water body except within any mixing zone granted by the Regional Board. The allowance of mixing zones is discretionary and shall be determined on a discharge-by-discharge basis. The Regional Board may consider allowing mixing zones and dilution credits only for discharges with a physically identifiable point of discharge that is regulated through an NPDES permit issued by the Regional Board."

Section 1.4.2.1 of the SIP defines a dilution credit as, "*a numerical value associated with the mixing zone that accounts for the receiving water entrained into the discharge. The dilution credit is a value used in the calculation of effluent limitations. Dilution credits may be limited or denied on a pollutant-by-pollutant basis, which may result in a dilution credit for all, some or no priority pollutants in a discharge*."

In allowing mixing zones for constituents governed by the SIP, a mixing zone shall be as small as practicable and shall not:

- Compromise the integrity of the entire water body;
- Cause acutely toxic conditions to aquatic life passing through the mixing zone;
- Restrict the passage of aquatic life;
- Adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws;
- Produce undesirable or nuisance aquatic life;
- Result in floating debris, oil, or scum;
- Produce objectionable color, odor, taste, or turbidity;
- Cause objectionable bottom deposits;
- Cause nuisance;
- Dominate the receiving water body or overlap a mixing zone from different outfalls; or
- Be allowed at or near any drinking water intake. A mixing zone is not a source of drinking water. To the extent of any conflict between this determination and the Sources of Drinking Water Policy (SWRCB Resolution No. 88-63), this SIP supersedes the provisions of that policy.

2.4 Evaluation of Available Dilution for Acute Criteria

The Technical Support Document (TSD) states that: "*The CMC should be met within a distance of five times the local water depth in any horizontal direction from any discharge outlet. This restriction will prevent locating the discharge in very shallow environments or very close to shore, which would result in significant surface and bottom concentrations.*" The outfall is located on the shore, which, by the TSD guidance, will greatly restrict the horizontal range that the acute criteria may be exceeded in the receiving water. Only a limited amount of water depth data was available around the outfall, but it appears to drop to about 4 feet within 10 feet of the bank. By the TSD, this provides about a 20-foot radius around the outfall for compliance with the CMC. The temperature modeling shows the discharge to remain concentrated on the surface of the receiving water and disperse horizontally and vertically as it moves downstream. With the spatial restrictions recommended by the TSD for compliance with acute criteria and the lack of dilution indicated by the temperature modeling at the outfall, no dilution is available for the acute aquatic criteria.

2.5 Evaluation of Available Dilution for Chronic Criteria

The TSD states that:
"Concentrations above the chronic criteria are likely to prevent sensitive taxa from taking up long-term residence in the mixing zone. In this regard, benthic organisms and territorial organisms are likely to be of greatest concern. The higher the concentration occurring within the isopleth, the more taxa are likely to be excluded, thereby affecting the structure and function of the ecological community. It is thus important to minimize the overall size of the mixing zone and the size of elevated concentration isopleths within the mixing zone."

The temperature model, while subject to the limitations discussed in section 2.2, provides information used as a basis to establish available dilution for compliance with chronic criteria to protect aquatic life. The model concludes that, for the timed discharge, the four degree F differential would reach a maximum area of 0.3 acre and would be contained in a shallow (less than one foot in depth) plume that hugs the east river bank until dissipating 450 feet downstream. The model also shows that significant vertical mixing does not occur until about 500 feet downstream at which point there will be contact with the benthic community. This is illustrated in Figure 8 of the Resource Management Associates, 2000, analysis. Using the conclusions of the temperature model, a 4 degree temperature differential downstream where the effluent and receiving water have a 15°F initial difference indicates that mixing in the near field is small and does not reach 4:1 until nearly 450 feet downstream and 15:1 at 1300 feet downstream. Complete mixing, which is defined in the SIP as not more than a 5 percent difference in the concentration of a pollutant across a transect of the water body, would not occur until over 1000 feet downstream. The SIP requires that a mixing zone not dominate or compromise the integrity of the entire water body and shall be as small as practicable. The thermal modeling presented a spatial definition to the changes in temperature that occur in the receiving water as discussed in the previous paragraph. This allowed a mixing zone to be defined and dilution to be determined at the edge of this mixing zone. The mixing zone will be restricted to the surface layer of the water column in a plume hugging the eastern shore of the river and extending to 450 feet downstream of the outfall. Temperature differences at the edge of this mixing zone indicate that a 4:1 dilution exists at the edge of this mixing zone. For constituents subject to chronic aquatic criteria, a 4:1 dilution will be applied. This mixing zone will provide protection to the benthic community and minimize the impacts of the discharge to the river.

2.6 Evaluation of Available Dilution for Specific Constituents

The overlap of the plumes from the City of Manteca and the Brown Sand impoundment will limit the extent of a mixing zone for arsenic, a constituent of mutual concern between these discharges. Additionally, the receiving water monitoring shows an average arsenic concentration of 3.0 ug/l, exceeding the USEPA recommended water quality criterion for protection of human health at the 1-in-a-million risk level. Therefore, the receiving water lacks assimilative capacity for arsenic, and there is no dilution available.

The assimilative capacity of the river is dependent on the background concentration of the receiving water. Data collected in 2002 indicates that the receiving water has no assimilative capacity, and therefore no dilution can be granted for aluminum, electrical conductivity, iron, manganese, and mercury.

2.7 Evaluation of Available Dilution for Priority Pollutant Human Carcinogen Criteria

The human health-based criteria for carcinogens, other than arsenic, are based on safe levels for lifetime exposure and utilize the harmonic mean flow to represent the receiving water flow. The harmonic mean flow at Vernalis is 1976 cfs. The current annual average discharge rate is 5.72 mgd (8.9 cfs). A steady state analysis utilizing the harmonic mean flow provides a dilution of 222:1. The Regional Board is not required to grant a mixing zone or allocate the full assimilative capacity of the receiving water. For limitations based on human health criteria, dilution is limited to that required to maintain compliance. Where the ambient background concentrations are lower than the applicable human health criterion, the dilution credits determined in Table 12 of the Information Sheet apply for the determination of effluent limitations for carcinogens.

3 Biosolids Management

The City of Manteca currently discharges biosolids that has been dewatered in drying beds to City-owned farmland adjacent to the treatment plant at agronomic rates, as described in the Order. New limitations on metal concentrations in sludge/soil mixtures and new conditions for sludge use as a soil amendment have been established. This new permit requires the City to reevaluate the sludge and effluent application rates to land and submit a land application plan.

4 Pretreatment Program

The Discharger submitted a draft pretreatment program to the Regional Board for approval. The Regional Board, in an October 2001 Pretreatment Audit, identified areas of the program that were deficient or not implemented. The Regional Board staff, on 22 January 2003, provided comments to the Discharger identifying provisions of the City's Waste Ordinance and the Interjurisdictional Agreement between the City of Manteca and the Lathrop County Water District that are deficient. This Order provides a compliance schedule for the Discharger to submit a pretreatment program that corrects the deficiencies noted in the October 2001 Pretreatment Compliance Audit and in the 22 January 2003 letter. The Regional Board will reopen this Order to approve the pretreatment program upon submittal of a program that corrects the deficiencies. This Order requires full compliance with all pretreatment program requirements by **1 October 2004**.

5 Ground Water

Domestic wastewater contains constituents such as total dissolved solids (TDS), specific conductivity, pathogens, nitrates, organics, and metals. The Discharger's use of unlined ponds and the application of wastewater to land may result in an increase in the concentration of these constituents in groundwater. The increase in the concentration of these constituents in groundwater must be consistent with Resolution 68-16. Any increase in pollutant concentrations in groundwater must be shown to be necessary to allow wastewater service necessary to accommodate housing and economic expansion in the area and must be consistent with maximum benefit to the people of the State of California. Some degradation of groundwater by the Discharger is consistent with Resolution 68-16 provided that:

a. The degradation is confined to a specified area;

b. The degradation after effective source control, treatment, and control is limited to waste constituents typically encountered in municipal wastewater as specified in the groundwater limitations in this Order;
c. The Discharger minimizes the degradation by fully implementing, regularly maintaining, and optimally operating best practicable control technology (BPCT) measures; and
d. The degradation does not result in water quality less than that prescribed in the Basin Plan, e.g., does not exceed water quality objectives.

Monitoring of the groundwater must be conducted to determine if the discharge has caused an increase in constituent concentrations, when compared to background. The monitoring must, at a minimum, require a complete assessment of groundwater impacts including an assessment of all wastewater-related constituents which may have migrated to groundwater, the vertical and lateral extent of any degradation, and an analysis of whether additional or different methods of treatment or control of the discharge are necessary to provide best practicable treatment or control to comply with Resolution 68-16. Economic analysis is only one of many factors considered in determining best practicable treatment. If monitoring indicates that the discharge has incrementally increased constituent concentrations in groundwater above background, this permit may be reopened and modified. Until groundwater monitoring is sufficient, this Order contains Groundwater Limitations that allow groundwater quality to be degraded for certain constituents when compared to background groundwater quality, but not to exceed water quality objectives or standards. If groundwater quality is shown to have been degraded by the wastewater treatment processes or the discharge, the incremental change in pollutant concentration (when compared with background) may not be increased. This Order may also be reopened and specific numeric limitations established.

The discharge authorized herein and the treatment and storage facilities associated with the discharge of treated municipal wastewater, except for discharges of residual sludge and solid waste, are exempt from the requirements of Title 27, CCR, Section 20005 et seq. (hereafter Title 27). The exemption, pursuant to Title 27, CCR, Section 20090(a), is based on the following:

a. The waste consists primarily of domestic sewage and treated effluent;

b. The waste discharge requirements are consistent with water quality objectives; and

c. The treatment and storage facilities described herein are associated with a municipal wastewater treatment plant.

This Order requires the Discharger to prepare technical and monitoring reports as authorized by California Water Code (CWC) Section 13267. This Order also requires that the Discharger conduct groundwater monitoring and includes a regular schedule of groundwater monitoring in the attached Monitoring and Reporting Program. The groundwater monitoring reports are necessary to evaluate impacts to waters of the State to assure protection of beneficial uses and compliance with Regional Board plans and policies, including Resolution 68-16, and to assure compliance with this Order.

6 Thermal Limitations

The State Water Resources Control Board (State Board) 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 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.

For the purposes of compliance with the Thermal Plan, the Discharger is considered to be an existing discharger of elevated temperature waste. Monitoring by the Discharger indicates that the 20 degree °F limitation of Objective 5.A.(1)a of the Thermal Plan is occasionally exceeded in winter months when the receiving water is at its lowest temperatures. Modeling conducted by RMA, subject to the limitations discussed below, indicates that the current and the expanded flows with continuous discharge exceed both the 1 degree and 4 degree requirements of Objectives 5.A.(1)b and 5.A.(1)c of the Thermal Plan. The modeling also demonstrates that a timed discharge, that is, discharging only on the outgoing tide, for the increased flow exceeds only the 4 degree requirement, but not the 1 degree requirement. The Discharger has requested an exception to the 4 degree requirement of Objective 5.A.(1)c of the Thermal Plan which requires that the discharge shall not cause a surface water temperature rise greater than 4 °F above the natural temperature of the receiving waters at any time or place and has also requested a one month averaging period to meet the 20 degree limit of Objective 5.A.(1)a. An exception cannot be authorized at this time due to a number of factors. First, the accuracy of the temperature model results which are the basis for the receiving water limitation violations are questionable due to a lack of site data to calibrate and validate the model, the lack of accounting for atmospheric heat gains and loss from the proposed holding pond and the river, the lack of accounting for tidal cycles and recirculation from the limited model run time, and the lack of accounting for the Brown Sand, Inc. discharge adjacent to the City's discharge. Second, the Discharger has not conducted regular monitoring of temperature at the outfall as required in its previous permit, and the available information is based on a limited data set which correlates the temperature at the plant site and at the outfall. Third, the Discharger has not provided adequate evidence that a 30-day averaging period for Effluent Limitation B.11. will not cause adverse impacts to aquatic life. Finally, the Discharger does not currently have the capability to implement a timed discharge on out-going tides.

Effluent Limitations and Receiving Water Limitations are included to require compliance with the Thermal Plan. If adequate information is developed to support exceptions to the Thermal Plan, this Order may be reopened to modify limitations for Thermal Plan compliance.

Studies by the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, the California Department of Fish and Game, the University of California at Davis, et. al., have identified the Central Valley Chinook Salmon and the Central Valley Steelhead as sensitive species that are affected by elevated temperatures in the San Joaquin River. There are four runs of salmon in the Central Valley that results in there being adults and juveniles in portions of the Delta every month of the year (Moyle, 2000). Generally, adults would be moving upstream in the fall, and fry and smolt moving downstream in the winter and spring. River temperatures above 68 °F are unsuitable for supporting salmonoids (Draft EIR, 2000). Migration of adults is usually delayed when river temperatures reach this level. In a Department of Water Resources Study, adult salmon will cease migration if water temperatures are above 70 °F. At 77 °F, adult mortality may occur (Myrick, Cech, 2001). 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 San Joaquin 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. The CALFED Bay-Delta Program target is to maintain water temperatures below 68 °F in migratory routes of anadromous fish in the spring and fall (CALFED, 2000). This Order requires the Discharger to study the thermal impacts to the receiving water associated with a discharge of treated effluent with elevated temperatures.

7 Antidegradation Analysis

The Regional Board must consider antidegradation pursuant to 40 CFR 131.12 and State Board Resolution No. 68-16 and find that the permitted discharge is consistent with those provisions. With regard to surface water, the receiving water may exceed applicable water quality objectives for certain constituents as described in this Order. However, this Order requires the discharger, in accordance with specified compliance schedules, to meet requirements that will result in the use of best practicable treatment or control of the discharge and will result in compliance with water quality objectives. Table 1 of the information sheet provides an analysis of the mass loading to the receiving water for a number of constituents based on current operations and for an expanded discharge flow following plant upgrades. This Order requires compliance with technology-based standards and more stringent water quality-based standards. In developing effluent limitations, this Order allows the use of some of the assimilative capacity of the receiving water based on the current performance of the discharger and is consistent with the SIP. Where assimilative capacity is available in the receiving water, this Order does not authorize the full use of the assimilative capacity. This Order is consistent with California Water Code section 13263(b). Any further use of the assimilative capacity would not be consistent with Resolution 68-16. Compliance with these requirements will result in the use of best practicable treatment or control of the discharge. The impact on existing water quality will be insignificant. The total allowable discharge to surface water of 9.87 mgd has been increased from 6.95 mgd from the previous Order. The discharge is consistent with Resolution 68-16 and 40 CFR section 131.12 because this Order requires the discharger to meet requirements that will result in best practicable treatment or control to assure that pollution or nuisance will not occur prior to allowing flows to increase.

With regard to groundwater, domestic wastewater contains constituents such as total dissolved solids (TDS), specific conductivity, pathogens, nitrates, organics, and metals. The Discharger's use of unlined ponds and the application of wastewater and sludge to land may result in an increase in the concentration of these constituents in groundwater. Some degradation of groundwater by the Discharger is consistent with Resolution 68-16 provided that:

a. The degradation is limited in extent;
b. The degradation after effective source control, treatment, and control is limited to waste constituents typically encountered in municipal wastewater as specified in the groundwater limitations in this Order;
c. The Discharger minimizes the degradation by fully implementing, regularly maintaining, and optimally operating best practicable control technology (BPCT) measures; and
d. The degradation does not result in water quality less than that prescribed in the Basin Plan, e.g., does not exceed water quality objectives.

The discharge to land authorized by this Order must comply with groundwater limitations, ground water monitoring requirements and a schedule to evaluate whether the Discharger is implementing best practicable treatment or control of the discharge. Compliance with this Order will result in use of best practicable treatment or control and will not further degrade the groundwater.

8 Acute Toxicity

Order No. 97-115 prescribed stricter acute toxicity test procedures than the Discharger's previous permit. Specifically, the acute toxicity bioassay parameters were revised to require compliance with the latest testing procedures contained in EPA/600/4-90/027F. The new USEPA procedure requires the use of larval stage (0 to 14 days old) fathead minnows or golden shiners instead of the previous method of using juveniles (15 to 30 days old). Larvae are much more sensitive to ammonia levels than the juvenile species. The new USEPA procedure for the acute bioassay test constitutes a more stringent acute toxicity limitation. This Order allows the Discharger to remove ammonia prior to conducting acute toxicity tests until 1 April 2004, when facilities are required to be operational to fully nitrify the wastewater.

9 Non-priority pollutants

9.1 Residual Chlorine

The Discharger currently uses chlorine for disinfection and has reported that it uses sodium hypochlorite for maintenance. Chlorine is extremely toxic to aquatic organisms. The Discharger uses a sulfur dioxide process to dechlorinate the effluent, but will discontinue this with the installation of the UV disinfection system. Because of the existing chlorine use and the future use of hypochlorite solutions without effluent dechlorination, there is reasonable potential for chlorine to be discharged at toxic concentrations. The Basin Plan contains a narrative toxicity objective. Consistent with 40 CFR 122.44(d), it is appropriate to use the USEPA ambient water quality criteria for chlorine for protection of freshwater aquatic life of 11 ug/l as a 4-day average (chronic) concentration, and 19 ug/l as a 1-hour

average (acute) concentration to implement the narrative toxicity objective. Therefore, this Order includes water quality based effluent limitations for chlorine based on the USEPA ambient criteria to protect freshwater aquatic life.
The WQCF outfall is a side bank discharge to the San Joaquin River. The chlorine residual limitations required in this Order are protective of aquatic organisms in the undiluted discharge. Because of this, the Regional Board does not anticipate residual chlorine impacts to benthic organisms if compliance is maintained.

9.2 Salinity

The discharge contains total dissolved solids (TDS), chloride and electrical conductivity. These are water quality parameters that are typically indicative of the salinity of the water. Their presence in water can be growth limiting to certain agricultural crops and can affect the taste of the water for human consumption. There are no USEPA water quality criteria for protection of aquatic organisms for these constituents. The Basin Plan "Chemical Constituent" objective incorporates state MCLs, contains a narrative objective, and contains numeric water quality objectives for electrical conductivity. The secondary California maximum contaminant level (MCL) for TDS is 500 mg/l as a recommended level, 1000 mg/l as an upper level, and 1500 mg/l as a short-term maximum. The recommended agricultural water quality goal for TDS, that would implement the narrative "Chemical Constituent" objective, is 450 mg/l as a long-term average based on *Water Quality for Agriculture,* Food and Agriculture Organization of the United Nations—Irrigation and Drainage Paper No. 29, Rev. 1 (R.S. Ayers and D.W. Westcot, Rome, 1985). *Water Quality for Agriculture* evaluates the impacts of salinity levels on crop tolerance and yield reduction, and establishes water quality goals that are protective of sensitive agricultural uses. The recommended agricultural water quality goal for chloride, that would implement the narrative "Chemical Constituent" objective, is 106 mg/l based on *Water Quality for Agriculture,* Food and Agriculture Organization of the United Nations—Irrigation and Drainage Paper No. 29, Rev. 1 (R.S. Ayers and D.W. Westcot, Rome, 1985). The Basin Plan water quality objectives for electrical conductivity for the South Delta are 700 umhos/cm (from 1 April to 31 August) and 1000 umhos/cm (from 1 September to 31 March). State Board Decision 1641 (D-1641) (water rights) requires that the 1000 umhos/cm objective be met year round until 1 April 2005 at which time the seasonal objectives will be effective.

A review of the Discharger's monitoring reports from January 1998 through December 2002 indicates an annual average TDS effluent concentration of 634 mg/l, a lowest monthly average of 540 mg/l, and a highest monthly average of 727 mg/l. These concentrations exceed the applicable objectives. Limited TDS data collected at receiving water sample location R1 from January 2002 through December 2002 showed a TDS concentration range from 210 mg/l to 1300 mg/l with an average of 500 mg/l in 12 sampling events. The Regional Board report *Total Maximum Daily Load for Salinity and Boron in the Lower San Joaquin River (January 2002)* presented monthly average TDS data for the San Joaquin River at Vernalis from October 1976 through September 1997. The Vernalis data showed a maximum monthly average TDS of 1024 mg/l with 57 of 252 months having monthly averages greater than 500 mg/l. These data indicate that the receiving water frequently exceeds water quality objectives to protect its beneficial uses and lacks assimilative capacity for TDS. As water exported from the Delta by the State Water Project is, in part, mixed with Colorado River water to provide municipal water supply with an acceptable TDS, any increase in salt concentration effectively reduces the available water supply in Southern California (*Metropolitan Water District of Southern California, Salinity Management Study, 1998*).

Chloride concentrations in the effluent ranged from 100-230 mg/l with an average of 138 mg/l based on 16 samples collected during 2002. Background concentrations in the San Joaquin River ranged from 51-170 mg/l with an average of 98 mg/l based on results from eleven samples collected during 2002. Both the receiving water and the effluent exceed the agricultural use-protective water quality limit of 106 mg/l, based on the narrative objective.

Electrical conductivity (EC) shows reasonable potential to exceed water quality objectives in both the effluent and in the receiving water. A review of the Discharger's monitoring reports from January 1998 through December 2002 shows the annual average effluent EC is 1099 umhos/cm, the lowest monthly average is 819 umhos/cm, and the highest monthly average is 1300 umhos/cm. These levels exceed the applicable objectives. EC data collected at receiving water sample location R1 from January 2002 through December 2002 show that the conductivity in the receiving water ranged from 380 umhos/cm to 1100 umhos/cm and averaged 686 umhos/cm in 12 sampling events. Hourly EC data collected at the Department of Water Resources (DWR) Mossdale monitoring station (RSAN087) from December 2000 through September 2002 show that the conductivity in the San Joaquin River ranged from 299 umhos/cm to 1131 umhos/cm and averaged 721 umhos/cm. San Joaquin River monitoring for electrical conductivity at Vernalis between 1985 and 1998 showed frequent exceedances of the EC water quality objectives (Reference Figure 1-3; *Total Maximum Daily Load for Salinity and Boron in the Lower San Joaquin River (January 2002)*). These data show that the receiving water frequently has no assimilative capacity for EC. An Effluent Limitation for electrical conductivity is included in this Order and is based on the Basin Plan water quality objective for electrical conductivity in the South Delta.

The TDS, chloride, and electrical conductivity objectives and recommended levels are all measures of the salt content of the water. Compliance with the Effluent Limitations for electrical conductivity based on the Basin Plan seasonal water quality objectives of 700 umhos/cm and 1000 umhos/cm will be protective of the chloride and TDS recommended levels; therefore, no limitations are included for chloride and TDS.

9.3 Aluminum

Aluminum concentrations in the effluent were detected in the range from 70 ug/l to 350 ug/l in sampling conducted in 2002. Aluminum was detected in the receiving water (R-1) in the range from 420 ug/l to 2200 ug/l in 12 samples collected between January 2002 and December 2002. Dissolved concentrations of aluminum in the effluent and the receiving water were significantly less than the totals listed above. The Basin Plan's chemical constituents water quality objective prohibits chemical constituents in concentrations that exceed state MCLs or that adversely affect beneficial uses. MUN is a beneficial use of the San Joaquin River. The Primary and Secondary MCLs for aluminum are 1000 ug/l and 200 ug/l respectively. The Basin Plan contains a narrative toxicity objective. Consistent with 40 CFR 122.44(d), USEPA's Ambient Water Quality Criteria for protection of freshwater aquatic life for aluminum expressed as total recoverable are 750 ug/l (1-hour average) and 87 ug/l (4-day average), and are appropriate to implement the narrative toxicity objective. Since both the receiving water and the effluent exceed USEPA's ambient water quality criteria and the secondary MCL, no dilution can be granted. The effluent has the reasonable potential to cause or contribute to an in-stream excursion above water quality objectives for aluminum. Therefore, this Order includes an effluent limitation for Aluminum of 71 ug/l as a 30-day average and 143 ug/l as the daily maximum. The monitoring data are included in Table 3 and the effluent limitation calculations are included in Table 6.

9.4 Iron

Iron concentrations in the effluent ranged from 170-730 ug/l while background concentrations in the San Joaquin River ranged from 780-2800 ug/l based on results from 12 samples collected between January 2002 and December 2002. The Basin Plan chemical constituents objective includes a receiving water objective in Table III-1 for iron of 300 ug/l in the Delta, and the secondary MCL for iron of 300 ug/l. Both the receiving water and the effluent exceed the Basin Plan numeric objective and the secondary MCL. Water quality based effluent limitations are included in this Order based on the Basin Plan chemical constituents objective. The data are included in Table 3 and the effluent limitation calculations in Table 6.

9.5 Manganese

Manganese concentrations in the effluent ranged from 13-120 ug/l while background concentrations in the San Joaquin River ranged from 82-220 ug/l based on results from 11 samples collected between January 2002 and December 2002. The Basin Plan chemical constituents objective includes a receiving water objective in Table III-1 for manganese of 50 ug/l in the Delta, and the secondary MCL for manganese of 50 ug/l. Both the receiving water and the effluent exceed the Basin Plan numeric objective and the secondary MCL. Water quality-based effluent limitations are included in this Order based on the Basin Plan chemical constituents objective. The data is included in Table 3 and the effluent limitation calculations in Table 6.

9.6 Methylene blue active substances (MBAS)

The effluent contains MBAS at levels that may cause or contribute to exceedances in the receiving waters of water quality objectives in the Basin Plan. The Basin Plan includes the "Chemical Constituents" objective that incorporates state MCLs that applies to waters designated MUN. MUN is a designated beneficial use of the San Joaquin River. The Secondary MCL Consumer Acceptance Limit is 500 ug/l for foaming agents (MBAS). The Basin Plan also includes water quality objectives that water not contain floating material or taste- or odor-producing substances in concentrations that causes nuisance or adversely affect beneficial uses. The Basin Plan identifies non-contact water recreation, which includes aesthetic enjoyment, as a beneficial use of the San Joaquin River. MBAS concentrations in excess of the Secondary MCL produce aesthetically undesirable froth, taste, and odor. Foam has been observed on the surface of the discharge plume from the WQCF. MBAS was detected in an effluent sample collected 13 June 2002 at a concentration of 1,800 ug/l. The maximum observed upstream receiving water MBAS concentration is less than 20 ug/l. These data were used in calculating Effluent Limitations for MBAS (see Table 6). Because of the observed foaming at the outfall, no dilution is available for MBAS. An Effluent Limitation for MBAS is included in this Order and is based on the Basin Plan water quality objectives for chemical constituents, floating material, and tastes and odors.

9.7 Molybdenum

The recommended agricultural water quality goal for molybdenum, that would implement the narrative "Chemical Constituent" objective, is 10 ug/l based on *Water Quality for Agriculture,* Food and Agriculture Organization of the United Nations—Irrigation and Drainage Paper No. 29, Rev. 1 (R.S. Ayers and D.W. Westcot, Rome, 1985). Molybdenum was not monitored in the effluent or in the receiving waters. Because of the uncertainty associated with the lack of monitoring, additional studies of this constituent are warranted to more thoroughly evaluate reasonable potential for this constituent to exceed criteria. MRP No. R5-2004-0028 specifies monitoring for this pollutant. If the monitoring shows a reasonable potential to cause or contribute to an exceedance of a water quality objective, this Order may be reopened for addition of appropriate effluent limitations.

9.8 Carbofuran

The Basin Plan contains a narrative objective for toxicity that prohibits concentrations of toxic substances that could produce detrimental physiological responses in humans. Public Health Goals published by OEHHA provide a measure of an amount of a toxic substance that, if exceeded could contribute to toxicity in humans who consume the water for municipal or domestic supply (MUN). MUN is a designated beneficial use of the receiving water. Carbofuran was detected in the effluent and receiving water at concentrations greater than the Public Health Goalof 1.7 ug/l. Because the data were greater than the method detection limit but less than the laboratory's reporting (quantitation) limit, the data were flagged as "detected but not quantified". Additional monitoring is required. If the monitoring shows a reasonable potential to cause or contribute to an exceedance of a water quality objective, this Order may be reopened to consider incorporation of appropriate effluent limitations.

9.9 Nitrate and Nitrite

Nitrate and nitrite are known to cause adverse health effects in humans. The Basin Plan's chemical constituents water quality objective prohibits chemical constituents in concentrations that exceed drinking water Maximum Contaminant Levels (MCLs) published in Title 22 of the California Code of Regulations or that adversely affect beneficial uses. Municipal and domestic water supply is a beneficial use of the San Joaquin River. The California Department of Health Services (DHS) has adopted Primary Maximum Contaminant Levels (MCLs) for the protection of human health for nitrite and nitrate that are equal to 1 mg/l and 10 mg/l (measured as nitrogen), respectively. Title 22 CCR, Table 64431-A, also includes a primary MCL of 10,000 ug/l for the sum of nitrate and nitrite, measured as nitrogen. The discharge from the WQCF has a reasonable potential to cause or contribute to an in-stream excursion above water quality standards for nitrite and nitrate because of the nitrification and denitrification processes. Effluent limits for nitrite and nitrate are based on the MCLs. Effluent Limitations for nitrite and nitrate are included in this Order to assure the treatment process adequately nitrifies and denitrifies the waste stream to protect the beneficial uses of municipal and domestic supply.

10 Ammonia-Nitrogen

This section provides a detailed discussion and evaluation of ammonia in the effluent.

A review of the Discharger's monitoring reports from January 1998 through December 2002 shows an average ammonia effluent concentration of 18 mg/l, a minimum concentration of less than 0.1 mg/l, and a maximum concentration of 43 mg/l. The data indicate very little seasonal fluctuation. Receiving water monitoring (R-1) was conducted from January 2002 through December 2002 (see Table 4). The receiving water data showed an average of 0.2 mg/l with a minimum of less than 0.01 mg/l and a maximum of 1.4 mg/l.

10.1 Toxicity Criteria

The USEPA 1999 Update of Ambient Water Quality Criteria for Ammonia provides the applicable water quality criteria for this pollutant. Ammonia is not a priority pollutant; therefore, USEPA guidance, rather than the SIP, is applicable for reasonable potential and effluent limitation calculations. Section 4.3.3 of the TSD allows the consideration of exposure duration in evaluating toxicity to organisms passing through a mixing zone. 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.

10.2 Consideration of Aquatic Organisms

The most stringent acute ammonia criteria are applied when salmonoids are present within the water column. The San Joaquin River at Manteca is a migratory path for salmon, and they are likely to be present in the river at any time of the year. The chronic ammonia criteria are most stringent when early life stages (ELS) of aquatic species are present. In response to a request for information regarding the time of year ELS of fish are present in the San Joaquin River near the Deep Water Ship Channel (DWSC), a Department of Fish and Game memorandum, dated 27 February 2001, states ELS of multiple fish and invertebrates species are present in the San Joaquin River year-round. Therefore, both acute and chronic ammonia toxicity are based on the assumption that both salmonoids and ELS of fishes are present in the San Joaquin River near the Manteca WQCF outfall year-round.

10.3 Reasonable Potential Evaluation

The reasonable potential evaluation shows that the WQCF effluent has reasonable potential to cause or contribute to an in-stream excursion above USEPA acute and chronic water quality criteria for ammonia. This has been demonstrated by determining reasonable potential based on critical conditions that are a combination of worst-case observations[1] using effluent data and using receiving water data (see Table 7). Consistent with 40 CFR section 122.44(d)(vi)(A) and the Basin Plan "Policy for Application of Water Quality Objectives", this Order implements the Basin Plan narrative toxicity objective by applying USEPA's Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life for ammonia. This Order includes effluent limitations for ammonia, based on the narrative toxicity objective and the USEPA's Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life.

The acute criterion or criteria maximum concentration (CMC) for ammonia is a function of receiving water pH and is stated as a 1-hour average concentration. A worst-case scenario occurs when there is little to no dilution of the effluent by the receiving water. This was discussed in the previous dilution section. Therefore, for the acute criteria, water quality objectives need to be achieved in the effluent at the end-of-pipe. As allowed by the TSD, this Order calculates the CMC using critical conditions that are a combination of worst-case observations. The acute criterion for ammonia is determined by evaluating the maximum effluent pH at the end of the pipe. The maximum allowable effluent pH is 8.0. The calculated CMC for this condition is 5.6 mg/l ammonia as N. The maximum effluent concentration, measured on 15 August 2001, was 42.8 mg/l ammonia as N. This exceeds the calculated ammonia CMC value. Even using the mean effluent ammonia concentration of 17.7 mg/l exceeds the CMC value under worst-case pH conditions. This scenario shows that there is reasonable potential for acute water quality objectives to be exceeded by effluent ammonia concentrations.

The receiving water pH and ammonia concentrations were also evaluated to determine if there is reasonable potential to cause acute ammonia toxicity, based upon concentrations found in the receiving water. The acute criterion is determined using the receiving water pH. In July 2002, the receiving water reached a maximum pH of 9.3, as recorded by the City at the R-1 monitoring site. The receiving water ammonia concentrations determined by the discharger's monitoring during 2002 indicated a maximum concentration of 1.4 mg/l with an average of 0.2 mg/l. As determined by the TSD approach, the receiving water at times may exceed the CMC for ammonia.

The chronic criterion, or 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 within the 30-day average not to exceed 2.5 times the CCC. As allowed by the TSD, the CCC is calculated using critical conditions that are a combination of worst-case observations. The highest receiving water 30-day average pH was 9.1, observed during June/July 1992 at the DWR Mossdale monitoring station. The maximum 30-day average temperature of 25.7 C (78.3 F) was observed during July 2002 at the DWR Mossdale monitoring station. The calculated CCC for this condition is 0.21 mg/l ammonia-N. The effluent 30-day average ammonia concentration during that same period was 14.1 mg/l ammonia as N and
17.7 mg/l averaged over the past 5 years. The calculated CCC is exceeded which demonstrates that the effluent has the reasonable potential to cause or contribute to chronic ammonia toxicity in the receiving water.

[1] EPA Technical Support Document, March 1991, Chapter 3

The monthly average receiving water pH and temperature from the Mossdale monitoring station, and ammonia concentrations collected from the R-1 sample location during 2002 were evaluated to determine if concentrations have been observed in the receiving water above the chronic criteria. The TSD method demonstrated a reasonable potential for the receiving water to exceed the chronic ammonia toxicity. The maximum ammonia concentration of 1.4 mg/l also demonstrates that there are times when there is no assimilative capacity in the receiving water for additional ammonia.

10.4 Effluent Ammonia Limits

Based on the above discussion of reasonable potential, daily and monthly effluent ammonia limitations are required to protect aquatic organisms from ammonia toxicity. The USEPA TSD recommends that statistical permit limit derivations be used to develop chemical specific limitations for NPDES permits. Effluent limitations are calculated as shown in Table 8. Because of the seasonal variation in pH and temperature of the receiving water and the sensitivity of the ammonia criteria to these conditions, seasonal limitations are established.

For the warm weather months from 1 June to 30 September, the maximum permitted monthly average effluent pH is 8.0, the maximum historical monthly average receiving water pH is 9.1, the maximum historical monthly average effluent temperature is 27.2 F, and the maximum historical monthly average receiving water temperature is 25.7 F. The pH and temperature at the edge of a 4:1 mixing zone were estimated utilizing the USEPA DESCON program. These estimations are utilized in Table 8 to calculate effluent limitations that maintain compliance with chronic aquatic criterion in the receiving water outside of the mixing zone. Effluent limitations compliant with acute criteria for conditions at the end-of-pipe are also determined, but the more restrictive chronic criteria determine the final effluent limitations. Table 8 provides a daily maximum effluent limitation of 4.4 mg/l ammonia as N and a 30-day average effluent limitation of 2.1 mg/l. As defined by the 1999 criteria, the 4-day average CCC ammonia concentration shall not exceed 2.5 times the value of the 30-day CCC. However, considering the maximum daily limitation is less than 2.5 times the CCC in all cases, the 4-day average cannot exceed the maximum daily limitation.

For the cool weather months from 1 October to 31 May, the maximum permitted monthly average effluent pH is 8.0, the maximum historical monthly average receiving water pH is 8.5, the maximum historical monthly average effluent temperature is 25.2 F, and the maximum historical monthly average receiving water temperature is 19.6 F. The pH and temperature at the edge of a 4:1 mixing zone were estimated utilizing the USEPA DESCON program. These estimations are utilized in Table 8 to calculate effluent limitations that maintain compliance with chronic aquatic criterion in the receiving water outside of the mixing zone. Effluent limitations compliant with acute criteria for conditions at the end-of-pipe are also determined. In this case, the more restrictive acute criteria determine the final effluent limitations. Table 8 show that the acute criteria using the maximum permitted effluent pH of 8.0 provides a daily maximum effluent limitation of 5.6 mg/l ammonia as N and a 30-day average effluent limitation of
2.8 mg/l.

The Clean Water Act requires publicly owned treatment works to comply with the secondary treatment and applicable water quality standards existing prior to 1 July 1977. USEPA's regulations state that any NPDES compliance schedule may not extend beyond an applicable Clean Water Act statutory deadline. Therefore, a compliance schedule that extends the date for compliance with water quality standards that existed prior to 1 July 1977 may not be included in the Order.

11 Priority Pollutants

This section and its subsections discuss how priority pollutants are evaluated against criteria and how limitations and interim requirements are developed.

For priority pollutants, guidance for determining reasonable potential, effluent limitations, and compliance schedules is provided by the SIP, adopted in March 2000 by the SWRCB. USEPA promulgated the numeric water quality criteria for priority pollutants with the adoption of the CTR in May 2000. Table 10 summarizes the priority pollutants of concern and their respective criteria.

Priority pollutant constituents were analyzed in the effluent and the receiving water (location R-1) from January 2002 to December 2002. The results of these analyses were evaluated for their reasonable potential to exceed Basin Plan, CTR, or other applicable criteria. Section 1.3 of the SIP establishes the guidance for reasonable potential analysis. Table 10 summarizes the reasonable potential analysis of the detected constituents.

11.1 Inorganic Priority Pollutants

The inorganic pollutants **arsenic**, **copper** and **cyanide** were found to have a reasonable potential to cause or contribute to an exceedance of the applicable Basin Plan objectives. Effluent limitations are therefore required for arsenic, copper, and cyanide.

Based on the information received from the Discharger, the use of the steady-state model described in Section 1.4B of the SIP was utilized for calculating effluent limitations. Dilution credits are provided to the degree indicated in the dilution evaluation (see section 2). The acute and chronic criteria for copper are a function of hardness. In general, lower hardness values provide more stringent criteria. The hardness value expected to occur at the point in the receiving water where the standard applies, is considered the design hardness. San Joaquin River hardness data is available at Vernalis, Mossdale, and at the Manteca outfall (R-1). The data sets have similar values. There is more river hardness data available over a longer period at Vernalis, therefore, the Vernalis data were used to evaluate receiving water hardness. In determining design hardness, the Regional Board analyzed the receiving water hardness measured at Vernalis during periods when critical low flow was probable (i.e. San Joaquin River flow at Vernalis ranging from 800 cfs to 1,200 cfs). The effluent hardness was also utilized for the acute criteria calculations where dilution is not available.

Receiving water hardness is generally flow-related with lower flows providing higher hardness values. To determine the design hardness, receiving water hardness and flow data collected from the USGS monitoring station at Vernalis from 1950 through 1999 were evaluated. The dataset was filtered for hardness under design flow conditions (see Figure 1). The minimum flow at Vernalis is approximately 1000 cfs which is the flow that the U.S. Bureau of Reclamation maintains at Vernalis to meet the 1995 Water Quality Control Plan salinity objective of 1000 umhos/cm. Hardness data was then evaluated in the range of 800 to 1,200 cfs. The receiving water hardness generally ranged from 150 to 250 mg/l as $CaCO_3$ with the lowest observed receiving water hardness under these conditions being 108 mg/l $CaCO_3$. At a hardness of 108 mg/l, the chronic criterion, or criterion continuous concentration (CCC), for copper is 9.6 ug/l.

Effluent hardness values ranged from 170 mg/l to 190 mg/l during the period from March 2002 to December 2002. Because no dilution is allowed for effluent limitations based on acute criteria, the minimum effluent hardness value of 170 mg/l was used for calculating effluent limitations. Using the minimum effluent hardness, the acute criterion, or criterion maximum concentration (CMC), for copper is 22.2 ug/l as dissolved, based on the SIP. However, the hardness dependent SIP criterion exceeds the Basin Plan site-specific objective of 10 ug/l as dissolved. Therefore, the copper effluent limits were calculated using a CMC of 10 ug/l as dissolved. Effluent limitations, which are expressed as total recoverable, are somewhat higher after the application of a 0.96 translator. There have been no approved studies by the Discharger to evaluate discharge-specific metal translators for copper; therefore, the default USEPA translators within the CTR were used in the calculation of the final effluent limitations.

The final effluent limitations were calculated using a steady-state model method described in Section 1.4 of the SIP. Section 5.4.4 of the TSD was utilized to determine the monthly average limit for arsenic. Water quality-based effluent limitations are included in this Order based on the Basin Plan chemical constituents objective. The data are included in Table 9 and the effluent limitation calculations in Table 11.

11.2 Human Carcinogens

There were five (5) human carcinogenic compounds present in the WQCF effluent. As summarized in Table 10, dibromochloromethane, bromodichloromethane, 2,4,6-trichlorophenol, and bis(2-ethylhexyl)phthalate were determined to present reasonable potential to exceed a one-in-a-million incremental human cancer risk criteria for water and/or organism consumption. Chloroform does not show reasonable potential to exceed the primary MCL. None of these constituents were detected in the receiving water.

11.2.1 Total Trihalomethanes and Chloroform

Information submitted by the Discharger indicate that the effluent contains trihalomethanes (THMs) including chloroform. The Basin Plan contains the "Chemical Constituent" objective that requires, at a minimum, that waters with a designated MUN use not exceed California MCLs. In addition, the Chemical Constituent objective prohibits chemical constituents in concentrations that adversely affect beneficial uses. The California's Drinking Water Standard primary MCL for total THMs is 100 ug /l. The USEPA primary MCL for total THMs is 80 ug/l, which was effective on 1 January 2002 for surface water systems that serve more than 10,000 people. Pursuant to the Safe Drinking Water Act, DHS must revise the current total THMs MCL in Title 22 CCR to be as low or lower than the USEPA MCL. Total Trihalomethanes (THMs) include bromoform, bromodichloromethane, chloroform, and dibromochloromethane. Chloroform does not have promulgated CTR criteria. The State Board, in WQO No 2003-0002, stated that the Drinking Water Standard primary MCL for Total THMs of 80 ug/l could be applied to address chloroform in the discharge regulated in that Order. In addition, the Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA) has published the Toxicity Criteria Database, which contains cancer potency factors for chemicals, including chloroform, that have been used as a basis for regulatory actions by the boards, departments and offices within Cal/EPA. This cancer potency factor is equivalent to a concentration in drinking water of 1.1 ug/l (ppb) at the 1-in-a-million cancer risk level with the consumption of the drinking water over a 70-year lifetime. This risk level is consistent with that used by the Department of Health Services (DHS) to set *de minimis* risks from involuntary exposure to carcinogens in drinking water in developing MCLs and Action Levels and by OEHHA to set negligible cancer risks in developing Public Health Goals for drinking water. The one-in-a-million cancer risk level is also mandated by USEPA in applying human health protective criteria contained in the National Toxics Rule and the California Toxics Rule to priority toxic pollutants in California surface waters.

MUN is a designated beneficial use of the receiving water. However, there are no known drinking water intakes on the San Joaquin River within several miles downstream of the discharge, and chloroform is a non-conservative pollutant. Therefore, to protect the MUN use of the receiving waters, the Regional Board finds that, in this specific circumstance, application of the USEPA MCL for total THMs for the effluent is appropriate, as long as the receiving water does not exceed the OEHHA cancer potency factor's equivalent receiving water concentration at a reasonable distance from the outfall (e.g., before reaching the drinking water intakes). Effluent samples collected from January 2002 through December 2002 indicated that THMs were present with a maximum concentration of 17 ug/l and an average concentration of 10 ug/l. Chloroform samples collected over the same period contained a maximum concentration of 12 ug/l and an average concentration of 8 ug/l. Considering the available dilution based on the harmonic mean flow of the San Joaquin River, the discharge does not have a reasonable potential to cause or contribute to an in-stream excursion above the water quality objective for MUN use by causing an exceedance of the USEPA primary MCL for total THMs or the chloroform OEHHA cancer potency factor's equivalent receiving water concentration. Therefore, effluent limitations for total THMs and chloroform are not included in this Order.

11.2.2 Effluent Limitations for Human Carcinogenic Priority Pollutants

The effluent limitation calculation procedures in Section 1.4 of the SIP allow for the granting of a dilution credit which, in this case, is 222-fold based on the harmonic mean flow of the San Joaquin River at Vernalis and the average discharge flow. However, the Regional Board finds that granting of this dilution credit would allocate an unnecessarily large portion of the River's assimilative capacity for these constituents and could violate the Antidegradation Policy. Instead, effluent limitations 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 are at estimated maximum levels as determined by taking the mean plus 3.3-standard deviations or the maximum observed concentration, which ever is larger, for data sets with 10 or more values. For data sets with less than 10 values, the maximum effluent concentration and a 3.11 multiplier (from Table 5-2 of the TSD) provides the estimated maximum levels. The calculations of the allowed dilution are shown in Table 12 which: (1) summarizes the monitoring data for the human carcinogens that have reasonable potential to exceed human carcinogen criteria; (2) summarizes the statistics used in calculating the estimated maximum concentration; and, (3) determines the amount of dilution that would be required to meet the applicable human-carcinogen criteria. Final effluent limitations are calculated and summarized in Table 13.

11.2.3 Ability to Meet Effluent Limitations and Interim Requirements

Based on historical effluent data, the WQCF can meet the effluent limitations for dibromochloromethane, bromodichloromethane, 2,4,6-trichlorophenol, and bis(2-ethylhexyl)phthalate. Additionally, because the plant will install a UV disinfection system by 1 February 2009, the THM constituents are expected to decrease significantly.

Section 1.4.2.2.B of the SIP requires, among other things, that when a mixing zone/dilution credit is granted, the permit must specify the point in the receiving water where the applicable criteria/objectives must be met. The Discharger has not performed such an analysis over a variety of flow conditions. However, considering the long-term averaging period for human carcinogens, the infrequency of critical conditions and worst-case effluent concentrations, and the fact that there are no drinking water intakes for numerous miles down- or up-stream of the discharge, the Regional Board finds the lack of a detailed mixing zone study is not significant enough to postpone the imposition of final effluent limitations for dibromochloromethane, bromodichloromethane, 2,4,6-trichlorophenol and bis (2-ethyhexyl)phthalate.

11.2.4 Receiving Water Monitoring for Human Carcinogen Priority Pollutants

Receiving water monitoring of human carcinogens is required to provide assurance that water quality criteria are being met downstream of the discharge and that the beneficial use of municipal supply is being protected. Although a mixing zone analysis has not been performed to delineate the specific boundaries of the mixing zone for human carcinogens, the samples collected at the existing R-1 and R-4 receiving water monitoring locations should provide adequate information to demonstrate compliance with water quality criteria.

11.3 Bioaccumulatives

Based on information submitted by the Discharger, the Regional Board concludes that the discharge contains **mercury**. The Delta waterways are listed in accordance with Clean Water Act Section 303(d) as impaired for mercury based on bioaccumulation of this pollutant in fish tissue. The CTR contains criteria for mercury. The CTR criteria, however, do not address bioaccumulation in the river. The WQCF effluent contains detectable levels of mercury below CTR priority pollutant 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 are not protective of actual bioaccumulation conditions in the River. Health advisories by the Department of Health Services remain in effect for human consumption of fish in the Delta, including the San Joaquin River at Manteca, due to excessive concentrations of mercury in fish tissue. These current warnings and available fish tissue data confirm that there is currently no assimilative capacity in the Delta for mercury.

Group A organo-chlorine pesticides, which include lindane, endrin aldehyde and DDT are also on the 303(d) listing. The Basin Plan sets forth a water quality objective that requires that organo-chlorine pesticides not be present in the water column in detectable concentrations. The SIP designates acceptable minimum laboratory detection levels for lindane, endrin aldehyde and DDT at 0.02 ug/l, 0.01 ug/l and 0.01 ug/l, respectively. The organo-chlorine pesticide effluent concentrations and corresponding reporting levels are at or below the SIP minimum levels and meet the Basin Plan objective. Based on these considerations, effluent limitations for Group A pesticides are not required in this Order.

Effluent samples collected from January 2002 to December 2002 contained mercury concentrations ranging from 0.013 ug/l to 0.028 ug/l. Receiving water monitoring for mercury over the same period provided results ranging from 0.0036 ug/l to 0.0093 ug/l. Table 14 summarizes the mercury data and statistics associated with the mercury results.

The effluent and receiving water have also been monitored for Group A pesticides and PCBs on four occasions during 2002. Dioxin (2,3,7,8-TCDD) was monitored twice during 2002. These constituents were not detected in the effluent or receiving water samples. Detection limits for DDT, PCB and the 2,3,7,8-TCDD were not adequate to determine compliance with the water quality criteria, therefore continued monitoring is required in this Order. Table 10 summarizes these results.

11.3.1 Interim Requirements - Bioaccumulative Priority Pollutants

The SIP recommends that the Regional Board consider whether the mass loading of bioaccumulative pollutants should be limited in the interim to "*representative current levels*" pending development of applicable water quality standards or TMDL allocation. The intent is, at a minimum, to prevent further impairment while a TMDL for a particular bioaccumulative constituent is being developed. Any increase in loading of mercury to an already impaired water body would further degrade water quality.

An interim effluent mass limitation for mercury has been determined using the WQCF design flow of 8.11 mgd and the maximum observed concentration. The data and calculation, as summarized in Table 14, provided an interim yearly mass limitation for mercury of 0.69 pounds/year (as total recoverable).

To track the Discharger's compliance with the interim mass limitation, the Discharger is required to calculate a 12-month consecutive running average of the mass loading for mercury. Starting on the 12th month after adoption of this permit, and for every month thereafter, the total mass pollutant loading for the previous twelve months will be reported in the monthly discharge monitoring reports and compared against the interim mass limitation calculated in the previous section. In addition to the numeric interim mass-based limitation for mercury, this Order requires the Discharger to prepare a pollutant prevention plan in compliance with CWC 13263.3(d)(3) for mercury.

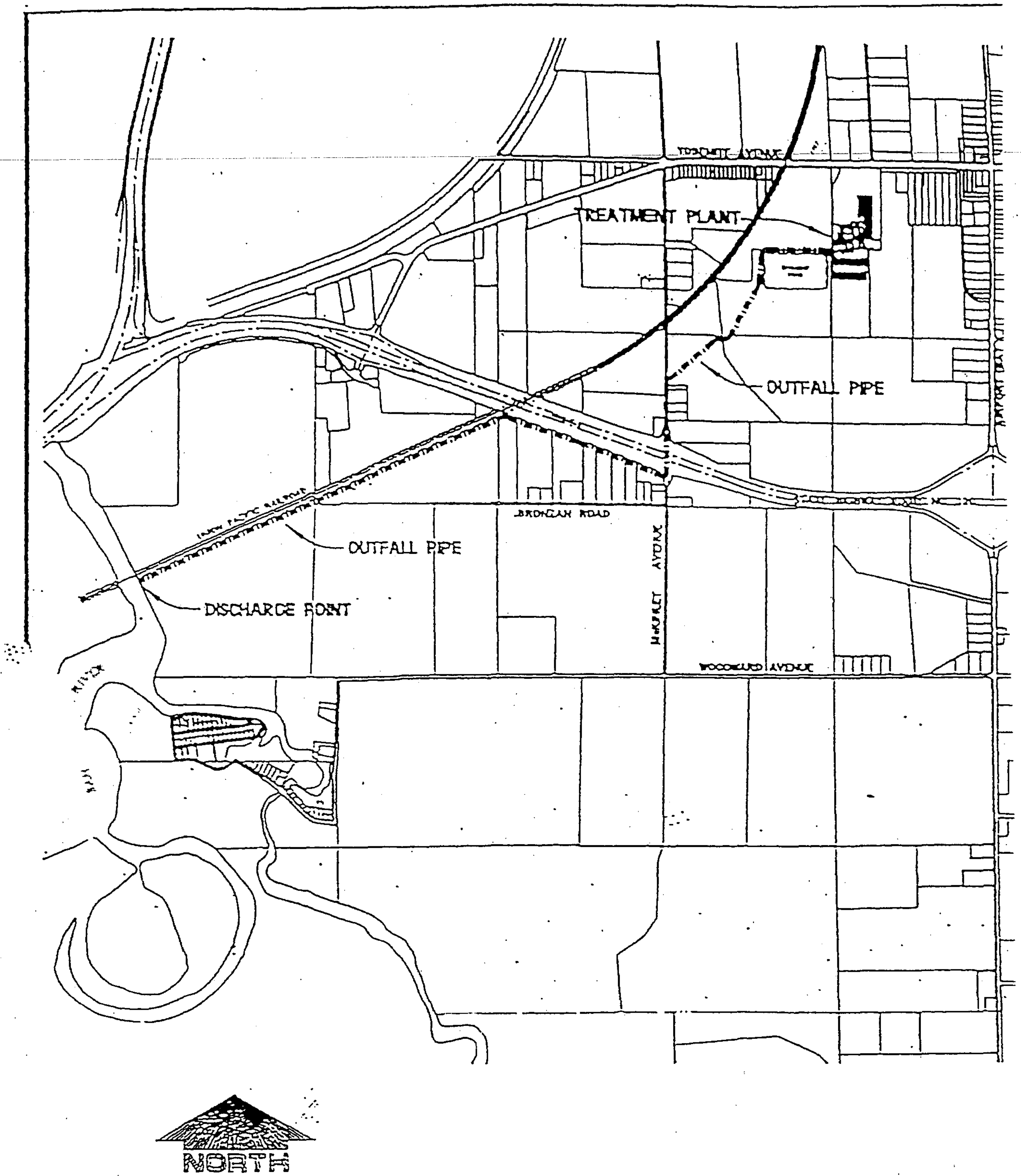
The final effluent limitations (mass load allocations) for mercury in the WQCF effluent will come from the TMDL. If the Regional Board determines that a mercury offset program is feasible for Dischargers subject to a NPDES permit, then this Order may be reopened to reevaluate the interim mercury mass loading limitation(s) and the need for a mercury offset program for this Discharger.

MWK

INFORMATION SHEET ORDER NO. R5-2004-0028 **ATTACHMENT A**
CITY OF MANTECA, CITY OF LATHROP
AND DUTRA FARMS
WASTEWATER QUALITY CONTROL FACILITY
SAN JOAQUIN COUNTY

<u>FIGURES AND TABLES</u>

F gu e



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CITY OF MANTECA & CITY OF LATHRO
WASTEW TER QUALITY CONTROL FACILITY
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SECTION .2 6E. .M.

Figure 2

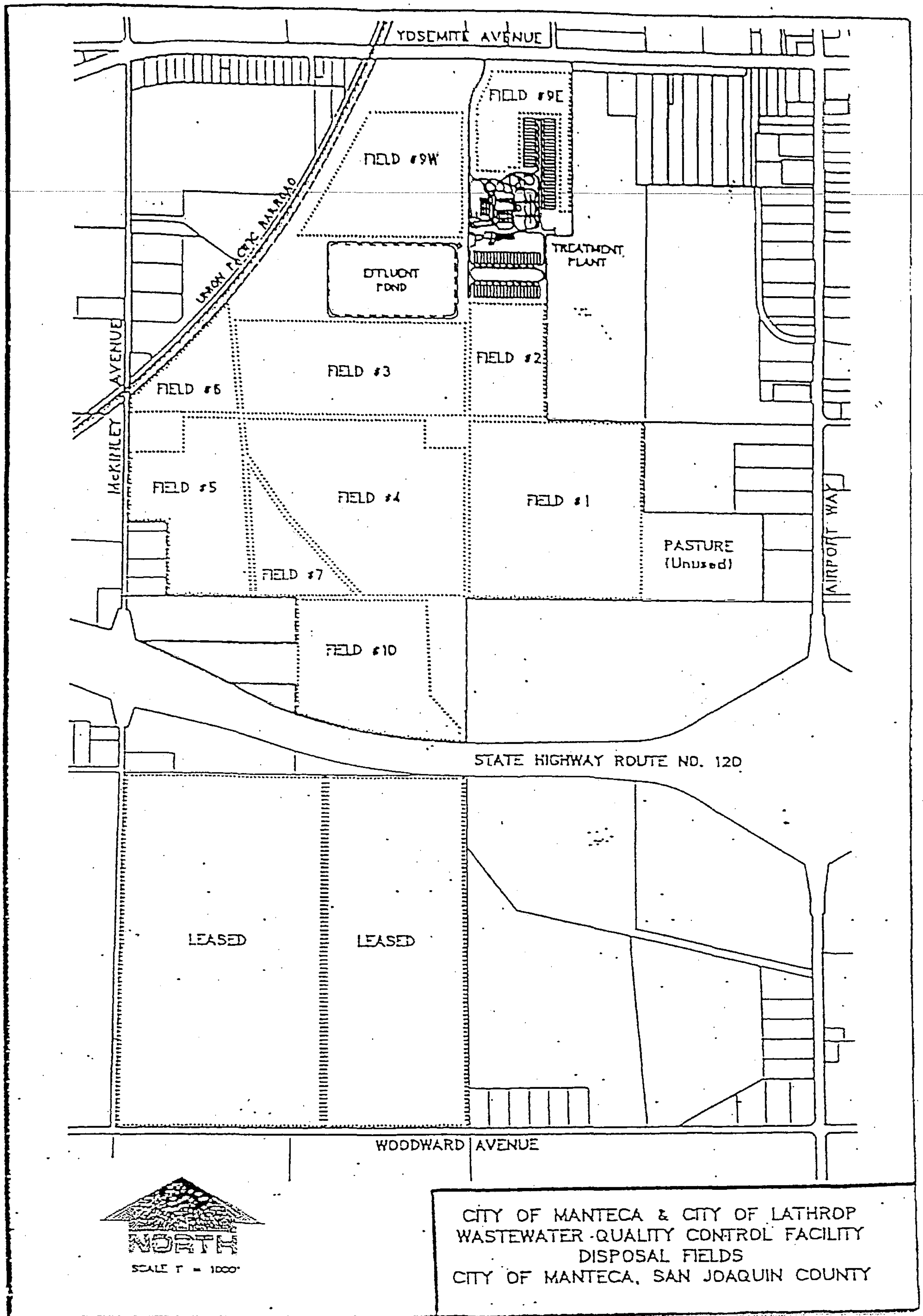
YOSEMITE AVENUE
FIELD #9E
FIELD #9W
UNION PACIFIC RAILROAD
EFFLUENT POND
TREATMENT PLANT
FIELD #3
FIELD #2
FIELD #6
McKINLEY AVENUE
FIELD #5
FIELD #4
FIELD #1
PASTURE (Unused)
AIRPORT WAY
FIELD #7
FIELD #10
STATE HIGHWAY ROUTE NO. 120
LEASED
LEASED
WOODWARD AVENUE
NORTH
CITY OF MANTECA & CITY OF LATHROP
WASTEWATER-QUALITY CONTROL FACILITY
DISPOSAL FIELDS
CITY OF MANTECA, SAN JOAQUIN COUNTY

FIGURE 3 BACKGROUND RECEIVING WATER HARDNESS VS. RIVER FLOW

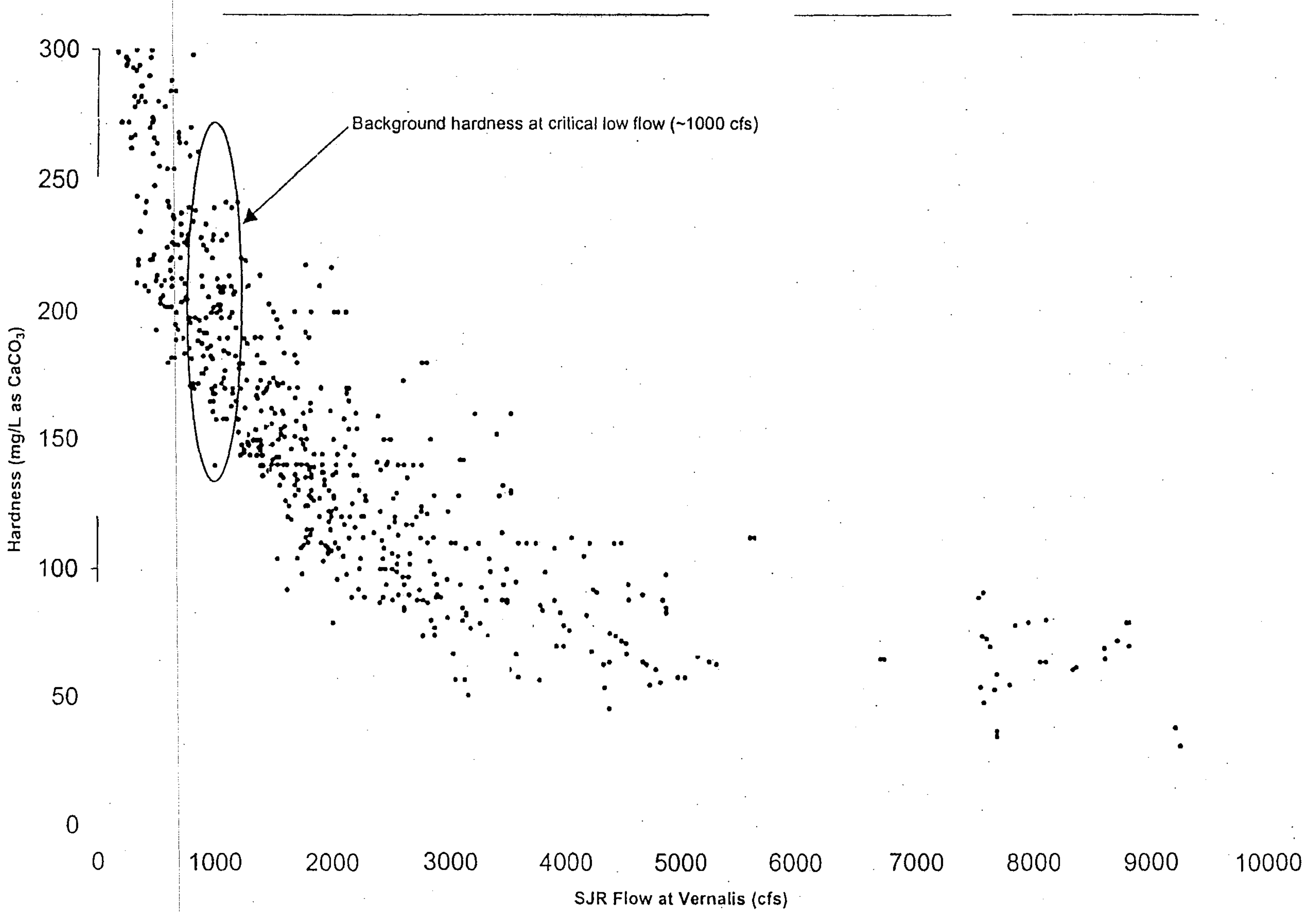

TABLE 1

DEGRADATION ANALYSIS
(for discharge to the San Joaquin River)

Compound	Units	Average Background Concentration	Monthly Average Discharge Concentration[4]	Mass (lb/day)[2]	Monthly Average Permit Limit	Mass (lb/day)[3]	% change
NUTRIENT LOAD							
BOD	mg/L		20	1,200	10	820	-32
TSS	mg/L		20	1,200	10	820	-32
Coliform	mpn/100 ml		23		2.2		
INORGANICS[1]							
Ammonia	mg/L	0.21	17.7	1,000	2.8	230	-77
EC	umhos	686	1099		1000		
Aluminum	ug/L	968	150	8.7	71	5.8	-33
Iron	mg/L	1.64	0.43	25	0.3	25	0
Manganese	ug/L	147	43	2.5	50	4.1	65
Arsenic	ug/L	3	13	0.75	10	0.82	9
Copper	ug/L	3	9	0.52	7.9	0.65	25
Cyanide	ug/L	1.4	7	0.41	3.7	0.30	-25
HUMAN HEALTH							
Dibromochloromethane	ug/L	0.3	0.47	0.03	1.4	0.12	320
Bromodichloromethane	ug/L	0.2	1.98	0.11	5	0.41	260
2,4,6-Trichlorophenol	ug/L	0.2	3.28	0.19	34	2.8	1400
Bis(2-ethylhexyl)phthalate	ug/L	0.3	3.48	0.20	22	1.8	800
BIOACCUMULATIVES							
Mercury	ug/L	0.006	0.019	0.0011		0.0019	70

Note:
1. Unless noted otherwise, all inorganic concentrations are expressed as total recoverable.
2. At 6.95 mgd, the maximum permitted flow before improvements are completed.
3. At 9.87 mgd, the maximum permitted flow after improvements are completed. Mercury is calculated at 8.11 mgd, the maximum current permitted flow.
4. BOD, TSS, and coliform reflect permit limitations from Order # 5-01-007. The remaining constituents are calculated from monitoring data.

TABLE 2 — 1Q10, 7Q10, AND 30Q10 CALCULATIONS

Vernalis 1Q10, 7Q10, and 30Q10 (1980-2002)

Unit of flow is cubic feet per second (CFS)

Year	Yearly Daily Avg. Min. Flow	Log10	Yearly 7-day Avg. Min. Flow	Log10	Yearly Monthly Avg. Min. Flow	Log10
1980	1760	3.245512668	1814	3.258637283	1969	3.294245716
1981	1030	3.012837225	1080	3.033423755	1181	3.072249898
1982	2460	3.390935107	3146	3.497758718	3889	3.589837943
1983	8010	3.903632516	8264	3.917190309	9035	3.955928157
1984	1710	3.23299611	1783	3.251151343	1904	3.279666944
1985	1280	3.10720997	1443	3.159266331	1748	3.242541428
1986	1740	3.240549248	1916	3.282395505	2060	3.31386722
1987	1120	3.049218023	1144	3.058426024	1278	3.106530854
1988	994	2.997386384	1042	3.017867719	1127	3.051923916
1989	984	2.992995098	1051	3.021602716	1169	3.067814511
1990	685	2.835690571	785	2.894869657	876	2.942504106
1991	436	2.639486489	500	2.698970004	537	2.729974286
1992	390	2.591064607	432	2.635483747	447	2.650307523
1993	1000	3	1147	3.059563418	1510	3.178976947
1994	743	2.870988814	783	2.893761762	867	2.938019097
1995	1310	3.117271296	1486	3.172018809	2250	3.352182518
1996	1790	3.252853031	1819	3.259832699	2034	3.308350949
1997	1560	3.193124598	1623	3.21031852	1756	3.244524512
1998	1810	3.257678575	1940	3.28780173	3290	3.517195898
1999	1790	3.252853031	1889	3.276231958	1688	3.227372442
2000	1519	3.181557774	1626	3.211120541	1954	3.290924559
2001	1171	3.068556895	1264	3.101747074	1340	3.127104798
2002	1000	3	1073	3.030599722	1150	3.06069784
n		23		23		23
Std. Dev.	1489	0.263033168	1547	0.25950094	1734	0.273646727
Mean	1578	3.105843393	1698	3.140436493	1959	3.197510525
CS1		0.745408359		0.787609079		0.55253052
CS2		0.939862713		0.993072317		0.696668917
K		1.339		1.34		1.333
Y10		2.753641981		2.792705234		2.832739438
	1Q10 =	567	7Q10 =	620	30Q10 =	680

Notes:

CS1	Skewness (see eqn. 3.40 on page 181 Hydrology and Flood Plain Analysis, Second Edition, Bedient & Huber)
CS2	Skewness correction to be used for Pearson Type 3 distribution (see eqn. 3.41, Bedient & Huber)
K	Frequency Factor for log Pearson Type 3 Distributions (Table 3.4, pgs. 204-205, Bedient & Huber)
Y10	e.g. log 30Q10

TABLE 3

NON-PRIORITY POLLUTANT METALS DATA

Date	Hardness, mg/L		pH		Aluminum, total, ug/L		Aluminum, diss, ug/L		Iron, ug/L		Manganese, ug/L	
	effluent	R-1	effluent	R-1	effluent	R-1	effluent	R-1	effluent	R-1	effluent	R-1
09-Jan-02			6.9	7.6	90	2200			600	2800	24	180
07-Feb-02			7.2	7.7	90	600	30	<10	400	1100	13	110
13-Mar-02	170	210	7.5	8.1	110	1000	30	<10	460	1600	16	130
16-Apr-02	180	80	7.2	8.1	350	700			590	1200	100	90
14-May-02	180	94	7.1	7.8	130	900	50	<20	350	1300	120	82
13-Jun-02	190	190	7.3	9.2	140	420	20	<10	730	780	25	96
09-Jul-02	190	220	7.5	9	70	1300	<50	<10	520	2200	48	220
06-Aug-02	200	200	6.9	8.8	90	1000			330	1700		
03-Sep-02	190	170	6.8	8.6	250	800			170	1900	51	200
01-Oct-02	188	172	6.8	7.5	80	600			240	1300	33	140
12-Nov-02	180	160	6.5	6	120	1400			320	2600	19	230
11-Dec-02	210	240	6.6	7.4	280	700			420	1200	21	140
Max	210	240	7.5	9.2	350	2200	50	20	730	2800	120	230
Min	170	80	6.5	6	70	420	20	10	170	780	13	82
Average	188	174	7	8	150	968	33		428	1640	43	147
Median	189	181	7	7.95	115	850	30	10	410	1450	25	140
St.Dev	11	52	0.3	2.11	91	483	13		161	625	36	53
N	10	10	12	12	12	12	5	5	12	12	11	11

TABLE 3

NON-PRIORITY POLLUTANT METALS DATA

TABLE 5

REASONABLE POTENTIAL ANALYSIS
Non-Priority Pollutants

Effluent data collected from January 1998 through December 2002

	Chloride	EC	MBAS	Nitrate as N	Nitrite as N	TDS	Sulfate
Units	mg/l	umhos/cm	ug/l	mg/l	mg/l	mg/l	mg/l
Detection Limit	10	10	20	0.2	0.03	20	5
Count	16	18	12	245	12	36	16
Concentrations							
Minimum	100.0	819.0	120.0	0.0	0.1	540.0	58.0
Maximum	230.0	1300.0	1800.0	19.0	1.8	727.0	130.0
Mean	137.7	1098.8	618.3	2.5	0.7	634.2	83.9
Stand. Deviation	32.3	118.6	450.9	3.2	0.6	40.8	20.5
CV	0.23	0.11	0.73	1.28	0.79	0.06	0.24
RP factor 99%	1.4	1.2	3.4	4.5	3.7	1.2	1.5
Dilution Ratio	1	1	1	1	1	1	1
RWC	322.0	1560.0	6120.0	85.5	6.7	872.4	195.0
Temp. max, C							
pH max							
Criteria							
CMC, mg/l	860						
CCC, mg/l	230						
Other	106(ag)	1000	500	10	1	450/500	250
Reasonable Potential?	yes	yes	yes	yes	yes	yes	no

Notes:

CV	Coefficient of Variation = standard deviation/mean
RP factor 99%	Reasonable Potential Multiplying Factors: 99% Confidence Level and 99% Probability Basis [Reference: EPA Technical Support Document, Table 3-1]
RWC	Receiving water concentration using mass balance equation = ((max effluent conc.x RP factor)+(dilution ratio-1) x upstream conc.)/dilution ratio [Reference: EPA Technical Support Document, Section 3.3.2 and Box 3-2]
CMC/CCC	Criteria Maximum Concentration/Criteria Continuous Concentration

TABLE 6
Non-Priority Pollutant Effluent Limitations for Protection of Aquatic Life and Human Health

Description	Aluminum		Iron		Manganese		MBAS	
Effluent Concentrations								
Sample Dates - Begin	Jan-02		Jan-02		Jan-02		Jan-02	
Sample Dates - End	Dec-02		Dec-02		Dec-02		Dec-02	
Sample Count	12		12		11		12	
Reporting Limits (ug/l)	10		50		5		20	
Maximum Reported Concentration (ug/l)	350.0		730.0		120.0		1800	
Mean (ug/l)	150.00		428.00		43.00		618	
Std. Deviation (ug/l)	91.00		161.00		36.00		451	
Coefficient of Variation (CV)	0.61		0.38		0.84		0.73	
Background Concentrations (R-1)								
Sample Dates - Begin	Jan-02		Jan-02		Jan-02		Jan-02	
Sample Dates - End	Dec-02		Dec-02		Dec-02		Dec-02	
Sample Count	12		12		11		12	
Count Above Reporting Limits	12		12		11		0	
Reporting Limits (ug/l)	10		100		5		20	
Maximum Reported Concentration (ug/l)	2200.0		2800.0		230.0		< 20	
Mean (ug/l)	968		1640		147		< 20	
Criteria (1)	acute	chronic	health		health		health	
Criteria (ug/l)	750	87	300		50		500	
Effluent Limit Calculations (7)								
Dilution Credit	0	0	0		0		0	
Effluent Concentration Allowance (2) (ug/l)	750.00	87.00	300.00		50		500	
σ^2 and $\sigma_4{}^2$	0.313	0.088	0.132	0.035	0.531	0.161	0.427	0.125
$\sigma_{30}{}^{2}$ (3)	--	0.0122	0.0047		0.0231		0.0176	
ECA Multiplier (4)	0.32	0.52						
Long-Term Average (5)	238.6	45.60						
AMEL Multiplier (6)	*	1.56	1.34		1.79		1.68	
Average Monthly Effluent Limit (ug/l)	*	**71**	**300**		**50**		**500**	
MDEL Multiplier (6)	*	3.14						
Max. Daily Effluent Limit (ug/l)	*	**143**						

General Note: Unless noted otherwise, all concentrations given as mg/l Ammonia-Nitrogen.
(1) Using CMC and CCC values for Al; Basin Plan and secondary MCLs for the health based constituents.
(2) Allows for dilution consideration, and is similar to the approach in Section 1.4.B, Step 2 of SIP.
(3) Calculated considering daily sampling frequency, Section 5.4.1 of EPA Technical Support Document.
(4) Acute and Chronic ECA Multiplier calculated at 99th percentile level per Sections 5.4.1 and 5.5.4 of TSD.
(5) LTA_c modified to meet 1999 Update recommendation.
(6) The probability basis for AMEL is 95th percentile level and for MDEL is 99th percentile level per Section 5.5.4 of TSD.
(7) Calculated per Section 5.4.1 of TSD for aquatic life protection and Section 5.4.4 of TSD for the protection of human health.
* = Not applicable as other criteria LTA is more stringent.

TABLE 7 **REASONABLE POTENTIAL ANALYSIS FOR AMMONIA**

Effluent data collected from January 1998 through December 2002

	Effluent ammonia data		Receiving Water ammonia data	
Time	Past 5 years		2002	
Detection Limit	0.1 mg/L		0.01 mg/L	
Count	516		28	
Concentrations (NH3-N)				
Minimum, mg/l	0.0		0.01	
Maximum, mg/l	42.8		1.4	
Mean, mg/l	17.7		0.2	
Stand. Deviation, mg/l	7.4		0.3	
CV	0.42		1.3	
RP factor 99%	1.8		4.5	
	acute	chronic	acute	chronic
Dilution Ratio	1	4	1	1
RWC, mg/l	77.0	20.3	6.1	6.1
Temperature max, C		25.7 (3)		25.7 (3)
pH max	8 (1)	9.1 (3)	9.3 (2)	9.1 (3)
Criteria				
CMC, mg/l	5.6		0.58	
CCC, mg/l		0.21		0.21
Reasonable Potential	yes	yes	yes	yes

Notes:

CV	Coefficient of Variation = standard deviation/mean
RP factor 99%	Reasonable Potential Multiplying Factors: 99% Confidence Level and 99% Probability Basis [Reference: EPA Technical Support Document, Table 3-1]
RWC	Receiving water concentration using mass balance equation = ((max effluent conc.x RP factor)+(dilution ratio-1) x upstream conc.)/dilution ratio [Reference: EPA Technical Support Document, Section 3.3.2 and Box 3-2]
CMC	Criteria Maximum Concentration
CCC	Criteria Continuous Concentration
(1)	Maximum permitted effluent concentration
(2)	Maximum receiving water pH at R-1 (See Table 4)
(3)	Maximum monthly average pH and temperature at Mossdale Landing DWR monitoring station

TABLE 8 **SEASONAL EFFLUENT LIMITATIONS FOR AMMONIA**

Description	**Ammonia**		**Ammonia**	
Season	June 1 to September 30		October 1 to May 31	
Effluent Concentrations (NH3-N)				
Sample Dates - Begin	Jan-98		Jan-98	
Sample Dates - End	Dec-02		Dec-02	
Sample Count	516		516	
Reporting Limits (mg/l)	0.1		0.1	
Maximum Reported Concentration (mg/l)	42.8		42.8	
Mean (mg/l)	17.70		17.70	
Std. Deviation (mg/l)	7.40		7.40	
Coefficient of Variation (CV)	0.42		0.42	
Background Concentrations (R-1)				
Sample Dates - Begin	Jan-02		Jan-02	
Sample Dates - End	Jan-03		Jan-03	
Sample Count	28		28	
Count Above Reporting Limits	17		17	
Reporting Limits (mg/l)	0.01		0.01	
Maximum Reported Concentration (mg/l NH3-N)	1.4		1.4	
Mean (mg/l NH3-N))	0.21		0.21	
Criteria (2)	acute	chronic	acute	chronic
pH (1)	8.0	8.4	8.0	8.2
Temperature ^{0}C	N/A	26	N/A	20.7
Criteria (mg/l ammonia as N)	5.62	0.62	5.62	1.2
Effluent Limit Calculations (9)				
Dilution Credit	0	4	0	4
Effluent Concentration Allowance (3) (mg/l)	5.62	2.24	5.62	5.18
$\sigma^2$and σ_4^2	0.161	0.043	0.161	0.043
σ_{30}^{2} (4)	--	0.0058	--	0.0058
ECA Multiplier (5)	0.43	0.84	0.43	0.84
Long-Term Average (7)	2.4	1.88	2.4	4.35
AMEL Multiplier (8), (6)	*	1.13	1.19	*
Average Monthly Effluent Limit (mg/l)	*	**2.1**	**2.8**	*
MDEL Multiplier (8)	*	2.35	2.35	*
Max. Daily Effluent Limit (mg/l)	*	**4.4**	**5.6**	*

General Note: Unless noted otherwise, all concentrations given as mg/l Ammonia-Nitrogen.
(1) Acute pH = maximum permitted effluent pH. Chronic pH = pH at edge of 4:1 mixing zone as calculated by USEPA DESCON program utilizing maxiumum permitted effluent pH and the maximum monthly average pH from Mossdale monitoring station (DWR-ESO-D1485C, RSAN087) for Jan. 1984 to Sept. 2002.
(2) Using CMC and CCC values.
(3) Allows for dilution consideration, and is similar to the approach in Section 1.4.B, Step 2 of SIP.
(4) Calculated considering daily sampling frequency, Section 5.4.1 of EPA Technical Support Document.
(5) Acute and Chronic ECA Multiplier calculated at 99th percentile level per Sections 5.4.1 and 5.5.4 of TSD.
(6) Assumes sampling frequency is 30 times per month.
* = Not applicable as other criteria LTA is more stringent.
(7) LTA_c modified to meet 1999 Update recommendation.
(8) The probability basis for AMEL is 95th percentile level and for MDEL is 99th percentile level per Section 5.5.4 of TSD.
(9) Calculated per Section 5.4.1 of TSD for aquatic life protection.

TABLE 9

PRIORITY POLLUTANT DATA TABLES

Date	Hardness effluent	Hardness R-1	pH effluent	pH R-1	Cu, total effluent	Cu, total R-1	Cu, diss effluent	Cu, diss R-1	Cyanide effluent	Cyanide R-1
Units	mg/L	mg/L	unit	unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
09-Jan-02			6.9	7.6	7.4	6.1			6	3
07-Feb-02			7.2	7.7	8.3	2.7	7.6	1.6	6	5
13-Mar-02	170	210	7.5	8.1	8.6	3.5	7.4	1.8	3	< 0.6
16-Apr-02	180	80	7.2	8.1	10	2.8	9	< 2	1.5 (<3)	< 0.6
14-May-02	180	94	7.1	7.8	9.1	2.7	8.1	1.3	5	< 0.6
13-Jun-02	190	190	7.3	9.2	12	2.6	11	1.8	6	< 0.8
09-Jul-02	190	220	7.5	9	8.9	4.2	8	4.7	10	< 0.8
06-Aug-02	200	200	6.9	8.8	7.6	3.6	7.3	1.9	31	< 0.9
03-Sep-02	190	170	6.8	8.6	12	3	9.7	1.9	1.7 J	1.4 J
01-Oct-02	188	172	6.8	7.5	8.5	2.7	7.6	1.8	3	< 0.9
12-Nov-02	180	160	6.5	6	8	4.8	6.8	2.2	3	< 0.9
11-Dec-02	210	240	6.6	7.4	13	2.9	12	1.7	5	< 0.9
Max (1)	210	240	7.5	9.2	13	6.1	12	4.7	31	5
Min	170	80	6.5	6	7.4	2.6	6.8	1.3	1.5	0.6
Mean (2)	188	174	7	8	9	3	9	2	7	1.4
St.Dev	11	52	0.33	0.87	1.88	1.08	1.66	0.90	7.99	1.32
Coeff. Var.	0.060	0.298	0.047	0.109	0.199	0.311	0.194	0.438	1.180	0.965
N	10	10	12	12	12	12	11	11	12	12

(1) Maximum of Background (R-1) calculated per Section 1.4.3.1, Step 2 of the SIP
(2) Arithmetic mean of Background (R-1) calculated per Section 1.4.3.2, Step 2 of the SIP

TABLE 9

PRIORITY POLLUTANT DATA TABLES

Date	Arsenic, total effluent	Arsenic, total R-1	Arsenic, diss effluent	Arsenic, diss R-1	Chloroform effluent	Chloroform R-1	Dibromochloromethane effluent	Dibromochloromethane R-1	Bromodichloromethane effluent	Bromodichloromethane R-1
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
09-Jan-02	13	2.9			4	< 0.3	0.7	< 0.3	2.2	< 0.2
07-Feb-02	11	2	11	2	4.5	< 0.3	< 0.3	< 0.3	1.3	< 0.2
13-Mar-02	11	2.6	12	1.9	6.1	< 0.3	< 0.3	< 0.3	1	< 0.2
16-Apr-02	13	1.9	14	0.003	7	< 0.3	< 0.3	< 0.3	1	< 0.2
14-May-02	14	1.9	14	1.3	8.3	< 0.3	0.5	< 0.3	2.8	< 0.2
13-Jun-02	14	3	13	2.3	11	< 0.3	0.3 J	< 0.3	2.3	< 0.2
09-Jul-02	13	3	13	2.8	7.5	< 0.3	1.2	< 0.3	3.5	< 0.2
06-Aug-02	12	3.5	13	3.1	8.1	< 0.3	0.4 J	< 0.3	2.2	< 0.2
03-Sep-02	13	3.1	13	2.9	12	< 0.3	< 0.3	< 0.3	1.4	< 0.2
01-Oct-02	12	2.7	13	1.9	5.7	< 0.3	< 0.3	< 0.3	1.7	< 0.2
12-Nov-02	12	2.8	12	1.5	8.5	< 0.3	< 0.3	< 0.3	1.4	< 0.2
11-Dec-02	12	2.6	12	1.5	7.8	< 0.3	0.7	< 0.3	3	< 0.2
Max (1)	14	3.5	14	3.1	12	0.3	1.2	0.3	3.5	0.2
Min	11	1.9	11	0.003	4	0.3	0.28	0.3	1	0.2
Mean (2)	13	3	13	2	8	0.3	0.5	0.3	2.0	0.2
St.Dev	1.00	0.51	0.90	0.88	2.36	0.00	0.28	0.00	0.82	0.00
Coeff. Var.	0.080	0.189	0.071	0.455	0.313		0.599		0.412	
N	12	12	11	11	12	12	12	12	12	12

(1) Maximum of Background (R-1) calculated per Section 1.4.3.1, Step 2 of the SIP
(2) Arithmetic mean of Background (R-1) calculated per Section 1.4.3.2, Step 2 of the SIP

TABLE 9

PRIORITY POLLUTANT DATA TABLES

Date	2,4,6-Trichlorophenol effluent	2,4,6-Trichlorophenol R-1	Carbofuran effluent	Carbofuran R-1	Bis(2-ethylhexyl)phthalate effluent	Bis(2-ethylhexyl)phthalate R-1
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
09-Jan-02	< 0.6	< 0.2	2.9 J		2.0 J	< 0.3
07-Feb-02						
13-Mar-02						
16-Apr-02	11	< 0.8	2.7 J	2.5 J	7	< 0.3
14-May-02						
13-Jun-02						
09-Jul-02	0.9 J	< 0.6	0.7 (<1.3)	0.7 (<1.3)	4	< 0.8
06-Aug-02						
03-Sep-02						
01-Oct-02	< 0.6	< 0.6	0.7 (<1.3)	0.7 (<1.3)	0.9 J	< 0.8
12-Nov-02						
11-Dec-02						
07-Jan-03			0.7 (<1.3)	1.84		
Max (1)	11	0.2	2.9	2.5	7	0.3
Min	0.6	0.2	0.65	0.65	0.9	0.3
Mean (2)	3.3	0.2	1.5	1.4	3.5	0.3
St.Dev	5.15	0.25	1.17	0.91	2.68	0.29
Coeff. Var.	1.573		0.780	0.649	0.771	
N	4	4	5	5	4	4

(1) Maximum of Background (R-1) calculated per Section 1.4.3.1, Step 2 of the SIP
(2) Arithmetic mean of Background (R-1) calculated per Section 1.4.3.2, Step 2 of the SIP

TABLE 10 SUMMARY OF REASONABLE POTENTIAL ANALYSIS FOR METALS AND ORGANICS

Compound	Units	MEC	B	CMC	CCC	Water & Org	Org. Only	BP/MCL (1)	Special Cond.	Reasonable Potential?
INORGANICS										
Aluminum	ug/L	350	2200	750	87			200(mcl)	60(3)	Yes, MEC>C & B > C
Chromium(VI)	ug/L	0.6	0.4	16	11			50(mcl)	0.2(3)	No
Iron	mg/L	0.73	2.8					0.3(mcl)		Yes, MEC>C & B > C
Manganese	ug/L	120	230				100	50(mcl)		Yes, MEC>C & B > C
Silver	ug/L	3.2	0.02	8.6(2)				10/100(mcl)		No
Zinc	ug/L	42	9	48(2)	49(2)			100		No
Lead	ug/L	1.3	1.2	180(2)	170(2)			15 (mcl)	2 (3)	No
Arsenic	ug/L	14	3.5	340	150			10/10(mcl)	0.023 (3)	Yes, MEC > C
Copper	ug/L	13	6.1	22	7.4	1300		10.4(4)		Yes, MEC > C
Cyanide	ug/L	31	5	22	5.2	700	220,000	10		Yes, MEC > C
HUMAN HEALTH										
1,4-Dichlorobenzene	ug/L	0.8	<0.5	--	--	400	2,600	5(mcl)		No
Toluene	ug/L	0.7	<0.5	--	--	6,800	200,000	150 (mcl)		No
Chloroform	ug/L	12	<0.3	--	--			80(mcl)	1.1 (3)	No
Chloromethane	ug/L	1.7	<0.5	11,000					3	No
Dichloromethane	ug/L	0.6	<0.5	--	--	4.7	1,600	5 (mcl)	4 (3)	No
Dibromochloromethane	ug/L	1.2	<0.3	--	--	0.41	34	80(mcl)	0.37 (3)	Yes, MEC > C
Bromodichloromethane	ug/L	3.5	<0.2	--	--	0.56	46	80(mcl)	0.27 (3)	Yes, MEC > C
Trihalomethane	ug/L	16.7	0.3					80(mcl)		No
2,4,6-Trichlorophenol	ug/L	11	<0.2	--	--	2.1	6.5		0.5(3)	Yes, MEC > C
MTBE	ug/L	0.7	<0.5	--	--			5 (mcl)	19(3)	No
Carbofuran	ug/L	2.9 J	2.5 J	--	--			18(mcl)	1.7(3)	Yes, MEC>C & B > C
Bis(2-ethylhexyl)phthalate	ug/L	7	<0.3	--	--	1.8	5.9	4 (mcl)		Yes, MEC > C
BIOACCUMULATIVES										
Mercury	ug/L	0.028	0.0093	reserved	reserved	0.05	0.051	2 (mcl)	1.2(3), 303d	No
Endrin Aldehyde	ug/L	<0.02	<0.01	0.086 (5)	0.036 (5)	0.76	0.81	2 (mcl), ND	BP objective	No
Lindane	ug/L	<0.02	<0.01	0.95	--	0.019	0.063	0.2 (mcl), ND	BP objective	No
4,4'-DDT	ug/L	<0.02	<0.01	1.1	0.001	0.00059	0.00059	ND	BP objective	No
PCBs	ug/L	<0.1	<0.1	--	0.014	0.00017	0.00017	0.5 (mcl)	303d	No
2,3,7,8-TCDD	pg/L	<0.8	<0.6	--	--	0.013	0.014		303d	No

General Note: Unless noted otherwise, all inorganic concentrations are given as total revoverable.
MEC = Maximum Effluent Concentration (lowest detection level or maximum reported concentration).
B = Background (lowest detection level or maximum reported concentration).
C = Criterion (From California Toxics Rule unless otherwise noted)
NS = Not Sampled
BP = Basin Plan
J = Detected but not quantified. Detection limit = 5 ug/L.
(1) = Basin Plan Objective unless designated as MCL as (mcl).
(2) = concentration expressed as **dissolved** metals
(3) = California OEHHA Public Health Goal for Drinking Water
(4) = Concentration converted to total recoverable using EPA default translator (0.96)
(5) = Criteria as Endrin.

TABLE 11
Priority Pollutant Effluent Limitations

Description	copper		cyanide		arsenic		
Effluent Concentrations							
Sample Dates - Begin	Jan-02		Jan-02		Jan-02		
Sample Dates - End	Dec-02		Dec-02		Dec-02		
Sample Count	12		12		12		
Count Above Reporting Limits	12		11		12		
% of Samples Above Reporting Limits	100.0		91.7		100.0		
Reporting Limits (µg/l)	0.5		3		0.5		
Maximum Reported Concentration (µg/l)	13		31.0		14.0		
Mean (µg/l)	9.0		7.0		12.5		
Std. Deviation (µg/l)	1.9		8.0		1.0		
Coefficient of Variation (CV) (µg/l)	0.20		1.18		0.08		
Background Concentrations							
Sample Dates - Begin	Jan-02		Jan-02		Jan-02		
Sample Dates - End	Dec-02		Dec-02		Dec-02		
Sample Count	12		12		12		
Count Above Reporting Limits	12		3		12		
Reporting Limits (µg/l)	0.5		0.6		0.5		
Maximum Reported Concentration (µg/l)	6.1		5.0		3.5		
Mean (µg/l)	3.0		1.0		3.0		
Criteria	acute	chronic	acute	chronic	acute	chronic	health
Hardness (mg/l as $CaCO_3$)	170.0	108.0	----	----	----	----	
CTR Criteria[(1)] (µg/l)	22.2	9.6	22	5.2	750	340	
Basin Plan Objective (µg/l)[(2)]	10		10				10
Translator [(3)]	0.96	0.96	n/a	n/a	n/a	n/a	n/a
Criteria (µg/l, total recoverable)[(4)]	10.4	10.0	10	5.2	750	340	10
Effluent Limit Calculations							
Dilution Credit	0	4	0	4	0	0	0
Effluent Concentration Allowance [(5)] (µg/l)	10.4	25.4	10.00	6.00	750.00	340.00	10
σ^2 and $\sigma_4{}^2$	0.04	0.01	0.87	0.30	0.006	0.002	
ECA Multiplier [(6)]	0.64	0.80	0.18	0.33	0.83	0.91	
Long-Term Average	6.7	20.3	1.8	2.0	624.8	310.1	
AMEL Multiplier [(7)(8)]	1.2	*	2.1	*	*	*	
Average Monthly Effluent Limit	**7.9**	*	**3.7**	*	*	*	**10.0**
MDEL Multiplier [(9)]	1.6	*	5.7	*	*	*	
Max. Daily Effluent Limit	**10.4**	*	**10.0**	*	*	*	

General Note: Unless noted otherwise, all concentrations given as total recoverable.
(1) Cu and As criteria are dissolved concentrations. Cyanide criteria are total concentrations.
(2) Metals are expressed as dissolved concentrations. Cyanide is expressed as total concentration.
(3) EPA Translators used as default.
(4) The total recoverable criteria is based on either the Basin Plan Objective or CTR, whichever is lower.
(5) ECA calculated per Section 1.4.B, Step 2 of SIP. This allows for the consideration of dilution.
(6) Acute and Chronic ECA Multiplier calculated at 99th percentile per Section 1.4.B, Step 3 of SIP or per Sections 5.4.1 and 5.5.4 of the TSD.
(7) Assumes sampling frequency n=>4.
(8) The probability basis for AMEL is 95th percentile per Section 1.4.B, Step 5 of SIP or Section 5.5.4 of the TSD.
(9) The probability basis for MDEL is 99th percentile per Section 1.4.B, Step 5 of SIP or Section 5.5.4 of the TSD.
* = Not applicable as other criteria LTA is more stringent.

TABLE 12 SUMMARY OF HUMAN CARCINOGENIC POLLUTANT STATISTICS

Sample Date (Concentations in ug/l)	Dibromochloromethane	Bromodichloromethane	2,4,6-Trichlorophenol	bis(2-ethylhexyl)phthalate
09-Jan-02	0.7	2.2	< 0.6	2.0 J
07-Feb-02	< 0.3	1.3		
13-Mar-02	< 0.3	1		
16-Apr-02	< 0.3	1	11	7
14-May-02	0.5	2.8		
13-Jun-02	0.3 J	2.3		
09-Jul-02	1.2	3.5	0.9 J	4
06-Aug-02	0.4 J	2.2		
03-Sep-02	< 0.3	1.4		
01-Oct-02	< 0.3	1.7	< 0.6	0.9 J
12-Nov-02	< 0.3	1.4		
11-Dec-02	0.7	3		

Sample Count	12	12	4	4
Max. Concentration (µg/l)	1.20	3.50	11.00	7.00
Mean (µg/l)	0.47	1.98	3.28	3.48
Median (ug/l)	0.3	1.95	0.75	3
Std. Dev.	0.28	0.82	5.15	2.68
CV	0.60	0.41	0.60	0.60
Factor (99th percentile)(1)			3.11	3.11
Estimated Max. Concentration (µg/l)(2)	1.38	4.68	34.21	21.77
Human Health Criteria	0.41	0.56	2.1	1.8
Mean of Reported Background (µg/l) (3)	< 0.3	< 0.2	< 0.2	< 0.3
Needed Dilution Credit(4)	**8.9**	**11.5**	**16.9**	**13.3**

(1) See USEPA TSD Table 5-2.
(2) For 10 samples or more, the estimated maximum concentration is the mean plus 3.3 standard deviations. For less than 10 samples, the estimated maximum concentration is the maximum observed concentration times the factor from Table 5-2.
(3) MDL utilized for receiving water detection limit.
(4) Dilution = (Est. max. conc.- HH Criteria)/(HH criteria - background conc.)

TABLE 13
PRIORITY POLLUTANT EFFLUENT LIMITATIONS FOR HUMAN HEALTH

Description	Dibromochloromethane		Bromodichloromethane		2,4,6-Trichlorophenol		Bis(2-ethylhexyl)phthalate	
Effluent Concentrations								
Sample Dates - Begin	Jan-02		Jan-02		Jan-02		Jan-02	
Sample Dates - End	Dec-02		Dec-02		Oct-02		Oct-02	
Sample Count	12		12		4		4	
Count Above Reporting Limits	6		12		2		4	
% of Samples Above Reporting Limits	50.0		100.0		50.0		100.0	
Reporting Limits (µg/l)	0.3		0.2		0.6		0.3	
Maximum Reported Concentration (µg/l)	1.2		3.5		11.0		7.0	
Mean (1) (µg/l)	0.5		2.0		3.3		3.5	
Std. Deviation (1) (µg/l)	0.28		0.82		5.2		2.7	
Coefficient of Variation (1) (CV) (µg/l)	0.60		0.41		0.60		0.60	
Background Concentrations								
Sample Dates - Begin	Jan-02		Jan-02		Jan-02		Jan-02	
Sample Dates - End	Dec-02		Dec-02		Oct-02		Oct-02	
Sample Count	12		12		4		4	
Count Above Reporting Limits	0		0		0		0	
Reporting Limits (µg/l)	0.3		0.2		0.2		0.3	
Maximum Reported Concentration (µg/l)	< 0.3		< 0.2		< 0.2		< 0.3	
Arithmetic mean (µg/l)(2)	< 0.3		< 0.2		< 0.2		< 0.3	
Criteria	health		health		health		health	
Basin Plan Objective (µg/l, dissolved)								
Translator (3)	n/a		n/a		n/a		n/a	
Criteria (µg/l, total recoverable)(4)	0.41		0.56		2.1		1.8	
Effluent Limit Calculations								
Dilution Credit(5)	8.9		11.5		16.9		13.3	
Effluent Concentration Allowance (6) (µg/l)	1.389		4.7		34.21		21.75	
σ^2 and σ_4^2	0.30	0.09	0.16	0.04	0.31	0.09	0.31	0.09
AMEL Multiplier (7)	1.5		1.4		1.6		1.6	
Average Monthly Effluent Limit (ug/l)	**1.4**		**5**		**34**		**22**	
MDEL Multiplier (8)	3.1		2.3		3.1		3.1	
Max. Daily Effluent Limit (ug/l)	**2.8**		**8**		**69**		**44**	

General Note: Unless noted otherwise, all concentrations given as total recoverable
(1) Calculated per Section 1.4.B, Step 3 of SIP.
(2) Calculated per Section 1.4.3.2 of SIP
(3) EPA Translators used as default.
(4) The total recoverable criteria is based on the CTR.
(5) See Table 12 for applicable dilution credit for human carcinogenic pollutants.
(6) ECA calculated per Section 1.4.B, Step 2 of SIP.
(7) Assumes sampling frequency n=>4. Uses 95th percentile AMEL multiplier, Step 5 of SIP.
(8) Uses 99th percentile MDEL multiplier, Step 5 of SIP.

TABLE 14 **MERCURY LOADING**

Date	Mercury effluent (ug/L)	Mercury R-1 (ug/L)
09-Jan-02	0.015	0.0093
07-Feb-02	0.014	0.0053
13-Mar-02	0.019	0.0075
16-Apr-02	0.021	0.0045
14-May-02	0.016	0.0048
13-Jun-02	0.028	0.0036
09-Jul-02	0.017	0.008
06-Aug-02	0.017	0.0054
03-Sep-02	0.027	0.0045
01-Oct-02	0.021	0.0045
12-Nov-02	0.013	0.0056
11-Dec-02	0.022	0.004
Maximum	0.028	0.009
Minimum	0.013	0.004
Mean	0.019	0.006
Median	0.018	0.005
Standard Deviation	0.005	0.002
Coefficient of Variation	0.252	0.315
Number of samples	12	12

Design Flow (mgd)	8.11
Maximum Observed Concentration (ug/l)	0.028
Daily Mass Loading (lbs)	0.00189
Yearly Mass Loading (lbs)	**0.69**

CITY OF MANTECA, CITY OF LATHROP AND DUTRA FARMS WASTEWATER QUALITY CONTROL FACILITY SAN JOAQUIN COUNTY **ATTACHMENT B**

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City of Manteca

CITY of MANTECA, CALIFORNIA
Manteca
the family city
INCORPORATED MAY 28, 1918

Consideration of
NPDES Permit Renewal
& Time Schedule Order

October 8th, 2009

Manteca's Comments on Tentative Order

Phil Govea, Deputy Director of Public Works
Tess Dunham, Special Counsel to City

Presentation Outline

- City's Efforts During the Current Permit Term
- Salinity & Electrical Conductivity
- Title 27
- Closing

EXHIBIT C

Manteca's Efforts During Current Permit Term

Treatment Plant Improvements	Corresponding Water Quality Improvements
Nitrification / Denitrification	Nitrate effluent levels reduced over 80%: ▪ 27 mg/L to 4 mg/L
Tertiary Filters	Metal concentrations greatly reduced: ▪ Example, copper reduced over 75% 14 μg/L to 3 μg/L

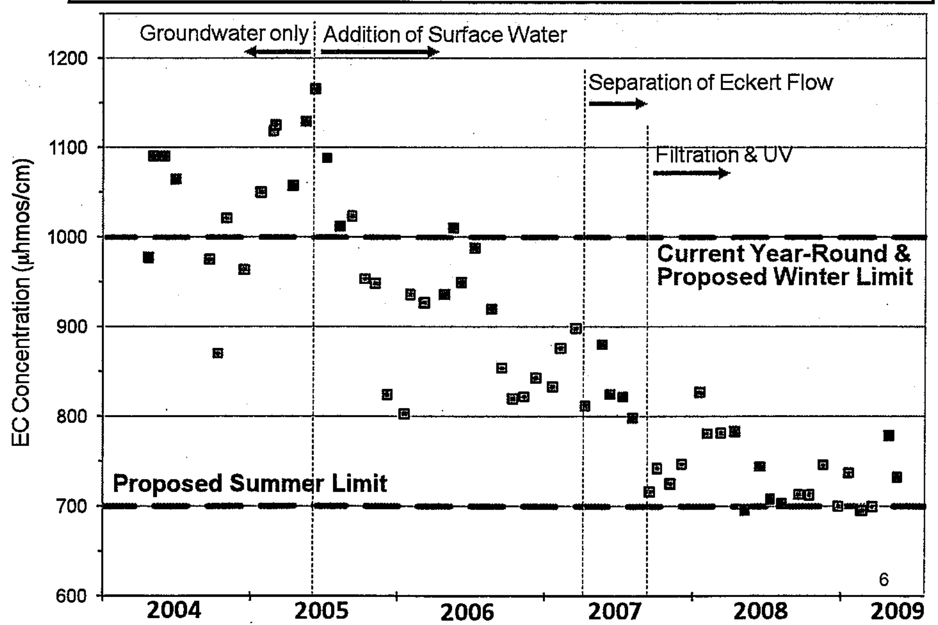
Manteca's Efforts During Current Permit Term

Treatment Plant Improvements	Corresponding Water Quality Improvements
Ultraviolet Light (UV) Disinfection	Eliminated cancer-causing by-products created by chlorine disinfection. ▪ Chlorine by-products are non-detect since UV start-up (September 2007)
Industrial Wastewater Separation Pipeline	Improved plant performance and reduced effluent salinity.

Manteca's Efforts During Current Permit Term

Water Supply Improvements	Corresponding Water Quality Improvements
Surface water added to Manteca's municipal groundwater supply	Reduction in some constituent levels: ▪ Aluminum levels reduced over 90% • 260 mg/L to 16 mg/L ▪ Electrical conductivity levels reduced 30% • 1,034 μmhos/cm to 721 μmhos/cm.

Electrical Conductivity: Plant Reductions



Electrical Conductivity (EC)
Plant Performance vs. Proposed Permit Limits

	April – August Summer EC (µmhos/cm)	September – March Winter EC (µmhos/cm)
Average EC Effluent Concentration	735	737
Max EC Effluent Concentration	783	827
Current Permit Limit (2005 SWRQB Order)	1,000	1,000
Proposed Limit	700	1,000
Expected Compliance	**NO**	**YES**

EC Compliance:
Microfiltration and Reverse Osmosis

Compliance Solution:

- Treat a portion of the effluent stream with Microfiltration and Reverse Osmosis

Costs:

- $33.4 million construction, $3.7 million annual O&M
- Sewer rates would double, to just over $80/month per household

EC Compliance:
Microfiltration and Reverse Osmosis

Results:

- 5% decrease in EC effluent levels, from 735 to 700 μmhos/cm
- Minimal benefit to River water quality: 0.02% decrease in River EC concentration
- RO by-product: a highly concentrated brine, which poses its own disposal problems

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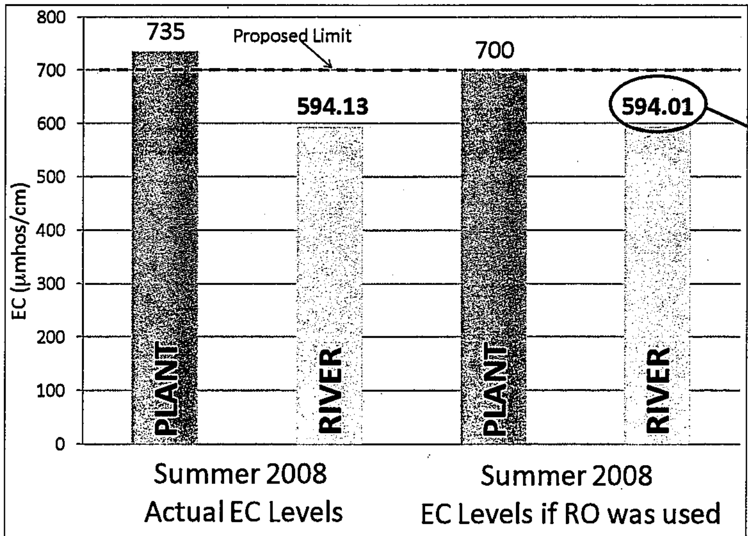
Salinity Reductions from MF/RO:
Before MF/RO vs. After MF/RO

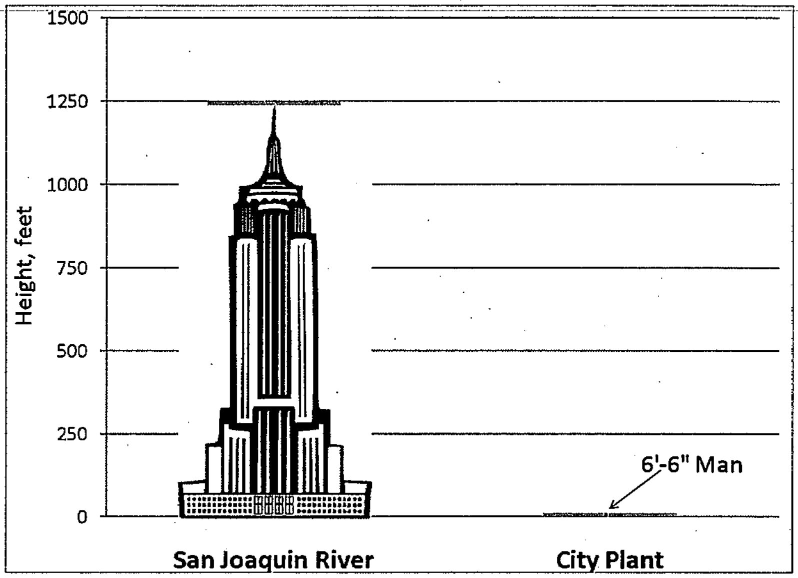


Water quality improvement from RO:

0.02% reduction of salinity levels in the river

10

Relative EC Loading: Existing River Load v. Plant Contribution



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Salinity: Manteca Order v. Tracy Order

- Existing limit of 1,000 umhos/cm adopted pursuant to Order 2005-0005 (Manteca Order)
- Manteca Order still controlling for Manteca
- Tracy Order not applicable to Manteca (*i.e.*, it did not repeal Manteca Order)
- Nothing has altered the essential material facts underpinning the Manteca Order

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Salinity: Bay-Delta Salinity Standards

- Established in Table 2 of the Bay-Delta Plan
  - April – August: 700 umhos/cm
  - September – March: 1,000 umhos/cm
- Previous State Board decisions & Bay-Delta Plan do not discuss treated effluent as a source of salinity (Manteca Order at p. 10.)
- Amendments in 2006 characterized as clarifying – but have substantive impact
- Amendments in 2006 *not* adopted pursuant to Water Code or approved by EPA

Estimated Schedule for Compliance with Final EC Limits

Proposed Action	Estimated Time to Complete
Develop Source-Control Compliance Workplan	6 months after Permit adoption
Participate in Southern Delta EC objectives reassessment and Basin Plan amendment	2 to 8 years, potentially longer
Implement Source-Control Compliance Workplan	Within 4 ½ years (successful outcome unknown)
Microfiltration / Reverse Osmosis • Research & Predesign • CEQA • Design • Bid & construct MF/RO/brine facilities • Achieve Compliance	 • 1 year after permit adoption • 2 years after permit adoption • 3 years after permit adoption • 5 years after permit adoption • October 14, 2014

Application of Title 27

Issue	Manteca's Secondary Effluent Storage Pond	Lodi Order
Post-Treatment	Yes	Yes
All Effluent Treated	Yes	No - Includes untreated industrial waste
Wastewater stored meets definition of recycled water	Yes	No

Summary

- Manteca's plant is a state-of-the-art facility, providing tertiary treatment
- Cost of further salinity reduction
  - $33.4 million construction, $3.7 million annual O&M
- Further salinity reduction provides no discernible benefits to the San Joaquin River
- Manteca to join CV-Salts
  - pending Manteca Council approval on October 20