total samples to exceed 400 MPN/100 ml.

E. Provisions:

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

2. Once installation of the CAP system is completed as described in Finding No. 13, sampling of the discharge is required in the attached Monitoring and Reporting Program No.5-00-188. If based on this data or other information available at a later date CAP discharge is found to result in the Regional Plant effluent having additional reasonable potential to cause an adverse impact on beneficial uses of the receiving water, this permit may be reopened.

3. This permit may be reopened, and effluent limits may be added, deleted, or modified if new regulations or information becomes available. The Board may consider inclusion of a compliance time schedule within the bounds of the applicable regulations if the Discharger is not able to meet a new discharge requirement immediately.

4. *Localized Impact Study:* A comprehensive study of impacts in the vicinity of the discharge and any associated mixing zones shall be performed which includes, at a minimum, consideration of the issues listed below. A work plan for this study shall be completed and submitted to the Executive Officer within **fourteen (14) months** after adoption of this Order. The work plan shall include a schedule for completing all work in accordance with the work plan within **twenty-two (22) months** following work plan approval by the Executive Officer. Also, a progress report shall be submitted every **six (6) months** after approval of the work plan. Interim performance-based effluent limits as shown in Effluent Limit B.1 will be in effect for the inorganic priority pollutants until such time as the studies are completed and the permit is reopened to incorporate final effluent limits for those constituents. The permit will be reopened accordingly after review of the submittal to incorporate Regional Board findings and requirements as appropriate.

   a) *Multiple Effluent Dosing:* As discussed further in Finding No. 7 and in Information Sheet Item No. 2, the Discharger shall evaluate the potential for multiple dosing of receiving water

with discharged effluent that could potentially be associated with tidally induced flow reversals in the Sacramento River. Based on historical flow data, astronomical tide models and other appropriate information and analytical tools, the Discharger shall evaluate the frequency and duration of such events.

b) *Chlorine:* As discussed further in Finding No. 22 and Information Sheet Item No. 5 the Discharger shall provide the Regional Board with information needed for the determination of effluent limits protective of short-duration discharges of chlorine in Regional Plant effluent. The study shall include, but not be limited to: 1) summary and analysis of relevant peer-reviewed research literature, 2) mixing zone analysis at appropriate acute critical flow conditions, and 3) collection of relevant site-specific data.

c) *Ammonia:* As discussed further in Finding No. 23 and Information Item No. 6, the Discharger shall provide the Regional Board with information to determine the need for or calculation of protective ammonia effluent limits. The study shall include, but not be limited to: 1) near- and far-field mixing zone analysis including consideration of pH, 2) assessment of acute and chronic exposure durations for water column and benthic organisms, and 3) possible dynamic modeling analysis.

d) *Inorganic Priority Pollutants:* As discussed further in Finding No. 25 and Information Item No. 10, the Discharger shall provide the Regional Board with additional information required for the determination of final effluent limits. The study shall include mixing zone analysis and/or dynamic modeling analysis for copper, lead, silver, zinc, and cyanide.

e) *Organic Priority Pollutants*: As discussed further in Finding No. 28 and Information Sheet Item No. 13, the Discharger shall perform a hydraulic analysis of the effluent discharge into the River shall be performed at the appropriate critical flow conditions (harmonic mean of receiving water flow) to delineate the extent of the corresponding mixing zone.

f) *Additive Toxicity:* As required by the Basin Plan, the Discharger shall provide the Regional Board with information to assess possible additive acute and chronic toxicity from other stressors in the mixing zone including pH, ammonia, chlorine and temperature.

g) *Thermal Impacts:* As discussed further in Finding No. 32 and Information Sheet Item No. 11, there are indications that elevated temperatures in the Sacramento River may affect migrating Chinook salmon and other fish during portions of the year. Temperature objectives in the Basin Plan and the Thermal Plan may not address the temperature parameters necessary to protect migrating fish. To evaluate the effect of an elevated temperature discharge to migrating fish, the Discharger shall conduct a study of the effect of an elevated temperature discharge to migrating fish (with particular attention being paid to those periods when River flow is lowest and/or River or effluent temperature are highest). The Discharger shall perform the study in consultation with the Department of Fish & Game, USEPA, NMFS, USF&WS and other interested parties.

h) *Receiving Water Monitoring:* A program of receiving water monitoring shall be developed by the Discharger at a Station R-2 to be determined. The purpose of this monitoring program is to provide data that will help evaluate if receiving water concentrations are being met at the

edge of the various mixing zones defined by the above activities. The specific constituent(s) to be measured and details of sampling frequency and locations for the program need to be outlined based on the findings of this study. When the permit is reopened to address the other findings of this study, the monitoring and reporting program will also be modified to include an R-2 monitoring program.

5. *Pollution Prevention Plans:* As discussed further in Finding No. 26 and Information Item No. 8 for mercury and lindane and as discussed further in Finding No. 27 and Information Item No. 9 for chlorpyrifos and diazinon, the Discharger shall prepare pollution prevention plans following the guidelines in CWC 13263.3(d)(3). Also, the Discharger shall continue its contribution of resources and sampling data to the respective TMDL processes. A work plan for preparation of these pollution prevention plans shall be completed and submitted to the Executive Officer within **fourteen (14) months** after adoption of this Order. The work plan shall include a schedule for completing all work in accordance with the work plan within **twenty-two (22) months** following work plan approval by the Executive Officer. Also, a progress report shall be submitted every **six (6) months** after approval of the work plan. Implementation of the pollution prevention plans shall commence immediately upon approval of the program by the Executive Officer.

6. *Treatment Feasibility Studies*: As discussed further in Finding No. 26 and Information Item No. 8 for mercury and lindane and as discussed further in Finding No. 27 and Information Item No. 9 for chlorpyrifos and diazinon, the Discharger shall perform the following treatment feasibility studies. A work plan for this study shall be completed and submitted to the Executive Officer within **fourteen (14) months** after adoption of this Order. The work plan shall include a schedule for completing all work in accordance with the work plan within **thirty-four (34) months** following work plan approval by the Executive Officer. Also, a progress report shall be submitted every **six (6) months** after approval of the work plan. The intent is to have the studies available in time for consideration in the next NPDES permit renewal cycle.

7. *Offset Programs*: As discussed further in Finding No. 26 and Information Item No. 8 for mercury and lindane, the Discharger shall perform the following offset program feasibility and development studies with the intention of mitigating the mass loading of these constituents in the Regional Plant effluent. Separate programs are required for mercury and lindane. A work plan for both the mercury and lindane studies shall be completed and submitted to the Executive Officer within **fourteen (14) months** after adoption of this Order. The work plan shall include a schedule for completing all work in accordance with the work plan within **thirty-four (34) months** following work plan approval by the Executive Officer. Also, a progress report shall be submitted every **six (6) months** after approval of the work plan. This permit will be reopened to provide for public comment and Regional Board approval of the final offset programs. Implementation of the offset programs shall commence upon its adoption by the Regional Board into the permit.

8. If the State Water Resources Control Board makes revisions to Resolution No. 92-82 (Approval of an Exception to the Thermal Plan) that contradict Receiving Water Limitations D.9., D.10., and/or D.11., this permit may be reopened and modified to address the revisions.

9. For effluent monitoring of pH, the Discharger shall maintain a continuous pH monitoring system capable of monitoring at intervals of at least once per second and report the results as required in the Monitoring and Reporting Program No. 5-00-188 for compliance with Effluent Limitation B.3. These reporting requirements and effluent limitation shall become effective on **1 November 2000** to allow discharger time to reconfigure their pH monitoring and reporting system accordingly. In the meantime, the effluent limits and monitoring and reporting requirements of the rescinded Order No. 94-006 shall remain in effect.

10. For constituents which did *not* have effluent monitoring requirements in rescinded Order 94-006 (lindane, TOC, arsenic, copper, lead, silver, zinc, mercury, cyanide, halogenated volatile organics, bis (2-ethylhexyl) phthalate, oxygenates, priority pollutants and acute and chronic bioassays), the applicable limits in the Effluent Limits of this Order, and effluent monitoring requirement of Monitoring & Reporting Program No. 5-00-188 shall become effective on **1 November 2000**. This will allow the Discharger adequate time to set up the equipment and procedures necessary for the new monitoring requirements. Prior to 1 November 2000 acute and chronic bioassays shall be performed according to the schedules and requirements of the rescinded Order No. 94-006.

11. The Discharger shall conduct the three species chronic toxicity testing as specified in the Monitoring and Reporting Program No.5-00-188. If the chronic toxicity monitoring trigger levels are exceeded as indicated below, the Discharger shall implement the approved toxicity reduction evaluation (TRE) work plan.

    Whenever a reportable no observable effects concentration (NOEC) in an effluent chronic toxicity test is equal to or greater than 8 toxicity units (TUs) for any test organism, accelerated monitoring shall go into effect. (A TU equals 100 divided by the no observable effect level (NOEL). The NOEL is determined from IC, EC, or NOEC values). Accelerated monitoring shall consist of the following:

    a) If a test species exhibits an NOEC equal to or greater than 8 TUs, the Discharger shall collect a fresh sample from the location where the toxicity was experienced within nine days of the event and conduct a new chronic toxicity test on the affected test species.

    b) If the follow up sample demonstrates an NOEC of less than 8 TUs, the Discharger shall conduct two additional weekly chronic tests from the same sample location on the affected test species to check for persistent toxicity. If there is no further significant toxicity shown on the follow up samples, the accelerated monitoring can be discontinued and event monitoring will resort to the regular schedule.

    c) If the follow up test exhibits an NOEC equal to or greater than 8 TUs, a TRE as described below shall be initiated immediately on the sample in an attempt to identify the toxicant. The

Discharger shall continue to perform follow up chronic testing for 6 consecutive months and return to routine scheduled sampling if the accelerated monitoring tests do not meet or exceed the trigger level of 8 TUs.

The Discharger shall submit a work plan and time schedule for the TRE work plan to the Executive Officer within **six (6) months** after adoption of this Order. Following approval by the Executive Officer, the Discharger shall implement the work plan as required above. The purpose of the TRE is to investigate the causes of, and to identify corrective control actions in response to effluent toxicity incidents. The objective of the TRE is to narrow the search for effective control measures for effluent toxicity. The TRE needs to be site specific but should follow EPA guidance and be conducted in a step-wise fashion. The following is a tiered approach in conducting the TRE:

Tier 1 includes basic data collection, followed by Tier 2, which evaluates optimization of the treatment system operation, facility housekeeping, and the selection and use of in-plant process chemicals. If unsuccessful in reducing toxicity, Tier 3, a toxicity identification evaluation (TIE) should be initiated and all reasonable efforts using currently available TIE methodologies employed. Assuming successful identification or characterization of the toxicant(s), Tier 4 is to evaluate final effluent treatment options and Tier 5 is to evaluate within plant treatment options. Tier 6 consists of confirmation once a toxicity control method has been implemented.

Many recommended TRE elements parallel source control, pollution prevention, and storm water control program best management practices (BMPs). To prevent duplication of efforts, evidence of complying with those requirements may be sufficient to comply with TRE requirements. By requiring the first steps of a TRE to be accelerated testing and review of the facility's TRE work plan, a TRE may be ended in its early stages. All reasonable steps shall be taken to reduce toxicity to the required level.

12. The Discharger shall submit to the Board on or before each compliance due date in Provisions 4 through 7 and 9 through 11 above, the specified document or a written report detailing compliance or noncompliance with the specific date and task. If noncompliance is reported, the Discharger shall state the reasons for noncompliance and include an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Board by letter when it returns to compliance with the time schedule. The permit shall be reopened if any changes are required to the deliverable dates established in the above Provisions.

13. The Discharger shall use the best practicable cost-effective control technique currently available to limit mineralization to no more than a reasonable increment.

14. The Discharger shall comply with all the items of the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements (NPDES)", dated 1 March 1991, which are part of this Order. This attachment is referred to as "Standard Provisions".

15. The Discharger shall comply with Monitoring and Reporting Program No. 5-00-188, which is a part of this Order, and any revisions thereto as ordered by the Executive Officer.

16. When requested by EPA, the Discharger shall complete and submit Discharge Monitoring Reports. The submittal date shall be no later than the submittal date specified in the Monitoring and Reporting Program No.5-00-188 for Discharger Self-Monitoring Reports.

17. This Order expires on **1 August 2005** and the Discharger must file a Report of Waste Discharge in accordance with Title 23, CCR, not later than 180 days in advance of such date in application for renewal of waste discharge requirements if it wishes to continue the discharge.

18. The Discharger shall enforce the Pretreatment Standards promulgated under Sections 307(b), 307(c) and 307(d) of the Clean Water Act. The Discharger shall perform the pretreatment functions required by 40 CFR Part 403 including but not limited to:

    a) Adopting the legal authority required by 40 CFR 403.8(f)(1);

    b) Enforcing the Pretreatment Standards of 40 CFR 403.5 and 403.6;

    c) Implementing procedures to ensure compliance as required by 40 CFR 403.8(f)(2); and

    d) Providing funding and personnel for implementation and enforcement of the pretreatment program as required by 40 CFR 403.8(f)(3).

19. The Discharger shall implement its approved pretreatment program and the program shall be an enforceable condition of this permit. If the Discharger fails to perform the pretreatment functions, the Regional Water Quality Control Board (RWQCB), the State Water Resources Control Board (SWRCB) or the U.S. Environmental Protection Agency (U.S. EPA) may take enforcement actions against the Discharger as authorized by the Clean Water Act.

20. The Discharger shall implement, as more completely set forth in 40 CFR 403.5, the necessary legal authorities, programs, and controls to ensure that the following incompatible wastes are not introduced to the treatment system, where incompatible wastes are:

    a) Wastes which create a fire or explosion hazard in the treatment works;

    b) Wastes which will cause corrosive structural damage to treatment works, but in no case wastes with a pH lower than 5.0, unless the works is specially designed to accommodate such wastes;

    c) Solid or viscous wastes in amounts which cause obstruction to flow in sewers, or which cause other interference with proper operation or treatment works;

    d) Any waste, including oxygen demanding pollutants (BOD, etc.), released in such volume or strength as to cause inhibition or disruption in the treatment works, and subsequent treatment process upset and loss of treatment efficiency;

e) Heat in amounts that inhibit or disrupt biological activity in the treatment works, or that raise influent temperatures above 40°C (104°F), unless the Regional Board approves alternate temperature limits;

f) Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;

g) Pollutants which result in the presence of toxic gases, vapors, or fumes within the treatment works in a quantity that may cause acute worker health and safety problems; and

h) Any trucked or hauled pollutants, except at points predesignated by the Discharger.

21. The Discharger shall implement, as more completely set forth in 40 CFR 403.5, the legal authorities, programs, and controls necessary to ensure that indirect discharges do not introduce pollutants into the sewerage system that, either alone or in conjunction with a discharge or discharges from other sources:

    a) Flow through the system to the receiving water in quantities or concentrations that cause a violation of this Order, or

    b) Inhibit or disrupt treatment processes, treatment system operations, or sludge processes, use, or disposal and either cause a violation of this Order or prevent sludge use or disposal in accordance with this Order.

22. The Discharger shall submit quarterly and annual reports to EPA, State Board, and the Regional Board describing the Discharger's pretreatment activities over the reporting period. In the event that the Discharger is not in compliance with any of the pretreatment conditions or requirements of this permit, the Discharger shall include the reasons for noncompliance and state how and when the Discharger shall comply with such conditions and requirements. The quarterly reports are due the **28th day** of the month following the reporting period, and shall include a summary of the compliance status of industrial users and the Discharger, and actions taken by the Discharger in order to comply with the requirements of the pretreatment program. The annual report shall be submitted by **25 March** of each year, and shall contain, but not be limited to, the items listed in Section G of the Standard Provisions.

23. Prior to making any change in the discharge point, place of use, or purpose of use of the wastewater, the Discharger shall obtain approval of, or clearance from, the State Water Resources Control Board (Division of Water Rights).

24. 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 this office.

25. To assume operation under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting

entity's full legal name, the state of incorporation if a corporation, the address and telephone number of the persons responsible for contact with the Board and a statement. The statement shall comply with the signatory paragraph of Standard Provision D.6 and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code. Transfer shall be approved or disapproved in writing by the Executive Officer.

I, GARY M. CARLTON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 4 August 2000.

GARY M. CARLTON, Executive Officer

AMENDED
MJG:lm

Attachment A

SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT'S

LIST OF PREVIOUSLY SUBMITTED DOCUMENTS RELEVANT TO THE

TENTATIVE WASTE DISCHARGE REQUIREMENTS NPDES NO. CA0077682, AND THERMAL PLAN EXCEPTION FOR SACRAMENTO REGIONAL WASTEWATER TREATMENT PLANT SACRAMENTO COUNTY

FEBRUARY 22, 2000

Documents previously submitted by the District regarding the SRWTP Tentative Waste Discharge Requirements, and hereby incorporated by reference, include the following:

- 21 December 1994 – Application for NPDES Permit Renewal for the Sacramento Regional Wastewater Treatment Plant (SRWTP)
- 18 March 1997 – Additional Effluent and Receiving Water Information
- 16 April 1997 – Proposal to Amend the Three Species Whole Effluent Monitoring Program
- 6 August 1997 – Draft Waste Discharge Requirements for Sacramento Regional Wastewater Treatment Plant, Sacramento, County of Sacramento
- 17 March 1998 – Adoption of 303(d) Lists and 305(b) Report for California
- 2 July 1998 – Meeting with Regional Water Quality Control Board Regarding NPDES Permit Renewal for Sacramento Regional Wastewater Treatment Plant – Major Policy Issues/Significant Issue
- 29 July 1998 - Sacramento Regional County Sanitation District Tentative Permit
- 10 August 1998- Comments on the Tentative Waste Discharge Requirements, NPDES No. CA0077682, Cease and Desist Order, and Thermal Plan Exception for the Sacramento Regional Wastewater Treatment Plant, Sacramento, County of Sacramento
- 21 September 1998 – Meeting with Regional Water Quality Control Board Regarding NPDES Permit Renewal for Sacramento Regional Wastewater Treatment Plant – Remaining Issues of Concern
- 21 September 1998 – Response to the Department of Water Resources (DWR) Comments on the Sacramento Regional Wastewater Treatment Plant (SRWTP) Tentative Waste Discharge Requirements
- 21 September 1998 – Data Discrepancies and Calculation Errors on the California Urban Water Agencies (CUWA) Comments on the Sacramento Regional Wastewater Treatment Plant (SRWTP) Tentative Waste Discharge Requirements (WDRs)
- 6 October 1998 - Meeting with Regional Water Quality Control Board Regarding NPDES Permit Renewal for Sacramento Regional Wastewater Treatment Plant – Plan of Operation Discussion

- 12 November 1998 – Comments on the Tentative Waste Discharge Requirements, NPDES No. CA0077682, and Thermal Plan Exception for the Sacramento Regional Wastewater Treatment Plant, Sacramento, County of Sacramento

- 14 December 1998 - Meeting with Regional Water Quality Control Board, DeltaKeeper, California Department of Fish and Game, USEPA, and California Urban Water Agencies Regarding SRWTP's Tentative NPDES Permit

- 11 February 1999 – Meeting with Regional Water Quality Control Board Regarding NPDES Permit Renewal for Sacramento Regional Wastewater Treatment Plant – Monitoring Data Meeting and Site Visit

- 11 February 1999 – Response to Requested Information for the Sacramento Regional County Sanitation District's (SRCSD's) Wastewater Treatment Plant Tentative NPDES Permit No. CA0077682

- 8 March 1999 – Sacramento Regional Wastewater Treatment Plant (SRWTP) Phase II Corrective Action Program (CAP) Discharge Issues

- 5 April 1999 – Status of the Requested Information for the Sacramento Regional County Sanitation District's (SRCSD's) Wastewater Treatment Plant Tentative NPDES Permit No. CA0077682

- 10 May 1999 - Meeting with Regional Water Quality Control Board and USEPA Regarding SRWTP's Tentative NPDES Permit

- 20 May 1999 – SRWTP Dilution Model Presentation for Regional Water Quality Control Board, California Department of Fish and Game, and USEPA

- 4 June 1999 – Transmittal of SRWTP Dilution Model Executive Summary and Presentation Notes (NPDES Permit No. CA 0077682)

- 4 June 1999 - Transmittal of updated Sacramento Regional Wastewater Treatment Plant (SRWTP) Copper Reasonable Potential Analysis (NPDES Permit No. CA 0077682)

- 10 June 1999 - Transmittal of Sacramento Regional Wastewater Treatment Plant (SRWTP) Whole Effluent Testing (WET) Evaluation and Recommendations (NPDES Permit No. CA 0077682)

- 11 June 1999 – NPDES Permit for SRCSD, Mercury Mass Limitation

- 11 June 1999 – Request for the Daily and Monthly Chlorine Residual Limitations for the Sacramento Regional Wastewater Treatment Plant (SRWTP) NPDES Permit Renewal (Permit No. CA 0077682)

- 21 June 1999 – Response to Comments on the Sacramento Regional Wastewater Treatment Plant (SRWTP) Tentative Permit Requirements

- 6 July 1999 – Transmittal of Proof of Posting Sacramento Regional County Sanitation District, Sacramento Regional Wastewater Treatment Plant (NPDES Permit No. CA0077682)

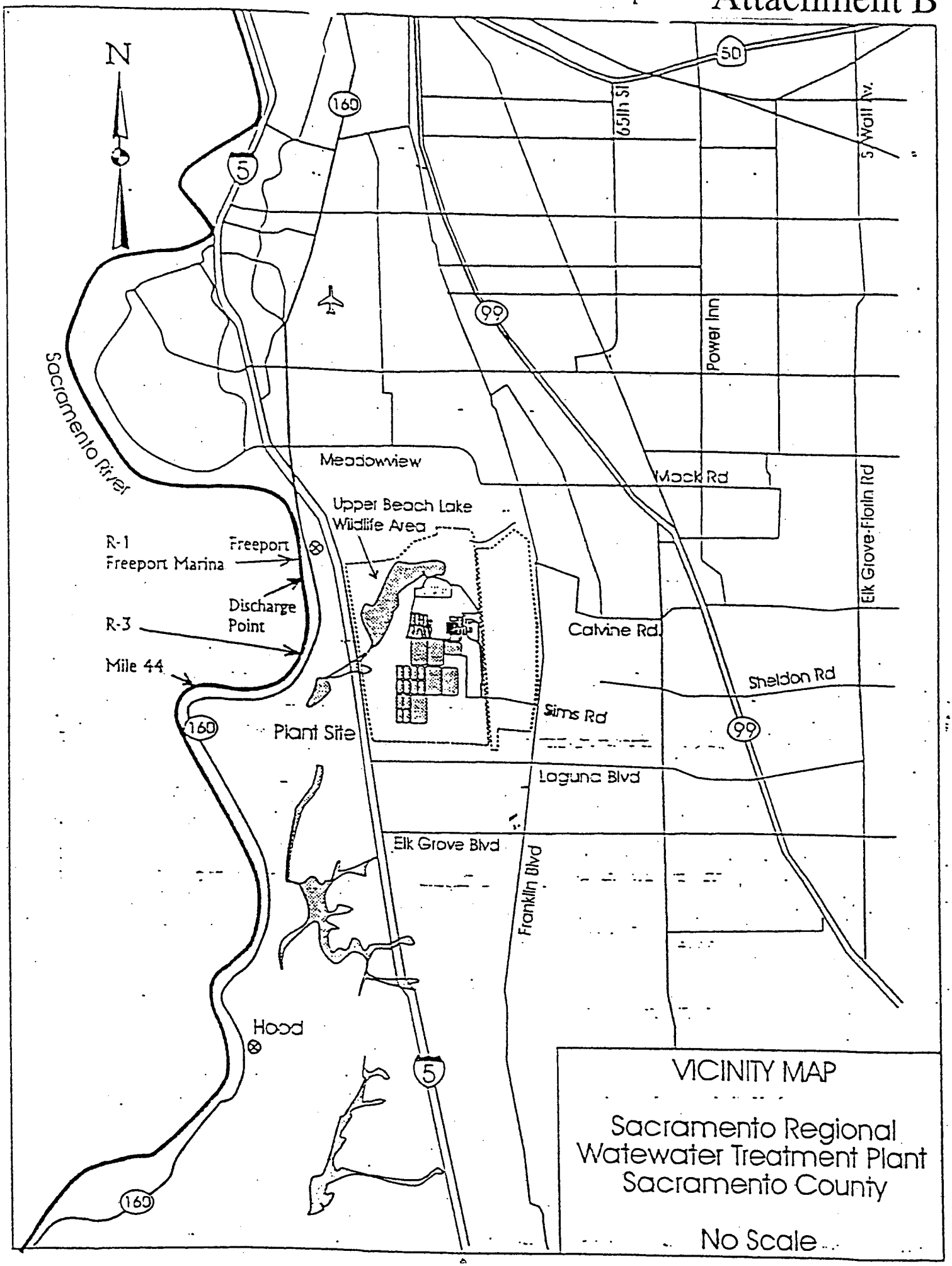
- 28 July 1999 – Transmittal of Copy of the Notice of Public Hearing Sacramento Regional County Sanitation District, Sacramento Regional Wastewater Treatment Plant (NPDES Permit No. CA0077682)

- 28 July 1999 – Comments on the Tentative Waste Discharge Requirements, NPDES No. CA0077682, and Thermal Plan Exception for the Sacramento Regional Wastewater Treatment Plant, Sacramento, County

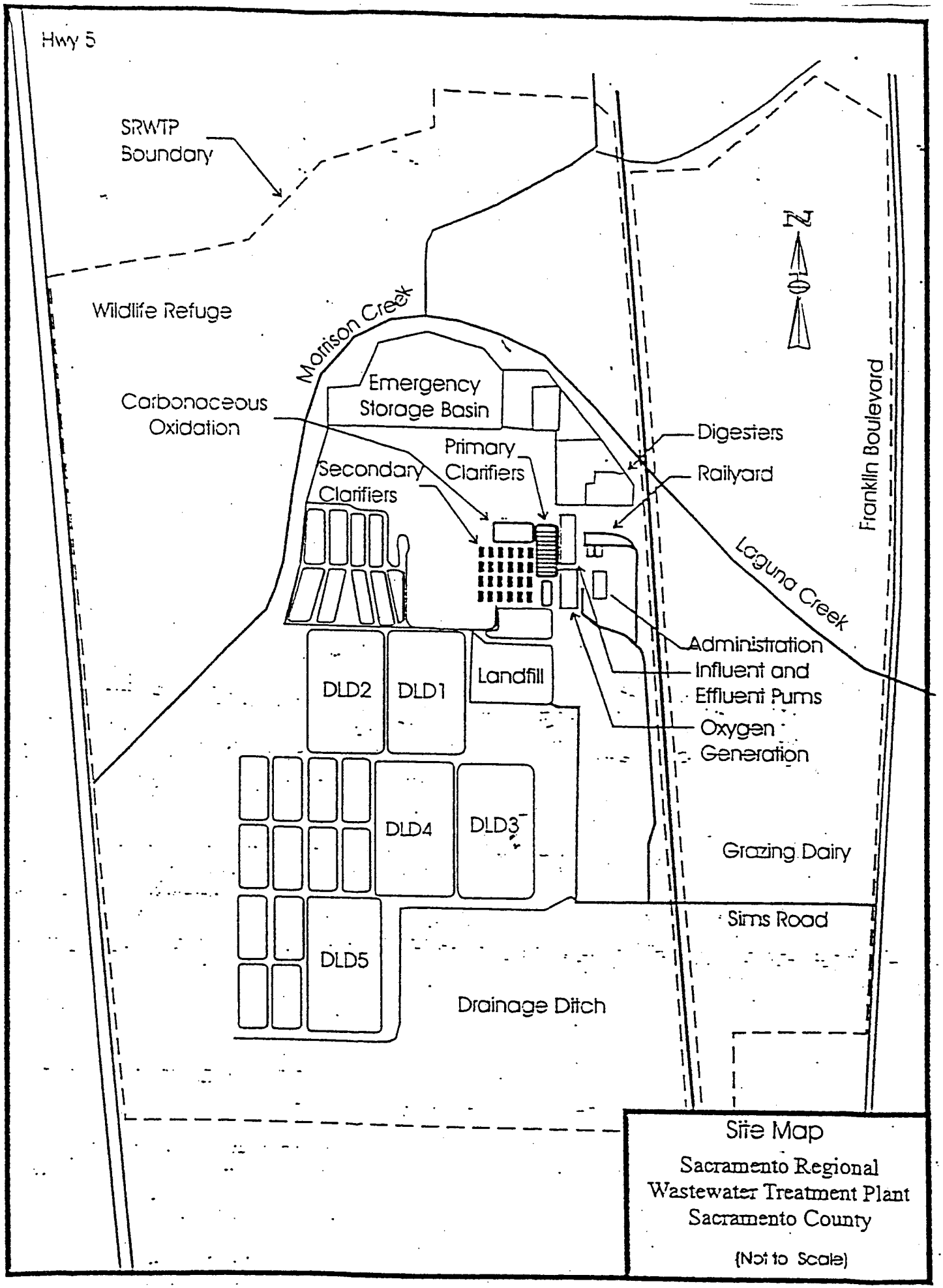
- 17 September 1999 – SRCSD Suggested Clarifications to Late Revisions to Tentative Waste Discharge Requirements, NPDES No. CA0077682, and Thermal Plan Exception for the Sacramento Regional Wastewater Treatment Plant, Sacramento, County (Hand delivered at 17 September 1999 Hearing)

- Documents referenced in the above comments and in the February 22, 2000 comments should also be considered.

Attachment B



Attachment C



Site Map

Sacramento Regional Wastewater Treatment Plant
Sacramento County

(Not to Scale)

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. 5-00-188

NPDES NO. CA0077682

FOR
SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT
SACRAMENTO REGIONAL WASTEWATER TREATMENT PLANT
SACRAMENTO COUNTY

Composite samples (except for receiving water composite samples) shall be in proportion to the flow and taken throughout the 24-hour day. When flow proportional sampling equipment is nonfunctional, composite samples shall be time proportional.

Specific sample station locations shall be established under direction of the Board's staff, and a description of the stations shall be attached to this Order.

INFLUENT MONITORING

Samples shall be collected at approximately the same time as effluent samples and should be representative of the influent. Influent monitoring shall include at least the following:

Constituent	Units	Type of Sample	Sampling Frequency
Flow	mgd	Meter	Continuous
20°C BOD5	mg/l, lbs/day	24 hr. Composite	Daily
Total Suspended Solids	mg/l, lbs/day	24 hr. Composite	Daily

GROUNDWATER CORRECTIVE ACTION PROGRAM (CAP) DISCHARGE MONITORING

Samples shall be representative of the CAP discharge to the SRWTP effluent channel. Monitoring shall include at least the following:

Constituent	Units	Type of Sample	Sampling Frequency
Flow (as a monthly average)	mgd	Meter/Totalizer	Monthly
Priority Pollutant Metals 1)	µg/l	Grab	Twice/Year
Total Dissolved Solids	mg/l	Grab	Twice/Year
Electrical Conductivity @25°C	µmhos/cm	Grab	Twice/Year
Nitrates	mg/l	Grab	Twice/Year

1) Priority pollutant metals as listed in the California Toxics Rule.

EFFLUENT MONITORING

Effluent samples shall be collected downstream from the last connection through which wastes can be admitted into the outfall. Effluent samples should be representative of the volume and quality of the discharge. Time of collection of samples shall be recorded. Effluent monitoring shall include at least the following:

Constituent	Units	Type of Sample	Sampling Frequency
Flow	mgd	Meter	Continuous
pH	number	Meter[1)]	Continuous[1)]
Chlorine Residual	mg/l	Meter[2)]	Continuous[2)]
Temperature	°F	Meter	Continuous
20°C BOD5	mg/l, lbs/day	24 hr. Composite	Daily
Total Suspended Solids	mg/l, lbs/day	24 hr. Composite	Daily
Settleable Solids	ml/l	Grab	Daily
Total Coliform Organisms	MPN/100 ml	Grab	Daily
Total Dissolved Solids	mg/l	Grab	Twice Weekly
Electrical Conductivity @25°C	µmhos/cm	Grab	Twice Weekly
Ammonia (as N) [3)]	mg N/l	Grab	Twice Weekly
Acute Toxicity[4)]	% Survival	Continuous	Weekly
Oil and Grease	mg/l	Grab	Monthly
Lindane	µg/l [5)]	24 hr. Composite	Three/year [6)]
Total Organic Carbon	mg/l	24 hr. Composite	Three/year [6)]
Arsenic	µg/l	24 hr. Composite	Three/year [6)]
Copper	µg/l	24 hr. Composite	Three/year [6)]
Lead	µg/l	24 hr. Composite	Three/year [6)]
Silver	µg/l	24 hr. Composite	Three/year [6)]
Zinc	µg/l	24 hr. Composite	Three/year [6)]
Mercury	µg/l [7)]	24 hr. Composite	Three/year[6)] and monthly
Cyanide	µg/l	Grab	Three/year [6)]
Halogenated Volatile Organics [8)]	µg/l	Grab	Three/year [6)]
Bis (2-ethylhexyl) Phthalate	µg/l	24 hr. Composite	Three/year [9)]

Constituent	Units	Type of Sample	Sampling Frequency
Oxygenates 10)	µg/l	Grab	Three/year 6)
Priority Pollutants 11)	various	24 hr. Composite	Three/year
Standard Minerals 12)	mg	24 hr. Composite	Three/year

(footnotes)

1) pH of effluent shall be measured continuously at one second intervals and tracked as a 20-minute running average. The highest and lowest 20-minute averages each day will be reported.
2) Calculated value from a continuously monitored mixture of chlorinated final effluent and mixed (dechlorinated and chlorinated) final effluent. Report the magnitude and duration of all non-zero chlorine residual events within the reporting period.
3) Concurrent with biotoxicity monitoring.
4) Flow-through bioassay shall be 96-hour continuous flow acute toxicity tests conducted in accordance with EPA method 600/4-90/027F. Fathead minnows (Pimephales promelas) shall be used as test species.
5) With MDL $\leq$ 0.020 µg/l
6) Seven consecutive days, three times per year. These samples should be taken during the same time that monthly receiving water samples are taken for the Coordinated Monitoring Program (CMP)
7) Requires use of EPA Method 1631 for sampling, handling, and analysis
8) Dichloromethane, chloroform, tetrachloroethylene, dichlorobromomethane, dibromochloromethane, 1,4 dichlorobenzene, and carbon tetrachloride
9) Three consecutive days, three times per year. These samples should be taken during the same time that monthly receiving water samples are taken for the Coordinated Monitoring Program (CMP)
10) Di-isopropyl ether (DIPE), ethyl tertiary butyl ether (ETBE), tertiary amyl methyl ether (TAME), and methyl tertiary butyl ether (MTBE)
11) All other priority pollutants as listed in the California Toxics Rule, except for asbestos and dioxin, and not otherwise indicated above.
12) Standard minerals shall include all major dissolved cations and anions and include a verification that the analysis is complete (i.e., cation/anion balance).

Effluent monitoring required above shall begin in accordance with the timelines in Provisions E.9 and E.10 of Order No. 5-00-188.

RECEIVING WATER MONITORING

All receiving water samples shall be grab samples. However, if the Coordinated Monitoring Program (CMP) samples and results are used, then CMP collection procedures shall be followed. In addition to the instream samples collected at R-1 and R-3, in-stream sampling will be required immediately

downstream of the discharge diffuser (R-2) as described below. The details of the monitoring procedures at this location will be further developed by the Discharger and submitted in a sampling and analysis plan for approval by the Executive Officer. Upon approval, the plan shall become a part of this Order. Receiving water monitoring shall include at least the following:

Station	Description
R-1	Freeport Bridge
R-2	Location to be determined as part of Localized Impact Study in Provision E.4
R-3	Cliff's Marina (4200 feet downstream of discharge)

Constituents	Units	Station	Sampling Frequency
River Flow	cfs	R-1	Daily
Effluent/River Dilution Ratio	Ratio 2)	R-1	Daily
Dissolved Oxygen	mg/l	R-1, R-3	Weekly
pH	Number	R-1, R-3	Weekly
Turbidity	NTU	R-1, R-3	Weekly
Chlorine Residual	mg/l	R-1, R-3	Weekly
Temperature	°F	R-1, R-3	Weekly
Electrical Conductivity @25°C	umhos/cm	R-1, R-3	Weekly
Ammonia (as N) 1)	mg N/l	R-1, R-3	Weekly
Total Nitrogen	mg/l	R-1, R-3	Monthly
Copper	µg/l	R-1, R-3 3)	3 times/year 4)
Cyanide	µg/l	R-1, R-3 3)	3 times/year 4)
Lead	µg/l	R-1, R-3 3)	3 times/year 4)
Silver	µg/l	R-1, R-3 3)	3 times/year 4)
Zinc	µg/l	R-1, R-3 3)	3 times/year 4)
Mercury	µg/l	R-1, R-3 3)	3 times/year 4)
Halogenated volatile organics 5)	µg/l	R-1, R-3 3)	3 times/year 4)
Bis (2-ethylhexyl) phthalate	µg/l	R-1, R-3 3)	3 times/year 4)

(footnotes)

1) pH and temperature shall be determined at the time of sample collection for ammonia
2) Running Hourly Average / Running Hourly Average. Report lowest, highest, and average ratio calculated for each day.
3) Receiving water results obtained from the Coordinated Monitoring Program (CMP) may be used, in which case the upstream sample will be taken at the Freeport Marina and the downstream sample will be taken at Mile 44. Sampling location will change to R-2 after a program is developed as part of Provision E.4

4) Receiving water metals monitoring is required at least three times per year, during the same sampling periods as the P4 effluent monitoring program. If CMP results are used, all CMP results for arsenic, copper, and mercury at the Freeport Marina and Mile 44 shall be reported.
5) Dichloromethane, chloroform, tetrachloroethylene and dichlorobromomethane

In conducting the receiving water sampling, a log shall be kept of the receiving water conditions throughout the reach bounded by Stations R-1 and R-3. Notes on receiving water conditions shall be summarized in the monitoring report. Attention shall be given to the presence or absence of:

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

THREE SPECIES CHRONIC TOXICITY MONITORING

The Discharger shall conduct chronic toxicity monitoring on the R-1 and R-3 receiving water monitoring stations and the effluent to determine if: a) toxicity exists in the Sacramento River (upstream and downstream of the point of discharge), and b) whether the effluent is contributing toxicity to the Sacramento River. The proposed monitoring will take a two phased approach. The purpose of Phase I will be to conduct a 12-month toxicity characterization study of the effluent and the receiving water. Phase II will be similar to Phase I except that it will consist of scheduled quarterly monitoring beginning with year two of the monitoring program. The monitoring program will be conducted as follows:

a) All testing shall be conducted as specified in EPA 600/4-91/002. The permit may be reopened if later amendments promulgated in Section 136 of the Code of Federal Regulation or elsewhere would lead to significant changes in the procedure.

b) Effluent chronic toxicity samples shall be collected downstream from the last connection through which wastes can be admitted into the outfall to the Sacramento River. Twenty-four hour flow proportional composite samples, representative of the volume and quality of the discharge shall be used for the test. Time and date of collection of the samples shall be recorded and maintained by the Discharger. Monitoring events will coincide whenever possible with effluent and receiving water monitoring.

c) As required by the SIP, all chronic toxicity tests will be conducted with concurrent reference toxicant tests and reported with the test results.

d) All tests must meet acceptability criteria as specified in the approved chronic toxicity methods manual. If test acceptability criteria are not met, the Discharger shall re-sample and re-test within 9 days of the onset of the failed test.

e) Test organisms that will be used for the chronic toxicity testing shall consist of the following:
   i) Fathead minnow (*Pimephales promelas*) representing a vertebrate species.
   ii) Water flea (*Ceriodaphnia dubia*) representing an invertebrate species.
   iii) Algae (*Selenastrum capricornutum*) representing a plant species.

f) Dilution water used for the effluent chronic toxicity monitoring shall be a grab sample of the Sacramento River collected at R-1 of the Receiving Water Monitoring Program station, which is upstream of the point of discharge, on an out-going tide.

g) In addition to chronic toxicity testing on the effluent, the Discharger also shall conduct concurrent toxicity tests on grab samples collected upstream and downstream of the point of discharge at the Discharger's R-1 and R-3 Receiving Water Monitoring stations.

h) The R-1 and R-3 samples will be further tested within 9 days of the onset of the receiving water tests, above, for chronic toxicity using a standard five dilution series, on the affected test species, if significant toxicity, compared to the control sample, is noted in either tests. Dilution water, for the R-1 and R-3 follow up chronic toxicity test, will be laboratory control water.

i) Test samples, sample treatment and standard five dilution series (ranging from 100 to 6.25 percent sample) will be used for the test samples according to the following test matrix:

Whole Effluent Toxicity Test Matrix

Sample or Treatment	Percent Sample Concentration															Dilution Water					
	100			50			25			12.5			6.25			R-1 Water			Lab Water		
		Cerio.	Fathead		Cerio.	Fathead		Cerio.	Fathead		Cerio.	Fathead		Cerio.	Fathead		Cerio.	Fathead		Cerio.	Fathead
SRWTP Effluent	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
R-1 Grab[1]	x	x	x																x	x	x
R-3 Grab[1]	x	x	x																x	x	x
R-1, Follow-up[2]	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				x	x	x
R-3, Follow-up[2]	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				x	x	x
R-1, + PBO[2,3]		x			x			x			x			x						x	
R-1, + Antibiotic[2,4]			x																		
Reference Toxicant																			x	x	x

Matrix Notes:

1. Determine toxicity of the Sacramento River upstream and downstream of the SRWTP discharge with each effluent monitoring event.

2. Follow-up testing will involve only the test specie(s) demonstrating significant toxicity compared to the control water.

3. Treatment administered if indicated test species demonstrates significant toxicity in R-1 screening test. (There are no performance criteria for this test included in this permit. This test is being performed to support ongoing study of ambient toxicity in the River.)

4. Treatment test to run concurrent with each SRWTP Effluent test. (There are no performance criteria for this test included in this permit. This test is being performed to support ongoing study of ambient toxicity in the River.)

j) The Discharger will notify the Board within 24 hours during the course of any biotoxicity monitoring event if it is discovered that an expected reportable effluent chronic toxicity NOEC result will be equal to or greater than 8 toxicity units (TUs) for any test organism.

k) Whenever a reportable no observable effects concentration (NOEC) in an effluent chronic toxicity test is equal to or greater than 8 toxicity units (TUs) for any test organism, accelerated monitoring will go into effect. Accelerated monitoring will consist of the following:

i) If a test species exhibits an NOEC equal to or greater than 8 TUs, the Discharger will collect a fresh effluent sample within nine days of the onset of the original test and conduct a new chronic toxicity test on the affected test species.

ii) If the follow up sample demonstrates an NOEC of less than 8 TUs, the Discharger will conduct two additional weekly effluent chronic tests on the affected test species to check for persistent toxicity. If there is no further significant toxicity shown on the follow up samples, the accelerated weekly monitoring will be discontinued. The Discharger will continue to perform follow up chronic testing on the affected species for 6 consecutive months and return to routine scheduled testing if none of the accelerated monitoring tests meet or exceed the trigger level of 8 TUs.

iii) If the follow up test exhibits an NOEC equal to or greater than 8 TUs, a TRE as described in Provision E.13 will be initiated immediately on the sample in an attempt to identify the toxicant. The Discharger will continue to perform follow up chronic testing for 6 consecutive months and return to routine scheduled testing if none of the accelerated monitoring tests meet or exceed the trigger level of 8 TUs.

l) Routine whole effluent toxicity test results will be reported within 30 working days following the completion of the test.

BIOSOLIDS MONITORING

Biosolids sampling and disposal shall be done in accordance with Waste Discharge Requirements Order No. 98-087 or subsequent Orders that regulate the disposition of biosolids.

GROUNDWATER MONITORING

Groundwater monitoring at the facility will be done in accordance with Waste Discharge Requirements Order No. 98-087 or subsequent Orders that regulate the disposition of biosolids and protection of groundwater in the vicinity of the biosolids disposal areas. Prior to construction, plans and specifications for ground water monitoring wells shall be submitted to Board staff for review and approval. Wells shall comply with requirements of the Department of Water Resources.

REPORTING

Monitoring results shall be submitted to the Regional Board by the **1st day of the second month** following sample collection. Quarterly monitoring results shall be submitted by the **1st day of the second month** following each calendar quarter. Quarterly monitoring and reporting requirements begin with the quarter that follows the adoption of this order.

In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner to illustrate clearly whether the discharge complies with waste discharge requirements. The highest daily maximum for the month, monthly and weekly averages, and medians, and removal efficiencies (%) for BOD and Suspended Solids, should be determined and recorded.

If the Discharger monitors any pollutant at the locations designated herein more frequently than is required by this Order, the results of such monitoring shall be included in the calculation and reporting of the values required in the discharge monitoring report form. Such increased frequency shall be indicated on the discharge monitoring report form.

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

a) The names, certificate grades, and general responsibilities of all persons employed at the WWTP (Standard Provision A.5).

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

c) A statement certifying when the flow meter and other monitoring instruments and devices were last calibrated, including identification of who performed the calibration (Standard Provision C.6).

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

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

All reports submitted in response to this Order shall comply with the signatory requirements of Standard Provision D.6.

Unless otherwise noted above or in Order No. 5-00-188 Provisions, the Discharger shall implement the above monitoring program on the first day of the month following effective date of this Order.

Ordered by: _____
GARY M. CARLTON, Executive Officer

MJG:lm
4 August 2000

INFORMATION SHEET

ORDER No. 5-00-188
SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT
SACRAMENTO REGIONAL WASTEWATER TREATMENT PLANT
SACRAMENTO COUNTY

1. General Plant Operation:

The Sacramento Regional County Sanitation District (Discharger) owns and operates the Sacramento Regional Wastewater Treatment Plant (Regional Plant). The Regional Plant is in Elk Grove, approximately eight miles south of the City of Sacramento, and approximately one mile east of Freeport and the Sacramento River (the location of the Regional Plant outfall). The service area covered by the Regional Plant collection system is generally defined as the Sacramento Metropolitan area, including the cities of Sacramento, Citrus Heights, and Folsom, and the urbanized areas of the County of Sacramento. The City of Folsom is responsible for collection system operation and maintenance within its city limits. The City of Sacramento is responsible for operation and maintenance of portions of the collection system within its city limits and Sacramento County Sanitation District No. 1 is responsible for the remainder. Sacramento County Sanitation District No. 1 is also responsible for collection system operation and maintenance in the City of Citrus Heights and in the unincorporated areas of Sacramento County. These entities are neither owners nor operators of the Regional Plant and are not named in this permit as dischargers.

The existing Regional Plant has a capacity to treat an average seasonal dry weather flow (SDWF) of 181 million gallons per day (mgd), and a peak wet weather flow (PWWF) of 392 mgd. Expansion of the plant to meet these capacities was completed in May 1993. During wet weather flows, up to 60 mgd of wastewater and storm runoff from the downtown Sacramento Combined Collection System are received at the Regional Plant. Combined collection flows in excess of 60 mgd are managed by the Combined Wastewater Control System (CWCS). The CWCS discharge is governed by Waste Discharge Requirements Order No. 96-090.

The Regional Plant wastewater treatment operation consists of coarse screening, aerated grit chambers, primary sedimentation, pure oxygen activated sludge, secondary clarification, and disinfection using chlorination/dechlorination systems. Effluent is pumped through an 8,000-foot outfall pipe, which is utilized as the chlorination/dechlorination contact chamber, to a 400-foot long multiport diffuser laid across the bottom of the Sacramento River. All processes at the Regional Plant, and many of the interceptor facilities are monitored via a computer network system. Tied into this system are instantaneous recording and monitoring systems for several key water quality parameters (including pH, total residual chlorine, and River and effluent flows).

2. Minimum River Dilution Ratio:

The Sacramento River in the vicinity of the discharge is influenced by tides, and slack flows and flow reversals can occur on occasion. To prevent a breakdown in jet diffusion (which provides rapid mixing of the effluent), and to prevent double dosing of the River with effluent during flow reversals, the Discharger diverts the secondary treated final effluent to on-site emergency storage basins (ESBs), which

will be expanded. Once the River flow is sufficient for adequate mixing of the effluent, the discharge is resumed.

The Discharger has determined in previous studies that River flows of at least 1,300 cubic feet per second (cfs) and providing a flow ratio of at least 14 to 1 (river:effluent) are required to allow for adequate mixing of the effluent. However, in comments received on a previous version of this tentative permit the California Department of Health Services (DHS) requested that the Discharger evaluate the likelihood of double-dosing effluent into the River under these flow reversal conditions. DHS concerns focused on the double-dosing of pathogens, but the Regional Board is also concerned about the possible consequences of double-dosing in regard other ambient water quality criteria as well. The Discharger has already begun this study, but was not able to complete it prior to adoption of this permit. The scope and schedule requirements for the study are in Provision E.4. If after review of this study any adjustments to the minimum operating dilution ratio are required to avoid double dosing concerns in the River, then the permit may be reopened accordingly.

Although the permit does not allow discharge to the River in conditions less than above, as a proactive precautionary measure, the Discharger has developed a set of emergency operating procedures in their April 1990 Plan of Operation which define how the plant will be operated in response to a combination of influent/effluent and River flow conditions beyond their control that may force operation of the Regional Plant beyond the above limits. These emergency procedures were designed with the intent of minimizing any negative water quality impacts from such an event while preventing damage to or overflow from Regional Plant treatment processes. The Discharger has indicated that these emergency operating procedures have not been implemented to date.

3. Solids Disposal and Groundwater Corrective Actions:

The Discharger operates three major waste management facilities at the Regional Plant for biosolids storage and disposal. These include the Solids Storage Basins (SSBs), Dedicated Land Disposal areas (DLDs) and the landfill (closed in 1994). Biosolids application at off-site locations are regulated by other waste discharge requirements. Biosolids applications at on-site locations are regulated by Waste Discharge Requirements Order No. 98-087, in conformance with Title 27, California Code of Regulations (CCR). Also, as part of these requirements, SRCSD recommended, and CVRWQCB staff agreed to, the details of a corrective action program (CAP) addressing elevated nitrate levels in groundwater downgradient of the DLDs and the Class III landfill. The objective of the project is to achieve hydraulic control of groundwater downgradient of these facilities with extraction wells. Phase I of this project is already complete and consisted of installing groundwater extraction wells in the areas of highest nitrate. The flow from the existing Phase I wells is 0.25 MGD and is routed to the SRWTP headworks. Phase II of the project, which has not been completed as of this date, will expand the CAP extraction well system to a estimated total of approximately 1.0 MGD. However, the existing pipeline connecting discharge from the Phase I wells to the headworks does not have capacity for the Phase II wells and a new conveyance system for disposal of the CAP discharge will need to be constructed.

SRCSD has developed projections of what constituent concentrations in the CAP discharge will be after Phase II has been completed. This includes consideration of analyses from existing Phase I discharge and groundwater sampling from areas where Phase II wells will be operating. The constituent estimates include nitrates, various metals, TDS, EC and chlorides at concentrations either below current SRWTP effluent levels or well below levels that would have a measurable impact on effluent concentrations. As the SRWTP does not currently have treatment processes capable of removing nitrates and other projected constituents, SRCSD proposed to convey the new Phase II CAP discharge, along with rerouting the Phase I CAP discharge to the SRWTP effluent channel downstream of the secondary clarifiers and upstream of the plant chlorination station. Considering the above projected CAP constituents, this is an acceptable approach. It is estimated that total flow from the CAP system will be approximately 1.0 MGD, however, no specific flow limitation will imposed. Once the CAP system is completed, sampling of the discharge is required in the attached Monitoring and Reporting Program. If analysis of CAP discharge finds constituent levels to have a reasonable potential to exceed any receiving water criteria, this permit may be reopened.

4. Coliform:

Coliform limits are imposed to protect the beneficial uses of the receiving water, including public health through contact recreation and drinking water pathways. According to California Department of Health Services (DHS) guidelines, a median 23 MPN/100 ml limitation is applicable to discharges with river/effluent dilution ratios greater than or equal to 20:1 based on "an average over a period of time and not the instantaneous minimum low flow of the year". A review of USGS Sacramento River flow data collected at Freeport, CA from January 1970 to September 1998 indicates that there were two periods of roughly 2 week duration in 1992 and one period of roughly 5 week duration in 1977 when River flow dropped below 5,600 cfs as a 7-day average. This 5,600 cfs flow rate represents the River flow rate that would yield a 20:1 dilution ratio with the Regional Plant discharging at its average dry weather flow (ADWF) design capacity of 181 MGD. Except for the three periods discussed above, the weekly running average of River flow did not drop below 6100 cfs (approximately 23:1 dilution ratio at 181 MGD Regional Plant effluent flow) for the remainder of the period between January 1970 and September 1998.Based on this data the 23 MPN/100 ml limitation is found to be appropriate.

However, in their February 2000 comment letter DHS recommended that the 23 MPN/100 ml. limitation be met as a 7-day median during periods of intensive recreational use as opposed to the 30-day median in the previous permit. There was an additional potential concern with periods of low river:effluent flow ratios that occur during tidally influenced flow reversals in the River. As recreational use of the Sacramento River takes place even during "off-season", and due to the difficulty of defining "intensive recreational use" the Regional Board will apply the 7-day median limitation for the full year. By adjusting the effluent limit down to a 7-day median our intent is to ensure a certain level of disinfection process reliability by reducing the number of days (from 14 down to 3) that the actual total coliform counts can be *above* the criteria level. The concern in regulating pathogenic organisms is that small quantities of pathogens can result in illness and reducing the amount of time that these criteria levels are exceeded is an important consideration. Based on a review of the most recent three years of effluent monitoring, the Discharger is already able to meet the 7-day median. Therefore, taking into

consideration CWC Section 13241 and 13263 the Regional Board does not find there to be significant economic impacts associated with the more stringent interpretation of the SIP used in the calculation of these final effluent limits. The Board finds, on the balance, that these requirements are necessary to protect the beneficial uses of the Sacramento-San Joaquin Delta.

The Discharger submitted an Effluent Disinfection Study dated August 1991. The study recommended several improvements to the existing disinfection system and concluded that to meet an effluent limitation for total coliform of a daily maximum of 500 MPN/100 ml, a chlorine contact basin would need to be constructed. Currently, the chlorine is added and mixed at the effluent observation structure and the 1.5 mile long outfall pipe performs as the contact basin. The California Department of Health Services concluded that an effluent limitation for total coliform of 500 MPN/100 ml not to be exceeded on two consecutive days is acceptable. In March 1997, the California Department of Health Services evaluated and approved the applicability of these effluent limitations for the reissuance of this permit. DHS again concurred with this finding in February 2000. The Discharger has determined that the existing disinfection system can provide compliance with the limit. The Discharger has completed some improvements that have increased the reliability of the disinfection system, including additional injector capacity, better chlorine residual analyzing capability, and the ability to monitor operation of chlorine mixers.

Monitoring for other pathogens (cryptosporidium parvum and giardia lamblia) are not included in the Monitoring and Reporting Program for this permit. The Discharger is currently contributing resources to the Sacramento River Watershed Program to monitor pathogens throughout the watershed. This includes participation in a one-year program to monitor pathogens in the vicinity of the Regional Plant discharge.

5. Chlorine:

5.1 Applicable Criteria and Guidance

As chlorine is not a priority pollutant, the Basin Plan and U.S. EPA guidance govern its regulation in NPDES permits. The U.S. EPA Ambient Water Quality criteria for chlorine are 0.019 mg/l as a one-hour average and 0.011 mg/l as a 4-day average, neither of which are to be exceeded more than once every three years. However, as stated in the 1984 criteria document *(EPA 440/5-84-030)*, "these criteria are intended to apply to situations of continuous exposure, whether the concentrations are fluctuating or constant, but not to situations of specially controlled intermittent exposures when more appropriate data are available". Based on the fact that there is a history of intermittent short-duration chlorine discharges in the Regional Plant effluent, the 0.02 mg/l acute criteria may not be an appropriate criterion concentration for this situation. Therefore, further studies will be required to analyze potential impacts to beneficial uses and to develop more appropriate site-specific criteria.

5.2 Chlorine Data

The Regional Plant utilizes a sulfur dioxide (SO_2) dechlorination system which operates on a positive SO_2 residual. This type of system ensures a zero residual chlorine level when positive SO_2 residual is present. Historically, chlorine has been present in Regional Plant effluent only during short-duration

discharges lasting less than one hour. Eighty-seven (87) short-duration discharges of chlorine in Regional Plant effluent between 1991 and 1998 were reported by the Discharger. Between 1991 and 1993 twenty-eight (28) of these events led to a calculated hourly average concentration in the effluent above the 0.02 mg/l ambient acute criteria. Numerous modifications to the chlorination/dechlorination facility significantly improved performance, reducing the number of events exceeding a calculated hourly average of 0.02 mg/l from 1994 through 1997 to eleven (11). These chlorine discharges had been caused by a number of different situations including power disruptions, flow diversion/resumption, maintenance activities, and equipment malfunctions. Further modifications were completed in 1998 which led to even better performance. In general, with the recent dechlorination system modifications the number and duration of chlorine discharges in the Regional Plant effluent have been significantly reduced in the last few years.

5.3 Chlorine Effluent Limits

The previous NPDES permit (Order 94-006) has maximum daily and monthly average limits which were intended to address short-duration chlorine discharges. The Discharger submitted extensive technical justification from a 1987 environmental impact report and other more recent studies. However, after further evaluation and numerous comments from the U.S. EPA and other designated parties during the current permit renewal process, the Regional Board has determined that these limits alone may not adequately address the potential impacts to water column and benthic organisms; specifically from intermittent combinations of high concentration, short-duration chlorine discharges.

To better protect beneficial uses against these possible situations, the Regional Board intends to implement a new limit to address short-term discharges of chlorine, such as a one-hour average limitation, in addition to possible modifications to the daily maximum and average monthly limitations already in place. However, before the Regional Board can establish protective quantitative limits there are a number of uncertainties related to 1) selecting an appropriate criterion concentration that properly addresses short-duration chlorine exposures and 2) the consideration of a mixing zone/dilution credits for the applicable criteria.

5.4 Further Chlorine Study

Based on the above discussion, a study of short-duration chlorine discharges will be required in this permit. This information will be used to determine the acceptable allowable concentration at the end-of-pipe that prevents acute or chronic toxicity to organisms in the mixing zone. Based on the uncertainties discussed previously, the study needs to include at least the following considerations:

- A summary and analysis of peer-reviewed research addressing short-term exposures to chlorine with the intent of determining maximum allowable end-of-pipe concentration, duration and frequency that will be protective of acute toxicity within a possible mixing zone.
- Collection of site-specific data to the extent practicable. This will primarily consist of measurement of physical parameters of the River in the vicinity of the discharge and as much characterization as practical of the indigenous aquatic biota. This information should be

collected with the data needs of the ammonia and inorganic priority pollutant studies considered as well.

- Mixing zone analysis at acute critical 14:1 flow ratio to determine the size and characteristics of a possible mixing zone. This will also be used to determine exposure duration to water column and benthic organisms and to define the physical dimensions of the mixing zone in the permit.
- A re-evaluation of the existing maximum daily and monthly average limits based on the same water quality considerations discussed above. Modifications may or may not be required, but their rationale needs to be consistent with that developed for the new short-duration average limit.

The schedule for completion of the above work plan and final study are outlined in Provision E.4. Based on the improved performance of the chlorination/dechlorination system and the fact that there are numerous technical uncertainties regarding a specific numeric limit, interim modifications to the existing chlorine effluent limits will not be required while the above study is being performed.

5.5 Chlorine Permit Reopener

Once the studies have been completed by the Discharger and evaluated by Regional Board staff, the permit will be reopened to incorporate the final determination of appropriate criteria, dilution credit/mixing zone allowances and additional short-duration average limits as appropriate. Also, modifications to the existing maximum daily and average monthly limits may be required.

6. Ammonia:

6.1 Applicable Criteria and Guidance

The U.S. EPA 1999 Update of Ambient Water Quality Criteria for Ammonia provides the latest applicable water quality criteria for this constituent. Also, as ammonia is not a priority pollutant, U.S. EPA guidance, rather than the State Implementation Plan, applies to reasonable potential and effluent limit calculation procedures.

6.2 Existing Data

As required by the existing Monitoring and Reporting Program (Order 94-006), ammonia samples are collected twice per week, temperature is measure once per day, and pH is monitored continuously and reported as an instantaneous maximum and minimum, and monthly average. Ammonia data collected as part of the Regional Plant monthly Discharger Monitoring Reports between March 1999 and February 2000 were used as the basis for the following reasonable potential analysis. Statistics on effluent variability needed for effluent limit calculations were also obtained from this data. See Table 6.1 below for summary statistics. Temperature and pH readings from the same source were also used as described below for the calculation of applicable water quality criteria.

6.3 Criteria Determination

Acute Criteria: The acute criteria, or what is referred to as the criteria maximum concentration (CMC), for ammonia is a function of receiving water pH. For ammonia this criteria is stated as a 1-hour average

concentration. For the development of acute criteria to be met in the receiving water outside any mixing zone that may be granted, it is reasonable to use the permit receiving water pH limitation at R-3 of 8.5 units. Plugging this into the acute ammonia criteria formula (with salmonid species present) leads to a CMC of 2.14 mgN/l as a 1-hour average.

Chronic Criteria: The chronic criteria, or what is referred to as the criteria continuous concentration (CCC), for ammonia is a function of both pH and temperature. For ammonia the CCC is stated as a 30-day average concentration (with the highest 4-day average concentration not to exceed 2.5 times the CCC concentration). For the development of a chronic criteria to be met in the receiving water outside any mixing zone that may be granted, the receiving water pH and temperature at monitoring station R-3 were used. Based on the above Discharger Monitoring Reports the maximum monthly "average" of pH in the receiving water at the downstream monitoring station R-3 was 7.8 units. Based on daily temperature readings from these same Discharger Monitoring Reports the highest 30-day average of temperature at R-3 is 69.9 °F. In the absence of receiving water limitations for 30-day average pH and temperature, these assumptions are considered reasonable. Plugging this into the chronic criteria formula (with fish early life stages present) yields a CCC of 2.09 mgN/l as a 30-day average.

Mixing Zone Criteria: When evaluating either an acute or chronic mixing zone for ammonia, the pH of the mixture of effluent and receiving water should be used to determine appropriate criteria to be applied within that mixing zone. The pH in the mixing zone will be a function of the effluent pH and the ambient dilution water pH being mixed together. The pH is an important factor because toxicity of ammonia increases logarithmically as pH increases. A detailed analysis of the pH concentration profiles in the mixing zone has not yet been performed by the Discharger. Therefore, the ability to evaluate dilution credits for acute and chronic criteria based on mixing zone considerations is limited at this time.

6.4 Reasonable Potential Analysis

Based simply on the fact that both maximum and average ammonia concentrations in Regional Plant effluent exceed the criteria calculated above, and without allowing dilution credits or mixing zones for meeting these criteria, U.S EPA guidance would otherwise require the calculation of effluent limits. Based on the U.S. EPA guidance for calculating effluent limits, the maximum daily and average monthly limits would be 2.1 mgN/l and 1.9 mgN/l respectively. The Regional Plant as currently configured could not meet these limits. The calculations indicate the acute criteria are driving the effluent limit calculations.

Table 6.1 – Ammonia Effluent Data Summary Statistics

Sample Dates - Begin	Mar-99
Sample Dates - End	Feb-00
Sample Count	105
Maximum Concentration (mgN/l)	25.0
Mean (mgN/l)	16.8
Maximum 30-day Average (mgN/l)	20.6
Std. Deviation (mgN/l)	1.38
Coefficient of Variation (CV)	0.08
Percentile of Highest Conc.(p_n) =	0.957
unit value =	1.72
sigma^2 =	0.007
99th Percentile Concentration (C_{99}) =	1.206
C_{Pn} =	1.148
Factor (99%, 99%)	1.05
Estimated Max. Concentration (mgN/l)	26.3
Background Concentration (mgN/l)	0.0

6.5 Dilution Credits / Mixing Zone Analysis

At the point of 12:1 dilution within the mixing zone during acute criteria critical flow conditions of 14:1 (which is the minimum operating flow ratio allowed by the permit and it happens to correspond to the 1Q10 at the permitted discharge of 181 MGD) the acute criteria would be met when discharge had estimated maximum effluent concentrations of 26.3 mgN/l into receiving water with acute water quality criteria of 2.14 mgN/l as a 1-hour average.

Likewise, the chronic criteria would also be met at a dilution ratio of 9:1 within the mixing zone during chronic criteria flow conditions and a maximum 30-day average ammonia concentration of 20.6 mgN/l. As the chronic criteria is based on a 30-day average, critical flow conditions for evaluating available dilution would be based on the lowest 30-day average flow with a 10 year return frequency. From probability analysis of historic River flow data performed by the Discharger the 30Q10 would be approximately 7000 cfs or a flow ratio of 27:1 at the permitted discharge of 181 MGD.

Based on the above, the entire issue with regards to ammonia effluent limits and/or reasonable potential revolves around toxicity in a mixing zone, if allowed. Although no mixing zone analysis for pH and ammonia toxicity has been performed yet by the Discharger, based on engineering judgment, there are a number of reasons to believe that, once evaluated, defensible mixing zone considerations can be made that would lead to the granting of dilution credits and less stringent effluent limits than those calculated above without dilution credits.

For example, the *Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)* at Section 4.3.3 allows the consideration of exposure duration in evaluating toxicity to organisms passing through a mixing zone. As the criteria for ammonia are based on 1-hour and 30-day average exposures, consideration of exposure times and the duration of critical flow conditions is also warranted. A dynamic analysis that includes these types of considerations, as well as the frequency and duration of other receiving water and effluent variables that could effect exposure time and ammonia concentrations/toxicity is also allowed for in the above guidance at Sections 4.4 and 4.5.1. The above considerations typically can have a dramatic impact on final reasonable potential and effluent limit calculations.

However, even though there is reason to believe that further studies would lead to less stringent reasonable potential and effluent limit analysis, such a determination by the Regional Board cannot be made until the studies are performed. Therefore, as discussed in detail below, this permit includes an interim upper effluent pH limit of 7.5 to assure no ammonia toxicity is present outside the 1:1 dilution mixing zone while the Discharger is given an opportunity to perform further mixing zone analysis. Once the studies have been completed by the Discharger and evaluated by Regional Board staff, the permit will be reopened to incorporate the final determination of dilution credits/mixing zone, reasonable potential analysis and ammonia or pH limits as appropriate.

6.6 Interim Effluent pH Limit

As discussed above, one of the key factors in determining toxicity of ammonia in the mixing zone is pH, and in particular, a lower effluent pH will considerably decrease toxicity in the portion of the mixing zone close to the diffuser (acute mixing zone). As discussed above the acute criteria is driving the effluent limit calculations. As reasonable potential and effluent limits calculations must be performed using the worst-case bounds of the permit conditions, the upper bound of effluent pH must be used when evaluating potential dilution credits for the acute mixing zone.

Using the previous permit's upper effluent pH limit of 8.5, as discussed above, leads to an acute criteria of 2.14 mgN/l. However, if the upper effluent pH limit is adjusted down to pH = 7.5 then the ammonia acute criteria concentration is raised to 13.3 mgN/l. Applying this higher criteria and allowing for a 1:1 dilution credit for acute toxicity leads to acceptable acute mixing zone ammonia concentrations at the estimated maximum ammonia effluent concentration of 26.3 mgN/l. The granting of a 1:1 dilution credit is deemed reasonable based on preliminary near-field mixing zone calculations performed by the Discharger, which show 1:1 mixing occurring by jet diffusion almost immediately downstream of the diffuser. The risk of an organism receiving an exposure greater than the acute criterion average concentration in such a small and unlikely place for aquatic life is insignificant. Also, the duration of 14:1 critical conditions typically is less than the 1-hour averaging period of the acute criteria which will further reduce the concern over the size of the 1:1 mixing zone. In addition, the 26.3 mgN/l estimated maximum concentration will not exceed the final acute value (at pH 7.5) as provided in the U.S. EPA ammonia criteria document.

In addition to the above discussion, it should be noted that acute or chronic toxicity tests performed during the term of the previous permit have not indicated that ammonia is the cause of any toxicity in the

effluent or receiving water. Therefore, based on all the above considerations the upper bound of the standard pH effluent limit is being adjusted down to an interim effluent pH limit of 7.5 which will be measured as a 1-hour running average of continuously monitored pH. The Regional Board finds this to be protective in the interim and will be one of the enforceable effluent pH limits during the period of time required to perform, evaluate, and reopen the permit as necessary to revise reasonable potential findings and effluent limits.

6.7 Further Study

Based on the above discussion, the following study will be required. Based on the above analysis, the study needs to include at least the first two considerations shown below. These two considerations, if applied to a worst-case steady-state model, may provide justification for adequate dilution credits. However, if further analysis is required/desired by the discharger, then the third and fourth items may be performed as well. It is important that both acute and chronic exposure considerations be included in the study. Also, careful consideration needs to be given to evaluating and comparing data and criteria with appropriate averaging periods.

- Detailed near- and far-field mixing zone analysis to determine spatial extent of the mixing zone. As pH in the mixing zone is driving the toxicity of ammonia, this effort shall include modeling of pH and resulting ammonia criteria in the mixing zone.
- Detailed assessment of acute and chronic exposure durations to passing organisms and benthic organisms in surrounding river bottom and banks.
- Dynamic modeling of receiving water concentrations performed according to U.S. EPA guidelines. Such modeling can take into account the relative probability distributions of different variables that factor into receiving water concentrations. These variables may include ambient pH, temperature and flow, and effluent pH, temperature, flow and ammonia concentrations.
- Possible downward adjustment of upper effluent pH limit with the intent of lowering the upper bound of ammonia toxicity in the mixing zone close to the diffuser.

The schedule for completion of the above work plan and final study are outlined in Provision E.4.

6.8 Permit Reopener

Based on the results of an acceptable study, the Regional Board will re-evaluate the dilution credit assumptions, reasonable potential analysis, and any effluent limits for pH or ammonia that may be required, if any. Specifically, this information will be used to determine the acceptable allowable concentration at the end-of-pipe that prevents acute or chronic toxicity to organisms in the mixing zone. After such analysis is completed by the Board staff, the permit will be reopened as necessary to make any necessary modifications to the Discharge Limitations.

7. <u>pH:</u>

The Basin Plan provides that the pH of the receiving water shall not be depressed below 6.5 or raised above 8.5. The Basin Plan also allows the use of "appropriate averaging periods" for determination of compliance with the receiving water limit.

The Discharger experiences difficulty in complete control of effluent chemistry when diverting to and from the ESBs. When the River conditions allow the discharge to resume, the dechlorination system is pre-started to ensure complete dechlorination. The pre-starting of the dechlorination system puts additional chemicals into the stagnant effluent, which can result in a depressed pH. Caustic can be added to raise the pH; however, precise dosing can be difficult during transient flow conditions

Based on these considerations, Effluent Limitation B.3 requires that the discharge shall not have a pH value of less than 6.0 nor greater than 8.5 as calculated by a running 20-minute average of continuously monitored effluent pH. The 20-minute averaging period provides adequate protection against excursions above or below the stated limits. (see also the Information Sheet discussion on ammonia toxicity for a description of the additional 7.5 interim upper effluent pH limit). Also, to comply with the Basin Plan, Receiving Water Limitation D.8 requires that pH of the discharge cannot cause the pH in the receiving water to be less than 6.5 nor exceed 8.5 outside of the mixing zone.

This permit also requires the study of pH as it affects ammonia toxicity and may be a contributing stressor in the evaluation of chlorine toxicity, inorganic priority pollutant toxicity and cumulative toxicity (see Provisions E.4) If the results of these studies finds the need for modifications to these pH limitations the permit can be reopened accordingly. As discussed regarding ammonia, the upper effluent pH limit of 7.5 is an interim limit only and may be eliminated if the above studies and Regional Board analysis find that the lower pH limit is not needed to prevent ammonia toxicity. Also, definition of the physical dimensions of a pH mixing zone will need to be included when the permit is reopened.

8. Bioaccumulative Priority Pollutants:

8.1 Mercury

Total mercury concentrations in 85 samples of Regional Plant effluent collected between January 1996 and April 1999 ranged from 0.004 to 0.025 µg/l. The California Toxics Rule (CTR) chronic criteria (CCC) for mercury is 0.77 µg/l (4-day average), and the acute criteria (CMC) is 1.4 µg/l (1-hour average). Based on this data the Regional Plant effluent does *not* have a reasonable potential to cause receiving water concentrations to exceed these mercury criteria. However, the bioaccumulation rates in fish tissue used to calculate the CTR water quality criteria are based only on a laboratory derived bioconcentration factor that considers organism uptake from water only and does not consider the contribution from the organism's food source. Therefore, the CTR criteria is not considered protective of actual bioaccumulation conditions in the River.

Mercury is listed under the California 303(d) list as a pollutant causing impairment in Delta waterways. This listing is based on elevated levels of mercury in fish tissue. If fish tissue levels indicate that the assimilative capacity of the receiving water is exceeded for a certain pollutant, any loading of that pollutant from the discharger may have the reasonable potential to cause or contribute to an excursion of the criteria. Therefore, water quality based effluent limits for mercury that properly addresses

bioaccumulation are required. A TMDL for mercury is currently scheduled to be completed by December 2005.

8.2 Lindane

A review of SRCSD analytical data for chlorinated hydrocarbon pesticides collected between January 1994 and February 1999 showed lindane (gamma-BHC) was detectable with a 0.025 ug/l detection limit in 23 out of 37 samples with a maximum value of 0.068 ug/l measured in March 1998. Background River samples were below detection limits for lindane. Detection limits on background samples ranged generally from 0.007 to 0.5 ug/l. The CTR acute criteria (CMC) is 0.95 µg/l (1-hour average) and there is no published chronic criteria. Based on this data the Regional Plant effluent does not have a reasonable potential to cause receiving water concentrations to exceed this criteria alone. However, the bioaccumulation rates in fish tissue used to calculate the CTR water quality criteria are based on a laboratory derived bioconcentration factor that considers organism uptake from water only and does not consider the contribution from the organism's food source. Therefore, the CTR criteria is not considered protective of actual bioaccumulation conditions in the River.

Lindane is listed under the California 303(d) list as a pollutant in the "Group A" organochlorine pesticides which is causing impairment in the Delta waterways. This listing is based on elevated levels of these pesticides in fish tissue. If fish tissue levels indicate that the assimilative capacity of the receiving water is exceeded for a certain pollutant, any loading of that pollutant from the discharger may have the reasonable potential to cause or contribute to an excursion of the criteria. Therefore, a water quality based effluent limit that properly addresses bioaccumulation is required. Furthermore, the Basin Plan, requires that such pesticides shall not be present in the water column in detectable concentrations. Based on the State Implementation Plan, the acceptable minimum detection limits for lindane are established at 0.02 µg/l. Based on the fact that the receiving water is 303(d) listed for bioaccumulation of lindane and the fact that effluent concentrations are above the Basin Plan criteria, but below CTR toxicity criteria, water quality based effluent limits protective of bioaccumulation considerations are required. A TMDL for lindane is currently scheduled to be completed by December 2011.

8.3 Interim Effluent Limits - Bioaccumulative Priority Pollutants

When developing effluent limits for bioaccumulative priority pollutants on the CWA Section 303(d) list for which TMDLs have yet to be adopted, the State Implementation Plan recommends that the RWQCB should consider whether the mass loading of the bioaccumulative pollutant(s) should be limited in the interim to representative, current levels pending development of applicable water quality standards. The intent is, at a minimum, to prevent further impairment while TMDLs are being developed. Any increase in loading of a pollutant to a water body that is impaired because of that pollutant would presumably further degrade water quality.

Using concentration data from 85 samples collected between January 1996 and February 1999 and combining it with corresponding flow data as described in Effluent Limit B.8, the average mass discharge rate of mercury was 5.1 lbs/yr (as total recoverable). In the same manner, the average mass discharge rate of lindane was calculated as 19.0 lbs/yr (as total recoverable) from 21 samples collected between September 1996 and September 1998. For mercury all samples had concentrations above

detection limits. For lindane 7 of 21 samples during this period had concentrations less than the reported detection limit. However, due to some of those detection limits being unrepresentatively high, no attempt was made to speculate on an assumed value for the purpose of averaging. Therefore, the 7 non-detect samples were excluded altogether from the above average mass discharge calculations.

8.4 Compliance Schedules - Bioaccumulative Priority Pollutants

As mercury is a CTR constituent, the compliance schedule guidelines of the State Implementation Plan govern the terms of the TMDL-based compliance schedule that will be required. The State Implementation Plan at Section 2.1.B allows up to 15 years from the effective date of the policy (April 28, 2000) to develop and adopt a TMDL, and accompanying Waste Load Allocations (WLAs). Section 2.2 of the State Implementation Plan then requires if a compliance schedule is allowed in accordance with Section 2.1, and if it exceeds one year, then interim numeric limitations are required and other interim requirements to control the pollutant may be required in the NPDES permit. Furthermore, there shall be no more than one year between interim dates in the compliance schedule. Once the TMDL has been completed, the Discharger will have an additional 5 years to comply with the TMDL, not to exceed a total of 20 years from the effective date of the policy.

Even though lindane is a CTR constituent, the fact that the Basin Plan has a more stringent water quality criteria (non-detectable concentrations) means that the Basin Plan compliance schedule requirements govern. In the case of lindane the State Implementation Plan guidance (adopted in April 2000) provides new minimum detection standards for lindane and other priority pollutant pesticides and is considered a new interpretation of the Basin Plan. As such, the Basin Plan allows up to ten years for compliance from the date of the new interpretation of the criteria.

Starting on the 12th month after adoption of this permit, and for every month thereafter, the total mass loading for the previous twelve months (calculated as described in Effluent Limit B.8) will be reported in the monthly discharge monitoring reports and compared against the interim limits calculated above. Provided the terms of the compliance schedule just described are being met then any mass loading over and above this annual mass limit will be banked as a debit against a net total of mass discharges over or under the interim limits. Likewise, any trailing 12 month mass loading under the above limit will be banked as a credit to the net total. The net total will be maintained until which time a discharge specific offset program is adopted by the Board into the permit to provide a means for offsetting these loads.

In addition to these numeric interim mass-based limits, there will be additional interim requirements as follows for both mercury and lindane. See Provisions E.5, 6, & 7 for the schedule of deliverables.

1) the preparation and implementation of a pollutant prevention program in compliance with CWC 13263.3(d)(3) as soon as possible;
2) continued contribution of resources and sampling data to the respective TMDL processes;
3) performance of an engineering study examining the feasibility, costs and benefits of treatment to remove pollutants from the discharge and/or reclamation/recycling projects that may also reduce loading; and

4) perform a study to identify other sources of pollutants within the watershed available for offset reduction and estimate the costs and potential reductions in receiving water loading associated with total or partial removal of these sources. Based on this information an offset program proposal will be developed for consideration by the Regional Board.

8.5 Offset Program - Bioaccumulative Priority Pollutants

It is recognized that the State Implementation Plan recommendation to consider interim limits at "representative, current levels" could effectively place a cap on future growth of the Regional Plant service area. Therefore, one of the interim requirements above, requires the development of an offset program which could be used to offset mercury and lindane loads *over and above the interim limits.* Also, if a TMDL is not finalized on schedule, then a final effluent limit of zero-net loading with the ability to offset will be required. In a similar fashion, if a TMDL is established and the discharge mass load still exceeds that limit, this program could be used to offset discharges *over and above the TMDL.* Under these circumstances, the only other alternative to offsets is source control or treatment of wastewater such that end-of-pipe concentrations comply with the appropriate requirements.

In this context the term *offset* refers to reductions in loadings of the pollutant to the Sacramento River watershed achieved through the discharger's actions from an appropriate source. Offsets do not include sources that, if not controlled, would enter the facility's treatment system. These sources should already be controlled as part of the Discharger's pollutant prevention program which will be developed as part of the interim requirements (item #1 above).

In order to assure that offsets will actually reduce the cause of the impairment, the offset feasibility study (item #4 above) will need to investigate ratios to express the relationship between the mass of the pollutant from the outfall and the mass discharged at the offset source. These ratios should take into account the relative bioavailability, the likelihood that the pollutant will actually reach the water body, and a factor of safety to account for uncertainty in biological effects and in monitoring. A monitoring program will need to be implemented that measures loadings from the Regional Plant outfall and provides data to estimate loading reductions from the offsets including possible base-line data collection.

The studies performed by the Discharger will provide the Regional Board staff with site and watershed specific information necessary to prepare terms for the final offset program. The NPDES permit will then be reopened for public comment and Regional Board approval of the final offset program. In addition to the offset program, the interim and/or final effluent limits would need to clearly indicate how compliance will be assessed. Also details, such as the amount of time for which loads can be banked, will need to be addressed. The approach described above will allow the discharger to comply with the terms of a defensible permit, allow for growth, and do so in a way that effectively removes the pollutants of concern from the watershed.

8.6 Final Effluent Limits - Bioaccumulative Priority Pollutants

The final effluent limits (mass load allocations) for mercury in the Regional Plant effluent would come from the TMDL that is currently scheduled for December 2005. An effluent limit of non-detectable lindane concentrations is imposed in this permit and must be met at the end of the lindane compliance

schedule. The respective interim mass limits would remain in effect until these times. If after consideration of the offset program study, it is determined that an offset program is infeasible, the Board will need to reconsider the interim mass cap. If the mercury TMDL is not completed on schedule, final effluent limits of "zero net discharge" shall be imposed. As these dates are beyond the 5-year term of this NPDES permit, this intent is included in the Findings of this permit.

9. Organophosphate Pesticides:

9.1 OP Pesticide Criteria

Chlorpyrifos and diazinon (organophosphate pesticides) are not priority pollutants, therefore, the latest Basin Plan and EPA guidance applies for the determination of reasonable potential, effluent limits and compliance schedules. In March 2000 the California Department of Fish and Game (CDFG) finalized its water quality criteria for chlorpyrifos and diazinon. For chlorpyrifos the acute and chronic criteria are 0.02 µg/l (1 hour average) and 0.014 µg/l (4 day average) respectively. For diazinon the acute and chronic water quality criteria are 0.08 µg/l (1 hour average) and 0.05 µg/l (4 day average) respectively. Also, the Delta waterway has been listed as an impaired water body per Section 303(d) of the Clean Water Act for both of these constituents.

9.2 OP Pesticide Effluent Data

Regional Plant effluent was sampled and analyzed by the Discharger for diazinon and chlorpyrifos between December 1996 and May 1999. Chlorpyrifos was detectable in 13 of 18 samples, with a maximum value of 0.054 ug/l. The minimum detection limit was 0.030 ug/l. A statistical estimation of maximum chlorpyrifos effluent concentration was performed using this data and U.S. EPA guidelines. Samples with less than detectable concentrations were included in these calculations using ½ the minimum detection level. The resulting estimated maximum concentration of chlorpyrifos (the 99th percentile value with 99% confidence) was 0.111 ug/l. This is above both the acute and chronic freshwater criteria stated above for chlorpyrifos. In 18 other samples diazinon was detectable in all samples with a maximum of 0.34 ug/l. This value is itself above both the acute and chronic freshwater criteria stated above for diazinon. Also, due to the fact that the River is listed as a 303(d) impaired water body for these types of constituents, no mixing zone/dilution credit can be granted in the determination of reasonable potential. Based on this data, chlorpyrifos and diazinon limitations must be established as described below. The Regional Plant does not currently have treatment processes designed to meet the water quality criteria discussed above.

TABLE 9.1 - Chlorpyrifos & Diazinon Effluent Data

	chlorpyrifos	diazinon
Sample Dates - Begin	Dec-96	Dec-96
Sample Dates - End	May-99	May-99
Sample Count	18	18
Maximum Concentration (ug/l)	0.054	0.340
Mean (ug/l)	0.031	0.12
Std. Deviation (ug/l)	0.015	0.07
Coefficient of Variation (CV)	0.48	0.57
Percentile of Highest Conc.(p_n) =	0.774	0.774
unit value =	0.755	0.755
$sigma^2$ =	0.210	0.288
99th Percentile Concentration (C_{99}) =	2.616	3.015
C_{Pn} =	1.273	1.298
Factor (99%, 99%)	2.06	2.32
Estimated Max. Concentration (ug/l)	0.11	0.79

9.3 Compliance Schedule – OP Pesticides

As the above criteria for chlorpyrifos and diazinon were released in March 2000 after the Basin Plan narrative toxicity criteria were issued, the Basin Plan allows for a compliance schedule of up to ten years from the adoption date of the new criteria. As a result, a time schedule for compliance with the new corresponding effluent limitation is allowable in this Order.

Reduction of organophosphate pesticides from Regional Plant effluent would require aggressive source control and possibly the addition of some form of tertiary treatment, at considerable cost to the Discharger. Therefore, the compliance schedule includes performance of two studies as described below with deliverable dates as outlined in Provision E.5 & 6.

- This Order requires the study and development of a pollution prevention plan for pesticide discharges to the collection system in compliance with CWC 13263.3(d)(3). Diazinon and chlorpyrifos are both registered pesticides in widespread commercial and residential use. Identifying controllable sources of the pesticides may be difficult, and the Discharger may be prohibited from taking some control actions if the pesticides are being used in accordance with label directions.
- The Discharger will be required to perform an engineering study examining the feasibility, costs and benefits of different treatment options that may be required to remove these pollutants from the discharge.

As described in Provision E.5, the pollution prevention plan shall be implemented by the Discharger immediately upon approval by the Executive Officer (i.e. the permit will not be reopened). The findings of the feasibility study will be used in developing the compliance schedule and/or final discharge limitations required in the next permit.

10. Inorganic Priority Pollutants Exceeding Aquatic Life Criteria:

10.1 Applicable Criteria and Guidance

For priority pollutants, guidance regarding determination of reasonable potential, effluent limits, and compliance schedules is covered by the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California*, adopted in March 2000 by the State Board, hereafter referred to as the State Implementation Plan (SIP). The numeric water quality criteria for priority pollutants were promulgated by U.S. EPA with the adoption of the California Toxics Rule in April 2000.

10.2 Reasonable Potential Analysis

Summary statistics for copper, lead, silver, zinc, and cyanide concentrations measured in Regional Plant effluent are presented in Table 10.1 below. Based on this data there is reasonable potential for these priority pollutants to cause or contribute to the exceedance of the applicable aquatic life priority pollutant criteria. The maximum concentration of each of these constituents measured in the time period evaluated exceeded at least one of the applicable criteria as described in the SIP, Section 1.3. Therefore, effluent limits will be required.

10.3 Effluent Limits Calculations – Priority Pollutants

Based on the information received to date from the Discharger only the use of the steady-state model option for calculating effluent limits in the SIP can be justified at this time. Also, in the absence of any mixing zone studies specifically addressing these constituents, no dilution credits can be allowed. The criteria for all these constituents with the exception of cyanide is a function of ambient hardness. In general lower hardness yields more stringent criteria. In the absence of specific SIP guidance, the Regional Board has determined that for use in a steady-state effluent limit model the calculation of acute criteria must assume the worst-case hardness measured in the receiving water. Receiving water data collected as part of the 1998 Sacramento River Coordinated Monitoring Program found lowest hardness at 30 mg/l as $CaCO_3$. For chronic criteria a 4-day average of hardness would be appropriate, but no hardness data with that averaging period is available for the Sacramento River at Freeport. Therefore, 30 mg/l as $CaCO_3$ will be assumed for chronic criteria as well. It should also be noted that according to SIP guidance worst-case background concentrations must be used in determining the assimilative capacity and dilution credits.

Although dilution credits were not granted in these effluent limit calculations, it is likely if the Discharger were to perform mixing zone analysis for each of these constituents, that dilution credits could be justified that would allow for less stringent, yet protective and defensible limits. Also, the effluent limits calculated in Table 10.1 were based on the steady-state model method described in the SIP. This method models the worst-case assumption for a number of variables all occurring simultaneously. However, as more variables are introduced into the model (i.e. hardness dependency of metals criteria), it becomes less likely that all of the worst-case assumption would actually occur simultaneously in the receiving water. This may lead to effluent limits that are unnecessarily stringent, based strictly on the way conservative assumptions are made in the model. As an alternative, the dynamic modeling approach to calculating effluent limits is allowed by the SIP in Section 1.4. This

Table 10.1 - Inorganic Priority Pollutant Reasonable Potential Analysis

Description	copper		lead [1]		silver		zinc		cyanide	
Effluent Concentrations										
Sample Dates - Begin	Jan-94		Jan-94		Jan-94		Jan-94		Jan-94	
Sample Dates - End	Jun-99		Jun-99		Sep-98		Sep-98		Feb-99	
Sample Count	122		116		66		87		76	
Count Above Reporting Limits	122		115		52		86		13	
% of Samples Above Reporting Limits	100.0		99.1		78.8		98.9		17.1	
Reporting Limits (ug/l)	varied		0.1		varied		4		5	
Maximum Concentration (ug/l)	19.0		6.5		0.6		58.2		9.0	
Mean [2] (ug/l)	5.64		0.81		0.34		30.91		3.16	
Std. Deviation [2] (ug/l)	2.17		0.76		0.14		8.56		1.54	
Coefficient of Variation [2] (CV) (ug/l)	0.38		0.93		0.42		0.28		0.60	
Background Concentrations										
Sample Dates - Begin	Jan-94		Jan-94		Jan-94		Jan-94		Jan-94	
Sample Dates - End	Dec-98		Dec-98		Apr-95		Dec-98		Feb-99	
Sample Count	83		82		27		83		73	
Count Above Reporting Limits	83		82		3		70		0	
Reporting Limits (ug/l)	not given		not given		0.02		4.0		5.0	
Maximum Concentration (ug/l)	12.2		2.3		0.03		25.0		< 5.0	
Mean (ug/l)	3.8		0.7		<0.02		6.3		< 5.0	
Criteria	acute	chronic	acute	chronic	acute	chronic	acute	chronic	acute	chronic
Hardness (mg/l as $CaCO_3$)	30.00	30.00	30.00	30.00	30.00	n/a	30.00	30.00	—	—
Criteria (ug/l, dissolved)	4.32	3.20	17.04	0.66	0.43	n/a	42.25	42.59	n/a	n/a
Translator	0.650 (4)	0.410 (4)	0.470	0.250	0.850	n/a	0.800	0.250	n/a	n/a
Criteria (ug/l, total recoverable)	6.65	7.81	36.26	2.66	0.51	n/a	52.81	170.38	10	5.2
Effluent Limit Calculations										
Dilution Credit (if B<C)	0.0	0.0	0.0	0.0	0.0	n/a	0.0	0.0	0.0	0.0
No Dilution Credit if C<B	C<B	C<B	0.0	0.0	0.0	n/a	0.0	0.0	0.0	0.0
Effluent Concentration Allowance [2] (ug/l)	6.65	7.81	36.26	2.66	0.51	n/a	52.81	170.38	10.00	5.20
σ^2 and σ_4^2	0.14	0.04	0.63	0.20	0.16	n/a	0.07	0.02	0.21	0.06
ECA Multiplier [3]	0.45	0.65	0.22	0.39	0.43	n/a	0.55	0.73	0.38	0.59
Long-Term Average	3.0	5.1	7.9	1.0	0.2	n/a	29.1	124.8	3.8	3.1
AMEL Multiplier [4], [5]	1.34	*	*	1.88	1.38	n/a	1.24	*	*	1.44
Average Monthly Effluent Limit	**4.0**	*	*	**2.0**	**0.3**	n/a	**36.2**	*	*	**4.4**
MDEL Multiplier [6]	2.21	*	*	4.60	2.34	n/a	1.81	*	*	2.63
Max. Daily Effluent Limit	**6.6**	*	*	**4.8**	**0.5**	n/a	**52.8**	*	*	**8.1**

General Note: Unless noted otherwise, all concentrations given as total recoverable

(1) excluding outlier

(2) Calculated per Section 1.4.B, Step 2 of SIP

(3) Acute and Chronic ECA multiplier calculated at 99th percentile per Section 1.4.b, Step 3 of SIP

(4) Calculated at 95th percentile per Section 1.4.B, Step 5 of SIP

(5) Assumes sampling frequency is four times per month or less per Section 1.4.B, Step 5 of SIP

(6) Calculated at 99th percentile per Section 1.4.B, Step 5 of SIP

* = not applicable as other criteria LTA is more stingent

method calculates a probability distribution of receiving water concentrations based on the probability distributions of the individual receiving water and effluent flow and concentration variables. This allows the risk of actual receiving water concentrations exceeding ambient criteria to be directly quantified and converted into effluent limits. Dynamic analysis may lead to less stringent effluent limits that more accurately reflect the probability of critical receiving water concentrations for comparison against the criteria. However, none of the mixing zone/dilution credit and/or dynamic analysis considerations discussed above can be made by the Regional Board until the corresponding studies are completed by the Discharger and there is adequate assurance for the Regional Board that such dilution credits/mixing zones are indeed protective of beneficial uses of the receiving water.

10.4 Compliance Schedules – Priority Pollutants

A review of historical effluent data indicates that Regional Plant effluent will not be in compliance with effluent limits calculated without dilution credits. In all cases there are historical values that exceed the maximum daily limits. The historical data sets also include 7-day segments of data collected on a daily basis. The 7-day average of some of these segments indicate that there may be exceedances of some average monthly limits as well.

Based on the SIP, Section 2.2.2 and the above data, the Regional Board finds a "demonstration of necessity" and will establish a schedule of interim requirements in this NPDES permit for each of these five priority pollutants. Specifically, the compliance schedules are being granted on a consideration of time needed to conduct mixing zone analysis and/or dynamic modeling for the calculation of final effluent limitations as will be discussed in more detail in the next section. Also, the Discharger appears to have met the four compliance schedule prerequisites for these constituents as outlined in the SIP, Section 2.1.

10.5 Interim Study Requirements - Priority Pollutants

Based on the above discussion, mixing zone studies and/or dynamic analysis for copper, lead, silver, zinc, and cyanide will be required. As discussed above, the effluent limits calculated above did not include the granting of dilution credits and assumed 30 mg/l for hardness in the calculation of all chronic criteria. Also, they were based on a steady-state model and did not consider the independent variability of different factors as is allowed in dynamic analysis. For each of these constituents it is appropriate per the SIP Section 2.2.2 and U.S. EPA guidance to provide the Discharger an opportunity to perform these analysis. The following provides direction for the interim studies which are required according to the schedule in Provision E.4.

- Copper: As the maximum background concentration of copper exceeded both the acute criteria and chronic criteria, no dilution credits can be allowed according to SIP Section 1.4.B in steady-state model calculations of effluent limits. However, dynamic analysis may lead to less stringent limits. Study will also need to include proper consideration of translators.
- Zinc & silver: Based on the steady state model calculations above, the *acute* criteria governs for both of these constituents. The granting of acute mixing zone dilution credits as low as 1:1 for both constituents would otherwise lead to final effluent limits that the Regional Plant, as currently configured, could likely comply with. Based on preliminary near-field mixing zone

calculations performed by the Discharger, the granting of a 1:1 dilution credit is likely to be reasonable. This preliminary analysis shows 1:1 mixing occurring by jet diffusion almost immediately downstream of the diffuser. The risk of an organism receiving an exposure greater than the acute criterion average concentration will be insignificant. Critical flow conditions for steady state modeling of acute criteria must be performed with the assumption of 14:1 flow ratios (river:effluent) which corresponds to a 1Q10 receiving water flow at Regional Plant design flow of 181 MGD. Also, dynamic analysis may lead to less stringent effluent limits. Study will also need to include proper consideration of translators.

- Lead & Cyanide: Based on the steady state effluent limit calculations, the *chronic* criteria governs for both of these constituents. However, the granting of chronic mixing zone dilution credits in the range of 18 for lead would otherwise lead to final effluent limits that the Regional Plant, as currently configured, could likely comply with. This holds true even with chronic criteria calculated at hardness of 30 mg/l as $CaCO_3$. Cyanide would need a dilution credit of 2 for its chronic mixing zone, along with a dilution credit of 1 for an acute mixing zone. Critical flow conditions for steady state modeling of chronic criteria must be performed with the assumption of 7Q10 flow in the receiving water. Also, dynamic analysis may lead to less stringent effluent limits. Study will also need to include consideration of a translator for lead.
- Possible additive acute and chronic toxicity from other stressors in the mixing zone including pH, ammonia, chlorine and temperature as evaluated in previous studies must be evaluated as required by the Basin Plan and included in the comprehensive study in Provision E.4.

Following completion of the studies this permit will be reopened to include final numeric effluent limitations. Dilution credits/mixing zones may be included if studies show they are protective of receiving water beneficial uses.

10.6 Interim and Final Numeric Limits - Priority Pollutants

Based on SIP Section 2.2.2, interim effluent limits are required when compliance schedules are granted to allow the Discharger an opportunity to provide more information. These limits must be based on current facility performance. In October 1995, the Public Advisory Task Force to the State Water Resources Control Board (Task Force) developed proposed guidance to the State Board regarding development of the Inland Surface Waters Plan and the Enclosed Bays and Estuaries Plan. The Discharger participated in the development of this consensus document. Part of the Task Force report included proposed guidance on the calculation of interim effluent limits. Specifically, the Task Force recommended that a trigger level first be established based on the maximum measured effluent concentration adjusted per the USEPA estimated maximum concentration procedure in Section 3.3.2 of their Technical Support Document. The Task Force further recommended that if this trigger concentration is exceeded in the effluent then an investigation into the cause of the exceedance will be performed and the Regional Board notified of the results. It was further recommended that upon review of the results of the investigation, the Regional Board may require an action plan to address the cause of the exceedance. In addition to the trigger concentration, an interim maximum limit was proposed based on this trigger concentration and a factor of safety between 1.15 to 2.0.

In light of the above task force recommendation and additional comments received from the Discharger dated 26 June 2000, the Regional Board finds the general approach, with some modifications, to be appropriate for calculation of interim performance-based effluent limits. In their comments, the Discharger proposed an interim limit based on the maximum measured concentration with a factor of 1.2 applied for uncertainty. After a review of the data statistics, this proposal by the Discharger is acceptable with some modifications. The Regional Board finds that the trigger concentration proposed by the Discharger would be more protective and appropriate if established as the 95th percentile value for each constituent assuming that historical data follows a lognormal probability distribution. Trigger concentrations and interim limits based on this modified Task Force approach are summarized below in Table 10.2 and appear in Effluent Limit B.1 and B.9.

Table 10.2 – Interim Effluent Limits for Inorganic Priority Pollutants (as total recoverable)

Description	Copper (ug/l)	Lead (ug/l)	Silver (ug/l)	Zinc (ug/l)	Cyanide (ug/l)
Max. Concentration	19	6.5	0.60	58.2	9.0
Factor of Safety	1.2	1.2	1.2	1.2	1.2
Max. Daily Limit	**22.8**	**7.8**	**0.72**	**69.8**	**10.8**
Mean/Std. Deviation	5.6 / 2.2	0.8 / 0.8	0.3 / 0.1	30.9 / 8.6	3.2 / 1.5
Trigger Concentration	**9.7**	**5.1**	**0.57**	**46.7**	**6.1**

The maximum daily limits will be enforceable interim limits until final limits can be established as discussed above. The trigger concentrations will lead to investigation by the Discharger and a possible action plan at the discretion of the Executive Officer. The inclusion of final numeric limits prior to the completion of the interim requirements of the compliance schedule are not required by the SIP. However, the intent, the rationale and the schedule of the Regional Board to issue final limits based on the interim studies are included in the permit Findings and Provisions.

11. Thermal Limitations:

The SWRCB Water Quality Control Plan for Control of Temperatures in Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan) is applicable to this discharge. The Thermal Plan requires that such a discharge:

a) shall not exceed the receiving water temperature by more than 20 °F;

b) shall not create a zone, defined by water temperatures of more than 1°F above natural receiving water temperature which exceeds 25 % of the cross sectional area of the River at any point; and,

c) shall not cause a temperature rise greater than 4 °F above the natural temperature of the receiving waters at any time or place.

The Board on 26 May 1989 adopted Resolution No. 89-094 modifying requirement a) above such that a higher temperature discharge, 25 °F, could be discharged during the fall and winter, and deleting requirement b) above. The SWRCB on 20 September 1990 adopted Resolution No. 90-103 approving and modifying the Board's action. However, the SWRCB Resolution did not give the Discharger an exemption on requirement b) above. Instead, it required the Discharger to evaluate alternatives to reducing the temperature of the discharge and means of compliance with requirement b). The Discharger completed the required study and determined that the only way to comply with the requirement was to construct a second outfall. The study also concluded that violations of requirement b) last less than one hour, and are insignificant when the River is above 65 °F (only a few percent of the time). In 1992, it was estimated by the Discharger that violations of requirement b) occurred for one hour in May and not at all in June through August. Such violations of the Requirement B result in a warming of the lower 25 percent of the River cross-section up to about 1.5 °F. The SWRCB concluded that this transient warming does not pose a significant threat of harm to salmon or other aquatic life and that a safe zone of passage for aquatic life is maintained at all times. Thus, on 22 October 1992, the SWRCB adopted Resolution No. 92-82 granting the Discharger an exception to requirement b). Specifically, the exception allows a maximum increase of 2 °F in a zone that does not exceed 25 percent of the cross-section area of the main River channel at any point. This excursion over 1 °F can only occur for an average of one hour per day in any thirty day period when the temperature of the Sacramento River is 65 °F or greater. In addition to the feasibility study required by the SWRCB, a compliance study was required by this Order to establish procedures to monitor temperature and determine compliance with requirements b) and c) above. Determining compliance with these requirements is not a straightforward matter. The Discharger was required to complete a compliance study to identify measurements or parameters that indicate compliance or noncompliance. SWRCB Resolution No. 92-82 expired in October 1997.

Studies by the National Marine Fisheries Service and the U.S. Bureau of Reclamation have identified the Sacramento Chinook Salmon as one fish that is affected by elevated temperatures in the Sacramento River. There are four runs of salmon in the Sacramento River and there are adults migrating and juveniles in portions of the River every month of the year. Juvenile salmon show signs of mortality at River temperatures of 65 °F. Migration of adults is usually delayed when River temperatures reach 70 °F. At 72 °F, adult mortality begins. In a Department of Water Resources Study, adult salmon are inhibited to migrate if water temperatures are above 70 °F. The Thermal Plan does not protect aquatic life from high temperature wastewater being discharged to a receiving water body with elevated temperature. The Thermal Plan only limits incremental increases in temperature. In so far as temperature is a detriment to the survivability of salmon, (mortality exists at higher temperatures), effluent temperature must be limited so as not to cause the receiving water to be harmful to salmon. When the assimilative capacity of the River is diminished, effluent temperature must be held to the water quality criteria. A study to determine the effects of the elevated temperature discharge and the possible compliance alternatives is required in this permit.

12. Three Species Chronic Toxicity Monitoring

12.1 Background

To better assess and understand the nature of potential chronic toxicity in the effluent and the receiving water, a revised protocol for three species chronic toxicity monitoring has been included in this Order. Three species chronic toxicity tests have been performed by the Discharger since 1993 and although some chronic toxicity was observed in these previous tests (performed with laboratory dilution water), it is uncertain to what extent these results are indicative of impact to the receiving water. The new protocol will use ambient receiving water for dilution series of effluent samples to better understand the chronic toxicity of the actual mixture of ambient receiving water and effluent. At the same time concurrent tests will be run on undiluted upstream and downstream samples to better assess ambient chronic toxicity and any increase in receiving water chronic toxicity downstream of the discharge. In addition, other concurrent tests will be run to help identify factors that may be contributing to unknown toxicity in the River, which is 303(d) listed. Trigger levels for the performance of TRE's have also been revised. This protocol is described in the Monitoring and Reporting Program No.5-00-188, and Provision No. E.11. and will be implemented in two phases. Phase I will be a 12-month toxicity characterization with the new protocol being performed on monthly samples. This phase will start within 3 months of adoption of this permit. Phase II will be the same as Phase I except it will consist of quarterly monitoring beginning with the second year of the monitoring program.

12.2 Revised Protocol

The Discharger shall conduct chronic toxicity monitoring on the R-1 and R-3 Sacramento River monitoring stations and the Sacramento Regional Wastewater Treatment Plant (SRWTP) effluent, to determine if a) toxicity exists in the Sacramento River (upstream and downstream of the point of discharge), and b) whether the effluent is contributing toxicity to the Sacramento River. The proposed monitoring will take a two phased approach. The purpose of Phase I will be to conduct a 12-month toxicity characterization study of the effluent and the receiving water. Phase II will be similar to Phase I except that it will consist of scheduled quarterly monitoring beginning with year two of the monitoring program. The monitoring program will be conducted as follows:

- All testing shall be conducted as specified in EPA 600/4-91/002. The permit may be reopened if later amendments promulgated in Section 136 of the Code of Federal Regulation or elsewhere would lead to significant changes in the procedure.
- Effluent chronic toxicity samples shall be collected downstream from the last connection through which wastes can be admitted into the outfall to the Sacramento River. Twenty-four hour flow proportional composite samples, representative of the volume and quality of the discharge shall be used for the test. Time and date of collection of the samples shall be recorded and maintained by SRWTP. Monitoring events will coincide whenever possible with effluent and receiving water monitoring.
- All chronic toxicity tests will be conducted with concurrent reference toxicant tests and reported with the test results.

- All tests must meet acceptability criteria as specified in the approved chronic toxicity methods manual. If test acceptability criteria are not met, the Discharger will re-sample and re-test within 9 days of the onset of the failed test.
- Test organisms that will be used for the chronic toxicity testing shall consist of the following:
  - Fathead minnow (*Pimephales promelas*) representing a vertebrate species.
  - Water flea (*Ceriodaphnia dubia*) representing an invertebrate species.
  - Algae (*Selenastrum capricornutum*) representing a plant species.
- Dilution water used for the effluent chronic toxicity monitoring shall be a grab sample of the Sacramento River collected at R-1 of the Receiving Water Monitoring Program station, which is upstream of the point of discharge, on an out-going tide.
- In addition to chronic toxicity testing on the effluent, the Discharger also proposes to conduct concurrent toxicity tests on grab samples collected upstream and downstream of the point of discharge at the Discharger's R-1 and R-3 Receiving Water Monitoring stations of the River.
- The R-1 and R-3 samples will be further tested within 9 days of the onset of the receiving water tests, above, on the affected test species, for chronic toxicity using a standard five dilution series, if significant toxicity, compared to the control sample, is noted in either tests. Dilution water, for the R-1 and R-3 follow up chronic toxicity test, will be laboratory control water.
- Test samples, sample treatment and standard five dilution series (ranging from 100 to 6.25 percent sample) will be used for the test samples according to the following Table 12.1:

Table 12.1 – Whole Effluent Toxicity Test Matrix

Sample or Treatment	Percent Sample Concentration															Dilution Water					
	100			50			25			12.5			6.25			R-1 Water			Lab Water		
	Algae	Cerio.	Fathead	Algae	Cerio.	Fathead	Algae	Cerio.	Fathead	Algae	Cerio.	Fathead	Algae	Cerio.	Fathead	Algae	Cerio.	Fathead	Algae	Cerio.	Fathead
SRWTP Effluent	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
R-1 Grab[1]	x	x	x																x	x	x
R-3 Grab[1]	x	x	x																x	x	x
R-1, Follow-up[2]	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				x	x	x
R-3, Follow-up[2]	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				x	x	x
R-1, + PBO[2,3]		x			x			x			x			x						x	
R-1, + Antibiotic[2,4]			x																		
Reference Toxicant																			x	x	x

Notes:

1. Determine toxicity of the Sacramento River upstream and downstream of the SRWTP discharge with each effluent monitoring event.
2. Follow-up testing will involve only the test specie(s) demonstrating significant toxicity compared to the control water.
3. Treatment administered if indicated test species demonstrates significant toxicity in R-1 screening test. (There are no performance criteria for this test included in this permit. This test is being performed to support ongoing study of ambient toxicity in the River.)
4. Treatment test to run concurrent with each SRWTP Effluent test. (There are no performance criteria for this test included in this permit. This test is being performed to support ongoing study of ambient toxicity in the River.)

- The Discharger will notify the Board within 24 hours during the course of any biotoxicity monitoring event if it is discovered that an expected reportable effluent chronic toxicity NOEC result will be equal to or greater than 8 toxicity units (TUs) for any test organism.
- Whenever a reportable no observable effects concentration (NOEC) in an effluent chronic toxicity test is equal to or greater than 8 toxicity units (TUs) for any test organism, accelerated monitoring will go into effect. Accelerated monitoring will consist of the following:
  - If a test species exhibits an NOEC equal to or greater than 8 TUs, the Discharger will collect a fresh effluent sample within nine days of the onset of the original test and conduct a new chronic toxicity test on the affected test species.
  - If the follow up sample demonstrates an NOEC of less than 8 TUs, the Discharger will conduct two additional weekly effluent chronic tests on the affected test species to check for persistent toxicity. If there is no further significant toxicity shown on the follow up samples, the accelerated weekly monitoring will be discontinued. The Discharger will continue to perform follow up chronic testing on the affected species for 6 consecutive months and return to routine scheduled testing if none of the accelerated monitoring tests meet or exceed the trigger level of 8 TUs.
  - If the follow up test exhibits an NOEC equal to or greater than 8 TUs, a TRE as described in Provision E.11 will be initiated immediately on the sample in an attempt to identify the toxicant. The Discharger will continue to perform follow up chronic testing for 6 consecutive months and return to routine scheduled testing if none of the accelerated monitoring tests meet or exceed the trigger level of 8 TUs.
- Routine whole effluent toxicity test results will be reported within 30 working days following the completion of the test.

13. Priority Pollutants Exceeding Human Health Criteria

13.1 Arsenic:

The Basin Plan water quality objective for arsenic is a maximum concentration of 10 ug/l dissolved, the U.S. EPA Primary MCL for arsenic is 50 ug/l total, and the California Proposition 65 Regulatory

Drinking Water Level (10^{-6} cancer risk) is 5 ug/l total. There are no CTR human health criteria for arsenic. The U.S. EPA recommended translator for converting total arsenic concentrations to equivalent dissolved concentrations is 1.0. This means all arsenic measured as total recoverable is to be considered as dissolved when compared to dissolved criteria. Of 130 samples of SRWTP effluent collected and analyzed for total recoverable arsenic between January 1994 and June 1999, all but two were measured above the 1 ug/l detection limit, with an average of 2.2 ug/l and a maximum of 4.8 ug/l. Based on the SIP guidance, Section 1.3 and the above information there is no reasonable potential for arsenic to cause or contribute to an excursion above water quality criteria.

13.2 Reasonable Potential for Organic Priority Pollutants:
There were five organic compounds present in the Regional Plant effluent above the CTR one-in-a-million incremental cancer risk criteria for water and fish consumption. These constituents are dichloromethane, chloroform, tetrachloroethylene, dichlorobromomethane, and bis-2 ethylhexyl phthalate. (Effluent data for carbon tetrachloride and dibromochloromethane indicated that 4 of 121 and 5 of 121 samples, respectively, contained concentrations above the 0.5 ug/l detection limits. Because of the nature of this data, the Regional Board does not consider them as indicative of being present at levels that are a water quality concern.) Based on data summarized in Table 13.1, these five constituents shall require effluent limits per the reasonable potential procedures in the SIP Section 1.3.

13.3 Effluent Limits for Organic Priority Pollutants
The effluent limit calculation procedures in SIP Section 1.4 allow for the granting of a dilution credit, in this case, of 87:1 based on the harmonic mean of River flow data between 1970 and 1998 and the Regional Plant design flow of 181 mgd. However, the Regional Board finds that granting of this dilution credit would give away an unnecessarily large portion of the River's assimilative capacity for these constituents. Instead effluent limits have been developed based on the amount of dilution that would be required such that receiving water concentrations for these constituents would be met when effluent concentrations were at the estimated maximum levels as determined by the USEPA method in its Technical Support Document (Section 3.3.2, pg. 52). Table 13.2 summarizes these estimated maximum concentration calculations and determines the amount of dilution that would be required to meet the applicable human-health receiving water criteria. These dilution credits are then used in Table 13.1 for the calculation of effluent limits. Based on historical effluent data, the Regional Plant should be able to meet these limitations. Therefore, taking into consideration CWC Section 13241 and 13263 the Regional Board does not find there to be significant economic impacts associated with the more stringent interpretation of the SIP used in the calculation of these final effluent limits. The Board finds, on the balance, that these requirements are necessary to protect the beneficial uses of the Sacramento-San Joaquin Delta. Furthermore, the combined relative carcinogenic risk for all six of these constituents is below 1 at the 87:1 river:effluent dilution ratio required by the SIP.

The SIP at 1.4.2.2.B (pg.15) requires, among other things, that when a mixing zone / dilution credits are granted, the permit must specify the point in the receiving water where the applicable criteria/objectives must be met. As of this time the Discharger has yet to perform such an analysis at the appropriate critical flow conditions. However, considering the long-term average nature of the human health criteria, the infrequency of critical conditions and worst-case effluent concentration, the sporadic short-

term nature of contact recreation in the vicinity of the discharge, and the fact that there are no drinking water intakes for numerous miles downstream of the discharge, the Regional Board finds the lack of a detailed mixing zone is not significant enough to postpone the imposition of final effluent limits. However, the Discharger shall include in the Localized Impact Study as described in Provision E.4 a hydraulic analysis of the effluent discharge into the River performed at the appropriate critical flow conditions (harmonic mean of receiving water flow) to delineate the extent of the corresponding mixing zone.

13.4 Receiving Water Monitoring for Organic Priority Pollutants

For the five organic priority pollutants requiring effluent limits, monitoring will be required in the receiving water to provide some assurance that water quality criteria are being met downstream of the mixing zone and that beneficial uses of municipal drinking water supply and contact recreation are being protected. Although mixing zone analysis has not been performed to delineate the specific boundaries of the mixing zone, based on previous mixing zone modeling performed by the discharger and engineering judgment, the Regional Board finds that receiving water samples collected at the existing R-3 will provide adequate information during the interim while a detailed mixing zone analysis is performed as required in Provision E.4. After the R-2 monitoring program is developed as part of that study, the location for the organic priority pollutant receiving water sample can be changed accordingly.

MJG:lm
4 August 2000

Table 13.1 - Effluent Limits For Organic Priority Pollutants

Description	dichloromethane (methylene chloride)	chloroform	tetrachloroethylene	dichlorobromomethane	bis-2 ethylhexyl phthalate
Sample Dates - Begin	Jan-94	Jan-94	Jan-94	Jan-94	Mar-97
Sample Dates - End	Sep-98	Sep-98	Sep-98	Sep-98	Sep-98
Sample Count	121	120	121	121	19
Count Above Reporting Limits	113	120	96	88	9
Reporting Limits (ug/l)	0.5	0.5	0.5	0.5	1.0
Maximum Concentration (ug/l)	10.0	32.0	9.0	2.7	3.1
Estimated Maximum Concentration (ug/l)	14.3	37.3	14.1	3.6	8.6
Mean (ug/l)	2.56	11.35	1.39	0.78	1.37
Std. Deviation (ug/l)	1.94	3.30	1.40	0.46	1.02
Coefficient of Variation (CV) (ug/l)	0.76	0.29	1.01	0.59	0.75
Human Health Criteria (ug/l)	4.7	5.7	0.8	0.56	1.80
Median of Background (ug/l)	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0
Dilution Credit	2.3	6.1	44.3	51.0	8.5
Effluent Concentration Allowance (1) (ug/l)	14.3	37.3	14.1	3.6	8.6
σ^2	0.45	0.08	0.70	0.30	0.44
σ_4^2	0.13	0.02	0.23	0.08	0.13
AMEL Multiplier (2), (3)	1.7	1.3	2.0	1.5	1.7
MDEL Multiplier (4)	3.8	1.9	4.9	3.1	3.8
MDEL/AMEL (5)	2.2	1.5	2.5	2.0	2.2
Max. Daily Effluent Limit (ug/l) (5)	**32.1**	**55.3**	**35.6**	**7.2**	**19.1**
Average Monthly Effluent Limit (ug/l) (5)	**14.3**	**37.3**	**14.1**	**3.6**	**8.6**

(1) Calculated per Section 1.4.B, Step 2 of SIP

(2) Calculated at 95th percentile per Section 1.4.B, Step 5 of SIP

(3) Assumes sampling frequency is four times per month or less per Section 1.4.B, Step 5 of SIP

(4) Calculated at 99th percentile per Section 1.4.B, Step 5 of SIP

(5) Calculated per Section 1.4.B, Step 6 of SIP

Table 13.2 - Estimated Maximum Concentrations For Organic Priority Pollutants

Description	dichloromethane (methylene chloride)	chloroform	tetrachloroethylene	dichlorobromomethane	bis-2 ethylhexyl phthalate
Sample Dates - Begin	Jan-94	Jan-94	Jan-94	Jan-94	Mar-97
Sample Dates - End	Sep-98	Sep-98	Sep-98	Sep-98	Sep-98
Sample Count	121	120	121	121	19
Count Above Reporting Limits	113	120	96	88	9
Reporting Limits (ug/l)	0.5	0.5	0.5	0.5	1.0
Maximum Concentration (ug/l)	10.0	32.0	9.0	2.7	3.1
Mean (ug/l)	2.56	11.35	1.39	0.78	1.37
Std. Deviation (ug/l)	1.94	3.30	1.40	0.46	1.02
Coefficient of Variation (CV) (ug/l)	0.76	0.29	1.01	0.59	0.75
Percentile of Highest Conc.(p_n) =	0.963	0.962	0.963	0.963	0.785
Corresponding Unit Value =	1.79	1.79	1.79	1.79	0.79
$sigma^2$ =	0.454	0.081	0.700	0.298	0.441
$C_{99}^{(1)}$ =	3.819	1.863	4.935	3.070	3.759
$C_{Pn}^{(1)}$ =	2.662	1.599	3.151	2.290	1.355
Factor (99%, 99 C.I.)	1.43	1.16	1.57	1.34	2.77
Estimated Max. Concentration (ug/l)	14.35	37.28	14.09	3.62	8.60
Human Health Criteria (ug/l)	4.7	5.7	0.8	0.56	1.80
Median of Background (ug/l)	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0
Dilution Ratio Required for Compliance:	2.3	6.1	44.3	51.0	8.5

General Note: One half the MDL was used for samples with concentrations less than the MDL.

(1) Calculated per USEPA TSD Section 3.3.2, pg.52