CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2002-0185

WASTE DISCHARGE REQUIREMENTS
FOR
CITY OF TULARE
WASTEWATER TREATMENT FACILITY
TULARE COUNTY

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

1. The City of Tulare (hereafter City or Discharger) owns and operates a wastewater collection, treatment and disposal system that provides sewage service for industry and about 41,000 residents. The Wastewater Treatment Facility (WWTF) includes two separate wastewater treatment trains (WWTTs), one for domestic wastes (hereafter Domestic WWTT), the other for primarily industrial wastes (hereafter Industrial WWTT). Discharges from the Domestic WWTT and Industrial WWTT are hereafter referred to as Domestic discharge and as Industrial discharge, respectively. The Domestic and Industrial discharges are combined (hereafter Commingled discharge) in an aerated mixing box and discharged to about 200 acres of ponds for disposal by evaporation and percolation. A portion of the effluent discharged to ponds is recycled on 1,330 acres of nearby farmland, of which the Discharger owns 800 acres (hereafter Use Area). The WWTF and Use Area are about seven miles southwest of the center of the City within Sections 16, 20, and 21, T20S, R24E, MDB&M, as shown on Attachments A and B, a part of this Order.

2. The Discharger submitted a Report of Waste Discharge (RWD), dated 15 August 2000, in support of an increase in discharge flow from the Domestic and Industrial WWTTs to 6.0 mgd each (12.0 mgd total WWTF discharge flow). The RWD indicates that the City completed an expansion of the Domestic WWTT in 1998 to increase its treatment capacity to 6.0 mgd, and began modifying the Industrial WWTT in July 1999 to increase its design treatment capacity. In subsequent documents, the Discharger has requested ultimate flow increases at the Domestic and Industrial WWTTs of 6 mgd and 8 mgd, respectively. By Regional Board letter dated 14 September 2000, the Discharger was notified that its RWD was incomplete and lacked technical information to demonstrate adequate effluent disposal capacity to accommodate the requested increase in discharge flow (e.g., monthly water balances). The Discharger has yet to supply this technical information.

3. Waste Discharge Requirements (WDRs) Order No. 91-133, adopted on 26 June 1991 for the Discharger, prescribes requirements for the monthly average daily discharge of 9.39 mgd and includes water recycling requirements.

4. Order No. 91-133 is subject to and due for periodic review and does not reflect the current WWTF. The purpose of this Order is to rescind the previous Order and update waste discharge requirements, in part, to ensure the discharge is consistent with water quality plans and policies, to

prescribe requirements that are effective in protecting existing and potential beneficial uses of receiving waters, and to reflect the Discharger's ongoing proposed expansion.

5. Discharge specifications for the Domestic, Industrial, and Commingled discharges in Order No. 91-133 include the following:

Constituent	Units	Monthly Average	Daily Maximum
Domestic discharge			
Flow	mgd	5.0	---
SS[1]	mL/L	0.2	0.5
BOD_5[2]	mg/L	40[3]	80[3]
$CBOD_5$[4]	mg/l	35[3]	70[3]
TSS[5]	mg/L	40	80
Chloride	mg/L	175	250
Industrial discharge			
Flow	mgd	4.39	--
Commingled discharge			
Flow	mgd	9.39	--
SS	mL/L	0.2	0.5
BOD_5	mg/L	40[2]	80[2]
$CBOD_5$	mg/L	35[2]	70[2]
TSS	mg/L	not specified	not specified
Chloride	mg/L	175	250
Boron	mg/L		1.0

1 Settleable solids
2 5-day, 20°C biochemical oxygen demand
3 The Discharger may determine compliance with either BOD_5 or $CBOD_5$ effluent limitation
4 5-day, 20°C carbonaceous biochemical oxygen demand
5 Total suspended solids

6. Order No. 91-133 also prescribes a maximum EC (conductivity at 25°C) for the Commingled discharge of 500 µmhos/cm over source water EC. Groundwater limitations prescribed by Order No. 91-133 stipulated that the WWTF or its discharges not cause, in combination with other sources, underlying groundwater to (a) exceed background water quality for constituents other than EC, (b) contain total coliform bacteria concentrations of 2.2 most probable number per 100 milliliters (MPN/100 mL), or (c) contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses (including agricultural).

7. Order No. 91-133 requires the Discharger to monitor: (a) Domestic WWTT and Industrial WWTT influent for flow, pH, SS, BOD_5, $CBOD_5$ and TSS; (b) Domestic discharge for pH, dissolved oxygen (DO), BOD_5, $CBOD_5$, TSS, and EC; and (c) Commingled discharge for pH, SS, DO, BOD_5, $CBOD_5$, EC, total dissolved solids (TDS), boron, chloride, sodium, sulfate, ammonia, nitrate, and total Kjeldahl nitrogen (TKN). Order No. 91-133 also requires the Discharger to monitor: (a) source water for EC; (b) soils of the disposal site for nitrate, TKN and soluble salts; and (c) groundwater for pH, EC, standard minerals, nitrate, chloride, and TDS. Order No. 91-133 does not require the Discharger to monitor Domestic discharge for nitrogen compounds, TDS, and sodium, nor require monitoring Industrial discharge quality prior to commingling with the Domestic discharge.

8. Source Water. The City's source water originates from 25 groundwater wells and is of high mineral quality (i.e., its quality is better than necessary to meet established water quality objectives). The City 1999 Annual Water Quality Report characterized the source water concentration ranges for select constituents as follows:

Constituent / Parameter	Units	Low	High	Average
EC	µmhos/cm	140	350	211
Total Dissolved Solids	mg/L	70	240	137
Sodium	mg/L	20	57	33
Chloride	mg/L	3	26	8
Nitrate **(as N)**	mg/L	nondetect	20	8

Pretreatment

9. Pursuant to Title 23, California Code of Regulations (CCR), section 2233, the Discharger is required to establish a pretreatment program to protect the WWTF from upset as well as protect sludge quality and groundwater quality underlying the WWTF and Use Area. The pretreatment program must conform with Title 40, Code of Federal Regulations (CFR), Part 403.

10. There are no categorical industrial users that discharge to the WWTF. Seven Significant Industrial Users (SIUs) discharge to the Industrial WWTT. These are primarily processors of cheese, butter and whey fractions, and other dairy-based products, and include Land O'Lakes, Kraft Cheese Company, Saputo Cheese Company, Ice Cream Partners, and Tulare Culture Specialists. Land O'Lakes' Tulare Dairy Plant is notable for being the largest, single-site dairy complex in the nation. In July 2002, Land O'Lakes, in conjunction with Mitsui & Co. Ltd, opened a new cheese plant in Tulare that will ultimately discharge 1.7 mgd to the Industrial WWTT.

11. Order No. 91-133 specifies the Discharger must submit by 1 May 1992 various reports and submit a complete pretreatment program package, and implement and enforce by 1 October 1992 an effective pretreatment program. Special Order No. 92-134 later extended the 1 May 1992 deadline to 30 September 1992.

12. Chapter 5, Title VII, of the City's Municipal Code implements its industrial pretreatment program. The State Water Resources Control Board, Office of Chief Counsel, reviewed the Discharger's pretreatment ordinance for adequate legal authority and indicated in a 19 September 1994 letter all elements required by the federal regulations were present. By letter dated 27 December 1994, the Discharger requested approval of the pretreatment program, but this Board has not yet acted on this request.

13. In August 1999, the U.S. Environmental Protection Agency (EPA) inspected the Industrial WWTT and several SIUs and concluded that some of the SIUs adversely impact the anaerobic treatment processes at the Industrial WWTT. The EPA's inspection report indicated that, in addition to capacity lagging behind growth, the Industrial WWTT upsets are due, in part, to industrial users discharging: dilute water (e.g., onsite storm water and single-pass cooling water), highly acidic wastewaters, and excessive oil and grease. The EPA recommended that the Discharger reevaluate, improve, and enforce its local limits and control programs.

14. In December 1999, the Discharger submitted a revised pretreatment program that lacked documents necessary to conduct a thorough technical review. Its major deficiencies included its lack of an up-to-date industrial user survey and adequate enforcement response plan. While the City has the necessary legal authority to implement the program, the revised pretreatment program is insufficient and therefore does not comply with 40 CFR 403.

15. On 3 May 2001, the City adopted Resolution No. 01-577, which modified the local limits for SIUs by establishing, effective 28 February 2002, a maximum EC limit of 950 µmhos/cm and a maximum oil and grease limit of 700 mg/L. The EC limit required the SIUs to reduce the maximum EC of their discharge by approximately 25 percent.

16. The City has allocated a total flow of 4.585 mgd to SIUs listed in Findng No. 10 (more than the 4.39 mgd allowed by Order No. 91-133) as the maximum discharge flow to the Industrial WWTT. The implementation of caustic solution recycling by some SIUs to reduce wastewater EC has increased the acidity of Industrial WWTT influent. The Discharger's enforcement effort is limited to levying monetary penalties that appear in SIUs' monthly billing reports. Prior to 2001, when fined, an SIU was allowed to use half of the penalty amount to upgrade its pretreatment facilities to improve compliance. For example, Saputo Cheese Company installed reverse osmosis units in 1999 to reduce the salinity of its discharge. Despite this upgrade, it continues to violate the local limit for EC.

17. The Discharger's pretreatment program is inadequate. Most of the City's SIUs are in noncompliance with at least one local limit and are not under any enforcement orders (e.g., notices of violation, cease and desist orders, etc.), demonstrating the Discharger's failure at implementing an effective pretreatment program. The Discharger recently retained Carollo Engineers to develop a complete and effective pretreatment program and therefore must reapply for approval.

Domestic discharge

18. The expanded Domestic WWTT is a 6-mgd-capacity activated sludge plant that includes headworks with mechanical screens and an aerated grit chamber, primary and secondary sedimentation, biofiltration, activated sludge units, sludge thickening and digestion, and sludge drying. Attachments C and D, a part of this Order, depict the Domestic WWTT's process flow diagram and a partial plan view of the Domestic WWTT, respectively.

19. The Discharger's self-monitoring reports (SMRs) from 1 January 2001 through January 2002 characterize the Domestic WWTT discharge as follows:

Constituent / Parameter	Units	Influent	Effluent
Monthly Average Daily Flow	mgd	3.07	N/A
Settleable Solids	mL/L	6.9	<0.1
BOD_5	mg/L	180	9.1
TSS	mg/L	232	8.1
EC[3]	µmhos/cm	N/A	547
Chloride	mg/L	N/A	49

20. Discharger SMRs from March 1998 through January 2002 indicate that winter flows to the Domestic WWTT are not significantly higher than summer flows, indicating that inflow and infiltration in general are not a serious problem for the Domestic WWTT.

21. The expanded Domestic WWTT was reportedly designed to accept up to 1.39 mgd of partially-treated industrial wastewater to supplement capacity at the Industrial WWTT. However, the Discharger reports that industrial flows greater than 0.39 mgd interfere with the treatment process at the Domestic WWTT.

Industrial discharge

22. Industrial influent contains high strength organic and nitrogen concentrations (i.e., BOD_5 and nitrogen concentrations typically exceed 1,500 mg/L and 60 mg/L, respectively). In addition to discharges from the City's dairy processing plants (e.g., cooling water, clean-in-place wastewater, and wash-down wastewater), discharges to the Industrial WWTT include storm water, domestic wastewater, septage, and supernatant. Approximately 25 percent of the Industrial WWTT influent flow is low strength wastewater (excluding storm water flows). Storm events reportedly introduce approximately 0.5 mgd of storm water into the Industrial WWTT wastewater collection system. From January 2002 through May 2002, monthly average daily influent flows to the Industrial WWTF were 5.5 mgd. The City began implementing in January 2002 corrective measures to segregate and remove low strength wastewater, domestic wastewater and storm water from the Industrial WWTT. In June 2002, the City completed a storm water diversion project to divert approximately 0.5 mgd of storm water to storm water retention ponds and intends to submit

certification that the project is complete once a storm event has occurred. In April 2002, the City also completed the Paige Avenue Sewer, a new domestic sewer line along Paige Avenue that will convey low strength domestic wastewater flows to the Domestic WWTT beginning in September 2002.

23. Industrial WWTT influent arrives via two separate pipelines that terminate into one headworks that feature a barscreen and grease and grit removal. After preliminary treatment, flows combine for grit and grease removal then enter a 30.1-million-gallon-capacity anaerobic "bulk volume fermenter" (BVF). The BVF has average monthly 4.39 mgd and peak hourly 7.0 mgd rated treatment capacity for 65 to 75 percent BOD_5 removal, provided environmental conditions such as pH, alkalinity, and temperature are maintained within optimal ranges.

24. Prior to 1999, effluent from the BVF was further treated in two unlined aerated treatment ponds, followed by a series of four 32-acre unlined oxidation ponds (ponds 1 through 4). In early 1999, increased dairy processing activity by the City's SIUs caused industrial wastewater flows to exceed the BVF's rated capacity. These excessive flows, combined with interference from high concentrations of oil and grease, adversely impacted the BVF's treatment performance (i.e., BOD_5 removals dropped from 75 to less than 50 percent).

25. In February 2002, the Discharger submitted *Final Report: Improving the Performance of the BVF Digester City of Tulare* (hereafter BVF Evaluation) prepared by ADI Systems Inc., the original designers of the BVF. The BVF Evaluation contains recommendations to improve BVF performance. They include measures to prevent excessive grease and oil from entering the BVF and to divert peak storm water flows from the BVF. Another suggests adding a buffering agent, magnesium hydroxide, to BVF influent for six months to achieve the proper alkalinity within the reactor. The need for a buffering agent is largely due to the increased acidity of Industrial WWTT influent due to the recent implementation of caustic solution recycling by the City's SIUs. The Discharger began the chemical addition in February 2002. Results on the effectiveness of the chemical additions are pending.

26. On 27 May 2002, when the Discharger was modifying the BVF, collected methane gas under the BVF's cover ignited and caused a fire that destroyed the perimeter of the BVF's cover and its inner liner and caused damage totaling $4,000,000. The BVF manufacturer (ADI Systems Inc.) indicates that the BVF should be able to continue to treat the industrial wastewater satisfactorily without the cover and inner liner, as floating oil and grease appear to provide an adequate substitute for an airtight cover. Nevertheless, the Discharger has significantly decreased BVF influent flow, and is investigating alternatives for cover and inner liner repair. The Discharger's June 2002 BVF performance data indicates that the BVF is achieving acceptable removal efficiencies at the lower influent flows. It is uncertain when the BVF will be repaired to restore its design 4.39-mgd treatment capacity.

27. Industrial WWTT Expansion Project. In May 1999, the Discharger began a phased expansion of the Industrial WWTT (hereafter Expansion Project), which is now in its final stages of completion. The Expansion Project is described in a technical report dated 2 September 1999 by

Carollo Engineers, *Design Memoranda for the Industrial Wastewater Treatment Plant Expansion Project* (hereafter Design Memoranda). The first phase, which was completed in April 2000, involved earthworks to construct four new parallel treatment "trains" to further treat BVF effluent. The four treatment trains were constructed in what was once one of the two unlined aerated treatment ponds and two oxidation ponds (ponds 1 and 2). Each of the four treatment trains (A through D) consists of one complete-mix lagoon (Cell 1) followed by three partially-mixed aerated ponds operated in series (Cells 2 through 4). The first phase also included the construction of two new 32-acre unlined disposal ponds (ponds 5 and 6). As of June 2001, the Discharger began operating treatment trains A through C and diverting flows from the BVF to the treatment trains to improve BVF treatment performance. In March 2002, the Discharger completed construction of two additional 32-acre unlined disposal ponds (ponds 7 and 8). The Discharger plans to add four additional treatment trains (E through H) in an area now encompassed by the two remaining 32-acre unlined oxidation ponds (ponds 3 and 4). In the June 2002 SMR, the Discharger reports taking ponds 3 and 4 out of service to construct treatment train E. The existing treatment trains at the Industrial WWTT are not lined and soils were not compacted to preclude or minimize the release of waste constituents to soil and to groundwater. Impoundment of high strength wastes in unlined treatment ponds has reasonable potential to unreasonably degrade groundwater. The City submitted a geotechnical report, dated 5 September 2002, that provides certified results that treatment train D (Cells 2 through 4) was compacted to reduce soil permeabilities to 1×10^{-6} cm/sec or less. Cell 1 of treatment train D was lined with gunite. The City also submitted a time schedule for lining the first-stage cells of all the remaining treatment trains with gunite and compacting the soils in the remaining treatment train cells to permeabilities of 1×10^{-6} cm/sec or less. The Discharger plans to complete soil compaction work in all five of the treatment trains within two years. Train E compaction will be completed in September 2002. Train A has been rotated out of service for sludge removal and compaction, which is scheduled for October 2002. Trains B and C will follow, one in 2003 and the next in 2004. The ongoing Expansion Project also includes a new industrial headworks and associated pipeline to permanently divert BVF influent flows in excess of 4.39 mgd (the BVF's design capacity) to the treatment trains. Attachments C and E, a part of this Order, depict the Industrial WWTT's process flow diagram and a partial plan view of the Industrial WWTT, respectively.

28. The design of the Industrial WWTT expansion, specifically the treatment trains, is based on optimal BVF performance. According to the Design Memoranda, the BVF effluent must have a BOD_5 concentration of no greater than 700 mg/L for subsequent treatment to perform as designed. In order for it to consistently meet this criterion, the BVF must be operated within its design parameters. The BVF Evaluation indicated that the design conditions of the BVF include, in part, an average influent chemical oxygen demand (COD) loading rate of 135,000 lbs/day. From January to May 2002, the Discharger operated the BVF at a monthly average influent flow of 4.6 mgd and COD loading rate of 91,000 lbs/day. The flow exceeds the design criteria described in Finding No. 23 and may impact the BVF's ability to consistently achieve the BOD_5 performance standard.

Commingled Discharge Violations

29. The Discharger's removal from service of major treatment components (e.g., aeration basins) during the Expansion Project's initial phases caused the organic and solids content of Industrial WWTT effluent quality to be comparable to raw domestic wastewater. In July 1998, the Discharger began diverting up to 0.5 mgd of BVF effluent flow to the Domestic WWTT to relieve the organic load to the Industrial WWTT's aeration basins. In May 2000, Industrial WWTT influent flows increased further due to increased production by the City's SIUs. Two years later, when Land O'Lakes brought online its new Cheese Plant (described in Finding No. 10), monthly average and daily maximum Industrial WWTT influent flows reached 5.5 mgd and 6.5 mgd, respectively. Flows have been steadily increasing well before the Discharger has the capacity to treat and dispose of the wastewater properly. A chronology of Industrial WWTT flows and treatment performance is detailed in the Information Sheet.

30. Discharger SMRs from 1 July 2001 through 1 May 2002 characterize the Commingled discharge as follows:

Constituent / Parameter	Units	Value
Monthly Average Daily Flow	mgd	N/A
Settleable Solids	mL/L	0.0
BOD_5	mg/L	40
$CBOD_5$	mg/L	14
EC	µmhos/cm	919
TDS	mg/L	459
Sodium	mg/L	131
Chloride	mg/L	75
Nitrate **(as N)**	mg/L	18
Ammonia **(as N)**	mg/L	17
TKN	mg/L	18
Total Nitrogen	mg/L	43

31. The Discharger has not submitted information to characterize fully the Industrial WWTT discharge quality. The ratio of Industrial to Domestic discharge in the Commingled discharge is about 1.6:1. Using the Domestic and Commingled discharges' average effluent BOD_5 concentrations and flowrates of 9.1 mg/L and 39 mg/L, and 3.1 mgd and 5.0 mgd, respectively, the average BOD_5 concentration of the Industrial WWTT discharge would be approximately 58 mg/L.

32. In addition to diverting some industrial flows to the Domestic WWTT, the Discharger has relied on the high quality of Domestic WWTT effluent to meet organic removal specifications prescribed for the Commingled discharge. Dilution by mixing a higher quality wastewater with a lower quality wastewater, as technically allowed by WDRs Order No. 91-133, allows less than optimum

treatment by the Industrial WWTF. The Domestic WWTT is currently operating at half its rated hydraulic capacity. The ongoing Industrial WWTT retrofits and expansions are designed to meet the Commingled discharge specifications of Order No. 91-133. Violations of Commingled discharge specifications have been largely attributable to poor treatment performance of the Industrial WWTT. It is inconsistent with water quality policies to allow optimal Domestic WWTT performance to accommodate less than optimal performance of the Industrial WWTT.

33. The Discharger has been allowed an alternative effluent limitation to the BOD_5 effluent limitation to compensate for disproportionate nitrogenous oxygen demand. To the extent that the presence of excessive nitrogen passes through the treatment system and as noted hereafter impacts groundwater, the appropriateness of the alternative should be reviewed as part of best practicable treatment and control evaluation.

34. The Discharger chronically exceeds the effluent EC discharge specification of source water plus 500 µmhos/cm, or 1,000 µmhos/cm, whichever is less. These exceedances range from 100 to 500 µmhos/cm. The EC violations are due primarily to the Discharger's failure to implement an effective salinity source control program (described in Finding Nos. 15, 16 and 17) and to the recent practice of adding chemical buffering agents to the Industrial WWTT influent (described in Finding No. 25).

Sludge Handling and Disposal

35. Domestic WWTT sludge is thickened, anaerobically digested, and discharged to the WWTF's unlined sludge drying beds (16 acres total). Supernatant from the anaerobic digesters is discharged to sludge beds, the Domestic WWTT headworks, or to the BVF. Industrial WWTT sludge (mainly from the BVF) is discharged to the WWTF's unlined sludge drying beds approximately twice per year or as needed. During the Expansion Project when the BVF cover was being replaced, sludge and oil and grease from ponds 1 and 2 and the BVF were removed and stored onsite. Discharge of sludge and supernatant to the unlined sludge handling facilities may have caused groundwater to contain elevated concentrations of salinity constituents, iron, and manganese (described in Finding No. 94). The Discharger has indicated its commitment to line its sludge beds over the next two years.

36. Prior to 1997, the Discharger stockpiled dried sludge onsite and periodically discharged it to the Use Area as a soil amendment. After 1997, the Discharger began disposing of sludge offsite by contracting with McCarthy Family Farms, Inc. (hereafter McCarthy Farms) of Corcoran, California. The Discharger has hired a consultant to prepare a Sludge Management Plan for submittal in October 2002.

37. In 2001, according to McCarthy Farms' annual monitoring report, it received approximately 25,402 wet metric tons of sludge from the City's WWTF. According to the Discharger 2001 annual monitoring report, the sludge consisted of digested sludge from the Domestic WWTT digesters (512 cubic yards, 508 metric tons); sludge removed from ponds 1 and 2 in 1999

(27,720 cubic yards, 23,370 metric tons) and all sludge produced from the Domestic and Industrial WWTTs in 2001 (2,087 cubic yards, 1,524 metric tons).

38. For approximately four years, the Discharger has been allowing haulers of grease trap waste to discharge this waste to a half-acre area adjacent to the WWTF's sludge drying beds. While the Discharger has not characterized this waste, it is reasonable to believe it similar in character to the grease trap waste recently analyzed by the City of Visalia: high BOD_5 (exceeding 20,000 mg/L) and high total nitrogen (up to 1,000 mg/L). While the waste is not hazardous, it may be designated waste, as defined in section 13173(b) of the California Water Code (CWC), as its discharge to land under ambient conditions has the potential to release waste constituents in concentrations that cause groundwater to exceed water quality objectives. Order No. 91-133, Discharge Prohibition A.3, prohibits the discharge of designated waste and otherwise does not authorize the discharge of grease trap waste. The Discharger was issued a Notice of Violation (NOV) on 30 October 2001 for this practice. The Discharger subsequently indicated that it would discharge grease trap waste to the Domestic WWTT's anaerobic digesters or to the BVF. The Discharger has not submitted technical justification that this practice will not adversely impact the WWTF's treatment units, particularly the BVF.

39. For over twenty years, the Discharger has buried animal carcasses from the City animal shelter within the WWTF property in trenches approximately 3 feet wide, 8 feet long, and 8 feet deep. Order No. 91-133 does not characterize or permit the discharge of solid waste such as animal carcasses. Such discharges are subject to the regulatory requirements of Title 27, CCR, section 20005 et seq (hereafter Title 27). The practice was first documented during a 3 October 2001 inspection. The Discharger was issued an NOV on 30 October 2001 that directed the Discharger to immediately cease burying animal carcasses on site. The Discharger indicated that it would comply.

Effluent Disposal and Recycling

40. Water balances prepared and certified by a professional civil engineer typically document the effluent disposal capacity for land discharges. The Discharger's water balances have been inaccurate, inconsistent, and contradictory. The Discharger's 2001 annual land management report provided a water balance not certified by a professional civil engineer that indicated 6,821 acre-feet of effluent were available for recycling and that about 6,025 acre-feet of effluent were recycled. In contrast, the water balance certified by the Discharger's consulting civil engineer indicated that 2,881 acre-feet of effluent were available for recycling. The consultant's water balance utilized a percolation rate of 1.08 in/day, four times higher than that indicated in the WWTF's Operation and Maintenance and used in the land management report.

41. At a current Commingled discharge flow of 9.1 mgd, the WWTF processes and disposes of approximately 10,200 af/yr. Of that amount, percolation and evaporative losses occur within the 64 acres of unlined treatment ponds and 197 acres of disposal ponds. Annual evaporation losses amount to about 1,230 af/ft (12 percent), while annual percolation losses in disposal ponds only are about 1,500 af/yr (15 percent). Additional percolation is expected to occur in the WWTF's unlined wastewater treatment ponds.

42. At an effluent nitrogen concentration of 35 mg/L and annual evaporative losses of about 12 percent, the concentration of nitrogen in wastewater percolating to groundwater would be about 40 mg/L in the absence of attenuation in the soil profile. The Discharger indicates that there will be a loss of nitrogen from the ponds due to ammonia volatilization and denitrification, but has not submitted data documenting the magnitude of these losses. The Discharger further indicates that it would be difficult to associate nitrogen concentrations in groundwater passing under WWTF ponds that exceed 40 mg/L with percolation of effluent from the ponds.

43. Recycling Operation. Clarklind Farms recycles WWTF effluent on 530 acres (hereafter Clarklind use area) on three separate parcels, as shown in Attachments A and B. Order No. 90-058 regulates recycling on a 240-acre parcel and on a 130-acre parcel within Sections 15, 20, and 22, T20S, R24E, MDB&M. Order No. 90-059 regulates recycling on a 160-acre parcel within Section 22, T20S, R24E, MDB&M.

44. The Use Area and Clarklind use area are planted in cotton and corn (grain and silage). The annual nitrogen demands for cotton and corn are 180 and 250 lbs/acre, respectively, according to *Western Fertilizer Handbook*. The Discharger has provided information from an agronomist that higher crop nitrogen uptakes occur when yields are higher than presented in the *Western Fertilizer Handbook*. The Discharger proposes to increase yields by double cropping in portions of the Use Area.

45. Domestic wastewater contains pathogens harmful to humans that are typically measured by means of total or fecal coliform, as indicator organisms. California Department of Health Services (DHS), which has primary statewide responsibility for protecting public health, has established statewide criteria in Title 22, CCR, section 60301 et seq., (hereafter Title 22) for the use of recycled water and has developed guidelines for specific uses.

46. The 1988 Memorandum of Agreement (MOA) between DHS and the State Water Resources Control Board (State Board or SWRCB) on the use of recycled water establishes basic principles relative to the agencies and the regional boards. In addition, the MOA allocates primary areas of responsibility and authority between these agencies, and provides for methods and mechanisms necessary to assure ongoing, continuous future coordination of activities relative to the use of recycled water in California.

47. Title 22 section 60304(d) allows for the use of undisinfected secondary recycled water for prescribed applications involving certain food and seed crops, subject to various restrictions. Because undisinfected secondary recycled water would represent a potential public health threat if food or seed crops were directly or indirectly exposed to the undisinfected recycled water, it is imperative that the restrictions outlined with the identified uses under section 60304(d) are strictly complied with. If a recycler cannot provide the necessary assurances that applicable restrictions can be complied with at all times, it is appropriate for this Board to either require a higher level of treatment (i.e., disinfection) or restrict applications of undisinfected secondary recycled water to crops not intended for human consumption (e.g., fodder and fiber crops).

48. Title 22 section 60320 requires recyclers of treated municipal wastewater to submit an engineering report detailing the use of recycled water, contingency plans, and safeguards. The Discharger submitted a Title 22 Engineering Report to the Regional Board and DHS for review. The Discharger submitted information dated 28 August 2002 to supplement the Title 22 Engineering Report. By letter dated 4 September 2002, DHS approved the City's Title 22 Engineering Report to recycle effluent on the Use Area and Clarklind use area. In March 2002, the Discharger submitted an incomplete Report of Water Recycling (RWR) and Title 22 Engineering Report to recycle WWTF effluent on 645 acres owned by Mr. Tony Mello directly south of the WWTF in Sections 28, 29 and 30, T20S, R24E, MDB&M. On 9 September 2002, the Discharger submitted supplemental information to complete the Title 22 Engineering Report. By letter dated 10 September 2002, DHS approved the Title 22 Engineering Report and its supplements. The Discharger has yet to submit information to complete the RWR (e.g., monthly water balance, yearly nutrient balance).

49. Effluent is applied to the Use Area and Clarklind use area at rates more than twice what can be reasonably justified with the crops grown, based on information in Discharger annual land management reports. For example, the 2001 report indicates that 6,025 acre-feet of effluent were applied to 1,087 acres, which equates to a hydraulic application of 5.5 feet. However, with an effluent total nitrogen concentration of 35 mg/L, this application equates to an annual nitrogen loading of about 530 lbs/acre, which is significantly greater than the annual 180 and 250 lbs/acre required for cotton and corn, respectively. Application rates exceeding agronomic nutrient demand has reasonable potential to cause groundwater pollution with nitrate and degradation with other waste constituents.

50. The Discharger also floods fallow portions of the Use Area with effluent for disposal by percolation and evaporation. The Discharger creates temporary earthen berms surrounding as much as 40 acres at a time and applies effluent at a rate of 1.5 to 2 feet per discharge event. On 30 October 2001, the Discharger was issued an NOV for threatening to discharge to surface waters as a result of the poor construction of berms surrounding the fallow areas. The Discharger continues to create shallow effluent disposal ponds in the Use Area. Additional effluent spills have occurred, one in July 2001 and two more in February 2002, due to circumstances unrelated to the shallow ponding of effluent. Two spills were associated with gophers during Use Area farming operations and one was associated with a soil failure at a pipe penetration through Storage Pond 7. To date, effluent spills to canals have totaled an estimated 15,000 gallons.

51. The Discharger has indicated that it has retained a consultant to prepare a Recycling Management Plan that will submitted in fall 2002, and that it may acquire up to 1,280 acres of additional farmland for water recycling.

Hydrology, Soils, and Land Use

52. The WWTF and Use Area lie within the Tulare Lake Basin, specifically the Kaweah Delta Hydrologic Area (No. 558.10) as depicted on interagency hydrologic maps prepared by the California Department of Water Resources (DWR) in 1986. The WWTF vicinity slopes gently

(10 feet/mile) toward the southwest. Surface water drainage is to Deep Creek, a Valley Floor Water that drains to the Tulare Lake Bed. All storm water runoff from the WWTF property is diverted into existing storm water retention basins, kept separate from the wastewater stream, and does not discharge to a water of the United States.

53. Tulare Canal is an unlined irrigation canal that conveys high quality surface water to farmland within the Tulare Irrigation District. It borders the WWTF's southern boundary, traverses much of the Use Area, and terminates in the Lakeland Canal approximately 12 miles southwest of the WWTF.

54. The discharge area is in an arid climate characterized by hot dry summers and mild winters. The rainy season generally extends from November through March. Occasional rains occur during the spring and fall months, but summer months are dry. Average annual precipitation and evapotranspiration in the discharge area are 11 inches and 62 inches, respectively, according to information published by DWR.

55. According to the United States Department of Agriculture Soil Conservation Service, *Soil Survey of Tulare County, California, Western Part* (draft), the soils of the Kaweah River alluvial fan near the WWTF consist of fine sandy loams and silty clay loams and are considered moderately permeable. The dominant sediments are silt, fine sands, and clay, according to logs of wells drilled in the area. A clay lens called the 'E' Clay of the Tulare Formation occurs at a depth of about 250 feet below ground surface (bgs). The 'E' Clay divides underlying groundwater into an upper unconfined and lower confined aquifers.

56. The WWTF is about seven miles southwest of the center of the City of Tulare. Land use in the area between the WWTF and the City is predominantly irrigated agriculture and rural residential. Land use to the north, west, and south of the WWTF primarily consists of irrigated agriculture, rural residential, and at least seven dairies within a two-mile radius surrounding the WWTF and Use Area. Crops grown within a five-mile radius of the WWTF include, but are not limited to, alfalfa, corn, cotton, grapes, almonds, walnuts, Sudan grass, dry beans, and pistachios, according to the DWR land use data published in 1999. Dominant crops are alfalfa and corn. Minor crops include beans (less than three percent of the area). Area crops are typically irrigated by flood or furrow irrigation systems, according to the Tulare County Agricultural Commissioner's Office.

Groundwater Characterization

57. The gradient of the unconfined aquifer in the WWTF and Use Area is about 1.8 feet per 1,000 feet to the southwest, according to information in *Lines of Equal Elevation of Water in Wells in Unconfined Aquifer*, published by DWR. Groundwater in the unconfined aquifer is encountered at depths of about 64 to 78 feet bgs.

58. In the process of crop irrigation, evaporation and crop transpiration remove water from soils and result in accumulation of residual salts in the soil root zone. These salts would retard or inhibit plant growth except for a fraction of irrigation water applied to leach the harmful salt from the

root zone. Leached salts eventually enter groundwater and concentrate above the uppermost layer of the uppermost aquifer. Leaching factors vary according to the quality of irrigation water, but leaching is necessary in all cases to sustain irrigated agriculture. As this is the general condition throughout the valley floor, water supply wells for all beneficial uses typically are constructed to extract groundwater from below the uppermost layer.

59. The Discharger has established a groundwater monitoring well network system encompassing the WWTF vicinity and Use Area, as indicated in Attachments A and B. The network consists of 16 wells constructed in 1989, 1990 and 2001. The network consists of the following: four upgradient wells (MW-1, MW-2, MW-6 and MW-12), seven wells in the Use Area vicinity (MW-3, MW-10, MW-11A, MW-14, MW-15A, MW-15B, and MW-16), three wells adjacent to the various WWTF ponds (MW-20, MW-18, and MW-19) and one well adjacent to the sludge drying beds (MW-22). The Discharger has been monitoring groundwater quality since March 2001 in seven wells (MW-1, MW-2, MW-3, MW-6, MW-10, MW-11A, MW-12, MW-14, MW-15A, MW-5B, and MW-16) on a quarterly basis since 1991 for nitrate, chloride, EC, and TDS and for nitrate, standard minerals, and total coliform.

60. Groundwater at the WWTF and Use Area occurs about 60 to 80 feet bgs and flows southwesterly, based on Discharger SMRs. Groundwater data from 1997 through 2000 indicate an increase in groundwater elevation of about 15 feet in the wells within or adjacent to the Use Area. This rise can be attributed to increased delivery of effluent to the Use Area and also to regional water-level rises following the end of a multi-year drought in the early 1990s.

61. Water quality data from upgradient wells are likely not representative of regional groundwater. MW-1 and MW-6 appear to be impacted by the WWTF or other sources of waste constituents. MW-2 and MW-12 are adjacent to canals and likely reflect high quality percolated irrigation water, which is not representative of regional groundwater. Additional monitoring well(s) at more appropriate location(s) are necessary to establish representative regional natural background groundwater quality. The Discharger reports that it has tried to site a background well upgradient from the WWTF, however, private property owners refused access to their land. All public right-of-ways are adjacent to surface water canals that make installation of a background well in public right-of-ways inappropriate. The Discharger will likely have to purchase property in a suitable location to install a properly sited background well.

62. Quarterly Discharger SMRs from 1 July 2001 through March 2002 characterize groundwater quality in selective wells downgradient of various WWTF components as follows:

Monitoring Well	Downgradient From	Average NO_3-N (mg/L)	Average EC (µmhos/cm)	Average TDS (mg/L)	Average Chloride (mg/L)
18[1]	pond 6	35	1,633	1,027	150
19[1]	pond 8	82	2,040	1,476	228
21	pond 9[2]	26	1,320	884	90
22	sludge beds	22	1,220	804	88

[1] MW-18 and MW-19 are new wells drilled after the construction of ponds 5 and 6 in 2000 and ponds 7 and 8 in 2001. The concentrations of TDS, EC, and chloride in groundwater passing through MW-19 exceed typical effluent concentrations by more than two-fold, and the groundwater nitrate-nitrogen concentration exceeds the total nitrogen in the effluent. The concentrations of TDS, EC, and chloride in groundwater passing through MW-18 also greatly exceed typical effluent concentrations. The Discharger interprets this data to indicate area agricultural practices may have a greater influence on shallow groundwater than percolating effluent. Ponds 6 and 8 were constructed in what was once a portion of the Discharger's Use Area. Therefore, the elevated concentrations likely reflect the flushing from the soil of waste constituents that had been applied from water recycling operations.

[2] Historically, pond 9 was referred to as 'Domestic Pond' because it only received treated domestic wastewater.

Basin Plan, Beneficial Uses and Water Quality Objectives

63. *Water Quality Control Plan for the Tulare Lake Basin, Second Edition),* (hereafter Basin Plan) designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve water quality objectives for all waters of the Basin. The Basin Plan incorporates plans and policies of the State Board by reference, including State Board Resolution No. 68-16 (hereafter Resolution 68-16 or the "Antidegradation" Policy) and State Board Resolution 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304" (hereafter Resolution 92-49).

64. The Basin Plan requires municipal WWTFs that discharge to land comply with treatment performance standards for BOD_5 and TSS. WWTFs that preclude public access and discharge one mgd or more must provide removal of 80 percent or reduction to 40 mg/L, whichever is more restrictive, of both BOD_5 and TSS. Regarding the discharge to land of industrial wastes, the Basin Plan states, in part, that "Generally, the effluent limits established for municipal waste discharges will apply to industrial wastes."

65. Water in the Tulare Lake Basin is in short supply, requiring importation of surface waters from other parts of the State. The Basin Plan encourages reclamation on irrigated crops wherever feasible and indicates that discharges to surface water and evaporation of reclaimable wastewater will not be acceptable permanent disposal methods where the opportunity exists to replace an existing use or proposed use of fresh water with recycled water. Where appropriate, the Basin Plan allows a timetable for implementing reclamation. The City's discharge constitutes a significant source of agricultural supply water and groundwater recharge.

66. The Basin Plan identifies the greatest long-term problem facing the entire Tulare Lake Basin as the increase in salinity in groundwater, which has accelerated due to the intensive use of soil and water resources by irrigated agriculture. The Basin Plan describes numerous salt management recommendations and requirements. The latter includes the requirement that discharge to land from wastewater treatment facilities not contain an EC greater than source water plus a maximum 500 µmhos/cm, or less if necessary to achieve water quality objectives. Accordingly, the Basin

Plan allows for salinity degradation and focuses on controlling the rate of increase. The Basin Plan limits discharges to areas that recharge to good quality groundwater to a maximum EC of 1,000 µmhos/cm, and a maximum concentration of chloride and boron of 175 and 1.0 mg/L, respectively.

67. The beneficial uses of Valley Floor Waters, designated by the Basin Plan are agricultural supply; industrial service supply; industrial process supply; water contact recreation; noncontact water recreation; warm freshwater habitat; wildlife habitat; rare, threatened, or endangered species; and groundwater recharge. The beneficial uses of the Tulare Canal are agricultural supply and groundwater recharge.

68. The WWTF is in Detailed Analysis Unit (DAU) No. 242 of the South Valley Floor. The Basin Plan identifies the beneficial uses of area groundwater as municipal and domestic supply, industrial service and process supply, agricultural supply, and water contact and noncontact water recreation.

69. The Basin Plan establishes numeric and narrative water quality objectives for surface waters and groundwater within the basin. Numeric water quality objectives are limits already quantified. Narrative water quality objectives are unquantified limits expressing the level of protection for beneficial uses from specific waste constituents and categories of waste constituents. Objectives for chemical constituents in, and toxicity and tastes and odors of, groundwater take both forms. The toxicity objective requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in humans, plants, or animals. The chemical constituent objective states that groundwater shall not contain chemical constituents in concentrations that adversely affect any beneficial use or exceed drinking water Maximum Contaminant Levels adopted by the Department of Health Services. The tastes and odors objective prohibits taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses.

70. Pursuant to sections 13263(a) and 13377 of the CWC, waste discharge requirements must implement the Basin Plan and consider the beneficial uses and water quality objectives reasonably required to protect the uses, the need to prevent nuisance, as well as other waste discharges and conditions in the area and groundwater. The Basin Plan requires that waste discharge requirements apply all water quality objectives for each constituent to ensure that discharges do not cause groundwater to contain chemical constituents, toxic substances, radionuclides, pesticides, or taste- or odor-producing substances in a concentration that adversely affects any beneficial use or causes nuisance. To satisfy all objectives, the most stringent objective for each constituent must be met.

71. The Basin Plan procedure for applying water quality objectives as terms of discharge in waste discharge requirements requires maintenance of the existing quality of groundwater except where an adverse change is consistent with Resolution 68-16. Resolution 68-16 requires that waste discharges occur in a manner that maintains high quality waters of the State. Any change in quality can only occur after full application of best practicable treatment and control (BPTC) of the waste and must be consistent with maximum benefit to the people of the State, not unreasonably affect any beneficial use, and not result in water that exceeds any water quality

objective. The discharge must be subject to requirements that will result in best practicable treatment or control.

72. Resolution 92-49 addresses procedural requirements for investigation as well as cleanup and abatement of unauthorized discharges. A discharger shall be required to conduct step-by-step investigations for this purpose, to submit written work plans and reports for all elements and phases, to conform to the provisions of Resolution 68-16, and to cleanup and abate the effects of the discharge in a manner that promotes attainment of background water quality or the highest water quality that is reasonable and which does not exceed water quality objectives. Chapter IV of the Basin Plan contains Regional Board policies on *Antidegradation* and *Ground Water Cleanups* that further explain and enhance these State Board policies.

73. To protect the designated use of municipal and domestic supply, water quality objectives require, at a minimum, that waters not exceed maximum contaminant levels (MCLs) specified in the following provisions of Title 22, CCR: sections 64431 (Inorganic Chemicals, including Fluoride); 64443 (Radioactivity); 64444 (Organic Chemicals); and 64449 (Secondary MCLs – Consumer Acceptance Limits).

74. The Basin Plan's incorporation of MCLs by reference is prospective to incorporate changes to MCLs as changes in Title 22 take effect. Should a change occur to an MCL and that MCL becomes the most stringent objective, implementation of the objective would be affected through reopening of this Order and consideration of a time schedule.

75. The Basin Plan sets forth a procedure for translating narrative water quality objectives into numeric receiving water limits, directing that relevant numeric criteria and guidelines developed and published by other agencies and organizations and any other relevant criteria be considered.

76. Quantifying a narrative water quality objective requires a site-specific evaluation of each waste constituent for consistency with the narrative objective using the procedures set forth in the Basin Plan. These translation procedures require this Board consider, among other things, site-specific hydrogeologic and land use factors and relevant numerical criteria and guidelines developed or published by other agencies and organizations. The latter include the National Academy of Sciences, the University of California Cooperative Extension, and the Food and Agricultural Organization of the United Nations. Westcot and Ayers in a 1985 publication *Water Quality for Agriculture, Food and Agriculture Organization of the United Nations - Irrigation and Drainage Paper No. 29*, (hereafter Guidelines) provide detailed information to evaluate the quality of irrigation water necessary to sustain various crops.

77. The major constituents of concern in assessing the quality of water for agriculture are salinity (expressed as EC or TDS), boron, chloride, and sodium. In general, animal uses are less sensitive than crops for these constituents. Salinity reduces crop growth by reducing the ability of plant roots to absorb water. The salt tolerance of crops also depends on the frequency and type of irrigation (e.g., drip, furrow, or sprinkler irrigation). Sprinkler irrigation has the greatest impact due to foliar absorption of salt. Absorption and foliar injury are further influenced by high

temperature, low humidity, and drying winds, type of sprinkler, and timing of irrigation. Boron is an essential element but can become toxic to some plants when concentrations in water even slightly exceed the amount required for optimal growth. Like salt tolerance, boron tolerance varies with the climate, the soil, and the crop. While boron sensitivity appears to affect a wide variety of crops, sodium and chloride toxicities are mostly limited to tree crops and woody perennials (e.g., citrus, stone-fruit, and vineyard). A predominance of sodium relative to other ions in irrigation water may disperse soil aggregates, which in turn, affects virtually all crops by decreasing the permeability of the soil to water and air.

78. The Guidelines indicate that considerable judgment should be used in applying the criteria and that appropriate irrigation management and crop variety selection can overcome some of the adverse impact where high water quality is not an option. The Guidelines provide general salt tolerance guidelines for many common field, vegetable, forage, and tree crops. Yield reductions in nearly all crops are not evident when irrigating with water having an EC of less than 700 µmhos/cm and TDS of less than 450 mg/L. There is, however, an eight- to ten-fold range in salt tolerance of agricultural crops. It is possible to achieve full yield potential with waters having EC up to 3,000 µmhos/cm if the proper leaching fraction is provided to maintain soil salinity within the tolerance of the crop.

79. The Guidelines divide water quality characteristics as having "No Problem – Increasing Problems – Severe Problems" based on large numbers of field studies and observations, and carefully controlled greenhouse and small plot research. In general, crops sensitive to sodium or chloride are most sensitive to foliar absorption from sprinkler-applied water. Bicarbonate has been a problem when fruit crops or nursery crops are sprinkler irrigated during periods of very low humidity and high evaporation. The following table contains numerical criteria adapted from the Guidelines for protection of a range of crops under various circumstances, but the most stringent is not necessarily the concentration that assures no adverse affect on any nonagricultural beneficial use:

Problem and Related Constituent	No Problem	Increasing Problem
Salinity of irrigation water (EC, µmhos/cm)	< 700	700 – 3,000
Salinity of irrigation water (TDS, mg/L)	< 450	450 – 2,000
Specific Ion Toxicity		
from ROOT absorption		
Sodium (mg/L)	< 69	69 – 207
Chloride (mg/L)	< 142	142 – 355
Boron (mg/L)	< 0.7	0.7 – 3.0
from FOLIAR absorption		
Sodium (mg/L)	< 69	> 69
Chloride (mg/L)	< 106	> 106
Miscellaneous		
NO_3-N plus NH_4-N and Organic-N (mg/L) (for susceptible crops)	< 5	5 – 30
HCO_3 (mg/L) (only with overhead sprinklers)	< 90	90 - 520
pH (for susceptible crops)	normal range = 6.5 – 8.4	

80. In determining the concentrations of salinity, boron, chloride, and sodium in groundwater associated with no adverse affects on agricultural beneficial use in a given area, it is likely that multiple criteria apply. While the most stringent concentration becomes the constraining criterion, it is not necessarily the concentration that is required to protect all crops that have the potential to be grown in the area.

81. The Guidelines present the maximum EC of irrigation water for various crops with respect to percent crop reductions (i.e., 0, 10, 25, and 50). The table below presents irrigation water EC data (in µmhos/cm) for crops cultivated in the WWTF vicinity (as described in Finding No. 56). As indicated below, zero crop yield reductions are not expected when irrigating all crops grown in the WWTF vicinity with water having an EC of less than 1,000 µmhos/cm, with the exception of beans.

Crop	0% Reduction	10% Reduction
Bean	700	1,000
Almond	1,000	1,400
Vineyard	1,000	1,700
Corn (Sweet)	1,100	1,700
Walnuts	1,100	1,600[1]
Corn (Forage)	1,200	2,100
Alfalfa	1,300	2,200
Sudan grass	1,900	3400
Cotton	5,100	6,400
Pistachio	NA[2]	NA[2]

[1] Value from 1976 version of Ayers and Westcot's *Water Quality for Agriculture*
[2] Not available in the Guidelines documents

82. With respect to specific-ion toxicity, the Guidelines and other similar references indicate that significant reductions in crop yields can be expected if boron content exceeds 0.7 mg/L for boron-sensitive crops (e.g., walnut). Similarly, reductions in yields of sodium- and chloride-sensitive crops are evident when sprinkler irrigated with water containing sodium and chloride concentrations of up to 3 milliequivalents per liter (me/L) (i.e., 69 mg/L sodium and 106 mg/L chloride). If such crops are not sprinkler irrigated, the maximum concentrations of sodium and chloride associated with no apparent yield reduction may increase, however the extent of the increase is typically crop specific.

83. The list of crops in Finding No. 56 is not intended as a definitive inventory of crops that are or could be grown in the area affected by the discharge. Based on climate, soil type, and natural background water quality, other crops sensitive to salt and boron may be capable of being grown in the area, and changing market conditions could drive a change in cropping patterns, but neither is expected to necessitate greater protection than crops already identified.

84. Implementation of Basin Plan narrative water quality objectives for toxicity and chemicals necessitate limitations for waste constituents to maintain the existing and anticipated beneficial uses of area groundwater for the production of area crops, including those sensitive to salt (i.e.,

sodium and chloride), boron, or both. The numerical values reflect the highest tolerable level of constituents and parameters necessary to sustain sprinkler application, as these are more restrictive than for flood irrigation. These values include EC (1,000 µmhos/cm), and the following expressed as mg/L: chloride (106), sodium (69), and boron (0.7). Assuming an EC:TDS ratio of 0.6, the corresponding TDS value for agricultural use is 600 mg/L. A value of 10 mg/L for total nitrogen is appropriate because all forms of nitrogen can convert to nitrate in groundwater and the nitrate primary MCL is 10 mg/L as nitrogen. Nitrogen is a beneficial nutrient for crops and 10 mg/L is adequately protective of nitrogen-sensitive agricultural land uses (e.g., livestock watering).

85. The discharge contains ammonia (NH_3), a taste-producing substance that, if present in excessive concentrations, can adversely affect the beneficial use of groundwater for municipal and domestic supply. Ammonia rarely occurs naturally in shallow groundwater. Its detection beneath near a discharge may indicate hydraulic overloading, insufficient drying time between wastewater applications, or other non-optimal waste management practice. The Basin Plan contains a narrative taste and odor objective that states, "Ground waters shall not contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses." The United Kingdom (UK) has prescribed a drinking water limit based on taste and odor for ammonium (ammonia and ammonium ions as NH_4) of 0.5 mg/L (UK's Water Supply (Water Quality) Regulations 1989 (as amended...) for England and Wales). While the UK standard is a value that is to be met at the point of use (i.e., the tap, rather than the receiving water), the Basin Plan stipulates on page IV-21 that "[w]ater quality objectives apply to all waters within a surface water or ground water resource for which beneficial uses have been designated, rather than at an intake, wellhead or other point of consumption." For example, drinking water MCLs are developed for application at the point of use; but the Basin Plan applies them to ambient waters designated as municipal or domestic supply. It is appropriate and reasonable to include a receiving water limit for ammonium (ammonia and ammonium ions as NH_4) of 0.5 mg/L for this location to protect the beneficial use of area groundwater for human consumption.

86. The most stringent receiving water limitations at this location for EC and TDS are the maximum recommended secondary drinking water MCLs of 900 µmhos/cm and 500 mg/L, respectively. While the EC limitation of 900 µmhos/cm is greater than the 700 µmhos/cm cited by the Guidelines as necessary for no adverse effects on bean production, the loss in bean production due to the higher EC is less than 10 percent, and may be offset altogether provided the grower applies an appropriate leaching fraction to maintain soil salinity within the tolerance of the crop.

87. Maximum receiving water limitations consistent with the Basin Plan at this location are as developed above for ammonium (ammonia and ammonium ions as NH_4), boron, chloride, EC, nitrogen, and TDS (i.e., 0.5 mg/L, 0.7 mg/L, 106 mg/L, 900 µmhos/cm, 10 mg/L, and 500 mg/L, respectively).

Degradation and Groundwater Limitations

88. Domestic wastewater contains constituents such as oxygen demanding substances (i.e., BOD_5), salinity constituents, pathogens, nutrients (e.g., nitrate), organics, and metals. Discharge to land in

a manner that allows waste infiltration and percolation may result in an increase in the concentration of one or more of these constituents in groundwater. To be permissible, any increase in the concentration of these constituents in groundwater as the result of waste discharge must be consistent with the antidegradation provisions of Resolution 68-16.

89. 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. The exemption, pursuant to section 20090(a) of Title 27, 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.

90. Excessive residual organic carbon in percolating wastewater may result in prolonged periods of oxygen deficiency and reducing conditions in groundwater. If wastewater percolating to and mixing with groundwater contains more organic carbon than can be oxidized by microorganisms respiring on the residual oxygen in the effluent and available in the soil column, the soil and groundwater beneath wastewater treatment ponds, sludge handling areas and percolation ponds will likely become anoxic and reducing. Further microbial decomposition of organic carbon in groundwater causes nitrate and oxidized forms of manganese and iron to substitute for oxygen as a terminal electron acceptor, reducing nitrate to nitrogen and transforming manganese and iron to more water-soluble reduced forms. Where groundwater underlying the WWTF contains dissolved manganese and iron in elevated concentrations, it likely indicates organic overloading (e.g., from long term use of unlined sludge drying beds).

91. Degradation of groundwater by constituents (e.g., toxic chemicals) other than those specified in the groundwater limitations in this Order, and by constituents that can be effectively removed by conventional treatment (e.g., total coliform bacteria) is inconsistent with Resolution 68-16. Degradation of groundwater by waste constituents in the discharge after subjecting them to effective source control, treatment, and control may be determined consistent with Resolution 68-16, after consideration of reasonableness under the circumstances of the discharge. Some degradation of groundwater by the discharge is consistent with Resolution 68-16 provided that the degradation is:

    a. limited in extent;

    b. restricted to waste constituents characteristic of municipal wastewater and not totally removable by best practicable treatment and control (BPTC) measures;

    c. minimized by fully implementing, regularly maintaining, and optimally operating BPTC measures;

    d. demonstrated to be consistent with water quality objectives prescribed in the Basin Plan; and

e. justified to be consistent with the maximum benefit to the people of California.

92. Degradation of groundwater by constituents in the discharge after effective source control, treatment, and control may be determined consistent with maximum benefit to the people of California. This determination is based on considerations of reasonableness under the circumstances of the municipal discharge. Factors to be considered include:

a. Past, present, and probable beneficial uses of the water (as specified in the Basin Plan);

b. Economic and social costs, tangible and intangible, of the discharge compared to the benefits;

c. Environmental aspects of the discharge; and

d. The implementation of feasible alternative treatment or control methods.

93. Groundwater passing under the WWTF contains elevated concentrations of nitrate and salt constituents compared to background water quality and to water quality objectives, a condition of pollution.

94. On occasion, groundwater passing under the WWTF also contains elevated concentrations of total organic carbon (TOC) and bicarbonate alkalinity compared to background water quality, and iron and manganese in excess of secondary MCLs (0.3 mg/L and 0.05 mg/L, respectively). The elevated concentrations of TOC and bicarbonate alkalinity are most likely due to the biological oxidation of carbonaceous matter and the subsequent formation of bicarbonate from the WWTF and its discharges to land (including sludge and supernatant discharges). Iron and manganese concentrations were occasionally detected adjacent and within the influence of the unlined treatment trains (MW-6) and downgradient of the unlined disposal ponds (MW-21). Iron concentrations in these wells ranged from 0.28 mg/L to 11 mg/L and manganese concentrations exceeded 0.18 mg/L.

95. The plume of high nitrate groundwater extends from the WWTF for at least 3.5 miles southwesterly (see Attachment A). The Discharger has yet to determine the plume's maximum horizontal or vertical extent, as required by Resolution 92-49. In 2001, the Discharger collected samples of groundwater from five domestic drinking wells downgradient from the WWTF within the plume, some of which are near dairies. The Discharger analyzed the samples for nitrate, chloride, sodium and EC. The nitrate-nitrogen concentration in sampled groundwater ranged from 8.1 mg/L to 30 mg/L and averaged 19 mg/L.

96. The WWTF described in Finding Nos. 18 and 27 provides treatment and control of the discharge that incorporates:

a. Technology for secondary treatment of municipal wastewater;

b. Biosolids handling and treatment for reuse;

c. Concrete Domestic WWTT treatment structures;

d. An operation and maintenance manual;

e. A capital recovery fund;

f. The implementation of measures to divert low strength wastewater from the Industrial WWTT to the Domestic WWTT and diverting storm water flows from the Industrial WWTT to dedicated storm water retention facilities; and

g. Groundwater monitoring.

97. Certain aspects of the WWTF and discharge do not reflect BPTC. Deficiencies in waste treatment and control include, but are not necessarily limited to:

a. Failure to ensure adequate capacity for industrial growth as required by Title 23, CCR, section 2232, which resulted in industrial influent flow rates that exceeded Industrial WWTT design and permitted capacity;

b. Failure to develop, implement, and enforce an effective pretreatment program (including salinity source control);

c. Failure to meet the minimum performance standards set forth by WDRs Order No. 91-133 and the Basin Plan;

d. Failure to submit a complete RWD prior to expansion of the Domestic and Industrial WWTTs;

e. Placement of high-strength waste in unlined waste treatment and management units (e.g., unlined wastewater treatment ponds, sludge drying beds, supernatant pits) in a manner that causes waste constituents to percolate and unnecessarily degrade and pollute groundwater;

f. Bypass of treatment units (e.g., BVF and aerated ponds) without provisions for assuring adequate treatment;

g. Recycling of wastewater at rates far in excess of agronomic demand thereby causing or contributing to groundwater degradation in exceedance of water quality objectives; and

h. Discharge to a portion of the Use Area without adequate containment, causing spills onto adjacent land and to irrigation canals.

Regulatory Approach

98. This Order is the first of a two-phase approach to ensure long-term discharge is consistent with water quality plans and policies. It is appropriate for the Discharger to assume responsibility for assembling the necessary information to determine consistency with water plans and policies. During Phase 1, the Discharger must:

a. Implements an effective groundwater monitoring program that characterizes the discharge's affect on water quality and beneficial uses and evaluates background water quality.

b. Perform a comprehensive evaluation of the WWTF and the discharge to:

i. identify less than optimum treatment or control practices, and

ii. ensure full implementation of BPTC and provide optimal operation and maintenance.

c. Evaluate and propose, with supporting documentation, the appropriate level of degradation that complies with Resolution 68-16.

d. Investigate and propose methods of cleanup and abatement that, in conjunction with BPTC, will ensure compliance with Resolutions 68-16 and 92-49.

99. Following the completion of Phase 1 tasks, evidence submitted by the Discharger will be evaluated and this Order reopened to consider final terms of discharge and cleanup consistent with Resolutions 68-16 and 92-49. These include waste-specific groundwater limitations based on information provided by the Discharger that reflect full implementation of BPTC and at least compliance with all applicable water quality objectives for that waste constituent, including the most stringent objective.

100. Until the work required in Phase 1 is completed by the Discharger and evaluated, it is reasonable that interim receiving water limitations directly implement Basin Plan water quality objectives and prohibit further degradation than has already been caused by the discharge. These groundwater limitations do not unreasonably threaten present and anticipated beneficial uses or result in groundwater quality that exceeds water quality objectives set forth in the Basin Plan. Where the stringency of the criterion for the same waste constituent differs according to beneficial use, the most stringent criterion applies as the governing water quality objective and limitation for that waste constituent. Consideration of the factors in CWC section 13241, including economics, is unnecessary when setting limitations at water quality objectives. As interim groundwater limitations during Phase 1, the limitations are conditional, temporary, and convey no entitlement. Tasks assure that BPTC and the highest water quality consistent with the maximum benefit to the people of the State will be achieved in the second phase. Accordingly, the discharge as authorized herein is consistent with the antidegradation provisions of Resolution 68-16.

CEQA

101. General Plan. On 7 December 1993, the City certified a Program Environmental Impact Report (Program EIR) for the new *Land Use and Circulation Elements of the City of Tulare General Plan* (hereafter General Plan) in accordance with the California Environmental Quality Act (CEQA) (Public Resources Code section 21000 et seq.) and the State CEQA Guidelines. The General Plan was to revise and update the *Land Use Element and Circulation Element of the Tulare General Plan* in response to changing development trends within the City's sphere of influence. The Program EIR indicates that the Domestic WWTT would not accommodate future growth and must be expanded in two to five years. The Program EIR indicates that significant impacts could result from inadequate sewer capacity. The Program EIR concludes that the Industrial WWTT would meet the demands of future industrial growth through 2005, but if domestic flows were diverted to the Industrial WWTT it would exceed capacity by 2005 and have a significant effect on the environment. The only mitigation measures identified by the City were to increase sewer connections fees to provide adequate funds for future projects.

102. Domestic WWTT. On 16 November 1995, the City adopted Resolution No. 95-480, which established that the City's plan to increase the Domestic WWTT treatment capacity from 4.0 to 8.0 mgd was within the scope of the Program EIR.

103. On 7 August 2001, the City certified an EIR for a WWTF expansion project pursuant to CEQA and State CEQA Guidelines. Prior to the certifying the EIR, the City circulated five consecutive environmental review documents — four mitigated negative declarations (MND) and a draft EIR. All five documents did not provide sufficient information to identify all significant impacts to water quality resulting from the increased discharge. When a document did identify as adverse impact to water quality as a result of the project, it did not specifically identify and discuss what mitigation measure(s) the City would implement to reduce these adverse impacts to less than significant levels. Each document included overriding statement(s) that compliance with existing laws and regulations would mitigate any identified adverse impacts from the WWTF expansion project.

104. New Land O'Lakes' Tulare Cheese Plant. On 11 September 2000, the Regional Board received a copy of a draft MND prepared by the City pursuant to CEQA and State CEQA Guidelines, for Land O'Lakes' new cheese plant (described in Finding No. 10) that would ultimately discharge up to 1.7 mgd to the Industrial WWTT. At the time the City circulated the MND, the Industrial WWTT was already receiving flows in excess of its design treatment capacity. The MND's recommendation to mitigate the potential adverse impact of the cheese plant's discharge to the Industrial WWTT was limited to general recognition of the City's need to plan and coordinate with the management of the cheese plant until it commenced discharge to the Industrial WWTF. On
2 October 2000, the City adopted the MND. Regional Board staff transmitted a letter to the City dated 4 October 2000 (less than 30 days following receipt of the draft MND) that recommended it revise the MND to explicitly state that the City is in violation of WDRs Order No. 91-133 and the Industrial WWTT lacks the treatment and disposal capacity to accommodate the cheese plant's additional industrial flow. In July 2002, the cheese plant officially opened and began discharging approximately 0.5 mgd of wastewater to the Industrial WWTT.

105. WWTF EIR. In June 2001, the City circulated a draft EIR addressing its expansion of the entire WWTF. Specifically, the document addressed the expansion of the Domestic WWTT to 6.0 mgd in 1998 and the ongoing and proposed expansion of the Industrial WWTT to 8.0 mgd. The document described the ongoing and proposed expansion of the Industrial WWTT (Expansion Project), listed several environmental impacts resulting from the Expansion Project, and concluded that its impact on groundwater quality and the overall increase in WWTF discharge flow to 14 mgd was unmitigable. Regional Board staff's letter of 30 July 2001 advised the City that the draft EIR lacks sufficient information to demonstrate the Expansion Project would not cause significant adverse effects on groundwater quality. The letter recommended that the City re-evaluate the groundwater impacts from the Expansion Project and feasible mitigation measures (e.g., enhance treatment to reduce nitrogen to concentrations below the MCL, modify treatment ponds to preclude or minimize wastewater infiltration, etc.). On 7 August 2001, the City adopted Resolution No. 01-4784, certifying a modified version of the EIR that stipulated overriding

considerations for groundwater degradation (i.e., increased employment and housing and an increased tax base to support redevelopment within the City). To address groundwater impacts, the modified EIR states, in part, that:

"a. Upon completion of the Project, City shall not release or discharge any waste constituent, or place where it will be released or discharged, in a concentration or mass that causes violations or groundwater limitations.

b. As a means of providing for mitigation measure above, the City shall in conjunction with the oversight and certification by a California registered civil engineer, and within a reasonable period of time given costs, practicality and needs:

i. Modify sludge treatment and storage areas to reduce permeabilities to 10^{-6} cm/sec or less;

ii. Line the first pond (Cell 1) of all industrial treatment trains with gunite ("shotcrete"); and

iii. Construct (or modify if already constructed) industrial treatment trains' cells 2 through 4 in a manner that allows no more than one (1) foot wastewater per year to percolate to underlying groundwater;

Provided however that City reserves the right to provide for alternative mitigation measures, subject to supplemental environmental assessment and report if necessary, should City deem such alternatives environmentally equally or more beneficial and more cost effective.

c. If economically and practically feasible and if other measures cannot assure compliance with water quality objects, City shall apply effluent to percolation ponds intermittently to achieve biological nitrogen removal in the upper soil profile.

d. To the extent economically feasible and practical, City shall apply wastewater, sludge and commercial fertilizer to [Regional Board]-approved use areas at reasonable agronomic rates considering the crops, soil, climate, and irrigation management system in accordance with a [Regional Board]-approved use area management plan.

e. Within a reasonable period of time, City shall implement a pretreatment program component that prescribes an EC limitation of 950 μmhos/cm for industrial discharges and that precludes compliance by means of diluting with fresh water.

f. If bacterial contamination of any domestic well probably effected by the City's wastewater treatment and disposal facilities occurs, the City will drill a replacement well supplying non-degraded water from a deeper aquifer.

g. The City will, upon the issuance of tentative Waste Discharge Requirements for the project by the [Regional Board], prepare a Facilities Plan Amendment incorporating the detailed steps and recommendations outlined in the consultant's Nitrogen Mitigation program, implementing the viable options on a time table established by the Regional Water Quality Control Board. Such Amendment will consider and evaluate any required and effective mitigation measures for domestic wellwater nitrate degradation.

h. The City will install and operate an Aquifer Storage and Recovery (ASR) wellfield to mitigate further spread of the plume."

106. Mitigation measures certified by the Discharger are indefinite, qualified, or unscheduled. The City's statements of overriding considerations are insufficient. The City's Program EIR, the EIR for the WWTF expansion, Resolution No. 95-480 for the Domestic WWTT expansion, do not adequately address let alone mitigate adverse impacts to groundwater.

107. Mitigation measures to reduce the adverse environmental impacts on water quality of the Expansion Project and increase to 14 mgd of total WWTF discharge flow are as follows

a. Flow discharge specification restricts flows to the Domestic WWTT to 5.0 mgd (Domestic Discharge Specification C.1.a) until the Discharger can certify it can dispose of the proposed flow increase in accordance with the terms and conditions of this Order (Provision J.11).

b. Flow discharge specification restricts flows to the Domestic WWTT to 0.39 mgd from the Industrial WWTT (Domestic Discharge Specification C.2).

c. Flow discharge specifications restrict flows to the Industrial WWTT to 4.39 mgd (Industrial Discharge Specification D.1) until the Discharger can certify it can treat and dispose of proposed flow increases in accordance with the terms and conditions of this Order (Provisions J.12 and J.13).

d. Effluent discharge specifications require that the BOD_5 and TSS concentrations in the Domestic discharges not exceed the Basin Plan's performance standard of 40 mg/L for both BOD_5 and TSS (Domestic Discharge Specification C.3).

e. Effluent discharge specifications require that the BOD_5 and TSS concentrations in the Industrial discharges not exceed the Basin Plan's performance standard of 40 mg/L for both BOD_5 and TSS (Industrial Discharge Specification D.2) within seven years.

f. Requirements for the monitoring and reporting of BVF treatment performance.

g. Waste constituents cannot be released or discharged, or placed where they will be released or discharged, in a concentration or in a mass that causes violation of groundwater limitations (General Discharge Specification B.10).

h. Wastewater, sludge, and commercial fertilizer must be applied at rates not exceeding reasonable agronomic demand considering the crops, soil, climate, and irrigation management system, as technically justified in a use area management plan (Recycling Specification F.4).

i. Treatment and storage of sludge generated by the WWTF must be confined to the WWTF property and conducted in a manner that precludes infiltration of waste constituents into soils in a mass or concentration that will violate groundwater limitations (Sludge Specifications G.2 and G.3).

j. Pretreatment requirements require the Discharger to implement an effective pretreatment program (Pretreatment Requirements H.1 through H.5).

k. Pollutant-free wastewater must not be discharged to the WWTF in quantities that significantly diminish its capability to comply with this Order (Provision J.21).

l. A two-phased approach to ensure the discharge is fully consistent with water quality plans and policies is being implemented. The culmination of this approach will be the establishment of final groundwater limitations for the discharge. In Phase 1, interim groundwater limitations are established at water quality objectives pending the completion of certain tasks in accordance with a time schedule (Provisions J.15 through J.17). In Phase 2, results of tasks (Provision J.18) will be re-evaluated and final groundwater limitations established.

General Findings

108. The Discharger is not required to obtain coverage under an NPDES general industrial storm water permit because all storm water runoff is diverted into existing storm water retention basins, kept separate from the wastewater stream, and does not discharge to a water of the United States.

109. Pursuant to CWC section 13263(g), discharge is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.

110. Section 13267(b) of the CWC states, in part, that:

> In conducting an investigation specified in [section 13267] subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.

111. The monitoring and reporting program required by this Order and the attached Monitoring and Reporting Program No. R5-2002-0185 are necessary to assure compliance with these waste discharge requirements. The Discharger operates the WWTF that discharges the waste subject to this Order.

112. The DHS and the Tulare County Health Department were consulted, and their recommendations regarding public health aspects for the Discharger's water recycling operation were considered.

113. All the above and the supplemental information and details in the attached Information Sheet, which is incorporated by reference herein, were considered in establishing the following conditions of discharge.

114. The Discharger and interested agencies and persons have been notified of the intent to prescribe waste discharge requirements for this discharge and provided with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

115. All comments pertaining to the discharge were heard and considered in a public meeting.

116. Any person affected by this action of the Regional Board may petition the State Water Resources Control Board to review the action in accordance with Sections 2050 through 2068, Title 23, California Code of Regulations. The petition must be received by the State Water Resources Control Board within 30 days of the date of issuance of this Order. Copies of the laws and regulations applicable to the filing of a petition are available on the Internet at http://www.swrcb.ca.gov/water_laws/index.html and will be provided on request.

IT IS HEREBY ORDERED that Waste Discharge Requirements Order No. 91-133 is rescinded and that, pursuant to CWC sections 13263 and 13267, the City of Tulare, its agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the CWC and regulations adopted thereunder, shall comply with the following:

[Note: Other prohibitions, conditions, definitions, and some methods of determining compliance are contained in the attached "Standard Provisions and Reporting Requirements for Waste Discharge Requirements" dated 1 March 1991.]

A. Discharge Prohibitions

1. Discharge of wastes to surface waters or surface water drainage courses is prohibited.

2. Discharge of 'hazardous' waste, as defined in section 2521(a) of Title 23, CCR, section 2510 et seq., is prohibited.

3. Discharge of 'designated' waste, as defined in CWC section 13173, is prohibited.

4. Discharge (through burial) of animal carcasses within the property encompassed by the WWTF, the Use Area, or Clarklind use area, is prohibited.

5. Bypass or overflow of untreated or partially-treated waste is prohibited, except as allowed in Provision E.2 of Standard Provisions and Reporting Requirements.

6. Recycling of effluent to use areas without valid water recycling requirements or waiver of said requirements is prohibited.

7. Cross-connections between any potable water supply and piping containing recycled water are prohibited. No physical connection shall exist between recycled water piping and any domestic water supply well, or between recycled water piping and any irrigation well that does not have an air gap or reduced pressure principle device.

B. General Discharge Specifications

1. Objectionable odors originating at the WWTF shall not be perceivable beyond the limits of the WWTF.

2. As a means of discerning compliance with General Discharge Specification B.1, the dissolved oxygen content in the upper zone (one foot) of wastewater in all ponds shall not be less than 1 mg/L at the time and location prescribed in the monitoring and reporting program.

3. Ponds shall be managed to prevent breeding of mosquitoes. In particular:
   a. An erosion control plan should assure that small coves and irregularities are not created around the perimeter of the water surface.
   b. Weeds shall be minimized through control of water depth, harvesting, and herbicides.
   c. Dead algae, vegetation, and debris shall not accumulate on the water surface.
   d. Vegetation management operations in areas in which nesting birds have been observed shall be carried out either before or after, but not during, the April 1 to June 30 bird nesting season.

4. Freeboard shall never be less than two feet in any pond (measured vertically) or lesser freeboard if certified in writing by a California registered civil engineer as adequate to prevent overtopping, overflows, or levee failures.

5. As a means of discerning compliance with General Discharge Specification B.4, the Discharger shall install and maintain in each pond permanent markers with calibration indicating the water level at design capacity and available operational freeboard. Upon the Discharger's written request, specific **WWTF** ponds may be exempt from this requirement. Such exemptions shall be subject to the Executive Officer's written approval.

6. The **WWTF** shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year frequency.

7. The Discharger shall preclude public access to the WWTF and Use Area through methods such as fences and signs, or other acceptable means.

8. Ponds shall have sufficient capacity to accommodate allowable wastewater flow and design seasonal precipitation and ancillary inflow and infiltration during the winter. Design seasonal precipitation shall be based on total annual precipitation using a return period of 100 years, distributed monthly in accordance with historical rainfall patterns.

9. On 15 November of each year, available storage capacity in ponds shall be at least equal to the volume necessary to comply with General Discharge Specification B.8.

10. No waste constituent shall be released or discharged, or placed where it will be released or discharged, in a concentration or in a mass that causes violation of groundwater limitations.

C. Domestic Discharge Specifications

The following specifications apply exclusively to the discharge from the Domestic Wastewater Treatment Train.

1. The monthly average daily influent flow shall not exceed the following:
   a. 5.0 mgd until Provision J.11 is satisfied; and
   b. 6.0 mgd after Provision J.11 is satisfied.

2. The monthly average daily BVF effluent flow to the Domestic WWTT from the Industrial WWTT (untreated and partially-treated wastewater) shall not exceed 0.39 mgd, unless the Discharger provides written technical justification, subject to Executive Officer approval, that a higher flow can be maintained without causing adverse effects to the treatment performance of the Domestic WWTT.

3. The discharge shall not exceed the following:

Constituent	Units	Monthly Average[1]	Daily Maximum
Settleable Solids	mL/L	0.2	0.5
BOD_5	mg/L	40	80
TSS	mg/L	40	80

[1] Average value for all samples collected within a calendar month.

4. The arithmetic mean of BOD_5 and of total suspended solids in effluent samples collected over a monthly period shall not exceed 20 percent of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (80 percent removal).

5. The discharge shall not have a pH less than 6.0 or greater than 9.0.

D. Industrial Discharge Specifications

The following specifications apply exclusively to the discharge from the Industrial Wastewater Treatment Train.

1. The monthly average daily influent flow shall not exceed the following:
   a. 4.39 mgd until Provision J.12 is satisfied;
   b. 6.0 mgd after Provision J.12 is satisfied; and

c. 8.0 mgd after Provision J.13 is satisfied.

2. **By 1 November 2009,** the discharge shall not exceed the following:

Constituent	Units	Monthly Average[1]	Daily Maximum
Settleable Solids	mL/L	0.2	0.5
BOD_5	mg/L	40	80
TSS	mg/L	40	80

[1] Average value for all samples collected within a calendar month.

3. **By 1 November 2009,** the arithmetic mean of BOD_5 and of total suspended solids in effluent samples collected over a monthly period shall not exceed 20 percent of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (80 percent removal).

E. Commingled Discharge Specifications

The following discharge specifications apply to the Commingled discharge.

1. **Effective until 1 November 2009**, the discharge shall not exceed the following:

Constituent	Units	Monthly Average [1]	Daily Maximum
Settleable Solids	mL/L	0.2	0.5
BOD_5	mg/L	40[2]	80[2]
$CBOD_5$[3]	mg/L	35[2]	70[2]

[1] Average value for all samples collected within a calendar month

[2] The Discharger may demonstrate compliance with either BOD_5 or $CBOD_5$ effluent specification.

[3] Five-day, 20°C carbonaceous biochemical oxygen demand

2. The monthly average EC in effluent samples shall not exceed the flow-weighted average EC of the source water plus 500 µmhos/cm, a total of 1,000 µmhos/cm, **or the concentration that ensures compliance with this Order's groundwater limitations, whichever is more stringent**.

3. The discharge shall not have a pH less than 6.0 or greater than 9.0.

F. Recycling Specifications

The following specifications apply to the Use Area defined in Finding No. 1.

1. Use of recycled water as permitted by this Order shall comply with all the terms and conditions of the most current Title 22 provisions.

2. Use of recycled water shall comply with backflow protection requirements for potable water supplies as specified in Title 17, CCR, section 7604, or as specified by DHS.

3. Use of recycled water shall be limited to flood irrigation of fodder, fiber, seed crops, and of crops such as wine grapes that undergo extensive commercial, physical, or chemical processing before human consumption.

4. Application of wastewater, biosolids, and commercial fertilizer to the Use Area shall be at reasonable agronomic rates considering the crop, soil, climate, and irrigation management system in accordance with the use area management plan required under Provision J.9 of this Order, subject to Executive Officer written approval. The annual nutrient loading to the Use Area, including the nutritive value of organic and chemical fertilizers and of the recycled water, shall not exceed the crop demand.

5. The Discharger shall maintain the following setback distances from the Use Area irrigated with recycled water:

Setback Distance (feet)	To
25	Property Line
30	Public Roads
50	Drainage courses
100	Irrigation wells
150	Domestic wells

6. The perimeter of Use Area shall be graded to prevent ponding along public roads or other public areas.

7. Recycled water shall be managed to prevent breeding of mosquitoes. More specifically:
   a. Effluent water must infiltrate completely within 48 hours after application.
   b. Ditches not serving as wildlife habitat should be maintained free of emergent, marginal, and floating vegetation.
   c. Low-pressure and unpressurized pipelines and ditches accessible to mosquitoes shall not be used to store recycled water.

8. Recycled water shall be managed to minimize runoff onto adjacent properties not owned or controlled by the Discharger.

9. Recycled water used for irrigation shall be managed to minimize erosion.

10. Recycled water shall be managed to minimize contact with workers.

11. If recycled water is used for construction purposes, it shall comply with the most current edition of *Guidelines for Use of Recycled Water for Construction Purposes*. Other uses of recycled

water not specifically authorized herein shall be subject to the approval of the Executive Officer and shall comply with Title 22.

12. Public contact with recycled water shall be precluded through such means as fences and signs, or acceptable alternatives. Signs with proper wording (shown below) of a size no less than four inches high by eight inches wide shall be placed at all areas of public access and around the perimeter of all areas used for effluent disposal or conveyance to alert the public of the use of recycled water. All signs shall present the international symbol similar to that shown in Attachment F and present the following wording:

RECYCLED WATER - DO NOT DRINK

AGUA DE DESPERDICIO RECLAMADA - POR FAVOR NO TOME

G. Sludge Specifications

Sludge in this document means the solid, semisolid, and liquid residues removed during primary, secondary, or advanced wastewater treatment processes. Solid waste refers to grit and screening material generated during preliminary treatment. Residual sludge means sludge that will not be subject to further treatment at the WWTF. Biosolids refers to sludge that has been treated and tested and shown to be capable of being beneficially and legally used pursuant to federal and state regulations as a soil amendment for agriculture, silviculture, horticulture, and land reclamation activities.

1. Sludge and solid waste shall be removed from screens, sumps, ponds, clarifiers, etc. as needed to ensure optimal plant operation.

2. Treatment and storage of sludge generated by the WWTF shall be confined to the WWTF property and conducted in a manner that precludes infiltration of waste constituents into soils in a mass or concentration that will violate Groundwater Limitations.

3. Any storage of residual sludge, solid waste, and biosolids on property of the WWTF shall be temporary and controlled and contained in a manner that minimizes leachate formation and precludes infiltration of waste constituents into soils in a mass or concentration that will violate Groundwater Limitations.

4. Residual sludge, biosolids, and solid waste shall be disposed of in a manner approved by the Executive Officer and consistent with Title 27. Removal for further treatment, disposal, or reuse at sites (i.e., landfill, WWTF, composting sites, soil amendment sites) operated in accordance with valid waste discharge requirements issued by a regional water quality control board will satisfy this specification.

5. Use of biosolids as a soil amendment shall comply with valid waste discharge requirements issued by a regional water quality control board. In most cases, this will mean General Biosolids Order (SWRCB Water Quality Order No. 2000-10-DWQ, General Waste Discharge

Requirements for the Discharge of Biosolids to Land for Use as a Soil Amendment in Agricultural, Silvicultural, Horticultural, and Land Reclamation Activities). For a biosolids use project to be covered by the General Biosolids Order, the Discharger must file a complete Notice of Intent and receive a Notice of Applicability for each project.

6. Use and disposal of biosolids should comply with the self-implementing federal regulations of 40 CFR 503, which are subject to enforcement by the U.S. Environmental Protection Agency (EPA), not the Regional Board. If during the life of this Order the State accepts primacy for implementation of 40 CFR 503, the Regional Board may also initiate enforcement where appropriate.

H. Pretreatment Requirements

1. The Discharger shall implement the necessary legal authorities, programs, and controls to ensure that the following incompatible wastes are not introduced to the treatment system, where incompatible wastes are:
   a. Wastes which create a fire or explosion hazard in the treatment works;
   b. Wastes which will cause corrosive structural damage to treatment works, but in no case wastes with a pH lower than 5.0, unless the works is specially designed to accommodate such wastes;
   c. Solid or viscous wastes in amounts which cause obstruction to flow in sewers, or which cause other interference with proper operation or treatment works;
   d. Any waste, including oxygen demanding pollutants (BOD_5, etc.), released in such volume or strength as to cause inhibition or disruption in the treatment works, and subsequent treatment process upset and loss of treatment efficiency;
   e. Heat in amounts that inhibit or disrupt biological activity in the treatment works, or that raise influent temperatures above 40°C (104°F), unless the treatment works is designed to accommodate such heat;
   f. Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;
   g. Pollutants that result in the presence of toxic gases, vapors, or fumes within the treatment works in a quantity that may cause acute worker health and safety problems; and
   h. Any trucked or hauled pollutants, except at points predesignated by the Discharger.

2. The Discharger shall implement the legal authorities, programs, and controls necessary to ensure that indirect discharges do not introduce pollutants into the sewerage system that, either alone or in conjunction with a discharge or discharges from other sources:
   a. Flow through the system to the receiving water in quantities or concentrations that cause a violation of this Order, or

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

3. The Discharger shall be responsible for the performance of all pretreatment requirements contained in 40 CFR Part 403 and shall be subject to enforcement actions, penalties, fines, and other remedies by the EPA, Regional Board, or other appropriate parties, as provided in the Clean Water Act (CWA), as amended, or other applicable authorities, for noncompliance.

4. The Discharger shall enforce the requirements promulgated under sections 307(b), (c), (d), and 402(b) of the CWA. The Discharger shall cause industrial users subject to federal categorical standards to achieve compliance no later than that date specified in those requirements or, in the case of a new industrial user, upon commencement of the discharge.

5. The Discharger shall comply fully with Pretreatment Requirements H.1 through H.4 and perform the pretreatment functions required in 40 CFR 403, including, but not limited to:

   a. Implementing the necessary legal authorities as provided in 40 CFR 403.8(f)(1);

   b. Enforcing the pretreatment requirements under 40 CFR 403.5 and 403.6;

   c. Implementing the programmatic functions as provided in 40 CFR 403.8(f)(2);

   d. Providing the requisite funding and personnel to implement the pretreatment program as provided in 40 CFR 403.8(f)(3);

   e. Publishing a list of industrial users which were in significant noncompliance and applicable pretreatment requirements as required by 40 CFR 403.8(f)(2)(vii); and,

   f. Conducting inspections in accordance with provisions of 40 CFR 403.8(f)(1)(v) and 403.8(f)(2)(v) and ensuring compliance with pretreatment standards and requirements by (1) assessing and collecting, when appropriate, civil penalties and civil administrative penalties in accordance with Government Code sections 54740, 54740.5, and 54740.6, or (2) other equally effective means.

I. Groundwater Limitations

Release of waste constituents from any storage, treatment, or disposal component associated with the WWTF shall not, in combination with other sources of the waste constituents, cause groundwater within the influence of the WWTF and Use Area to contain waste constituents in concentrations in excess of any of the limits listed below, unless natural background is greater, in which case the natural background concentration shall be the limit.

1. Total coliform organisms of 2.2 MPN/100 mL.

2. Chemical constituents in concentrations that adversely affect beneficial uses, including:

a. Constituent concentrations listed below:

Constituent	Units	Limitation
EC	µmhos/cm	900
Total Dissolved Solids[1]	mg/L	500
Total Nitrogen	mg/L	10

[1] A cumulative constituent comprised of dissolved matter consisting mainly of inorganic salts, small amounts of organic matter, and dissolved gases [e.g., ammonia, bicarbonate alkalinity, boron, calcium, chloride, copper, iron, magnesium, manganese, nitrate, phosphorus, potassium, sodium, silica, sulfate, total alkalinity]

b. For constituents identified in Title 22 (as described in Finding No. 73) — except chloride, EC and Total Dissolved Solids — that are present in the discharge, the concentrations in the discharge (as determined in this Order's monitoring and reporting program) or the Title 22 MCLs, whichever is more stringent.

c. Toxic constituents in concentrations that produce detrimental physiological responses in human, plant, or animal life, including but not limited to, boron, chloride, and sodium in excess of concentrations in the discharge or that listed below, whichever is more stringent:

Constituent	**Units**	**Limitation**
Boron	mg/L	0.7
Chloride	mg/L	106
Sodium	mg/L	69

d. Taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses, including but not limited to, **ammonium (ammonia and ammonium ions as NH_4)** in excess of 0.5 mg/L.

J. Provisions

1. The Discharger shall comply with Standard Provisions and Reporting Requirements for Waste Discharge Requirements, dated 1 March 1991, which are attached hereto and by reference a part of this Order. This attachment and its individual paragraphs are commonly referenced as Standard Provision(s).

2. The Discharger shall comply with Monitoring and Reporting Program (MRP) No. R5-2002-0185, that is part of this Order, and any revisions thereto as ordered by the Executive Officer.

3. The Discharger shall keep a copy of this Order, including its attachments and Standard Provisions, at the WWTF for reference by operating personnel. Key operating personnel shall be familiar with its contents.

4. All technical reports required herein that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code, sections 6735, 7835, and 7835.1. To demonstrate compliance with Title 16, CCR, sections 415 and 3065, all technical reports must contain a statement of the qualifications of the responsible registered professional(s). As required by these laws, completed technical reports must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work.

5. The Discharger shall use best practicable treatment and control of the discharge, including proper operation and maintenance, to comply with terms of this Order.

6. **By 1 March 2003,** the Discharger shall submit a technical report describing its procedures for handling, treating, and disposing of grease trap waste. The technical report shall evaluate the extent to which, if any, grease trap waste discharged to WWTF treatment units affect their performance. Should this waste adversely impact the performance of WWTF treatment units, the technical report shall describe corrective measures to mitigate these adverse impacts and include an implementation schedule. The technical report shall be prepared in accordance with Provision J.4 and is subject to the Executive Officer's written approval.

7. **By 1 May 2003,** the Discharger shall submit a technical report that contains a characterization of the discharge for constituents identified in Title 22 (as described in Finding No. 73). The technical report shall describe the sampling program utilized to characterize the discharge, shall be prepared in accordance with Provision J.4, and is subject to the Executive Officer's written approval.

8. **By 1 March 2003,** the Discharger shall submit a technical report describing a sludge management plan that satisfies the information requirements of Attachment G *Information Needs For Sludge Management Plan*. The technical report shall be prepared in accordance with Provision J.4 and is subject to the Executive Officer's written approval.

9. **By 15 April 2003,** the Discharger shall submit a technical report describing a management plan that ensures wastewater, biosolids, and commercial fertilizer will be applied to the Use Area and the Clarklind use area at reasonable agronomic rates considering the crop, soil, climate, and irrigation management system. The technical report shall describe the types of crops to be grown and harvested annually, crop water use, nitrogen uptake, and supporting data and calculations for monthly water and yearly nutrient balances. The technical report shall include a map showing locations of all domestic and irrigation wells that are within and near the Use Area and the Clarklind use area, areas of public access, locations and wording of public warning signs, and setback distances from irrigation and domestic wells, property boundaries, and roads. The technical report shall be prepared in accordance with Provision J.4 and is subject to the Executive Officer's written approval.

10. All technical reports required herein that involve certification of expanded treatment capacity must also demonstrate that the Discharger can recycle the increased flow or provide justification why this is not possible. The technical report shall describe the terms and conditions of lease agreements for existing and proposed use areas, include hydrologic and nutrient balance calculations for WWTF effluent disposal ponds and all designated use areas. The technical report shall describe the type of crops grown in designated use areas (e.g., pasture forage), crop water use, and amount of nitrogen utilized by the crop. Values of seasonal precipitation used in the hydrologic balance calculations shall be based on total annual precipitation in the area using a return period of 100 years, distributed monthly in accordance with historical rainfall patterns. The technical report must include a monthly water balance with monthly storage requirements and must demonstrate that water recycling can be accomplished with accepted irrigation practices and in compliance with the terms and conditions of this Order. Technical reports submitted pursuant to this Provision shall be prepared in accordance with Provision J.4 and are subject to the Executive Officer's written approval.

11. **Prior to increasing flow at the Domestic WWTT to more than 5.0 mgd,** the Discharger shall obtain written approval from the Executive Officer documenting that it has technically justified to his satisfaction that it can dispose of 6.0 mgd from the Domestic WWTT and all authorized flow from the Industrial WWTT in compliance with Provision J.10. The Discharger shall submit a technical report prepared in accordance with Provision J.4 at least 60 days prior to the expected approval.

12. **Prior to increasing flow at the Industrial WWTT to more than 4.39 mgd,** the Discharger shall obtain written approval from the Executive Officer documenting that it has technically justified to his satisfaction that it can dispose of 6.0 mgd from the Industrial WWTT and all authorized flow from the Domestic WWTT in compliance with Provision J.10. The Discharger shall submit a technical report prepared in accordance with Provision J.4 at least 60 days prior to the expected approval that certifies that treatment trains A through E are complete and capable of treating and disposing of 6.0 mgd of wastewater in full compliance with the terms of this Order.

13. **Prior to increasing flow at the Industrial WWTT to more than 6.0 mgd,** the Discharger shall obtain written approval from the Executive Officer documenting that it has technically justified to his satisfaction that it can dispose of 8.0 mgd from the Industrial WWTT and all authorized flow from the Domestic WWTT in compliance with Provision J.10. The Discharger shall submit a technical report prepared in accordance with Provision J.4 at least 60 days prior to the expected approval that certifies that treatment trains G through H are complete and capable of treating and disposing of 8.0 mgd of wastewater in full compliance with the terms of this Order.

14. **By 1 November 2003,** the Discharger shall submit a technical report describing how it intends to comply with Industrial Discharge Specifications D.3 and D.4. **The technical report must include an implementation schedule, as appropriate, with the time frame for completion of necessary Industrial WWTT modifications by 1 November 2009.** The technical report submitted pursuant to this Provision shall be prepared in accordance with Provision J.4 and is subject to the Executive Officer's written approval.

15. **Groundwater Monitoring Tasks**. The Discharger shall complete a hydrogeologic investigation within the area affected and potentially affected by the WWTF and its discharge(s) to land. The technical report documenting the hydrogeologic investigation shall describe the area's hydrogeology, existing wells (active and otherwise), local well construction practices and standards, well restrictions, and groundwater extraction and recharge patterns. The technical report shall also discuss the potential horizontal and vertical extent of percolated effluent and adverse effects on receiving water quality from the WWTF and its discharge(s) to land. The technical report shall recommend and justify specific monitoring for determination of compliance with groundwater limitations and Provision J.5 regarding BPTC implementation. Following completion of its hydrogeologic investigation, the Discharger shall submit a technical report describing a proposed modified groundwater monitoring well network. The technical report shall consist of a monitoring well installation work plan that satisfies Attachment H, *Standard Monitoring Well Provisions for Waste Discharge Requirements*. The network shall include one or more background monitoring wells and sufficient number of designated monitoring wells to evaluate performance of BPTC measures and compliance with this Order's groundwater limitations. These include monitoring wells immediately downgradient of representative treatment, storage, and disposal units that do or may release waste constituents to groundwater.

    All wells shall comply with appropriate standards as described in *California Well Standards Bulletin 74-90* (June 1991) and *Water Well Standards: State of California Bulletin 74-81* (December 1981), and any more stringent standards adopted by the Discharger or county pursuant to CWC section 13801. The existing well network will be evaluated as part of this effort, and the proposed network should include existing monitoring wells where they will serve to measure compliance or provide other relevant information (e.g., depth to groundwater) and recommend their destruction if they will no longer serve a useful purpose.

    The Discharger shall install approved monitoring wells, properly destroy ineffective wells, and commence groundwater monitoring in accord with this Order's MRP. After the first sampling event, the Discharger shall report on its sampling protocol as specified in this Order's MRP. After one year of monitoring, the Discharger shall characterize natural background quality of monitored constituents in a technical report. The Discharger shall comply with the following compliance schedule in implementing the work required by this Provision:

Task		Compliance Date
a.	Submit technical report: hydrogeologic investigation	1 May 2003
b.	Submit technical report: revised monitoring well installation work plan	120 days following completion of task a
c.	Implement monitoring well installation work plan	30 days following completion of task b

Task		Compliance Date
d.	Complete monitoring well installation and well destruction and commence groundwater monitoring	180 days following completion of task c
e.	Submit technical report: monitoring well installation report of results	30 days following completion of task d
f.	Report on sampling procedures as described in the MRP	1st day of the second month following the first sampling event
g.	Submit technical report: natural background quality	365 days following completion of task e

Technical reports submitted pursuant to this Provision shall be prepared in accordance with Provision J.4 and are subject to Executive Officer written approval.

16. Compliance with groundwater limitations will be evaluated based on data collected from completion of Provision J.15, task g. Should the Discharger fail to comply with the schedule to characterize natural background groundwater quality at approved monitoring zones by the date specified in Provision J.15, task g, the Regional Board shall not consider the lack of natural background characterization as sufficient defense to enforcement for violations of Groundwater Limitations I.1 and I.2.

17. **BPTC Evaluation Tasks**. The Discharger shall propose a work plan and schedule for a systematic and comprehensive technical evaluation of each major component of the WWTF's waste treatment and control to determine for each waste constituent BPTC as required by Resolution 68-16. The technical report describing the work plan and schedule shall contain a preliminary evaluation of each component (including source control aspects) and propose a time schedule for completing the comprehensive technical evaluation. Following completion of the comprehensive technical evaluation, the Discharger shall submit a technical report describing the evaluation's results and critiquing each evaluated component with respect to BPTC and minimizing the discharge's impact on groundwater quality. Aspects of source control to be considered include regulation of residential water softening or conditioning devices to the extent necessary to comply with water quality objectives, as set forth in section 116785 and 116790 of the Health and Safety Code. Where deficiencies are documented, the technical report shall provide recommendations for necessary modifications (e.g., new or revised salinity source control measures, WWTF component upgrade and retrofit) to achieve BPTC and identify the source of funding and proposed schedule for modifications. The schedule shall be as short as practicable but in no case shall completion of the necessary modifications exceed five years past the Executive Officer's determination of the adequacy of the comprehensive technical evaluation, unless the schedule is reviewed and specifically approved by the Regional Board. The technical report shall include specific methods the Discharger proposes as a means to

measure processes and assure continuous optimal performance of BPTC measures. The Discharger shall comply with the following compliance schedule in implementing the work required by this Provision:

Task	Compliance Date
a. Submit technical report: work plan and schedule for comprehensive evaluation	1 May 2003
b. Commence comprehensive evaluation	30 days following Executive Officer written approval of task a
c. Complete comprehensive evaluation	As established by task a or 2 years following task b, whichever is sooner
d. Submit technical report: comprehensive evaluation results	90 days following completion of task c, or 1 November 2005, whichever is sooner
e. Include in its annual report (described in the MRP) a description of the overall status of BPTC implementation and compliance with interim groundwater limitations over the past reporting year	Annually on 1 February following completion of task d

Technical reports submitted pursuant to this Provision shall be prepared in accordance with Provision J.4 are subject to Executive Officer written approval as to adequacy.

18. **By 1 November 2005,** the Discharger shall submit a technical report that proposes specific numeric groundwater limitations for each waste constituent that reflects full implementation of BPTC and compliance with the most stringent applicable water quality objectives for that waste constituent. The most stringent applicable water quality objective shall be interpreted based on the Regional Board policy entitled "Application of Water Quality Objectives" on pages IV-21 through IV-23 of the Basin Plan. If the Discharger wishes the Regional Board to consider a proposed water quality limitation that is less stringent than the most stringent water quality objective necessary to protect the most sensitive beneficial use (e.g., sprinkler application of citrus trees), it must provide documentation necessary to support the proposed limitation. For example, where the stringency of a proposed **limit implementing a** water quality objective can vary according to land use and other factors, and the Discharger's BPTC cannot assure the most stringent limit will be met, the Discharger must provide documentation that a less stringent but attainable limit is fully protective of all existing and probable future beneficial uses. This documentation must be from public agencies and organizations with appropriate expertise and authority relative to the uses potentially affected by the less stringent objective, or the water necessary to sustain the uses. The Discharger should submit results of a validated groundwater model or other hydrogeologic information to support its proposal.

19. Upon completion of tasks set forth in Provisions J.17 and J.18, this Board shall consider the evidence provided by the Discharger in determining whether the Discharger has justified its treatment and control methods as BPTC. Further, this Board shall consider the Discharger's proposed waste-specific numeric groundwater limitation that both reflects full implementation of BPTC and complies with all applicable water quality objectives. The Regional Board shall revise this Order to contain conditions designed to assure full implementation of BPTC and compliance with the maximum permissible groundwater limitation consistent with Resolutions 68-16 and 92-49.

20. At least **365** days prior to termination or expiration of any lease, contract, or agreement involving designated use areas or offsite use of effluent used to justify the capacity authorized herein and assure compliance with this Order, the Discharger shall notify the Regional Board in writing of the situation and of what measures have been taken or are being taken to assure full compliance with this Order.

21. The Discharger shall not allow pollutant-free wastewater to be discharged into the WWTF collection, treatment, and disposal systems in amounts that significantly diminish the system's capability to comply with this Order. Pollutant-free wastewater means storm water (e.g., inflow), groundwater (i.e., infiltration), and cooling waters that are essentially free of pollutants.

22. The Discharger shall report to the Regional Board any toxic chemical release data it reports to the local emergency services coordinator pursuant to section 313 of the "Emergency Planning and Community Right to Know Act of 1986" within 15 days of such reporting. If the Regional Board determines that the toxic waste constituent had or has a reasonable potential to cause or contribute to violation of a water quality objective, the Regional Board may reopen this Order and prescribe an effluent limitation for the constituent.

23. **If the Regional Board determines that waste constituents in the discharge have reasonable potential to cause or contribute to an exceedance of any Groundwater Limitation, this Order may be enforced or, alternately, reopened for consideration of addition or revision of appropriate numerical effluent or groundwater limitations for the problem constituents**

24. The Discharger must comply with all conditions of this Order, including timely submittal of technical and monitoring reports as directed by the Executive Officer. Accordingly, the Discharger shall submit to the Regional Board on or before each report due date the specified document or, if an action is specified, a written report detailing evidence of compliance with the date and task. If noncompliance is being reported, the reasons for such noncompliance shall be stated, plus an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Regional Board by letter when it returns to compliance with the time schedule. Violations may result in enforcement action, including Regional Board or court orders requiring corrective action or imposing civil monetary liability, or in revision or rescission of this Order.

25. In the event of any change in control or ownership of land or waste treatment and storage facilities presently owned or controlled by the Discharger, the Discharger shall notify the

succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office. To assume operation under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, the address and telephone number of the persons responsible for contact with the Regional Board and a statement. The statement shall comply with the signatory paragraph of Standard Provision B.3 and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code. Transfer shall be approved or disapproved in writing by the Executive Officer.

26. The Regional Board will review this Order periodically and will revise requirements when necessary

I, THOMAS R. PINKOS, Acting Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 18 October 2002.

_____
THOMAS R. PINKOS, Acting Executive Officer

Order Attachments:

Monitoring and Reporting Program No. R5-2002-0185
A: Vicinity Map
B: Location Map
C: Process Flow Diagram
D: Partial Plan View of Domestic WWTT
E: Partial Plan View of Industrial WWTT
F: Recycled Water Sign Symbol
G: Information Needs for Sludge Management Plan
H: Standard Monitoring Well Provisions for Waste Discharge Requirements
I: Recommended Use Area Reporting Form
Information Sheet
Standard Provisions (1 March 1991 version) (separate attachment to Discharger only)

ARP/JLK10/18/2002

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM ORDER NO. R5-2002-0185

FOR
CITY OF TULARE
WASTEWATER TREATMENT FACILITY
TULARE COUNTY

This Monitoring and Reporting Program (MRP) is issued pursuant to California Water Code (CWC) section 13267. The Discharger shall not implement any changes to this MRP unless and until the Regional Board issues a revised MRP. Sample station locations are depicted on Attachment C. Changes to sample location(s) shall be established with concurrence of Regional Board's staff, and a description of the revised stations shall be submitted to the Regional Board and attached to this Order. All samples should be representative of the volume and nature of the discharge or matrix of material sampled. The time, date, and location of each sample shall be recorded on the sample chain of custody form. All analyses shall be performed in accordance with the latest edition of *Guidelines Establishing Test Procedures for Analysis of Pollutants*, promulgated by EPA (40 CFR 136) or other procedures approved by the Regional Board. In reporting monitoring data, the Discharger shall indicate whether any analysis was performed using a method not in conformance with EPA's Guidelines.

INDUSTRIAL INFLUENT MONITORING

The Discharger shall collect influent samples at the headworks of the Industrial WWTT prior to any treatment of waste. Time of a grab sample shall be recorded. Influent monitoring shall include at least the following:

Constituent	Units	Type of Sample	Frequency
Flow			
To Treatment Trains	mgd	Metered	Continuous
To BVF	mgd	Metered	Continuous
Total	mgd	Calculated	Monthly
SS[1]	ml/L	Grab	1/Day
pH[2]	pH units	Grab	1/Day
EC[3]	µmhos/cm	24-hr Composite[4]	1/Day
Alkalinity (as $CaCO_3$)	mg/L	Grab	1/Week
BOD_5[5]			
Concentration	mg/L	24-hr Composite	2/Week[6]
Monthly Average	mg/L	Calculated	1/Month
COD[7]			
Concentration	mg/L	24-hr Composite	2/Week
Monthly Average	mg/L	Calculated	Monthly
Loading Rate[8]	lbs/day	Calculated	Monthly

Constituent	Units	Type of Sample	Frequency
TSS[9]			
Concentration	mg/L	24-hr Composite	2/Week[6]
Monthly Average	mg/L	Calculated	1/Month
Total Nitrogen			
Concentration	mg/L	24-hr Composite	1/Week
Monthly Average	mg/L	Calculated	1/Month
Oil and Grease			
Concentration	mg/L	Grab	2/Week[6, 10]
Monthly Average	mg/L	Calculated	1/Month

1 Settleable solids
2 Report pH and EC from both the influent into the BVF and flow diverted directly to the treatment trains.
3 Conductivity at 25°C
4 24-hr composite samples as referred to in this program shall be flow-proportioned.
5 Five-day, 20° Celsius biochemical oxygen demand
6 On nonconsecutive days
7 Chemical oxygen demand
8 Loading to the BVF only
9 Total suspended solids
10 2/Week for the first three months, 2/Month thereafter subject to Executive Officer approval

INDUSTRIAL WWTT BVF MONITORING

The Discharger shall collect samples at a point in the system directly following the BVF but before discharge to the treatment trains. BVF effluent samples shall be representative of the volume and nature of wastewater following BVF treatment. Time of collection of a grab sample shall be recorded. BVF monitoring shall include the following:

Constituent	Units	Type of Sample	Frequency[1]
pH	pH Units	Grab	1/Day
EC	µmhos/cm	24-hr Composite	1/Day
Alkalinity (as $CaCO_3$)	mg/L	Grab	1/Day
BOD_5			
Concentration	mg/L	24-hr Composite	1/Week[1]
Monthly Average	mg/L	Calculated	1/Month
Percent Removal	%	Calculated	1/Month

TSS			
Concentration	mg/L	24-hr Composite	1/Week[2]
Monthly Average	mg/L	Calculated	1/Month
Percent Removal	%	Calculated	1/Month
Total Nitrogen			
Concentration	mg/L	24-hr Composite	1/Week[2]
Monthly Average	mg/L	Calculated	1/Month
Percent Removal	%	Calculated	1/Month
Oil and Grease			
Concentration	mg/L	Grab	2/Week[2, 3, 4]
Monthly Average	mg/L	Calculated	1/Month
Percent Removal	%	Calculated	1/Month

1 If results of monitoring a pollutant appear to violate discharge specifications, but monitoring frequency is not sufficient to validate violation (e.g., the monthly mean for BOD_5), or indicate a violation and potential upset of the treatment process, the frequency of sampling shall be increased to confirm the magnitude and duration of violation, if any, and aid in identification and resolution of the problem.

2 Coincident with influent monitoring

3 On nonconsecutive days coincident with influent monitoring

4 2/Week for the first three months, 2/Month thereafter subject to Executive Officer approval

The Discharger shall indicate on a monthly basis when BVF performance parameters are exceeding any of the following:

Constituent/Parameter	Units	Monthly Average[1]
BVF Influent		
Flow	mgd	4.39
COD[2] Loading	lbs/day	135,000
BVF Effluent		
BOD_5	mg/L	700

1 Average value for all samples collected within a calendar month.

2 Chemical oxygen demand

The Discharger shall also report on a monthly basis whether any exceedances of the above BVF performance parameters have caused or threaten to cause violations of discharge specifications. If exceedances of the above BVF parameters have caused or contributed to cause exceedances of discharge specifications, the Discharger shall also describe in monthly monitoring reports corrective actions taken and planned be taken to restore BVF treatment performance to design capacity.

INDUSTRIAL DISCHARGE MONITORING

The Discharger shall collect effluent samples from the Industrial WWTT that are representative of the volume and nature of the discharge. Time of collection of a grab sample shall be recorded. Industrial discharge monitoring shall include the following:

Constituent	Units	Type of Sample	Frequency[1]
Flow	mgd	Metered	Continuous
SS	mL/L	Grab	1/Day
pH	pH Units	Grab	1/Day
EC	µmhos/c	24-hr Composite	1/Day
BOD_5			
Concentration	mg/L	24-hr Composite	2/Week[2]
Monthly Average	mg/L	Calculated	1/Month
Percent Removal	%	Calculated	1/Month
TSS			
Concentration	mg/L	24-hr Composite	2/Week[2]
Monthly Average	mg/L	Calculated	1/Month
Percent Removal	%	Calculated	1/Month
Total Dissolved Solids (TDS)[3]	mg/L	24-hr Composite	2/Month[4]
Ammonia (as NH_3-N)	mg/L	24-hr Composite	1/Week
Nitrate (as NO_3-N)	mg/L	24-hr Composite	1/Week
Total Kjeldahl Nitrogen (TKN)	mg/L	24-hr Composite	1/Week
Total Nitrogen			
Concentration	mg/L	Calculated	1/Week
Monthly Average	mg/L	Calculated	1/Month
Percent Removal	%	Calculated	1/Month
Oil and Grease			
Concentration	mg/L	Grab	2/Week
Monthly Average	mg/L	Calculated	1/Month
Percent Removal	%	Calculated	1/Month
General Minerals[5]	mg/L	24-hr Composite	When performed[6]
Metals[7]	mg/L	24-hr Composite	When performed[8]

[1] If results of monitoring a pollutant appear to violate discharge specifications, but monitoring frequency is not sufficient to validate violation (e.g., the monthly mean for BOD_5), or indicate a violation and potential upset of the treatment process, the frequency of sampling shall be increased to confirm the magnitude and duration of violation, if any, and aid in identification and resolution of the problem.

[2] On nonconsecutive days

[3] TDS referenced hereafter in this program shall be determined using Environmental Protection Agency (EPA) Method No. 160.1 for combined organic and inorganic TDS and EPA Method No. 160.4 for inorganic TDS or equivalent analytical procedures specified in 40 Code of Federal Regulations (CFR) Part 136.

[4] One week between sample dates

[5] General Minerals referenced hereafter in this program shall include the constituents in the General Minerals Analyte List presented below.

[6] When analyzed as part of any investigation to characterize general mineral content of Industrial WWTT effluent.

[7] Metals referenced hereafter in this program shall include aluminum, arsenic, barium, copper, cadmium, chromium, lead, mercury, molybdenum, selenium, silver, zinc, and nickel.

[8] When analyzed as part of any investigation to characterize the metals content of Industrial WWTT effluent.

General Minerals Analyte List

Alkalinity (as $CaCO_3$)	Carbonate (as $CaCO_3$)	Manganese
Aluminum	Chloride	Phosphate
Bicarbonate (as $CaCO_3$)	Hardness (as $CaCO_3$)	Potassium
Boron	Iron	Sodium
Calcium	Magnesium	Sulfate

General Minerals Sample Collection and Preservation: With the exception of effluent samples, samples placed in an acid-preserved bottle must first be filtered through a 0.45 µm nominal pore size filter. If field filtering is not feasible, samples shall be collected in unpreserved containers and submitted to the laboratory within 24 hours with a request (on the chain-of-custody form) to immediately filter then preserve the sample.

DOMESTIC INFLUENT MONITORING

The Discharger shall collect influent samples at the headworks of the Domestic WWTT prior to any treatment of waste. Time of a grab sample shall be recorded. Influent monitoring shall include at least the following:

Constituent	Units	Type of Sample	Frequency
Flow	mgd	Metered	Continuous
Settleable Solids	ml/L	Grab	1/Day
pH	pH units	Grab	1/Day
EC	µmhos/cm	24-hr Composite	1/Day

Constituent	Units	Type of Sample	Frequency
BOD_5			
Concentration	mg/L	24-hr Composite	2/Week[1]
Monthly Average	mg/L	Calculated	1/Month
TSS			
Concentration	mg/L	24-hr Composite	2/Week[1]
Monthly Average	mg/L	Calculated	1/Month
Oil and Grease			
Concentration	mg/L	Grab	2/Month[2]
Monthly Average	mg/L	Calculated	1/Month

[1] On nonconsecutive days
[2] One week between sample dates

DOMESTIC DISCHARGE MONITORING

The Discharger shall collect samples of Domestic discharge that are representative of the volume and nature of the discharges. Time of collection of a grab sample shall be recorded. Domestic discharge monitoring shall include the following:

Constituent	Units	Type of Sample	Frequency[1]
Flow	mgd	Metered	Continuous
Settleable solids	mL/L	Grab	1/Day
pH	pH Units	Grab	1/Day
EC	µmhos/cm	24-hr Composite	2/Month[2]
BOD_5			
Concentration	mg/L	24-hr Composite	2/Week[3]
Monthly Average	mg/L	Calculated	1/Month
Percent Removal	%	Calculated	1/Month
TSS			
Concentration	mg/L	24-hr Composite	2/Week[3]
Monthly Average	mg/L	Calculated	1/Month
Percent Removal	%	Calculated	1/Month
Total Dissolved Solids (TDS)	mg/L	24-hr Composite	2/Month[2]
Ammonia (as NH_3-N)	mg/L	24-hr Composite	2/Month[2]
Nitrate (as NO_3-N)	mg/L	24-hr Composite	2/Month[2]
Total Kjeldahl Nitrogen (TKN)	mg/L	24-hr Composite	2/Month[2]

Constituent	Units	Type of Sample	Frequency[1]
Total Nitrogen	mg/L	Calculated	2/Month[2]
Oil and Grease			
Concentration	mg/L	Grab	2/Month[2]
Monthly Average	mg/L	Calculated	1/Month
Percent Removal	%	Calculated	1/Month
General Minerals	mg/L	24-hr Composite	When performed[3]
Metals	µg/L	24-hr Composite	When performed[4]

1 If results of monitoring a pollutant appear to violate discharge specifications, but monitoring frequency is not sufficient to validate violation (e.g., the monthly mean for BOD_5), or indicate a violation and potential upset of the treatment process, the frequency of sampling shall be increased to confirm the magnitude and duration of violation, if any, and aid in identification and resolution of the problem.

2 One week between sample dates coincident with influent monitoring

3 On nonconsecutive days coincident with influent monitoring

4 When analyzed as part of any investigation to characterize general minerals content of Domestic WWTT effluent

5 When analyzed as part of any investigation to characterize the metals content of Domestic WWTT effluent

COMMINGLED DISCHARGE MONITORING

The Discharger shall collect samples after to point where the Industrial and Domestic WWTTs effluent is combined prior to discharge to the disposal ponds or use areas. Effluent samples shall be representative of the volume and nature of the discharges. Time of collection of a grab sample shall be recorded. Commingled discharge effluent monitoring shall include the following:

Constituent	Units	Type of Sample	Frequency[1]
Flow	mgd	Metered	Continuous
pH	pH Units	Grab	1/Day
EC	µmhos/cm	24-hr Composite	2/Month[2]
BOD_5			
Concentration	mg/L	24-hr Composite	2/Week[3]
Monthly Average	mg/L	Calculated	1/Month
$CBOD_5$[4]			
Concentration	mg/L	24-hr Composite	2/Week[3]
Monthly Average	mg/L	Calculated	1/Month
General Minerals	mg/L	24-hr Composite	1/Quarter[5]

Constituent	Units	Type of Sample	Frequency[1]
Metals	mg/L	24-hr Composite	1/Quarter[5]
Title 22 constituents[6]	varies	8-hr Composite or Grab, whichever is appropriate	2/Year[7]
Priority Pollutants[8]	µg/L	Grab	2/year[7]

1 If results of monitoring a pollutant appear to violate discharge specifications, but monitoring frequency is not sufficient to validate violation (e.g., the monthly mean for BOD_5), or indicate a violation and potential upset of the treatment process, the frequency of sampling shall be increased to confirm the magnitude and duration of violation, if any, and aid in identification and resolution of the problem.

2 One week between sample dates coincident with Domestic WWTT influent monitoring

3 On nonconsecutive days coincident with Domestic WWTT influent monitoring

4 Five-day, 20° Celsius carbonaceous biochemical oxygen demand

5 January, April, July, and October

6 Title 22 constituents, as used in this program, shall refer to constituents identified in the technical report submitted pursuant to Provision J.7.

7 January and July

8 Reporting shall conform with Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California Reporting Requirements, section 2.4 et seq.

POND MONITORING

Effluent ponds shall be sampled systematically for the parameters specified below. Freeboard shall be monitored on all effluent ponds in use to the nearest one tenth of a foot. Pond monitoring shall include at least the following:

Constituent/Parameter	Units	Type of Sample	Sampling Frequency[1]
Dissolved Oxygen (DO)	mg/L	Grab[2]	1/Week
Freeboard	feet[3]	Observation	1/Week

1 If results of monitoring appear to violate effluent limitations, but monitoring frequency is not sufficient to validate violation or indicate a violation and potential upset of the treatment process (e.g., less than minimum dissolved oxygen concentration), the frequency of sampling shall be increased to confirm the magnitude and duration of violation, if any, and aid in identification and resolution of the problem.

2 Samples shall be collected at a depth of one foot from each pond in use, opposite the inlet, and analyzed for DO. Samples shall be collected between 0700 and 0900 hours. If DO results for any pond in use indicate noncompliance with the effluent limit, the Discharger shall implement corrective measures as specified in the operation and maintenance manual and monitor said pond daily until its DO stabilizes above 1 mg/L.

[3] Freeboard shall be monitored to the nearest tenth of a foot.

In addition, the Discharger shall inspect the condition of ponds once per week and write visual observations in a bound logbook. Notations shall include observations of whether weeds are developing in the water or along the bank, and their location; whether dead algae, vegetation, scum, or debris are accumulating on the pond surface and their location; whether burrowing animals or insects are present; and the color of the ponds (e.g., dark sparkling green, dull green, yellow, gray, tan, brown, etc.). A summary of the entries made in the log during each month shall be submitted along with the monitoring report the following month. If the Discharger finds itself in violation of either General Discharge Specifications B.1, B.2, B.3, B.4, B.6, B.7, and B.8 the Discharger shall briefly explain the action taken or to be taken to correct the violation. The Discharger shall certify in each November monitoring report that it is in compliance with General Discharge Specification B.9.

PRETREATMENT PROGRAM MONITORING

The Discharger shall submit an annual report to the Regional Board, with copies to the EPA Regional Administrator and the State Board, describing the Discharger's pretreatment activities over the previous 12 months. In the event that the Discharger is not in compliance with any conditions or requirements of this Order, the Discharger shall include the reasons for the noncompliance and state how and when the Discharger shall comply with such conditions and requirements. This annual report shall be submitted by **1 March** and shall contain, but not be limited to item E.7 of *Standard Provisions and Reporting Requirements for Waste Discharge Requirements* dated 1 March 1991 (Standard Provisions).

USE AREA MONITORING

The type of crop(s) irrigated, amounts of water and/or recycled water applied to the crops(s) (in acre-feet) and amounts of biosolids and chemical fertilizers (in pounds of nitrogen per acre) shall be measured and reported to the Regional Board quarterly in accordance with the following schedule:

Monitoring Period	Data Due
January – March	1 May
April – June	1 August
July – September	1 November
October - December	1 February

The Discharger shall utilize the form presented in Attachment I (or variation thereof subject to Regional Board staff approval) for reporting the Use Area monitoring data.

USE AREA SOIL MONITORING

At least seven representative locations shall be established for soil profile sampling of the Use Area. At least five of these shall be within the Use Area, and two shall be outside to represent background conditions. The samples shall be collected and analyzed for the following constituents:

Constituent	Units	Sample Depth (ft)	Frequency
Nitrate (as NO_3-N)	mg/kg	2, 6, 10	1/Year
TKN	mg/kg	2, 6, 10	1/Year
Soluble Salts	mg/kg	2, 6, 10	1/Year

[1] Soluble salts shall be determined using test methods described in Methods of Soil Analysis, Part 2, Chemical and Microbiological Properties, Second Edition; edited by Page Miller and Keeney; American Society of Agronomy, Inc., Soil Science Society of America, Inc.; 1982, page 168, et seq., or other acceptable test methods with prior approval by the Executive Officer. Analytical results shall report the soil/water ratio.

SLUDGE MONITORING

A composite sample of sludge shall be collected according to the following frequencies but at least once per year. Sampling frequencies shall comply to EPA's *POTW Sludge Sampling And Analysis Guidance Document, August 1989*, and is as follows*:*

Amount of Biosolids[1] (metric tons of dry solids per 365-day period)	Minimum Frequency
Greater than zero but less than 290	1/Year
Equal to or greater than 290 but less than 1,500	1/Quarter
Equal to or greater than 1,500 but less than 15,000	6/Year
Equal to or greater than 15,000	1/Month

[1] Either the amount of bulk biosolids applied to the land, or the amount of sewage sludge received by a person who prepares biosolids that is sold or given away in a bag or other container for application to the land (dry weight basis), or the amount of biosolids (excluding domestic septage) placed on a surface disposal site.

During each sampling event, the Discharger must test for the following metals:

Arsenic	Copper	Nickel
Cadmium	Lead	Selenium
Molybdenum	Mercury	Zinc

Sludge sampling records shall be retained for a minimum of five years. A log shall be kept of sludge quantities generated and of handling and disposal activities. The frequency of entries is discretionary; however, the log should be complete enough to serve as a basis for part of the annual report.
Prior to any disposal or land application of sludge or biosolids, or removal of sludge or biosolids from the WWTF site, the monitoring and record keeping requirements of 40 CFR 503 shall be met.

GROUNDWATER MONITORING

Prior to collecting samples and after measuring the water level, each monitoring well shall be adequately purged to remove water that has been standing within the well screen and casing that may not be chemically representative of formation water. Depending on the hydraulic conductivity of the geologic setting, the volume removed during purging is typically from 3 to 5 volumes of the standing water within the well casing and screen, or additionally the filter pack pore volume.

In the technical report required by Provision J.14 task d describing the results of the first sampling event performed pursuant to this program, the Discharger shall include a detailed description of the procedures and techniques for: (a) sample collection, including purging techniques, sampling equipment, and decontamination of sampling equipment; (b) sample preservation and shipment; (c) analytical procedures; and (d) chain of custody control. As it continues to monitor groundwater pursuant to this program, the Discharger shall report when it deviates from these procedures and techniques.

At least quarterly and concurrently with groundwater quality sampling, the Discharger shall measure the water level in each well as groundwater depth (in feet and hundredths) and as groundwater surface elevation (in feet and hundredths above mean sea level). Samples shall be collected from approved monitoring wells and analyzed for the following constituents at the following frequency:

Constituent/Parameter	Units	Type of Sample	Frequency
Depth to groundwater	To 0.01 foot (hundredths)	Measured	Quarterly[1]
Groundwater elevation	Above mean sea level, to 0.01 foot	Calculated	Quarterly[1]
pH	pH Units	Grab	Quarterly[1]
Total Coliform Organisms	MPN/100 mL	Grab	Quarterly[1]
Total Organic Carbon	mg/L	Grab	Quarterly[1]
Nitrogen compounds:			
Ammonia (as NH_3-N)	mg/L	Grab	Quarterly[1]
Nitrate (as NO_3-N)	mg/L	Grab	Quarterly[1]
Total Kjeldahl Nitrogen (TKN)	mg/L	Grab	Quarterly[1]
Total Nitrogen	mg/L	Calculated	Quarterly[1]
Salinity compounds/parameters:			
EC	µmhos/cm	Grab	Quarterly[1]

Constituent/Parameter	Units	Type of Sample	Frequency
Total dissolved solids	mg/L	Grab	Quarterly[1]
SAR[2]	None	Calculated	Quarterly[1]
General Minerals[3]	mg/L	Grab	Quarterly[1]
Metals	µg/L	Grab	Quarterly[1] for the first year, annually[4] thereafter
Title 22 Constituents[5]	varies	Grab	Quarterly[1] for the first year, annually[4] thereafter

[1] January, April, July and October

[2] Sodium adsorption ratio $(SAR) = \frac{Na}{\sqrt{\frac{Ca + Mg}{2}}}$, where Na, Ca, and Mg are in meq/L

[3] Samples shall pass through a 0.45 µm filter prior to analysis.

[4] October

[5] Monitoring of Title 22 constituents will be limited to wells selected in concurrence with Regional Board staff that are representative of groundwater reflecting the greatest impact from the WWTF and its discharges.

Additionally, the Discharger shall include in the Provision J.14 task d technical report a technical description of proposed Data Analysis Methods for evaluating groundwater monitoring data (e.g., equivalent or similar to that described in Title 27, section 20415(e)(7-10)), consisting, at a minimum, methods to: (a) characterize natural background water quality of monitored constituents; (b) determine statistically significant differences between background and compliance wells for constituents that do not have water quality objectives or have background concentrations that exceed water quality objectives; and (c) select the minimum sample size required for the proposed data analysis approach and, if greater than that required by this program (i.e., quarterly), identification of when and how the additional samples will be collected during the one-year groundwater characterization period.

The network-wide false positive rate and statistical power are directly related. That is, as the false-positive rate increases, power, the ability of the statistical test to detect an actual release, also increases. Conversely, as the false-positive rate decreases, statistical power also decreases. Strategies to minimize the network-wide false positive rate and maximize a statistical test's power generally require careful review of the analytical data set, selection of a minimum number of representative wells and constituents to compare, and a retesting procedure for wells when an elevated concentration is detected[1]. Due to the importance of these factors performing statistical analyses of groundwater data, the Discharger must also include in the Provision J.14 task f technical report a technical discussion on how it intends to (a) minimize network-wide false positive rate to less than five percent, and (b) maximize statistical power. As it continues to monitor groundwater pursuant to this program, the Discharger shall report when it deviates from the proposed Data Analysis Methods.

[1] A detailed discussion of these topics can be found in Addendum to Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, U.S. EPA, July 1992.

After one full year of groundwater monitoring, the Discharger shall analyze monitoring data from background well(s) to compute background water quality values for monitored constituents selected in concurrence with Regional Board staff to perform an initial assessment of whether there is evidence of an impact from the WWTF operation or discharge. To complete this task, the Discharger shall follow its proposed Data Analysis Methods described in the technical report required by Provision J.14 task f. Reports thereafter shall be submitted quarterly by the **1st day of the second month** after the prescribed sample collection and shall include the same analysis.

The Discharger shall characterize groundwater quality using the proposed Data Analysis Method on constituents below selected in concurrence with Regional Board staff:

Groundwater Constituents to Evaluate Using Data Analysis Method

Alkalinity (as $CaCO_3$)	Hardness (as CaCO3)	Sodium
Ammonia (as N)	Magnesium	Sulfate
Bicarbonate (as CaCO3)	Nitrate (as N)	TDS
Boron	Iron and Manganese	TKN
Calcium	Phosphate	TOC
Chloride	Potassium	Total Nitrogen

WATER SUPPLY MONITORING

The supply water for the City of Tulare shall be monitored as follows:

Constituent	Units	Measurement	Frequency
EC[1]	µmhos/cm	Grab	Quarterly[2]

[1] EC shall be reported as a flow-weighted average from all supply wells. Include copies of supporting calculations with monitoring reports.

[2] January, April, July and October

Following two years of sampling in the manner specified, the Discharger may, following written approval by the Executive Officer, establish a sampling station where representative samples of the City's water supply can be obtained.

REPORTING

Monitoring results shall be submitted to the Regional Board by the **1st day of the second month** following sample collection. Quarterly monitoring results shall be submitted by the **1st day of the second month** following each calendar quarter. Annual monitoring results shall be submitted by **1 February** of each year.

In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner to illustrate clearly whether the discharge complies with waste discharge requirements. The highest daily maximum for the month, monthly and weekly averages, and medians, and removal efficiencies (%) for specified constituents (e.g., BOD_5, TSS, oil and grease, total nitrogen) should be determined and recorded.

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

By **1 February of each year**, the Discharger shall submit a written report to the Executive Officer containing the following:

1. The names, certificate grades, and general responsibilities of all persons in charge of wastewater treatment and disposal.
2. The names and telephone numbers of persons to contact regarding the WWTF for emergency and routine situations.
3. A statement certifying when the flow meter and other monitoring instruments and devices were last calibrated, including identification of who performed the calibration (Standard Provision C.6).
4. A statement whether the current operation and maintenance manual, and contingency plan, reflect the wastewater treatment facility as currently constructed and operated, and the dates when these documents were last reviewed for adequacy.
5. The results of an annual evaluation conducted pursuant to Standard Provision B.5 and a figure depicting monthly average discharge flow for the past five years.
6. The most recent annual water supply report for the City of Tulare.
7. A summary of the report on recycling and effluent disposal operations in the Use Area that includes for each distinct parcel monthly and annual totals of applied (a) fresh water (af/acre), (b) wastewater (af/acre), (c) total nitrogen (lbs/acre), and (d) TDS (lbs/acre). The report shall also include a water and nitrogen balance for each parcel and a summary of the crops grown.
8. A summary of sludge monitoring, including:
    a. Annual sludge production in dry tons and percent solids.
    b. A schematic diagram showing sludge handling facilities and solids flow diagram.
    c. A description of disposal methods, including the following information related to the disposal methods used at the WWTF. If more than one method is used, include the percentage of annual sludge production disposed of by each method.
        i. For **landfill disposal**, include: (a) the Order numbers of WDRs that regulate the landfill(s) used, (b) the present classifications of the landfill(s) used, and (c) the names and locations of the facilities receiving sludge.
        ii. For **land application**, include: (a) the locations of the site(s), and (b) the Order numbers of any WDRs that regulate the site(s).
        iii. For **incineration**, include: (a) the names and location of the site(s) where sludge incineration occurs, (b) the Order numbers of WDRs that regulate the site(s), (c) the disposal method of ash, and (d) the names and locations of facilities receiving ash (if applicable).

iv. For **composting**, include: (a) the location of the site(s), and (b) the Order numbers of any WDRs that regulate the site(s).

9. A summary of groundwater monitoring in a format (both printed and electronic) selected in concurrence with Regional Board staff, including

   a. Hydrographs showing the groundwater elevation in approved wells for at least the previous five years or to the extent that such data are available, whichever is fewer. The hydrographs should show groundwater elevation with respect to the elevations of the top and bottom of the screened interval and be presented at a scale of values appropriate to show trends or variations in groundwater elevation. The scale for the background plots shall be the same as that used to plot downgradient elevation data;

   b. Graphs of the laboratory analytical data for samples taken from approved wells within at least the previous five calendar years (as data become available). Each such graph shall plot the concentration of one or more waste constituents specified above selected in concurrence with Regional Board staff. The graphs shall plot each datum, rather than plotting mean values, over time for a given monitoring well, at a scale appropriate to show trends or variations in water quality. For any given constituent, the scale for the background plots shall be the same as that used to plot downgradient data.

   c. All monitoring analytical data obtained during the previous four quarterly reporting periods, presented in tabular form, as well as on 3.5" computer diskette.

10. A summary and discussion of the compliance record for the reporting period. If violations have occurred, the report shall also discuss the corrective actions taken and planned to bring the discharge into full compliance with this Order.

All reports submitted in response to this Program shall comply with the signatory requirements of Standard Provision B.3.

The Discharger shall implement the above Monitoring and Reporting Program on the first day of the month following effective date of this Order.

Ordered by:_____
THOMAS R. PINKOS, Acting Executive Officer

18 October 2002
(Date)

ARP/JLK:10/18/2002

INFORMATION SHEET

ORDER NO. R5-2002-0185
CITY OF TULARE
WASTEWATER TREATMENT FACILITY
TULARE COUNTY

Background

The City of Tulare (City or Discharger) owns and operates a wastewater treatment facility (WWTF) that serves the City's 41,000 residents and its various industries, primarily dairy processing industries. The Wastewater Treatment Facility (WWTF) includes two separate wastewater treatment trains (WWTTs), one for domestic wastes (hereafter Domestic WWTT), the other for primarily industrial wastes (hereafter Industrial WWTT). Discharges from the Domestic WWTT and from Industrial WWTT are hereafter referred to as Domestic discharge and Industrial discharge, respectively. The Domestic and Industrial discharges are combined (hereafter Commingled discharge) in an aerated mixing box and disposed of by evaporation and percolation in about 200 acres of ponds, as well as recycled on nearby farmland.

Waste Discharge Requirements (WDRs) Order No. 91-133 currently regulates the WWTF, and limits the discharge flows to the Domestic WWTT and to the Industrial WWTT to 5.0 million gallons per day (mgd) and 4.39 mgd, respectively. Order No. 91-133 does not include effluent quality limitations for the Industrial discharge, but separate effluent quality limitations for the Domestic and Commingled discharges. For the Domestic and Commingled discharges, it allows the Discharger to determine compliance with the secondary treatment standards using either the five-day 20°C carbonaceous biochemical oxygen demand ($CBOD_5$) or five-day 20°C biochemical oxygen demand (BOD_5) effluent limit criterion. It does not require the Commingled discharge to comply with a total suspended solids (TSS) secondary treatment standard.

Domestic WWTT. To provide utility service for projected domestic growth and provide interim treatment of some industrial wastewater, the Discharger completed the first phase of a two-phase expansion of the Domestic WWTT in 1998. The first phase provides an organic treatment capacity of 8 mgd and a hydraulic loading capacity of 6.0 mgd to serve population growth to the year 2008. The second phase includes a hydraulic expansion to 8.0 mgd and would provide treatment capacity until the year 2018. The first phase expansion included construction of additional primary and secondary sedimentation and aeration basins to facilitate the addition of an activated sludge process. Phase one also included construction of a cogeneration building, an activated biofilter (trickling filter) and sludge drying beds. The Discharger has not begun phase two of the expansion. Currently the Domestic WWTT includes headworks with mechanical screens and an aerated grit chamber, primary and secondary sedimentation, biofiltration, activated sludge units, sludge thickening and digestion, and sludge drying. Sludge from the activated sludge units, and primary sedimentation basins are discharged directly to the anaerobic digesters, while sludge from the secondary basins is thickened first. Sludge from the digesters is discharged to 16 acres of unlined sludge drying beds. Supernatant from the digesters is discharged to sludge beds, the Domestic WWTT headworks, or the Industrial WWTT's bulk volume fermenter. The Domestic WWTT's process flow diagram and site layout is depicted in Attachments B and C. The Domestic WWTT complies with the effluent limits in WDRs Order No. 91-133. Currently influent flows average 3.0 mgd and effluent quality is good with BOD_5 typically below 15 mg/L, but the WWTT can operate consistently under 10 mg/L with BOD_5/TSS removals as

high as 95 percent. The EC of the Domestic WWTT discharge is typically below 560 µmhos/cm (or 350 µmhos/cm over source water).

Industrial WWTT. In 1989, the Discharger increased the design flow of the Industrial WWTT from 1.5 to 4.39 mgd through the addition of a 30.1-million-gallon capacity anaerobic reactor treatment unit called a bulk volume fermenter (BVF) and designed by ADI Systems, Inc. (ADI). The BVF has a reported treatment capacity of 4.39 mgd and BOD_5 removal efficiency of 65 to 75 percent. The former anaerobic lagoons for industrial wastewater were converted to mechanically aerated lagoons to polish the BVF effluent. Effluent from the aerated lagoons was then discharged to four oxidation ponds in series (ponds 1 through 4). Industrial wastewater from the last oxidation pond was mixed with 80 percent of the treated domestic flows and recycled on adjacent farmland. The Industrial WWTT accepts wastewater from local septic haulers, which directly discharge into the BVF. Over the past two years, the City authorized flow at the Industrial WWTT to nearly double and exceed the Industrial WWTT hydraulic and treatment capacity. In a belated effort to resolve the capacity problems at the Industrial WWTT, the City began an expansion project in 1999.

For approximately four years, the Discharger has been allowing haulers of grease trap waste to discharge this waste to an area no larger than a half acre adjacent to the sludge drying beds. While the waste may not be hazardous, it does qualify as a designated waste, as defined in section 13173(b) of the California Water Code. Order No. 91-133, Discharge Prohibition A.3, prohibits the discharge of designated waste. On 30 October 2001, the Discharger was issued a Notice of Violation (NOV) for this practice. In response, the Discharger indicated that it would discontinue this practice and instead have haulers discharge to the BVF after grit and grease removal. The Discharger has not identified the extent to which, if any, the discharge of grease trap waste will adversely impact BVF treatment performance, which, as discussed later, has been adversely impacted by excessive discharges of oil and grease by industrial users.

During a 3 October 2001 inspection, staff observed the Discharger had disposed of animal carcasses in a trench approximately 3 feet wide, 8 feet long, and 8 feet deep west of the Industrial WWTT. The WWTF operator indicated the City had been disposing of animal carcasses from the City's animal shelter in similar trenches on the WWTF property for the last 20 years. Disposal of solid waste such as animal carcasses is subject to solid waste regulations in Title 27, California Code of Regulations (CCR), section 20005 et seq. The Discharger was issued a NOV, dated 30 October 2001, for this practice. In response, the Discharger indicated that it would discontinue the practice.

The Discharger submitted a Report of Waste Discharge, dated 15 August 2000, in support of an increase in discharge flows from the Domestic and Industrial WWTTs of 6.0 mgd and 8.0 mgd, respectively.

Pretreatment

No categorical industrial users discharge to the WWTF. Seven Significant Industrial Users (SIUs), primarily processors of dairy products, discharge to the Industrial WWTT. These include Land O'Lakes, Kraft Cheese Company, Saputo Cheese Company, Ice Cream Partners, and Tulare Culture Specialists. Land O'Lakes' Tulare Dairy Plant, which produces cheese, butter and whey fractions, in addition to other dairy-based products, is the nation's largest, single-site dairy complex.

Pursuant to Title 23, CCR, section 2233, the Discharger is required to establish a pretreatment program that conforms to Title 40, Code of Federal Regulations (CFR), Part 403. Order No. 91-133 required the Discharger to submit various reports describing its pretreatment program for Regional Board approval by 1 May 1992. The Regional Board extended this deadline to 30 September 1992 through adoption of Special Order No. 92-134. During 1991 through 1994, the Discharger submitted various pretreatment program reports intended to comply with Order No. 91-133. By letter dated 27 December 1994, the Discharger requested the Regional Board approve its pretreatment program. The City's Municipal Code, Chapter 5, Title VII, implements its pretreatment program. The State Water Resources Control Board, Office of Chief Counsel, reviewed the Discharger's pretreatment program and sewer ordinance for legal authority and indicated by 19 September 1994 letter that all elements required by the federal regulations appeared to be present. Although staff never proposed that the Regional Board act on the approval, the City implemented the program it developed.

In August 1999, the U.S. Environmental Protection Agency (EPA) inspected the Industrial WWTT and several of the City's SIUs. The reports documenting these inspections recommended that the Discharger reevaluate, improve, and enforce its local limits and control programs. The EPA's inspection report indicated that dilute water (e.g., onsite storm water and single-pass cooling water), highly acidic wastewaters, and excessive oil and grease being discharged by SIUs interfere with treatment at the Industrial WWTT.

In December 1999, the Discharger submitted a revised pretreatment program but it lacked all the necessary documents for staff to perform a complete review (e.g., up-to-date industrial user survey and adequate enforcement response plan). While the City has the necessary legal authority to implement the program, the revised pretreatment program is insufficient and therefore does not comply with 40 CFR 403. Staff therefore recommends the Regional Board determine the Discharger's pretreatment program inadequate.

Table 1 is a list of major industrial users' average daily flows, organic loadings, and EC for 2001 and corresponding local limits for respective constituents. The local limits in the following table are effective from 1 April 2002 through March 2003.

TABLE 1
Comparing SIU's Local Limits

SIU	Average Daily Flow (mgd)		Average Daily BOD_5 Load (pounds)		Average Daily EC (µmhos/cm)	
	Actual	Permitted	Actual	Permitted	Actual	Permitted
Land O'Lakes	***2.538***[1]	2.100	***26,437***[2]	18,285	858	950
Kraft Cheese Company	***0.953***	0.928	***11,771***	10,273	***1,285***	950
Saputo Cheese Company	0.394	0.880	8,011	8,340	***2,084***	950
Ice Cream Partners	0.221	0.251	***8,847***	5,249	***1,232***	950
Tulare Culture Specialists	0.210	0.426	4,200	7,274	***1,030***	950
Total	**4.316**	**4.585**	**59,266**	**49,421**	N/A	N/A

[1] Bolded entries show the total amount of all major industrial user flows and BOD_5 loadings.
[2] Bolded italicized entries note local limit violations

As indicated in Table 1, the City allocated more flow to SIUs than the 4.39 mgd allowed by Order No. 91-133 as the maximum discharge flow from the Industrial WWTT. The implementation of caustic solution recycling by some SIUs to reduce wastewater EC has increased the acidity of Industrial WWTT influent. With one exception, all SIUs listed would violate the City's newly imposed local EC limit. The Discharger's enforcement effort is limited to levying monetary penalties that appear in SIUs' monthly billing reports. Prior to 2001, when fined, an SIU was allowed to use half of the penalty amount to upgrade its pretreatment facilities to improve compliance. For example, Saputo Cheese Company installed reverse osmosis units in 1999 to reduce the salinity of its discharge. Despite this upgrade, however, it continues to violate the local limit for EC.

Meanwhile, all of the SIUs named above are or will be in noncompliance with at least one local limit (e.g., flow, BOD_5 loading, or EC). None of the noncomplying SIUs is currently under enforcement orders for the chronic violations. Rather than directing the SIUs to implement corrective measures to achieve and maintain compliance with local limits, the Discharger levies fines against noncomplying SIUs in a manner so routine that fines appear as line item charges in SIU monthly billing statements.

The Commingled discharge frequently exceeds the discharge EC limit of source water EC plus 500 µmhos/cm or 1,000 µmhos/cm, whichever is less, due mostly to SIUs discharging high EC wastewaters to the Industrial WWTT. As a result of EPA's inspection (specifically, the oil and grease concerns), the City adopted Resolution No. 01-577 on 3 May 2001 to modify local limits to improve its ability to achieve and maintain compliance with discharge specifications for EC and BOD_5. Specifically, the City lowered the local limits for total oil and grease from 1,000 to 700 mg/L and the maximum EC from 1,256 to 950 µmhos/cm. Resolution No. 01-577 set forth a time schedule that required the EC limit to be lowered to 1,150 µmhos/cm by 31 August 2001, 1,050 µmhos/cm by 30 November 2001 and then finally 950 µmhos/cm by 28 February 2002. The Discharger has identified deficiencies in its current pretreatment program and has retained an engineering consultant to develop an appropriate program. The Discharger has not indicated when it will complete the revised pretreatment program.

Industrial WWTT Expansion

While the Discharger has submitted several different project descriptions for the Industrial WWTT expansion, the current version describes a project that involves earthworks to construct four new treatment trains in what was once the aerated lagoons and ponds 1 and 2 and two new 32-acre ponds (ponds 5 and 6) in what was once a portion of the City's Use Area. Each treatment train (treatment trains A through D) will consist of one complete mix lagoon (Cell 1) followed by three partially mixed aerated ponds operated in series (Cell 2 through 4). The Discharger completed the earthworks for treatment trains A through D in April 2000 and in July 2001 completed treatment trains A through C. The Discharger has the capability of adding four additional treatment trains (E through H) in ponds 3 and 4. In June 2002, the Discharger reported taking ponds 3 and 4 out of service to begin the construction of treatment train E. The Discharger currently has plans for completing treatment trains A through F for a total treatment capacity of 8.0 mgd.

The Industrial WWTT expansion also includes projects to re-direct 1.0 mgd of domestic sewage and storm water flows from the Industrial WWTT collection system to the Domestic WWTT collection system and to dedicated storm water retention ponds, respectively. In April 2002, the City completed the new Paige Avenue Sewer, which will be tied into the new industrial headworks in September 2002. Once the tie-in is completed, the low-strength domestic flows that previously went to the Industrial WWTT will be sent to the Domestic WWTT. In June 2002, the City completed a storm water diversion project along Pratt Street and Bardsley Avenue. The City predicts the project will divert approximately 0.5 mgd of storm water from the Industrial WWTT.

As of June 2002, influent to the Industrial WWTT arrives in two separate pipelines. Since 2001, flows in excess of 4.39 mgd (the BVF capacity) are diverted from the BVF treatment and discharge directly to treatment trains A through C. Diverted flows are pumped from either of two pipelines. The remaining influent, not diverted, is combined for grit and grease removal prior to entering the BVF. Once the Industrial WWTT expansion is complete, the Discharger will have a single headworks that will consist of a lift station and splitter box to deliver flows to the BVF or treatment trains, a Parshall flume, and two mechanical bar screens. The reported hydraulic and organic treatment capacity of treatment trains A through C when flows in excess of 4.39 are being diverted from the BVF is 5.0 mgd. The Industrial WWTT's process flow diagram for an Industrial WWTT flow of 6.0 mgd and site layout is depicted in Attachments B and D.

Table 2 below characterizes the Commingled discharge quality and Industrial WWTT influent flow during the initial phases of the Industrial WWTT expansion, at which time aeration ponds were taken offline and Industrial WWTT influent flow exceeded the BVF treatment capacity.

TABLE 2
Industrial WWTT Flow and Commingled Discharge Quality

Constituent	Units	Mar-Dec 1998	Jan – Apr 1999	May 1999-Apr 2000[1]	May 2000 - May 2001[2]	Jun 2001[3]
Industrial WWTT						
Flow	mgd	4.25	4.85	4.71	5.03	5.10
Commingled discharge						
BOD_5	mg/L	67	91	330	91	28
$CBOD_5$	mg/L	50	67	280	38	16
TKN[4]	mg/L	--	42	47	36	38
Nitrate **(as N)**	mg/L	--	2	2	2	4
Ammonia **(as N)**	mg/L	--	34	90	23	18
TDS	mg/L	615	607	730	505	480
EC	µmhos/cm	780	757	1,080	970	1,000

1 Ponds 1 and 2 are out of service
2 Flows diverted (formerly ponds 1 and 2) to partially complete treatment trains.
3 Treatment trains A through C are complete and receiving flows diverted from the BVF.
4 Total Kjeldahl Nitrogen (TKN)

Industrial WWTT influent flow began to increase in 1999 as industrial users began to increase production and discharge flow (e.g., Haagen-Dazs, Kraft USA). Highly acidic wastewater and excessive oil and grease discharging to the BVF interfere with treatment and cause pass-through of waste constituents. The BVF did not meet the design BOD_5 75 percent removal efficiency 50 percent of the time during early expansion phases; BOD_5 removal efficiency was 13 percent during July 1999.

For an anaerobic treatment system such as the BVF to be effective, environmental conditions such as pH, alkalinity, and temperature must be maintained within optimal ranges. In February 2002, the Discharger submitted *Final Report: Improving the Performance of the BVF Digester City of Tulare* (hereafter BVF Evaluation) prepared by ADI. The BVF Evaluation contains findings and recommendation to improve BVF performance, which, in turn, directly affects the overall performance of the Industrial WWTT. According to the BVF Evaluation, the pH should range from 6.6 to 7.6 (for methane-producing or methanogenic organisms), alkalinity from 1,000 mg/L to 5,000 mg/L, and the temperature from 85 to 100°C (for mesophilic digestion). The pH within the BVF cannot fall outside the pH range necessary for methanogenic organisms to function properly. Without the methanogenic organisms, the nonmethanogenic organisms produce an abundance of acid, killing the methanogenic organisms and causing an imbalance in the microbial community. In order to maintain a balance, there must be sufficient alkalinity to prevent the pH from dropping below 6.2 pH units.

In order to improve the treatment effectiveness of the BVF, the BVF Evaluation suggested the City implement the following measures:

- Add magnesium hydroxide to the BVF influent during a six-month trial to increase alkalinity (began in February 2002)

- Prevent excessive oil and grease from entering the BVF
- Prevent peak (as high as 10 mgd) storm water flows from entering the Industrial collection system

On 27 May 2002, the BVF caught fire while workers were installing baffles under the BVF's cover. Methane gas trapped underneath the BVF's newly installed poly-vinyl cover was ignited by a worker's equipment. The fire damaged the cover approximately two to four feet around its perimeter. The cost of repair of the cover and other damage associate with the fire is estimated at 2 to 4 million dollars. The resulting loss of an airtight cover disrupted the anaerobic conditions necessary for effective treatment. The Discharger reported in a 30 May 2002 memorandum to the Regional Board that ADI indicates that the digester should be able still continuously treat the industrial wastewater to satisfactory levels. The City is investigating alternatives to repair the cover.

The Discharger approved projects that created higher flows at the Industrial WWTT prior to having adequate treatment capacity, relying on its ability to dilute resulting poor quality effluent from the Industrial WWTT with high quality effluent from the Domestic WWTT. As previously noted in the report, the dilution was insufficient. When successful, the Discharger is able to mask actual treatment performance and possible pass-through of pollutants. As indicated above, the Domestic discharge quality is better than necessary to meet prescribed limits, largely because it is operating at half its design capacity. The spare Domestic WWTT capacity allows the Discharger to divert partially treated flows from the Industrial WWTT to the Domestic WWTT. The Discharger's reliance on the Domestic WWTT's spare treatment capacity may interfere with the City's ability to accommodate future nonindustrial growth.

Effluent Disposal and Recycling

At the current flow of 9.1 mgd (Domestic discharge of 3.0 mgd and Industrial discharge of 6.1 mgd), the annual discharge flow is almost 3,400 million gallons (or about 10,400 acre-feet). The WWTF currently has about 200 acres of effluent storage/disposal ponds (ponds 3 through 9). At an annual lake pan evaporation rate of 4.7 feet/year, the amount of the annual discharge flow lost to evaporation is 400 million gallons, or about 12 percent. This assumes the ponds are always full. This represents a concentration effect of about 12 percent. This, in turn, means that if total nitrogen in percolating effluent is not to exceed 10 mg/L, then the total nitrogen in effluent discharged to the ponds should be no greater than 8.9 mg/L. At a daily percolation rate of 0.25 inch/day, which is cited in the Discharger's operation and maintenance manual, the amount of the annual discharge flow lost to percolation is 7.6 feet/year (almost 500 million gallons), or about 16 percent. Using a total nitrogen concentration in Commingled discharge of 35 mg/L, the nitrogen load to pond bottom soils due to percolating effluent would be about 720 lbs/acre/year. This estimate assumes no losses of nitrogen occur during effluent storage (i.e., through ammonia volatilization and/or denitrification). If total nitrogen concentration in effluent percolating from ponds were no greater than 10 mg/L, the maximum contaminant level for drinking water, the nitrogen loading to pond bottom soils would be about 210 lbs/acre/year.

The Discharger has not submitted evidence to confirm the 0.25 inch/day percolation rate reflects current conditions or applies to all ponds. Provided the 0.25 inch/day percolation rate is accurate and applies

uniformly to all ponds, however, then the amount of the annual discharge flow applied to the 1,330 acres of farmland approved to receive recycled water is about 2,361 million gallons or about 7,245 acre-feet/year.

The 1,330 acres on which effluent is recycled are comprised of an 800-acre parcel owned by the City (hereafter Use Area), and two parcels owned by Clarklind Farms (hereafter Clarklind use area) regulated by separate water reclamation requirements (WRRs). WRRs Order No. 90-058 regulates 370 acres on the southwest corner of the WWTF and 130 acres on the southeast corner on of the WWTF, and WRRs Order No. 90-059 regulates 160 acres on the eastside of the WWTF. Order No. 91-133 regulates the recycling of effluent on the City-owned Use Area.

Order No. 91-133 requires the Discharger to submit Annual Management Reports documenting and discussing the total water recycled over the season; the total nutrient loading from wastewater, sludges, and chemical fertilizers; and the amount of nutrients removed through harvest of the crop. According to the Discharger's Annual Land Management reports from 1999 through 2001, the average annual nitrogen loading (in lbs/acre) from recycled water ranges from 130 (forage) to 310 (cotton) to 510 (corn). The *Western Fertilizer Handbook* cites annual nitrogen demands of 180, 240, and 300 lbs/acre for cotton, corn, and forage, respectively. While the nitrogen loadings for forage appear reasonable, the loadings for cotton and corn are excessive. Nitrogen not attenuated in the soil profile has a reasonable potential to be released into groundwater in concentrations greater 10 mg/L.

The Discharger indicated some time ago that it may convert additional Use Area acreage to ponds and acquire 1,280 acres of additional farmland for recycling, but has not specified a plan or schedule for doing so. Until recently, the Discharger had not submitted an engineering report to the California Department of Health Services pursuant to Title 22, California Code of Regulations, section 60323, for its current water recycling operations. By Regional Board letter dated 9 April 2002, the Discharger was requested to submit by 12 July 2002 a Title 22 Engineering Report to the Regional Board and to DHS. Regional Board letter dated 24 July 2002 extended this date to 12 August 2002. In August 2002, the Discharger submitted a Title 22 Engineering Report to the Regional Board and DHS for review. The Discharger submitted information dated 28 August 2002 to supplement the Title 22 Engineering Report. By letter dated 4 September 2002, DHS approved the City's Title 22 Engineering Report to recycle effluent on the Use Area and Clarklind use area. In March 2002, the Discharger submitted a Report of Water Recycling (RWR) and a Title 22 Engineering Report in support of a project to recycle WWTF effluent on 645 acres owned by Mr. Tony Mello directly south of the WWTF in Sections 28, 29 and 30, T20S, R24E, MDB&M. By Regional Board letter dated 25 March 2002, the Discharger was notified that the RWR, including its Title 22 Engineering Report, was incomplete. By letter dated 16 May 2002, DHS notified the Discharger that the Title 22 Engineering Report was incomplete. On 9 September 2002, the Discharger submitted supplemental information to complete the Title 22 Engineering Report. By letter dated 10 September 2002, DHS approved the Title 22 Engineering Report and its supplements. To date, however, the Discharger not submitted the information requested to complete the RWR (e.g., monthly water balance, yearly nutrient balance).

The City does not have adequate effluent disposal capacity (e.g., percolation pond and use area acreage). As a result, the Discharger flood irrigates fallow portions of its Use Area for effluent disposal by

percolation and evaporation. The Discharger creates temporary berms surrounding as much as 40 acres at a time and applies effluent at a rate of 1.5 feet to 2 feet per discharge event. The Discharger received an NOV, dated 30 October 2001, for threatening to spill wastewater to adjacent canals. During an 11 June 2002 inspection, staff observed the Discharger continuing to flood fallow portions of the Use Area.

The Discharger reports that animals borrowing through the berms constructed in the Use Area and Clarklind use area to contain recycled water and a soil failure surrounding a disposal pond distribution pipe has resulted in three incidences (one in July 2001 and two in February 2001) in which effluent spilled and flooded adjacent lands or spilled to irrigation canals. To date, effluent spills to canals have totaled an estimated 15,000 gallons. The City has not submitted a detailed wastewater recycling management plan to demonstrate that recycling of treated wastewater can be accomplished at reasonable agronomic rates.

Surface Hydrology, Groundwater Conditions and Land Use

The WWTF is in the Kaweah Delta Hydrologic Unit of the Tulare Lake Basin. Surface water drainage is to Deep Creek, a tributary of the Tule River. Tulare Canal is an open unlined irrigation canal that borders the southern boundary of the WWTF, traverses much of the Use Area, and terminates in the Lakeland Canal, at the point approximately 12 miles southwest of the WWTF. The Tulare Canal conveys deliveries of surface water to farmland with water from Kaweah Lake and the Friant-Kern Canal.

Regional groundwater flows southwesterly and the depth of water occurs about 64 feet below ground surface (bgs), according to information in *Lines of Equal Elevation of Water in Wells in Unconfined Aquifer*, published by the California Department of Water Resources (DWR). The United States Department of Agriculture Soil Conservation Service, Soil Survey of Tulare County, California, Western Part (draft), describe the soils of the Kaweah River alluvial fan near the WWTF as fine sandy loams and silty clay loams and are considered moderately permeable. The dominant sediments are silt, fine sands, and clay, according to logs of wells drilled in the area. A clay lens called the 'E' Clay of the Tulare Formation occurs at a depth of about 250 feet below ground surface (bgs). The 'E' Clay divides underlying groundwater into unconfined (above the 'E' Clay) and confined (below the 'E' Clay) aquifers.

Land use in the vicinity of the WWTF primarily consists of irrigated agriculture and dairies. Crops grown within a 5-mile radius of the WWTF include, but are not limited to, alfalfa, corn, cotton, grapes, almonds, walnuts, Sudan grass, dry beans, and pistachios, according to the DWR land use data published in 1999. Crops in the area are typically irrigated by flood or furrow irrigation systems according to the Tulare County Agricultural Commissioner's Office.

The Discharger has been monitoring groundwater quality quarterly in sixteen wells for nitrate, chloride, EC, standard minerals, and coliform. Table 3 presents the installation year, perforated intervals, and locations of the groundwater wells in the Discharger's monitoring network.

TABLE 3

Monitoring Well Locations

MW No.	Installed	Perforated Interval (feet bgs)	Location
1	1990	55-75	8,000 ft east and upgradient of the WWTF (directly west of HWY 99)
2	1990	68-78	7,000 ft east and upgradient of the WWTF adjacent to a canal
3	1989	54-74	4000 ft south and downgradient of the WWTF ponds 5 through 8, Use Area and Clarklind use area
6	1989	61-81	500 ft north and upgradient of the WWTF treatment trains
10	1989	62-82	5,000 ft west and downgradient of the Clarklind use area and WWTF ponds
11A	1991	135-145	6,000 ft southwest and downgradient of the WWTF, Use Area and Clarklind use area
12	1990	65-85	10,000 ft east and upgradient of the WWTF (directly east of HWY 99) and adjacent to a canal
14	1990	71-91	3.5 miles west and downgradient of the WWTF
15A	1990	54-74	1.7 miles south and downgradient of the WWTF and within the Use Area
15B	1990	59-79	2.5 miles south and downgradient of the WWTF and adjacent to Use Area.
16	1990	55-75	2 miles south and downgradient of the WWTF, Use Area and Clarklind use area
18	2001	50-75	Directly downgradient of WWTF pond 6
19	2001	60-85	Directly downgradient of WWTT pond 8
20	2001	60-85	Directly downgradient of pond 4 adjacent to the Tulare Canal
21	2001	55-80	Directly downgradient of pond 9 and adjacent to sludge beds
22	2001	65-90	Directly downgradient of sludge beds

MW-1 and MW-6 were intended to monitor natural regional background quality, but appear to be impacted by the WWTF or other sources of waste constituents and, thus, are not acceptable background monitoring wells. MW-1 is near the former Coehlo Meats, a meat packing facility that ceased discharging slaughterhouse wastewater to ponds and fields in April 1995. MW-6 is directly upgradient of the unlined treatment ponds and appears impacted, in part, by the discharges. MW-2 and 12 are upgradient of the WWTF but, due to their locations adjacent to canals, are likely monitoring high quality canal water seepage. As a result, the Discharger's well network is insufficient and is likely not monitoring regional background quality. Additionally MW-20, downgradient of unlined ponds, is adjacent to the Tulare Canal and is effectually monitoring high quality canal water seepage and not groundwater affected by the discharge.

Table 4 summarizes the results of the Discharger's monitoring wells within the vicinity of the WWTF, Use Area and Clarklind use area. The table shows the Discharger's monitoring from March 1998 through March 2002 with the number of samples used to calculate each average, and includes a summary of the applicable water quality data for the Commingled discharge from 1 July 2001 through 31 January 2002.

TABLE 4
Groundwater Quality

	Number of Samples[1]	NO_3-N (mg/L)	EC (µmhos/cm)	TDS[1] (mg/L)	Chloride (mg/L)
Commingled discharge[2]	8	26	863	435	75
Monitoring Wells					
Upgradient					
1[3]	11	24	1,107	907	119
2[4]	8	1	127	104	4
12[4]	8	<1	160	130	4
Upgradient next to WWTF					
6	11	10	736	451	41
Within WWTF and next to Canal					
20	5	7	656	402	28
Directly Downgradient					
18	3	35	1,633	1,027	150
19	5	82	2,040	1,476	228
21	5	26	1,320	884	90
22	5	22	1,220	804	88
Use Area and Clarklind use area					
3	12	21	1,386	898	102
15A	14	25	874	580	33
15B	12	20	1,102	693	76
16	12	15	722	447	38
Further Downgradient					
10	15	21	1,021	663	65
11A	12	29	1,046	677	86
14	10	23	893	566	35

	Number of Samples[1]	NO_3-N (mg/L)	EC (µmhos/cm)	TDS[1] (mg/L)	Chloride (mg/L)

[1] Samples where TDS concentrations were greater than EC levels are not included in this summary due to possible laboratory error.
[2] Water quality of the Commingled discharge has varied greatly due to the Industrial WWTT expansion.
[3] Monitoring well impacted by a meat packing facility that is no longer in operation.
[4] Located adjacent to a canal and is monitoring high quality canal water seepage.

Monitoring wells downgradient of the Discharger's sludge drying and storage areas (MW-22 and MW-21) show elevated nitrogen, TDS constituents (e.g., sodium, chloride, sulfate), and total organic carbon. Additionally, monitoring wells downgradient of the ponds (MW-18 and MW-19) show elevated nitrate and TDS constituents. The elevated concentrations may be due to the flushing out of waste constituents in the soils that were once part of the Discharger's Use Area. According to 1999 DWR Land Use Maps, there are at least five confined animal facilities within or surrounding the WWTF vicinity and are likely contributing to groundwater degradation with nitrate and TDS.

Occasionally, the groundwater data indicates elevated concentrations of total organic carbon (TOC) and bicarbonate compared to background water quality that are most likely due to biological (bacterial) oxidation of carbonaceous matter from the WWTF discharge and sludge drying beds and the subsequent formation of bicarbonate. For example, in September 2001, the background bicarbonate concentration in MW-2 was 60 mg/L, while the downgradient concentrations ranged from 210 to 540 mg/L. Additionally, TOC concentrations in MW-2 was 1.6 mg/L while downgradient concentrations (MW-6 and MW-21) ranged from 10 to 24 mg/L, also indicating an increase in organic loading.

The Discharger has been monitoring for iron and manganese since April 2001. Occasionally, both iron and manganese concentrations were elevated in the wells directly upgradient of the unlined treatment trains (MW-6) and downgradient of the unlined disposal ponds (MW-21). Iron concentrations in these wells ranged from 0.28 mg/L to 11 mg/L and manganese concentrations exceeded 0.18 mg/L.

Basin Plan, Beneficial Uses, and Regulatory Considerations

The WWTF is in the Kaweah Basin Detailed Analysis Unit of the Tulare Lake Basin. *Water Quality Control Plan for the Tulare Lake Basin, Second Edition,* (Basin Plan), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin. Beneficial uses often determine the water quality objectives that apply to a water body. For example, waters designated as municipal and domestic supply must meet the maximum contaminant levels (MCLs) for drinking waters. The Basin Plan sets forth the applicable beneficial uses (industrial, agricultural, and domestic supply in this instance), the procedure for application of water quality objectives, and the process for and factors to consider in allocating waste assimilation capacity.

Nearby canals convey surface water for irrigation. The beneficial uses of the Valley Floor Waters as identified in the Basin Plan, include agricultural supply; industrial service supply; industrial process

supply; water contact recreation; noncontact water recreation; warm freshwater habitat; wildlife habitat; rare, threatened, or endangered species; and groundwater recharge.

The Basin Plan establishes the beneficial uses for area groundwater as municipal and domestic supply, agricultural supply, industrial service supply, and industrial process supply.

The Basin Plan requires that facilities which discharge or are designed to discharge in excess of 1 million gallons per day must provide removal of 80 percent or reduction to 40 mg/L, whichever is more restrictive, of both 5-day BOD and suspended solids. The Basin Plan also indicates that, in general, effluent limits established for the land discharge of treated municipal waste will also apply to the land discharge of treated industrial waste.

The Basin Plan indicates the greatest long-term problem facing the entire Tulare Lake Basin is increasing salinity in groundwater, a process accelerated by man's activities and particularly affected by intensive irrigated agriculture. Regional Board policies and programs focus on controlling the rate of increase of salt in the Basin from all controllable sources, and particularly point sources of waste. To this end, the Regional Board encourages proactive management of waste streams by dischargers to control addition of salt through use. The Basin Plan establishes an incremental EC limitation of 500 μmhos/cm over source water EC as the measure of the maximum permissible addition of salt constituents through use. The Basin Plan indicates a more restrictive limitation on salt constituents added through use is appropriate where necessary to assure compliance with a groundwater limitation for any constituent established by the Regional Board.

Water in the Tulare Lake Basin is in short supply, requiring importation of surface waters from other parts of the State. The Basin Plan encourages recycling and does not consider disposal by evaporation and percolation or discharge to surface waters a permanent disposal solution when the potential exists for recycling. Further, the Basin Plan requires that project reports for new or expanded wastewater facilities include plans for wastewater recycling or the reasons why this is not possible

Further, the California Department of Health Services (DHS) has established statewide recycling criteria in Title 22, CCR, section 60301 et seq., (hereafter Title 22), and guidelines for use of recycled water. Revised water recycling criteria, which became effective on 2 December 2000, expands the range of allowable uses of recycled water, establishes criteria for these uses, and clarifies some of the ambiguity contained in the previous regulations. Further, the revised Title 22 requires that all wastewater used for recycling receive, at a minimum, secondary treatment. The Basin Plan's secondary treatment performance standard meets the Title 22 minimum criteria. Title 22, section 60304(d), stipulates restrictions on the use of undisinfected secondary recycled water. It requires the User to comply with these restrictions, including restricting the use of undisinfected secondary treated municipal wastewater on crops permitted by Title 22, section 60304(d)(3)-(7) (e.g., fiber, fodder, seed crops, and food crops that must undergo pathogen destroying processing prior to human consumption).

The Basin Plan incorporates statewide policies and plans by reference. Two policies are of particular relevance to the proposed requirements, and are described in the next two subsections.

Antidegradation

In allowing a discharge, the Regional Board must comply with CWC section 13263 in setting appropriate conditions. The Regional Board is required, relative to the groundwater that may be affected by the discharge, to implement the Basin Plan and consider the beneficial uses to be protected along with the water quality objectives essential for that purpose. The Regional Board need not authorize the full utilization of the waste assimilation capacity of the groundwater (CWC section 13263(b)) but must consider other waste discharges and factors that affect that capacity.

The antidegradation directives of CWC section 13000 require that waters of the State that are better in quality than established water quality objectives be maintained "consistent with the maximum benefit to the people of the State." Waters can be of high quality for some constituents or beneficial uses and not others. Policies and procedures for complying with this directive are set forth in the Basin Plan (including by reference State Water Board Resolution No. 68-16, "Statement of Policy With Respect to Maintaining High Quality Waters in California," commonly referred to for convenience as Resolution 68-16 or as the "Antidegradation" Policy).

Resolution 68-16 establishes essentially a two-step process to comply with the policy. The first step is if a discharge will degrade high quality water, the discharge may be allowed if any change in water quality (a) will be consistent with maximum benefit to the people of the State, (b) will not unreasonably affect present and anticipated beneficial uses of such water, and (c) will not result in water quality less than that prescribed in State policies (e.g., water quality objectives in the Basin Plan). The second step is that any activities that result in discharges to such high quality waters are required to use the best practicable treatment and control (BPTC) of the discharge necessary to avoid a pollution or nuisance and to maintain the highest water quality consistent with the maximum benefit to the people of the State.

In authorizing waste discharges, the Regional Board evaluates each case to determine whether degradation should be allowed and then either proscribes or limits the degradation on a constituent-by-constituent basis to that which complies with Resolution 68-16. If allowing water quality degradation, the Regional Board must first find that the degradation is at least balanced by the benefit to the public of the activity creating the discharge and that the discharge is undergoing BPTC. To facilitate this process and protect their interests, dischargers must provide material and relevant technical information that fully characterizes:

- site-specific hydrogeologic conditions
- background quality of the receiving water
- background quality of other waters that may be affected by the discharge
- all waste constituents to be discharged
- waste treatment and control measures
- how treatment and control measures qualify as BPTC
- the extent that each waste constituent after BPTC will degrade the quality of the groundwater
- how the expected degradation compares to water quality objectives

- how the expected degradation is consistent with maximum public benefit

Water quality objectives

Water quality objectives (objectives) define the least stringent criteria that could apply as water quality limitations for groundwater at this location, except where natural background quality already exceeds the objective. When the Regional Board adopts objectives in the Basin Plan, it is required to comply with CWC section 13241, including consideration of economics. Section 13241 does not indicate how the Regional Board is to consider economics in its decisions or emphasize any one of the section 13241 factors over another. Regardless, section 13241 applies to the imposition of requirements only when the Regional Board is considering whether to impose groundwater limitations more stringent than an objective (see State Water Resources Control Board (SWRCB or State Board) Order WQ 95-4, slip op. page 5). Where a Basin Plan narrative objective exists, the Regional Board can quantify it by adopting a numeric effluent or receiving water limitation in WDRs that implements the narrative objective in accordance with the translation processes set forth in the Basin Plan. The factors in CWC section 13241 need not be re-evaluated in this process.

The objectives in the Basin Plan occur in numeric and narrative form. In issuing waste discharge requirements, the Regional Board must implement the Basin Plan, including all its objectives, but need not allow degradation to the objectives (CWC section 13263). Narrative objectives generally specify that groundwater shall not contain constituents (e.g., chemicals, pesticides, toxic substances, taste- and odor-producing substances) in concentrations that adversely affect beneficial uses. For some narrative objectives, the Basin Plan establishes minimum numerical objectives. Basin Plan numerical objectives are the concentration thresholds necessary for the reasonable protection of beneficial uses of the water. For example, the narrative objective for chemical constituents specifies that, as a minimum, groundwaters designated for municipal supply shall not exceed MCLs. Similar objectives exist for radioactivity and pesticides. Numeric objectives based on these MCLs are in Title 22, sections 64431 (Inorganic Chemicals, including Fluoride); 64443 (Radioactivity); 64444 (Organic Chemicals); and 64449 (Secondary MCLs – Consumer Acceptance Limits). Numeric objectives in the Basin Plan intended to assure protection of municipal supply also include total coliform of less than 2.2/100 mL and lead not to exceed 0.015 mg/L.

The Basin Plan objective for toxicity requires that the threshold numeric concentration be identified for each constituent to assure protection of every use. Beneficial uses exclude aquatic life in this instance as it is not a designated beneficial use of groundwater in the Basin Plan, but irrigation, animals, and municipal consumption can all be adversely affected if the concentration of a certain constituent is too high. For example, some crops experience specific-ion toxicity from boron, chloride, and sodium. Trace elements (heavy metals typically found in trace concentrations in background water quality and common in municipal waste with industrial and commercial contributors) can adversely affect beneficial uses if in elevated concentrations.

The translation procedure to follow in establishing numerical limitations in waste discharge requirements that will implement Basin Plan narrative objectives is described in pages IV-21 through IV-23 of the Basin Plan. The Regional Board must consider, among other things, information submitted

by a discharger and other interested parties and relevant numerical criteria and guidelines developed or published by other agencies and organizations on harmful concentrations of constituents.

Municipal wastewater contains numerous dissolved inorganic waste constituents (i.e., salts, minerals) that together comprise total dissolved solids (TDS). Not every constituent is critical to beneficial use. The cumulative impact from these other constituents, along with the cumulative affect of the constituents that are individually listed, can be effectively controlled using TDS as a generic indicator parameter. Most dissolved inorganic substances in water are in the ionized form and so contribute to a solution's ability to carry an electrical current, or its "electrical conductivity" (EC). EC varies both with the number and type of ions the solution contains and is strongly temperature dependent. It is standard practice to report a solution's EC at 25° Celsius (this value is technically called "specific conductance"). Only ions can carry a current, however. Un-ionized species of weak acids or bases will not carry a current, nor will uncharged soluble organic materials, such as ethyl alcohol and glucose, even though these constituents comprise a portion of TDS. Although EC is affected by the nature of the various ions, their relative concentrations, and ionic strength of the water, EC measurements can give a practical estimate of the variations in a solution's dissolved mineral content. An empirical factor may be developed from simultaneous measurements of TDS and EC over a period that thereafter allows for the rapid estimation of TDS from EC measurements.

Not all TDS constituents pass through the treatment process and soil profile in the same manner or rate. Chloride is one of several that pass through both to groundwater. As chloride concentrations in the high quality groundwaters in the basin are much lower than in treated municipal wastewater, chloride is one constituent that is likely to degrade groundwater if discharged at a higher concentration than in groundwater. As a conservative constituent not attenuated in the soil profile, it is a useful indicator parameter for evaluating discharge plumes in groundwater. Another TDS constituent that might reach groundwater is nitrate, but it may show a less direct relationship due to transformations and other forms.

Boron is a TDS constituent that may occur in wastewater in concentrations greater than groundwater depending on the source water, the extent residents use cleaning products containing boron, and the extent that industries that discharge to the sewerage system utilize boron (e.g., glass production, cosmetics).

Waste constituents unique to municipal waste that may reach groundwater include total and fecal coliform bacteria. Still other constituents in treated municipal waste that may pass through the treatment process and the soil profile include recalcitrant organic compounds (e.g., ethylene glycol, or antifreeze), radionuclides, and pharmaceuticals (e.g., endocrine disruptors). Hazardous compounds are not usually associated with domestic wastes and when present are reduced in the discharge to inconsequential concentrations through dilution with domestic waste, treatment, and the implementation of effective pretreatment programs.

A discharge of wastewater that overloads soils with nutrients and organics can result in anaerobic conditions in the soil profile, which in turn creates organic acids and decreases soil pH. Under conditions of low soil pH (i.e., below 5), iron and manganese compounds in the soil can solubilize and leach into groundwater. Discharge of residual sludge to land may also lead to increases in groundwater alkalinity and hardness to concentrations that impair the water's beneficial uses and contribute to an

overall increase in TDS. Overloading is preventable and does not constitute BPTC as used in Resolution 68-16. Elevated concentrations in groundwater compared to percolating effluent of dissolved iron and dissolved manganese, along with elevated alkalinity, and hardness are useful indicators to determine whether components of the WWTF with high-strength waste constituents, such as sludge handling facilities, are ineffective in containing waste.

Salinity adversely affects use by animals, humans, and plants, but generally plants are the most sensitive to increasing concentrations. Salinity affects the efficiency and feasibility of irrigation in a number of ways that could violate both the toxicity and chemical narrative objectives. Increasing TDS adversely affects the availability of water from soil for use by a crop, and an increasing sodium adsorption ratio (SAR), a unitless parameter that characterizes the predominance of sodium compared to calcium and magnesium, adversely affects infiltration of water and air into soil.

Specific ions of TDS, in particular sodium, chloride, and boron, can cause increasing severity of injury to certain crops as their concentrations increase. A number of factors are involved in determining the threshold numeric concentrations that implement the Basin Plan narrative objective for toxicity (e.g., particular crops in particular climates and for particular methods of irrigation). Crops can be more tolerant to concentrations of specific ions if there is little or no contact with the leaves. Sodium and boron do not work in this way in the lower ranges, but chloride does. If applied by sprinklers on the most sensitive crops, chloride must be less than 106 mg/L, but if applied by other means it may be as high as 175 mg/L without causing injury. Even so, *Water Quality for Agriculture* cautions that in areas of high temperature and low humidity (less than 30%) crops may be more sensitive due to higher foliar absorption. Specific crops are more sensitive than others to constituents, but in general trees, vines, and woody species are the most susceptible to injury. The less conservative concentrations cited by the *Agricultural Salinity Assessment and Management* were derived from the same source used by *Water Quality for Agriculture*, and both refer to criteria developed in 1974 by the University of California Committee of Consultants made available as guidelines by the University of California Cooperative Extension in 1975**.** The less conservative criteria attributed to the *Agricultural Salinity Assessment and Management* is also in *Water Quality for Agriculture* and applies to situations where the most sensitive types of crops are not grown and constraints on method and time of irrigation provide protection to crops.

The values in Table 5 reflect water quality objectives that must be met to maintain specific beneficial uses of groundwater. Unless natural background for a constituent proves higher, the groundwater limit established in the proposed Order must be the most stringent of the values listed for the constituent or the MCL listed in Title 22, whichever is most stringent.

TABLE 5
Groundwater Limitations

Constituent	Units	Value	Beneficial Use	Criteria or Justification
Ammonium ion as NH_4	mg/L	0.5	MUN[1]	Taste and Odor[2]
Nitrate-Nitrogen	mg/L	10	MUN[1]	Primary MCL[5]
Boron	mg/L	0.7	AGR[3]	Boron sensitivity[4]

Constituent	Units	Value	Beneficial Use	Criteria or Justification
Chloride	mg/L	106	AGR[3]	Chloride sensitivity on certain crops irrigated via sprinklers[4]
Conductivity (EC)	µmhos/cm	900	AGR[3]	Secondary MCL[5]
pH	pH Units	6.5 to 8.5	MUN	Secondary MCL[5]
Sodium	mg/L	69	AGR[3]	Sodium sensitivity on certain crops[4]
Total Dissolved Solids	mg/L	500	MUN[1]	Secondary MCL[5]

1 Municipal and domestic supply
2 United Kingdom Water Supply (Water Quality) Regulations 1989 (as amended...) for England and Wales)
3 Agricultural supply
4 Ayers, R. S. and D. W. Westcot, Water Quality for Agriculture, Food and Agriculture Organization of the United Nations – Irrigation and Drainage Paper No. 29, Rev. 1, Rome (1985)
5 Title 22, CCR, section 64449

Treatment Technology and Control

Given the character of municipal wastewater, secondary treatment technology had been thought generally sufficient to control degradation of groundwater from decomposable organic constituents. However, even secondary effluent percolated at sufficient rates can contain more organic carbon than can be oxidized by the residual oxygen in the effluent and soil profile.

Percolating effluent passes through progressively more oxygen-deficient conditions. Bacteria in the soil and effluent under these conditions utilize oxygen from nitrate (denitrification). Once nitrate is depleted, bacteria utilize oxygen from oxidized forms of soil manganese and iron. These are then transformed to soluble forms for which the Basin Plan prescribes numerical objectives. A discharge containing BOD_5 of less than 40 mg/L and dissolved iron and manganese far below objectives could lead to area groundwater containing these constituents in concentrations exceeding that prescribed by the Basin Plan (i.e., secondary MCLs). Treatment technology exists to achieve low effluent BOD_5 without filtration (e.g., sequencing batch reactor, oxidization ditch). Application of such technology also yields significant nitrogen removal (to below 5 mg/L). Technology used to remove nitrogen from municipal wastewater (e.g., sequencing batch reactor, oxidation ditch) generally also accomplishes significant BOD_5 removals as well (95 percent or more).

Municipal wastewater typically contains nitrogen in concentrations greater than objectives, which vary according to the form of nitrogen. The Basin Plan lists numerical objectives for nitrate and nitrite (Title 22, CCR, section 64449, Table 64449-A). The taste threshold for ammonium (ammonia and ammonium ions as NH_4) in drinking water is 0.5 mg/L, according to the United Kingdom's Water Supply (Water Quality) Regulations 1989 (as amended...) for England and Wales. Degradation by nitrogen in a municipal discharge can be controlled by an appropriate secondary treatment system (e.g., oxidation ditch), tertiary treatment for nitrogen reduction, and agronomic reuse on crops that are

harvested. The effectiveness varies, but generally BPTC measures should be able to limit nitrogen (including ammonia) degradation to a concentration well below Basin Plan objectives.

The majority of ions that compose salinity waste constituents pass through the secondary treatment process and soil profile and effective control of their long-term effects typically relies upon effective residential and industrial source control and pretreatment measures. In areas of high quality groundwater and areas where salinity objectives are exceeded despite current source control measures, evaluation of BPTC will require, at a minimum, a review of residential, commercial and industrial use of water softeners; industrial treatment and control technology; and consideration of local discharge salinity limits for significant industrial dischargers of high EC waste streams. Unless groundwater quality already contains saline waste constituents in greater concentration than the effluent, the Regional Board and Basin Plan recognize that long-term land discharge of treated municipal wastewater will cause some degradation of groundwater from salt (as measured by TDS and EC) and the individual component ions of salts (e.g., sodium, chloride).

Treatment of trace elements (for protection of groundwater, wastewater recycling, and biosolids reuse) is generally achieved through source control, but if this proves insufficient to be found consistent with Resolution 68-16, technology is available and will need to be evaluated with respect to providing BPTC.

Title 27

Title 27, CCR, section 20005 et seq. (Title 27), contains regulations to address certain discharges to land. Title 27 establishes a waste classification system, specifies siting and construction standards for full containment of classified waste, requires extensive monitoring of groundwater and the unsaturated zone for any indication of failure of containment, and specifies closure and post-closure maintenance requirements. Generally, no degradation of groundwater quality by any waste constituent in a classified waste is acceptable under Title 27 regulations.

Discharges of domestic sewage and treated effluent can be treated and controlled to a degree that will not result in unreasonable degradation of groundwater. For this reason, they have been conditionally exempted from Title 27. Treatment and storage facilities for sludge that are part of the WWTF are considered exempt from Title 27 under section 20090(a), provided that the facilities not result in a violation of any water quality objective. However, residual sludge (for the purposes of the proposed Order, sludge that will not be subjected to further treatment by the WWTF) is not exempt from Title 27. Solid waste (e.g., grit and screenings) that results from treatment of domestic sewage and industrial waste also is not exempt from Title 27. This residual sludge and solid waste are subject to the provisions of Title 27.

Accordingly, the municipal discharge of effluent and the operation of treatment or storage facilities associated with a municipal wastewater treatment plant can be allowed without requiring compliance with Title 27, but only if resulting degradation of groundwater is in accordance with the Basin Plan. This means, among other things, that degradation of groundwater must be consistent with Resolution 68-16 and in no case greater than water quality objectives.

CEQA

On 7 August 2001, the Tulare City Council certified an environmental impact report (EIR) for an expansion in WWTF treatment and disposal capacity in accordance with the California Environmental Quality Act (CEQA) (Public Resources Code section 21000 et seq.) and the State CEQA Guidelines. Since 1993, the City has circulated and certified several different environmental documents regarding changes to the WWTT. These are discussed below.

Program EIR. On 7 December 1993, the Tulare City Council adopted Resolution No. 3959, which certified an EIR for an amended General Plan, *Land Use and Circulation Elements of the City of Tulare General Plan* (hereafter Program EIR), in accordance with CEQA and the State CEQA Guidelines. The General Plan was to revise and update the City's General Plan in response to changing development trends in the City's sphere of influence. The Program EIR identifies the potential environmental impacts as a result of anticipated growth and change through the year 2005. It describes the City's need to expand its domestic and industrial sewage capacity and indicates that the City needs to expand its Domestic WWTT in the next two to five years to accommodate future growth beyond 2005. The General Plan concludes that failure to expand the Domestic WWTT and associated sewer collection system would result in potential adverse significant environmental impacts. The Program EIR also describes that the existing (during 1993) Industrial WWTT would meet the demands of future industrial growth through 2005 resulting in no environmental impacts, with the contingency that if flows to the Domestic WWTT were diverted to the Industrial WWTT and cause it to exceed capacity by 2005, this would result in potential significant adverse environmental impact. The Program EIR offered only one measure to mitigate the potential significant environmental impact resulting from the General Plan's proposal to increase Domestic WWTT treatment capacity, namely to increase sewer connection fees to provide adequate funds for future projects.

Domestic WWTT. On 16 November 1995, the Tulare City Council adopted Resolution No. 95-480, which determined that the City's Domestic WWTT expansion project, from 4.0 to 8.0 mgd, was within the scope of the Program EIR.

Tulare Cheese Plant Expansion. Land O'Lakes and other project proponents jointly proposed to open an additional cheese processing plant (Cheese Plant) that is expected to discharge 1.1 – 1.7 mgd to the Industrial WWTT. In September 2000, the Discharger circulated a draft mitigated negative declaration (MND) for the proposed Cheese Plant. The MND described the proposed Cheese Plant and attempted to address potential environmental impacts by recommending mitigation measures. The MND included a mitigation measure that called for the City to coordinate with Land O'Lakes management until the City accepted the Cheese Plant's discharge. The City adopted the MND for the new Cheese Plant on 2 October 2002. By letter dated 4 October 2000 commenting on the MND, Regional Board staff indicated that the MND should explicitly state that the City (1) is in violation of WDRs Order No. 91-133 for exceeding Industrial WWTT discharge flow limitations and (2) lacks the treatment and disposal capacity to accommodate additional industrial flows. Increased flow will exacerbate an existing condition of noncompliance. In effect, the Cheese Plant, as proposed, would constitute a significant adverse impact. In May 2002, the Cheese Plant began discharging 0.5 mgd of industrial wastewater to the Industrial WWTT and was officially opened in July 2002.

Industrial WWTT Negative Declarations. On 2 October 2000 and 25 October 2000, the City initially circulated two different MNDs for an expansion of Industrial WWTT treatment capacity to 8.0 mgd. By letters dated 26 October and 1 December 2000, Regional Board staff commented that there was substantial evidence that the proposed project may have a significant adverse effect on water quality, and recommended the City prepare an EIR pursuant to section 21082.2(d) of the Public Resources Code. The City then circulated on two more MNDs that were different from the last submittals. The first MND, dated 5 January 2001, indicated that the City intended to prepare an EIR but in a second MND submittal, dated 24 January 2001, was unclear and internally contradictory, and indicated that the City had reversed its previous decision and intended not to proceed with an EIR. The accompanying Environmental Assessment indicated no potential environmental impacts for every evaluated category. By 21 February 2001 letter, Regional Board staff reiterated the City's responsibility under CEQA to prepare an EIR for the proposed project.

WWTF EIR. In June 2001, the City submitted *Final Environmental Impact Report* (EIR) for expanding its WWTF. The draft EIR described the proposed expansion of the WWTF and its possible environmental impacts. The EIR did not identify mitigation measures that will completely address the proposed project's significant adverse impacts to groundwater quality and concluded that the impacts were unmitigable. By letter dated 30 July 2001, Regional Board staff recommended that the City reconsider the EIR's analysis of groundwater impacts and disclose, in detail, how the impacts of the expansion project will be mitigated. As a result, the City adopted Resolution No. 01-4784 on 7 August 2001, which certified a revised EIR that cited the EIR in accordance with the CEQA (Public Resources Code Section 21000, et seq.). The City found the EIR adequate, using overriding considerations for groundwater degradation that cite increased employment and housing, and an increased tax base to support redevelopment within the city.

To address groundwater impacts, the City adopted the following mitigation measures ***with qualifications***:

"1. Upon completion of the Project, City shall not release or discharge any waste constituent, or place where it will be released or discharged, in a concentration or mass that causes violations or groundwater limitations.

2. As a means of providing for mitigation measure above, the City shall in conjunction with the oversight and certification by a California registered civil engineer, and within a reasonable period of time given costs, practicality and needs:

   a. Modify sludge treatment and storage areas to reduce permeabilities to 10^{-6} cm/sec or less;

   b. Line the first pond (Cell 1) of all industrial treatment trains with gunite ("shotcrete"); and

   c. Construct (or modify if already constructed) industrial treatment trains' cells 2 through 4 in a manner that allows no more than one (1) foot wastewater per year to percolate to underlying groundwater;

Provided however that City reserves the right to provide for alternative mitigation measures, subject to supplemental environmental assessment and report if necessary, should City deem such alternatives environmentally equally or more beneficial and more cost effective.

3. If economically and practically feasible and if other measures cannot assure compliance with water quality objects, City shall apply effluent to percolation ponds intermittently to achieve biological nitrogen removal in the upper soil profile.

4. To the extent economically feasible and practical, City shall apply wastewater, sludge and commercial fertilizer to [Regional Board]-approved use areas at reasonable agronomic rates considering the crops, soil, climate, and irrigation management system in accordance with a [Regional Board]-approved use area management plan.

5. Within a reasonable period of time, City shall implement a pretreatment program component that prescribes an EC limitation of 950 μmhos/cm for industrial discharges and that precludes compliance by means of diluting with fresh water.

6. If bacterial contamination of any domestic well probably effected by the City's wastewater treatment and disposal facilities occurs, the City will drill a replacement well supplying non-degraded water from a deeper aquifer.

7. The City will, upon the issuance of tentative Waste Discharge Requirements for the project by the [Regional Board], prepare a Facilities Plan Amendment incorporating the detailed steps and recommendations outlined in the consultant's Nitrogen Mitigation program, implementing the viable options on a time table established by the Regional Water Quality Control Board. Such Amendment will consider and evaluate any required and effective mitigation measures for domestic wellwater nitrate degradation.

8. The City will install and operate an Aquifer Storage and Recovery (ASR) wellfield to mitigate further spread of the plume."

In reviewing the factual situation and the above documents, Regional Board staff concludes that these CEQA documents were incorrect and that continued discharge in the present and proposed manner will further degrade and pollute groundwater and that these documents (e.g., Program EIR, Resolution No. 95-480 (Domestic WWTF), and WWTF EIR) do not mitigate groundwater quality impacts from the WWTF, specifically the groundwater nitrogen pollution as a result of the discharge. Regional Board staff also concludes that the CEQA documents and the proposed mitigation measures described in above documents are appropriate but insufficiently protective with respect to mitigating groundwater quality impacts. Given the extant situation, an accompanying enforcement order with terms and conditions to enforce mitigation measures is appropriate and necessary.

PROPOSED ORDER TERMS AND CONDITIONS
Phased Approach

This discharge of effluent from the City's WWTF to ponds and use areas has been occurring for years. Certain waste constituents in municipal wastewater are not fully amenable to waste treatment and

control and it is reasonable to expect some impact on groundwater. The Regional Board cannot yet determine whether to allow any, and if so, how much degradation, due to incomplete data and incomplete evaluation of treatment and control measures. Groundwater monitoring data at this site is insufficient to establish the most appropriate numeric receiving water limitations.

Reasonable time is necessary to gather specific information about the facility and the site to make informed decisions on appropriate, long-term conditions of discharge. In October 2000, the Regional Board concurred with a two-phased approach to determining long-term conditions of discharge that fully implement the Antidegradation Policy for municipal discharges to land. In general, Phase 1 sets forth schedules and tasks to gather the information necessary to assure long-term requirements for discharge assure consistency with all water quality policies. Phase 1 is represented by the proposed order. Phase 2 will be determined by the outcome of Phase 1 and formalized in a subsequent WDRs order. The Phase 2

WDR will set specific effluent and groundwater limitations derived from information obtained in Phase 1, and establish a schedule for whatever tasks are necessary to assure compliance with the new limitations.

If a municipal discharger is in noncompliance with certain conditions of discharge pertaining to BPTC and groundwater degradation, the Phase 1 WDRs may define the process to resolve the noncompliance. Where clearly substandard practices that violate existing WDRs have caused pollution, enforcement action in conjunction with the phased approach is appropriate. That is the case with Tulare. For Phase 2 WDRs, the Discharger should be prepared to justify that it has implemented (or will implement) BPTC measures and propose that the Regional Board consider site-specific groundwater limitations that comply with Resolution 68-16. Where investigation, abatement, and cleanup of unauthorized discharges is necessary in accord with Resolution 92-49, the Discharger must perform the required work on schedule with Phase 1 to consider ultimate resolution of the matter in conjunction with decisions to be made at the on-set of Phase 2.

This proposed Order, therefore, represents Phase 1 for the Discharger. It establishes receiving water limitations that (a) temporarily and conditionally allow use of the full assimilative capacity of the aquifer affected by the discharge and (b) do not authorize impairment of the beneficial uses of groundwater pending the completion of specific tasks. During Phase 1, degradation may occur from certain constituents, but can never exceed water quality objectives (or background water quality should it exceed the objectives) or cause nuisance.

The proposed Order requires the Discharger to conduct a BPTC evaluation of the discharge (including source control, pretreatment, treatment, and disposal). Specifically, it provides time schedules to complete specific tasks that require the Discharger to identify, implement, and adhere to BPTC and to review its present practices and upgrade as necessary. It requires that the Discharger conduct studies to identify groundwater quality limitations representative of degradation caused by full implementation of BPTC, and recommend means of monitoring and measuring compliance with BPTC and groundwater limitations.

Once it completes its BPTC evaluation in Phase 1, the Discharger shall propose for Regional Board consideration specific numeric groundwater quality limitations appropriate for this situation and with full consideration of Basin Plan concepts. Certain groundwater quality limitations may be more or less stringent than the numeric receiving water limitations in the proposed Order. The burden, however, is on the Discharger. If seeking less stringent alternative limitations for salt constituents, for example, the Discharger must contact land use and agricultural agencies and organizations knowledgeable about cropping patterns within the area affected by the discharge and obtain documentation on what crops are grown and have the potential to be grown in the area. Until this comprehensive effort is completed, staff's preliminary research and review of land use maps prepared by DWR indicate that the discharge area supports the production of crops sensitive to boron (e.g., grapes and beans) and crops sensitive to sodium and chloride (e.g., beans, corn, alfalfa, grapes and cotton). These crops fall within the sensitive categories, but not the most sensitive, and require stringent protection thresholds unless, for chloride, it can be established that sprinkler irrigation is not practiced and will not be practiced. The objective is not to suggest that the reference sources do not contain recommendations to counter damaging affects, such as not irrigating with sprinklers and not at mid-day, should there be no choice as to available water quality.

In considering the Phase 2 WDRs, the Regional Board will evaluate the Discharger's justification of BPTC implementation and its proposed groundwater limitations. It is possible upon further documentation and analysis that the discharge may be found not to be causing degradation from certain waste constituents.

Discharge Prohibitions, Specifications and Provisions

To mitigate the discharges impacts on groundwater as a result of the WWTF Expansion Project and to implement water quality plans and policies, the Regional Board should include the following terms and conditions in the proposed Order. Table 6 lists significant terms and conditions and along with a brief statement (in italics) of justification.

TABLE 6
Proposed Conditions of Discharge

Specification	Description
Discharge Prohibition A.4	Proscribes the burial of animal carcasses within the WWTF and Use Area and Clarklind use area (*ensures the City will not use the WWTF as an unpermitted disposal site for animal carcasses*).
Domestic Discharge Specifications C.1.a and C.1.b	The average monthly Domestic WWTT discharge flow shall not exceed 5.0 mgd until the Discharger has sufficient capacity to disposal of an incremental flow increase to 6.0 mgd *(reflects the Domestic WWTT expansion flow increase from 5.0 mgd to 6.0 mgd).*

Specification	Description
Domestic Discharge Specification C.2	The monthly average daily influent bypass flow to the Domestic WWTT from the Industrial WWTT (untreated and partially-treated wastewater) shall not exceed 0.39 mgd *(reflects a bypass flow that will not disrupt treatment at the Domestic WWTT, according to the Discharger).*
Domestic Discharge Specifications C.3 and C.4	The monthly average BOD_5/TSS concentrations and the settleable solids cannot exceed 40 mg/L and 0.2 mL/L, respectively. The monthly average minimum organic removal efficiency of at least 80 percent for BOD_5/TSS *(reflects the Basin Plan's requirement that municipal facilities designed to discharge greater than 1 mgd provide 80 percent removal efficiency or reduction to a concentration of 40 mg/L, whichever is more restrictive, of both BOD_5 and TSS. The Domestic WWTT can currently meet these requirements).*
Industrial Discharge Specifications D.1.a through D.1.c.	The average monthly Industrial WWTT flow shall not exceed 4.39 mgd until the Discharger has sufficient capacity to treat a maximum flow of 8.0 mgd *(reflects the Industrial WWTT current influent flow (4.39 mgd) allowed by Order No. 91-133 until such a time that the Discharger ensures adequate treatment and disposal capacity by complying with Provisions J.11 and J.12).*
Commingled Discharge Specifications E.1 and E.2	The monthly average BOD_5 and $CBOD_5$ concentrations cannot exceed 40 mg/L and 35 mg/L, respectively. Compliance may be determined using either BOD_5 or $CBOD_5$ *(reflects WDRs Order No. 91-133 discharge specifications until the Discharger implements modifications to ensure consistent compliance with Basin Plan minimum secondary treatment performance standards).*
Industrial Discharge Specifications C.2 and C.3.	Effective 1 November 2009, the monthly average BOD_5/TSS concentrations and the settleable solids cannot exceed 40 mg/L and 0.2 mL/L, respectively. The monthly average minimum organic removal efficiency of at least 80 percent (*reflects the Basin Plan's general requirement that industrial facilities should be subject to the same discharge specifications as municipal facilities – i.e., secondary treatment performance standards; discharge from the Industrial WWTT does not currently meet these minimum performance standards).*

Specification	Description
Commingled Discharge Specification E.2	The EC of the discharge cannot exceed 500 µmhos/cm over source water or 1,000 µmhos/cm, or the concentration that ensures compliance with this Order's groundwater limitations, whichever is more stringent (*partly reflects the Discharger's existing Order's effluent EC specifications and ensures compliance with proposed Order's groundwater limitations).*

The Discharger intends to upgrade the Industrial WWTT to meet the Basin Plan's minimum performance standards but objects to separate requirements for the Domestic and Industrial WWTTs. The Discharger indicates that this will make it more susceptible to violations and enforcement. It contends that enforcement of the discharge quality specifications can appropriately be limited to the quality of water leaving the WWTF and prefers to maintain the current Order's regulation of Domestic discharge and Commingled discharge quality. Dilution by mixing a higher quality wastewater with an inadequately treated wastewater, as technically allowed by WDRs Order No. 91-133, allows less than optimum treatment by the Industrial WWTF. The Domestic WWTT is currently operating at half its rated hydraulic capacity. The ongoing Industrial WWTT retrofits and expansions are designed to meet the Commingled discharge specifications of Order No. 91-133. Violations of Commingled discharge specifications have been largely attributable to poor treatment performance of the Industrial WWTT. From January 1999 through May 2002, the Discharger violated Commingled discharge limitations in 21 out of 29 months, on occasion reaching concentrations 10 times greater than allowed and monthly daily averages of about 500 and 415 mg/L, respectively. It is inconsistent with water quality policies to allow optimal Domestic WWTT performance accommodate less than optimal performance of the Industrial WWTT. Staff recommends the Regional Board establish separate treatment performance specifications to the Industrial discharge, in part, to ensure the WWTF discharge meets secondary standards.

General Discharge Specifications and Provisions

The discharge specifications in the proposed Order regarding dissolved oxygen and freeboard would be consistent with Regional Board policy for the prevention of nuisance conditions, and are applied to all such facilities.

The proposed Order requires the Discharger to comply with the provisions of Title 22. To ensure compliance with Title 22 and Regional Board recycling policies, the proposed Order requires the Discharger to implement best management practices with respect to effluent reuse (e.g., to reuse effluent at reasonable agronomic rates considering the crop, soil, climate, and irrigation management plan). To this end, the proposed Order requires the Discharger to submit a use area management plan.

The conditions for sludge, solid waste, and biosolids management proposed in the proposed Order assures that degradation resulting from the City's management of sludge is in accordance with the Basin Plan. To this end, the proposed Order requires the Discharger to submit a technical report describing its sludge management plan. It also requires that storage, use and disposal of biosolids comply with the self-

implementing federal regulations of Title 40, Code of Federal Regulations (CFR) Part 503, which are subject to enforcement by the U. S. Environmental Protection Agency not the Regional Board, and with the statewide "General Order for the Discharge of Biosolids" (Water Quality Order No. 2000-10-DWQ) (or any subsequent document which replaces Order No. 2000-10-DWQ).

Groundwater limitations in Order No. 91-133 stipulate that the discharge, in combination with other sources, shall not cause underlying groundwater to contain waste constituents in concentrations greater than background water quality, except for EC. It also allows for an incremental increase in EC over a five-year period of not exceeding 15 µmhos/cm. The Discharger has not characterized background water quality. However, due to the location of the WWTF (at the eastern fringe of the San Joaquin Valley), the mineral quality of background groundwater is expected to be of high quality (i.e., concentrations of mineral constituents in groundwater are below water quality objectives).

The proposed Order prescribes groundwater limitations that specify that the discharge not cause or contribute to exceedances of Basin Plan water quality objectives or natural background water quality, whichever is most stringent. In effect, where upgradient water quality already exceeds an objective due to reasons other than natural background water quality, the Discharger will not be held accountable for contributing a violation unless the quality of the discharge also exceeds the objective. For certain waste constituents where sufficient data is available, the proposed Order prescribes numeric limitations derived from the narrative objective as described herein. The Phase 1 process will lead to more appropriate site-specific numeric groundwater limitations, but for the proposed Order, the Regional Board must implement objectives derived primarily from the published documents of other agencies and organizations. Since the proposed Order implements existing objectives, the Regional Board need not undertake further consideration of the factors in CWC section 13241 (including economic considerations). The proposed Order's groundwater limitations reflect numerical water quality objectives either directly from the Basin Plan (e.g., drinking water MCLs) or translate narrative objectives using the procedures prescribed by the Basin Plan. Groundwater limitations that would be prescribed by the proposed Order are:

> Groundwater Limitation I.1, total coliform organism limitation of 2.2 MPN/100 mL, is based on the Basin Plan's objective for bacteria (i.e., the concentration of TCO over any 7-day period shall be less than 2.2 MPN/100 mL) but rephrased to allow for reduced monitoring requirements.
>
> Groundwater Limitation I.2 implements the Basin Plan's narrative objective for chemical constituents. The value for total nitrogen of 10 mg/L in Groundwater Limitation I.2.a ensures that groundwater nitrate levels remains at or below the Title 22 primary drinking water MCL for nitrate (45 mg/L as nitrate or 10 mg/L as N). The values for EC and for TDS in Groundwater Limitation I.2.a ensure that groundwater salinity levels remains at or below that necessary to sustain agricultural beneficial use. The values for chemical constituents prescribed in Groundwater Limitation I.2.b reflect the Title 22 drinking water MCLs (with the exception of chloride, EC, and TDS). The allowable degradation for Title 22 constituents is limited to those constituents known to exist in the discharge. Groundwater Limitation I.2.c implements the Basin Plan's narrative objective for toxicity and establishes numerical limitations for boron, chloride,

> and sodium to ensure that groundwater concentrations of these constituents will remain at or below that necessary to sustain agricultural beneficial use. Groundwater Limitation I.2.d implements the Basin Plan's narrative objective for taste- and odor-producing substances, and establishes a numerical receiving water limitation for ammonium (ammonia and ammonium ions as NH_4) to ensure groundwater ammonia levels will remain at or below that necessary to protect domestic and municipal uses.

The proposed Order requires the Discharger to implement best practicable treatment and control for the subject wastewater and the Discharger must also ensure that the discharge does not create a condition of nuisance and maintain the highest water quality.

The proposed Order requires the Discharger to submit numerous technical reports that are subject to Executive Officer approval. These include technical reports that:

- characterizes the discharge for constituents identified in Title 22 (as described in Finding No. 73)
- characterizes the Discharger's grease trap waste handling procedures and their potential impact to WWTF treatment unit performance
- describes the Discharger's sludge management plan
- describes the Discharger's Use Area management plan
- certifies various stages of WWTF expansion completion
- evaluates the Discharger's existing groundwater monitoring network and proposes network modifications
- describes a comprehensive work plan to evaluate the WWTF from source control to effluent disposal to determine the extent to which it reflects best practicable treatment and control (BPTC)
- describes a comprehensive BPTC evaluation of the WWTF and its discharges to land

The Basin Plan incorporates a State Board policy (Resolution 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304) that addresses procedural requirements for investigation as well as cleanup and abatement of unauthorized discharges. A discharger shall be required to conduct step-by-step investigations for this purpose, to submit written workplans and reports for all elements and phases, to conform to the provisions of Resolution 68-16, and to cleanup and abate the effects of the discharge in a manner that promotes attainment of background water quality or the highest water quality that is reasonable and which does not exceed water quality objectives. As the Discharger's unauthorized discharges of certain waste constituents have caused exceedances of water quality objectives and as Resolution 92-49 requires restoration of affected groundwater to water quality objectives if not background water quality, investigation, cleanup, and abatement are inextricably linked to determination of the degree of degradation consistent with BPTC.

Monitoring Requirements

Section 13267 of the CWC authorizes the Regional Board to require monitoring and technical reports as necessary to investigate the impact of a waste discharge on waters of the state. In recent years there has been increased emphasis on obtaining all necessary information, assuring the information is timely as well as representative and accurate, and thereby improving accountability of any discharger for meeting the conditions of discharge. Section 13268 of the CWC authorizes assessment civil administrative liability where appropriate.

The proposed Order requires influent and effluent monitoring for both the Domestic and Industrial WWTTs, and monitoring of BVF performance. Tables 7 and 8 indicate what monitoring is required by Order No. 91-133 (in italics) compared with required by the proposed Order (in bold).

TABLE 7
Monitoring Frequencies for Conventional Pollutants

	Flow	COD	BOD_5	TSS	EC	pH
Domestic WWTT						
Influent	*C*[1]	--	*1/Month*	*1/Month*	--	*1/Day*
	C	**--**	**2/Week**	**2/Week**	**1/Day**	**1/Day**
Industrial WWTT						
Influent	*C*	--	*1/Month*	*1/Month*	--	*1/Day*
	C	**2/Week**	**2/Week**	**2/Week**	**1/Day**	**1/Day**
BVF Effluent	--	--	--	--	--	--
	C	**--**	**1/Week**	**1/Week**	**1/Day**	**1/Day**
Effluent	--	--	--	--	--	--
	C	**--**	**2/Week**	**2/Week**	**1/Day**	**2/Day**

[1] Continuous sampling

TABLE 8
Monitoring Frequencies for Other Waste Constituents

	Nitrogen Compounds[1]	General Minerals	Metals	Oil and Grease	Title 22 Constituents[2]	Priority Pollutants
Domestic WWTT						
Influent	--	--	--	--	--	--
	--	--	--	**2/Month**	--	--

	Nitrogen Compounds[1]	General Minerals	Metals	Oil and Grease	Title 22 Constituents[2]	Priority Pollutants
	--	--	--	--	--	
Effluent	**2/Month**	**As performed**	**As performed**	**2/Month**	--	--
Industrial WWTT						
	--	--	--	--	--	--
Influent	**1/Week**	--	--	**2/Month[3]**	--	--
	--	--	--	--	--	--
BVF Effluent	**1/Week**	--	--	**2/Month[3]**	--	--
	--	--	--		--	
Effluent	**1/Week1/Week**	**As performed**	**As performed**		**1/Year**	
Commingled discharge	*1/Month*	--	--		--	
		1/Quarter	**2/Year**		**1/Quarter**	**2/Year**
Groundwater	*1/Quarter[4]*	*1/Year*	--	--	--	
	1/Quarter[1]	**1/Quarter**	**1/Quarter[5]**	--	**1/Quarter[5]**	**1/Quarter[5]**

1 Includes nitrate, total kjeldahl nitrogen (TKN), total nitrogen and ammonia

2 Title 22 constituents, as used here, refer to constituents identified in the technical report submitted pursuant to Provision J.7.

3 Commencing after three months of 2/week monitoring, subject to Executive Officer approval

4 Includes nitrate (as N)

5 Quarterly for the first year, yearly thereafter on selected wells

The addition of the total suspended solids monitoring of the Industrial WWTT effluent will enable a quick determination of the efficiency of each treatment process and compliance with the Basin Plan's minimum treatment performance standards. The addition of effluent TDS and ammonia monitoring is to develop a more accurate characterization of the discharge and its impact on groundwater. The proposed Order requires monitoring of Commingled discharge for general minerals, metals, and priority pollutants. If the Discharger finds elevated concentrations of these constituents in the Commingled discharge, it may analyze for these constituents the Domestic discharge and the Industrial discharge, in which case, the Discharger shall report the values in monthly monitoring reports.

The current and proposed Orders require the Discharger to monitor freeboard available and dissolved oxygen content weekly to monitor ponds for capacity constraints and potential nuisance conditions.

The proposed Order requires the Discharger to monitor sludge at least annually but would require the frequency of monitoring to increase when more than 290 ton of dry solids are produced within a year, in accordance with EPA's *POTW Sludge Sampling And Analysis Guidance Document, August 1989*, and

test for arsenic, cadmium, molybdenum, copper, lead, mercury, nickel, selenium, and zinc. The proposed Order requires the Discharger to submit an annual summary of sludge discharge operations.

The Title 27 zero leakage protection strategy relies heavily on extensive groundwater and unsaturated zone monitoring to increase a discharger's awareness of, and accountability for, compliance with the prescriptive and performance standards. With a high volume, concentrated, uncontained discharge to land, monitoring takes on even greater importance. The proposed Order includes monitoring of applied wastewater quality, application rates, and groundwater.

The proposed Order requires installation of an effective monitoring network that includes monitoring points represented by wells forming a vertical line that extends from the soil surface into the uppermost layer of water in the uppermost aquifer. One or more wells would monitor the quality of groundwater unaffected by the discharge and serve as 'background.' Other monitoring wells would be for determining compliance with the proposed Order's groundwater limitations.

The proposed Order requires the Discharger to monitor groundwater for constituents present in the discharge that are capable of reaching groundwater and violating groundwater limitations if its treatment and control, and any dependency of the process on sustained environmental attenuation, proves inadequate. As some groundwater limitations are based on background water quality, it is essential that the Discharger install wells in a location that can provide groundwater quality representative of the discharge area but unaffected by both the discharge and other waste sources. The proposed Order requires the Discharger to install such well(s) and characterize background water quality over a one-year period of quarterly groundwater sampling events. The Discharger has indicated past difficulty in installing a properly-sited background well. Owners of private property upgradient from the WWTF have refused the City access to their land. All public right-of-ways upgradient from the WWTF are adjacent to surface water canals that make installation of a well in a public right-of-way inappropriate. To comply with the requirement to install a background well, the Discharger will likely have to purchase property in a suitable location upgradient from the WWTF. To reduce costs, monitoring of groundwater for Title 22 constituents will be limited to wells selected in concurrence with Regional Board staff that are representative of groundwater reflecting the greatest impact from the WWTF and its discharges.

Reopener

The conditions of discharge in the proposed Order were developed based on currently available technical information and applicable water quality laws, regulations, policies, and plans, and are intended to assure conformance with them. However, information is presently insufficient to develop final effluent and groundwater limitations, so the proposed Order sets limitations for the interim while site-specific, constituent-specific limits are developed in conjunction with a BPTC evaluation, including source control and pretreatment, and with investigation, abatement, and cleanup of effluent for unauthorized discharges. Additional information must be developed and documented by the Discharger as required by schedules set forth in the proposed Order. As this additional information is obtained, decisions will be made concerning the best means of assuring the highest water quality possible that could involve substantial cost. It may be appropriate to reopen the Order if applicable laws and regulations change, but the mere possibility that such laws and regulations may change is not sufficient

basis for reopening the Order. The CWC requires that waste discharge requirements implement all applicable requirements.

Proposed Enforcement Order

The degradation of groundwater described above has resulted in pollution. Influent to the Industrial WWTT exceeds design capacity. The City's industrial pretreatment program has not been approved by the Regional Board and has proven ineffective. The City does not have adequate effluent disposal capacity. Given the situation, enforcement is analyzed separately and should be considered to ensure:

- **Adequate treatment at the Industrial and Domestic WWTTs**
- **Compliance with the monthly average daily influent flow limit to the Industrial WWTT**
- **Complete projects to reduce or eliminate high volumes of pollutant-free waters that interfere with Industrial WWTT performance and evaluate and certify their effectiveness**
- **Adequate effluent disposal capacity**
- **Elimination of the discharge of pollutants to groundwater that cause violations of the proposed groundwater limitations from the discharge of high strength industrial wastewater into the treatment trains**
- **Elimination of the discharge of sludge/biosolids in a manner that cause waste constituents to unreasonably degrade groundwater**
- **An effective salinity source control program**
- **An effective pretreatment program**
- **Investigation of the distribution of waste constituents in groundwater that exceed water quality limitations, as well as in the overlying soil column**
- **Evaluate alternatives to cleanup groundwater that is in excess of water quality objectives**

A separate staff report and chronology accompanies the proposed enforcement Order.

ARP/JLK:10/18/02