CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. 5-01-153

WASTE DISCHARGE REQUIREMENTS
FOR
CITY OF HANFORD
WASTEWATER TREATMENT FACILITY
KINGS COUNTY

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

1. The City of Hanford (hereafter 'City' or 'Discharger') owns and operates a wastewater treatment facility ('WWTF' or 'Facility') that provides municipal and industrial sewerage service for the City. The WWTF is about two miles south of the City in section 12, T19S, R22E, MDB&M, and bounded on the north by Houston Avenue, on the west by 11th Avenue, on the south by Iona Avenue, and on the east by the AT&SF Railroad, as shown in Attachment A, a part of this Order.

2. Waste Discharge Requirements (WDRs) Order No. 91-164 currently prescribes the terms and conditions for the discharge of 4 million gallons per day (mgd) disinfected secondary-treated wastewater to the WWTF's storage ponds, and recycling of effluent on farmland along the western portion of the WWTF property boundary. While some effluent disposal occurs via evaporation and percolation, most effluent is currently reused on nearby farmland under two Board-adopted Master Reclamation Permits: WDRs Order No. 5-00-222 for Lakeside Ditch Company and the City and WDRs Order No. 5-00-223 for the City.

3. In March 1992, the Discharger submitted a complete Report of Waste Discharge (RWD) in support of an increase in permitted discharge flow from 4.0 to 5.5 mgd. On 9 June 1992, the Discharger certified a Mitigated Negative Declaration for the 1993 WWTF expansion project in accordance with the California Environmental Quality Act (CEQA) (Public Resources Code section 21000 et seq.) and State CEQA Guidelines. Revised WDRs reflecting the increase have not been prepared for Board consideration. In the absence of revised WDRs, and as allowed by section 13264(2)(d) of the California Water Code, the Discharger initiated the increase in discharge flow as proposed in its March 1992 RWD.

4. The Discharger submitted a second RWD, dated 24 November 1999, in support of an increase in discharge flow from 5.5 to 8.0 mgd. The Discharger submitted the following supporting documents to complete the RWD: (a) *Recycled Water Engineering Report* (including Addendum Nos. 1, 2, and 3), (b) 29 February 2000 letter that addressed deficiencies in the RWD, and (c) *Wastewater Treatment and Disposal Engineering Report* (revised April 2000).

5. Order No. 91-164 does not reflect the current WWTF or the Discharger's past and proposed discharge flow increases. The purpose of this Order is to rescind Order No. 91-164 and update waste discharge requirements, in part, to (1) ensure the discharge is consistent with Board plans and policies, (2) prescribe requirements that are effective in protecting existing and potential beneficial uses of receiving waters, and (3) establish conditions as necessary to authorize the Discharger's request for an increase in discharge flow.

6. Existing Facility. The Discharger's 5.5-mgd-capacity WWTF includes headworks, primary clarifiers (2), primary trickling filters (2), secondary trickling filters (2), and secondary clarifiers (2). Effluent is disinfected in a chlorine contact basin via a gaseous chlorination system, discharged to an effluent equalization basin prior to final discharge to 77 acres of effluent storage ponds (8). Sludge is thickened in a dissolved air flotation (DAF) unit, stabilized in anaerobic digesters (3), then discharged to an unlined facultative sludge lagoon, the contents of which are discharged to unlined sludge drying beds (16). After drying, the resulting biosolids are stored onsite prior to disposal via land application for use as a soil amendment. A flow process diagram of the existing Facility is shown in Attachment B, a part of this Order.

7. Proposed Facility Expansion. The Discharger proposes to increase the WWTF's treatment capacity to 8.0 mgd by constructing new headworks, a separate 2.5 mgd oxidation ditch facility, and ancillary infrastructure. Effluent from the new facility will discharge to an expanded chlorine contact chamber, then to existing storage ponds. A flow process diagram of the proposed Facility expansion is shown in Attachment B, a part of this Order. The Discharger will begin construction in October 2001 and expects to finish by April 2003. To increase storage capacity to serve a design flow of 8.0 mgd, the Discharger proposes to deepen the existing 77 acres of storage ponds.

8. Discharge from the WWTF is characterized below:

Constituent/ Parameter		Units	Monthly Average	7-Day Median	Daily Maximum
Flow		mgd			
	Prescribed		4.0	--	--
	Current[1]		4.8	--	6.8
BOD_5[2]		mg/L			
	Prescribed		40	--	80
	Current[1]		10		50
TSS[3]		mg/L			
	Prescribed		40	--	80
	Current[1]		24	--	78
TCO[4]		MPN[5]/100 mL			
	Prescribed		--	23	240
	Current[1]		--	ND[6]	540
EC[7]		µmhos/cm			
	Prescribed				500 plus source water
	Current[1]		920		2,940
Total nitrogen		mg/L			
	Prescribed		No numerical effluent limitations		
	Current[8]		10	--	20

[1] Self-monitoring data from January 1999 through May 2000
[2] Five-day biochemical oxygen demand at 20°C
[3] Total suspended solids

[4] Total coliform organisms
[5] Most probable number
[6] Nondetect
[7] Conductivity at 25°C
[8] Self-monitoring data from July 1999 through October 1999

9. WWTF effluent is characterized on occasion by color. Staff observed the effluent to be dark gray on 27 August 1999 and slightly brown on 19 December 2000. The color appears to be due, in part, to dyes in the influent that originate from a paper manufacturer (International Paper).

10. Recent self-monitoring reports indicate that winter flows are not higher than summer flows, demonstrating insignificant inflow and infiltration to the collection system during winter months.

11. Source Water Quality. The City's source water is from 19 deep wells, one of which is immediately south of the Facility's southwest corner (see Attachment A). The City's wells tap deeper aquifers due to the presence of arsenic and hydrogen sulfide in upper aquifers. The City's 1999 Annual Water Quality Report characterizes the source water quality as follows:

Constituent	Units	Average
Arsenic	µg/L	28
Bicarbonate as $CaCO_3$	mg/L	111
Calcium	mg/L	5
Carbonate as $CaCO_3$	mg/L	6
EC	µmhos/cm	554
Magnesium	mg/L	0.3
Nitrate-nitrogen	mg/L	Nondetect
Sodium	mg/L	117
Sulfate	mg/L	5
Total Alkalinity	mg/L	115
Total Dissolved Solids	mg/L	334

12. The City's source water and WWTF effluent are also characterized by relatively high levels of sodium compared to calcium and magnesium. Sodium adsorption ratio (SAR) is a parameter that expresses the concentration of sodium relative to calcium and magnesium. This unitless parameter can be further adjusted to reflect the contribution of alkalinity. The SAR and adjusted SAR of the City's source water (derived from information presented in Finding No. 11) and WWTF effluent are presented below.

Water	SAR	$SAR_{adjusted}$
City Source Water	13	10
WWTF effluent collected 11/10/98	17	38
WWTF effluent collected 5/28/99	15	19

13. Waters with excessive sodium relative to calcium and magnesium are potentially hazardous to soils. High sodium concentrations may reduce soil permeability, according to *The Nature and Properties of Soils*, 8th Edition, by Nyle C. Brady. Specifically, the sodium ions disperse mineral colloids, which then develop a tight impervious soil structure. Application of irrigation water with adjusted SAR values greater than 24 can be expected to cause severe soil permeability problems, according to *Water Quality for Agriculture*, United Nations Irrigation and Drainage Paper No. 29, by R. S. Ayers and D. W. Westcot. To maintain soil permeability when irrigating regularly with water with high SAR values requires periodic applications of soil amendments (e.g., gypsum). This increases the overall salt loading to agricultural lands irrigated with WWTF effluent.

Industrial Pretreatment Program

14. On 3 February 1998, the Hanford City Council adopted Ordinance No. 98-02 amending Chapter 13.08 of Title 13 of the Hanford Municipal Code, which implements its Industrial Pretreatment Program (IPP). The Discharger's IPP was developed consistent with Title 40, Code of Federal Regulations (CFR), Part 403. The Discharger submitted its IPP for review and approval on 6 March 1998 and staff determined it complete on 11 August 2000. The Board, as Approval Authority, herein approves the pretreatment program submitted by the City. Pretreatment Requirements included herein implement this approval.

15. Three significant industrial users (i.e., El Mexicano, Mid-America Dairy, and Pirelli Armstong Tire) discharge a total of 0.27 mgd into the WWTF under individual permits. Pirelli Armstrong recently ceased operation of its Hanford Plant. The Discharger also identified 43 general industrial/commercial users, which include radiator shops, auto shops, dry cleaners, and photo processors. The general industrial/commercial users will all be regulated under general permits.

Sludge Management and Biosolids Disposal

16. Sludge as used herein means the solid, semisolid, and liquid residues generated during the treatment of industrial and domestic sewage in a municipal WWTF. Sludge includes solids removed during primary, secondary, or advanced wastewater treatment processes, but not grit or screening material generated during preliminary treatment. Biosolids as used herein means sludges that have undergone treatment and subsequently been 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.

17. Supernatant as used herein refers to the liquid separated from sludge during anaerobic digestion; specifically, it is the liquid above the settled-sludge layer in a sedimentation tank or basin. Leachate as used herein refers to the liquid separated from sludge during dissolved air flotation sludge thickening and drying operations; specifically, it is the liquid that percolates from and through solid materials or wastes and contains suspended or dissolved waste constituents from the solids.

18. Supernatant from the anaerobic digestion of sludge from trickling filter units typically has concentrations of TSS from 500 to 5,000 mg/L, BOD_5 from 500 to 5,000 mg/L, and ammonia as NH_3 from 400 to 600 mg/L, according to EPA's *Process Design Manual for Sludge Treatment and*

Disposal, Publication Number 625/1-74-006. It is reasonable to conclude that leachate is similar to supernatant with respect to waste constituent composition.

19. General Biosolids Order. Pursuant to section 13274 of the California Water Code, the State Water Resources Control Board adopted on 17 August 2000 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, Sivicultural, Horticultural, and Land Reclamation Activities* (hereafter General Biosolids Order).

20. Facility Sludge Handling. The Discharger pumps sludge from secondary clarifiers in the trickling filter plant to a DAF unit and from primary clarifiers to three anaerobic digesters, sludge from the DAF unit is pumped to the three anaerobic digesters, and sludge from the three anaerobic digesters is pumped to the unlined facultative sludge lagoon, from which it is discharged to unlined sludge drying beds. Prior to upgrading its WWTF in 1992, the Discharger discharged supernatant from its anaerobic digesters to an unlined supernatant pit and sludge to unlined sludge drying beds. Once the 1992 Facility upgrade was complete, the Discharger discontinued use of the supernatant pit and discharged both supernatant and anaerobically digested sludge to the unlined facultative sludge lagoon. The Discharger controls for odors by operating an aerator in the facultative sludge lagoon. Sludge is eventually pumped from the facultative lagoon to 1.5 acres of sludge drying beds, where it is typically solar dried for about three months then transferred to an unlined biosolids stockpile area. Until recently, the Discharger had been stockpiling biosolids onsite for more than two years.

21. Biosolids Disposal. Prior to 1997, the Discharger routinely applied biosolids to Field 1, a 90-acre use area in the northwest corner of the WWTF property. The last application of biosolids to Field 1 was in 1997. In April 2000, the Discharger contracted McCarthy Farms to remove 3-years worth of stockpiled biosolids.

22. Proposed Sludge Handling. The Discharger plans to pump sludge from the oxidation ditch's secondary clarifiers to the existing facultative sludge lagoon or directly to unlined sludge drying beds. The Discharger plans to decommission 0.5 of the 1.5 acres of existing sludge drying beds adjacent to Field 1 and construct an additional 7.5 acres of sludge drying beds in Field 1, which will give the Discharger 8.5 acres of sludge drying beds. For a design capacity of 8.0 mgd, this would provide for 1.06 acres of sludge drying beds/mgd, which meets the minimum requirement of 1.0 acre of sludge drying beds/mgd recommended in the Discharger's *Wastewater Treatment and Disposal Engineering Report* described in Finding No. 4.

23. Proposed Biosolids Disposal. The Discharger proposes to regularly dispose of biosolids via land application as a soil amendment on a City-owned 1,600-acre use area that has been permitted for water reclamation under WDRs Order No. 5-00-223. Discharge of biosolids to the City-owned use area will be regulated separately through the General Biosolids Order.

Effluent Storage and Reuse

24. Title 22. The California Department of Health Services (DHS) established statewide water recycling criteria in Title 22, California Code of Regulations, section 60301 et seq. Revisions to the water recycling criteria in Title 22 became effective on 2 December 2000. The revised Title 22

requires that all wastewater used for reclamation receive, at a minimum, secondary treatment. Title 22, section 60323, requires recyclers of treated municipal wastewater to submit an engineering report detailing the use of recycled water, contingency plans, and safeguards. Further, Title 22, section 60341 et seq. requires WWTFs to (a) be able to provide emergency disposal or storage of wastewater for at least 20 days, and (b) include all the necessary diversion works, provisions for nuisance control, conduits, and pumping equipment.

25. Effluent Storage Operations. The Discharger uses six storage ponds with a surface area of 77 acres to store effluent for reclamation and for disposal by evaporation or percolation. The six storage ponds provide 805 acre-feet of storage, which is adequate for a design flow of up to 6.9 mgd in a 100-year rain event. The Discharger recently constructed two additional ponds in what was the southern portion of Field 1. The new ponds, Ponds 5 and 8, have a combined surface area of 67 acres. All effluent storage ponds are interconnected with piping and ancillary infrastructure.

26. Historic Reclamation Operations. Until 2000, effluent was recycled on nearby farmland under several Board-adopted water reclamation requirements (WRRs). The Discharger's 1992 *Irrigation Management Plan* describes effluent reuse operations in the early 1990s. In the late 1990s, the amount of acreage available for effluent recycling was significantly reduced. The table below shows the City's recycled water users and their 1992 acreage and the amount of acreage documented in a 15 March 1999 staff inspection report:

User	WRRs Order No.	1992 Acreage	1999 Acreage
D&P Sanchez	88-113 and 98-097 (rescinded 10/29/99)	382.88	0
Loftis	91-166	31.00	0
Alcala	91-167	288.82	35
Blum	91-235 (rescinded)	46.66	0
G&T Sanchez (sold to Hakker Brothers)	88-113 99-128	244.50	234
Walker	91-168	357.74	0
	Total	1,351.60	269

27. As part of its 1999 RWD, the Discharger submitted a *Recycled Water Engineering Report* pursuant to Title 22, section 60323. The Title 22 Engineering Report describes the Discharger's proposed reuse of WWTF effluent on (a) use areas within Lakeside Ditch Company's 11,500-acre service area, (b) a City-owned 1,600-acre use area south of the WWTF, (c) use areas within 12,000 acres of farmlands near the pipeline route to the 1,600-acre use area, and (d) certain existing use areas operating under Board-adopted water reclamation requirements (i.e., WRRs Order Nos. 91-166, 91-167, 91-168, and 99-128). The DHS approved the Discharger's Title 22 Engineering Report by letter dated 3 April 2000.

28. On 27 October 2000, the Board adopted WDRs Order Nos. 5-00-222 and 5-00-223. Both Orders function as Master Reclamation Permits pursuant to California Water Code section 13523.1. The first is for Lakeside Ditch Company (LDC) and the City to recycle WWTF effluent on approved use areas within LDC's 11,500-acre service area. The second is for the City to recycle WWTF effluent on the City's 1,600-acre use area and on approved use areas on up to 12,000 acres of farmlands near the pipeline route to the 1,600-acre use area. Both Master Reclamation Permits incorporate the Discharger's Title 22 contingency plan. For example, the Permits prohibit the discharge of recycled water to use areas when effluent coliform concentrations exceed 23 MPN/100 mL and do not allow the Discharger to resume discharging recycled water to use areas until the coliform count remains below 23 MPN/100 mL for three consecutive days.

29. To ensure that the Discharger does not use inadequately treated wastewater for reclamation, it is appropriate to determine compliance with Title 22 requirements with respect to effluent quality immediately following disinfection and prior to discharge to the equalization basin.

30. The Discharger plans to deliver effluent via LDC's conveyance system to approved use areas within LDC's service area under the terms and conditions of Order No. 5-00-222. The LDC plans to (a) use its surface water conveyance system to deliver recycled water initially to 30 noncontiguous use areas owned and managed by individual growers (hereafter Users) and (b) convey recycled water in batches either undiluted or blended with surface water. Each "run" will distribute 400 to 800 acre-feet of recycled water to Users. Irrigation pipelines will distribute effluent (undiluted and/or blended) from the LDC's conveyance system via ditch and/or pipeline to Users, where it will flow by gravity from a standpipe through the Users' irrigation system. Order No. 5-00-222 details how LDC will coordinate with Users to ensure that compliance is maintained with Order No. 5-00-222 and, by extension, with Title 22 requirements.

31. The Discharger has a long-term agreement with LDC that requires LDC to notify the Discharger two years before it will refuse to accept WWTF effluent. Should LDC refuse to accept WWTF effluent, the Discharger plans to build a ten-mile pipeline to the City-owned 1,600-acre use area and to recycle WWTF effluent on the City-owned use area and on other approved use areas under the terms and conditions of Order No. 5-00-223.

32. The WWTF's storage ponds are expected to accumulate effluent from September through February. At a design capacity of 8.0 mgd, planned irrigation runs to Lakeside Ditch will exceed the amount of recycled water available for six months of the year, according to the *Recycled Water Engineering Report*. On an annual basis, crop water demand will exceed wastewater production.

33. The Discharger will need an additional 160 acre-feet of storage to provide adequate storage capacity for a design flow of 8.0 mgd in a 100-year rain event, according to Addendum No. 3 of the *Recycled Water Engineering Report*. The Discharger plans to deepen the six active storage ponds to provide the additional storage.

34. When the discharge does not meet Title 22 requirements with respect to effluent quality, the Discharger plans to discharge to two storage ponds (Ponds 5 and 8) where effluent will either evaporate or percolate to groundwater. The Discharger recently constructed these two ponds on lands that previously served as a reclamation area. Addendum No. 3 of the *Recycled Water Engineering Report* indicates that Ponds 5 and 8 will provide a combined emergency storage volume of 720 acre-feet. This value exceeds the 338 and 540 acre-feet required to meet Title 22 emergency storage requirements for design flows of 5.5 and 8.0 mgd, respectively.

Recent Effluent Storage Capacity Problems

35. In the late 1990s, the Discharger's major recycler decided to no longer accept effluent and the Discharger was faced with a sudden reduction in effluent disposal capacity. The Discharger applied substantial quantities of WWTF effluent on approved use areas immediately west of the WWTF (Walker Property and Field 1), constructed two additional effluent storage ponds (i.e., Ponds 5 and 8), and discharged effluent to the City's recently constructed Houston Street storm water retention basin east of the WWTF.

36. The discharge to the Walker Property and to Ponds 5 and 8 contributed to rising groundwater levels in neighboring properties, most significantly at Britz Fertilizers immediately north of the Walker Property and west of Pond 5 (see Attachment A). Rising groundwater levels, in turn, threatened the structural integrity of concrete pier footings that support two 12,000-gallon-capacity anhydrous ammonia tanks at Britz Fertilizers. Samples of shallow groundwater collected at Britz Fertilizers on 10 November 1998 revealed a nitrate-nitrogen concentration of 63 mg/L, which is significantly higher than the nitrate-nitrogen concentration of WWTF effluent.

37. To mitigate the effects of rising groundwater levels, the Discharger (a) stopped discharging effluent to Ponds 5 and 8, (b) excavated a six-foot deep groundwater interception trench along the northern and eastern boundaries of the Walker Property adjacent to 11th Avenue, and (c) pumped intercepted groundwater to pond segment of nearby Sand Slough immediately west of the Walker Property. Rising groundwater levels have reportedly not been a problem since the Discharger ceased discharging to Ponds 5 and 8. The Discharger recently backfilled the groundwater interception trench.

Surface Hydrology, Soils and Land Use

38. The WWTF lies within the Tulare Lake Basin, specifically within Consolidated Hydrologic Area No. 551.90, as depicted on interagency hydrologic maps prepared by the California Department of Water Resources (DWR) in 1986. Areal topography indicates a slope of about 1 foot per 1,500 feet toward the southwest. The nearest surface waterway hydraulically connected to a water of the United States is the Tulare Lake Canal, ten miles southwest, which ultimately drains into the

Tule River. Other surface waters include irrigation delivery canals or ditches and segments of sloughs, many of which receive irrigation return water and storm water flows. The closest of these are Sand Slough and Peoples Ditch to the west, and Lakeside Ditch to the east. Lakeside Ditch Company's conveyance system terminates in numerous basins, at least one of which is fed by groundwater, as necessary, to maintain a private fishery habitat.

39. The WWTF is outside of the 500-year flood hazard, according to maps published by the Federal Emergency Management Agency.

40. The WWTF is in a semiarid region. Average annual precipitation and evapotranspiration are about 10 inches and 63 inches, according to information published by DWR.

41. According to the National Resource Conservation Service, the two main soil types in the vicinity of the WWTF are Cajon sandy loam and Kimberlina sandy loam, which were both developed from alluvial deposits. Soils west of the AT&SF Railroad line, on which the WWTF is situated, are typically less permeable than those to the east and frequently create perched water table conditions. The RWD indicates that the percolation rate underlying the storage ponds is about 0.03 feet/day.

42. A water balance was performed to estimate the amount of effluent that would percolate from the six active storage ponds at a design flow of 8.0 mgd. The water balance determined that the annual discharge from the Facility would be about 8,940 acre-feet, of which about 370 acre-feet would evaporate and about 840 acre-feet would percolate to groundwater (assuming ponds continuously contained effluent). Using an average effluent total nitrogen concentration of 10 mg/L, this amount of effluent represents a nitrogen load of about 300 lbs/acre/year.

43. Land use in the vicinity includes agricultural, manufacturing, rural residential, and some suburban developments. Primarily, the surrounding land use is for agriculture. There are 12 dairies along LDC's canal system. Further, rural residents with domestic wells exist in the vicinity of the Facility and LDC's service area. According to the UC Cooperative Extension, the primary crops near the WWTF are cotton, alfalfa, corn, walnuts, almonds, canning tomatoes, and wine grapes. Currently, all crops are furrow or flood irrigated.

Groundwater Flow and Quality

44. Regional groundwater flows southeast and occurs about 90 feet below ground surface, according to information in *Lines of Equal Elevation of Water in Wells in Unconfined Aquifer*, published by DWR in Spring 1998.

45. Existing Groundwater Monitoring Network. Since 1992, the Discharger has used four monitoring wells to monitor the effects of percolating effluent on groundwater. The Discharger performs quarterly monitoring of groundwater passing through four groundwater monitoring wells for depth and concentrations of nitrate and of total dissolved solids. Monitoring Well No. 1 (MW-1) is at the northwest corner of Field 1, while the rest are east of the storage ponds (see Attachment A). The Discharger recently installed a fifth monitoring well (MW-5) directly east of the City's Houston

Street storm water basin to monitor the effects of its discharge of effluent to the storm water basin when it experienced effluent storage capacity problems. The Discharger initiated this discharge in October 1998 and ceased in April 1999.

46. Local Groundwater Conditions. Depth to groundwater in the four monitoring wells near the storage ponds has ranged from about 15 to 40 feet below ground surface from 1994 through 2000. Groundwater flow is normally to the northeast. As MW-1 is at the northwest corner of the Facility, it does not monitor groundwater that is upgradient from and unaffected by the Facility.

47. Interpretation of groundwater monitoring results is complicated by (a) rising groundwater levels in the Hanford area due to higher flows in Peoples Ditch and possibly Sand Slough, both west of the WWTF; and (b) encountering coarse grained sands at different depths in the monitoring wells, according to the Discharger's consulting hydrogeologist, Kenneth D. Schmidt and Associates (hereafter KSA). Percolation from the Discharger's storage ponds and groundwater pumping by nearby farmers also influence groundwater flow direction near the WWTF. To evaluate the effect of storage ponds on groundwater, KSA recommended in the WWTF expansion project's Environmental Impact Report (EIR) that the City install two additional monitoring wells directly east of the storage ponds. The recommendation follows KSA's conclusion that existing downgradient wells are too far removed from the storage ponds to adequately monitor the effect of percolating effluent on groundwater.

48. The Discharger monitors groundwater passing through four groundwater monitoring wells quarterly for nitrate and total dissolved solids (TDS). A time-scale plot of nitrate-nitrogen and TDS concentrations is included in the attached Information Sheet. Monitoring data from February 1994 through June 2000 indicate the following:

	Nitrate-Nitrogen (mg/L)		Total Dissolved Solids (mg/L)	
Monitoring Well	Average	Maximum	Average	Maximum
MW-1	23.1	56.4	1,240	1,900
MW-2	2.9	9.0	830	900
MW-3	8.6	27.5	990	1,270
MW-4	2.4	19.2	1,080	1,730

49. Nitrogen concentrations in groundwater passing through MW-1 (in the northwest corner of Field 1) are much higher when compared to WWTF effluent or to groundwater passing through the Discharger's monitoring wells east of the storage ponds. The Discharger does not have a monitoring well that provides upgradient groundwater quality data, as groundwater near its storage ponds flows to the northeast (See Attachment A).

50. Groundwater samples collected from MW-1 in May and December of 1998 revealed nitrate-nitrogen concentrations of 56.4 and 54.2 mg/L, and TDS concentrations of 1,700 and 1,900 mg/L. These levels are well above the historic average for these constituents in MW-1. As indicated in Finding No. 21, the Discharger routinely disposed of biosolids in Field 1 until March 1997. Soon after this last application, the Discharger inundated Field 1 for more than a year. The Discharger's repeated application to Field 1 of biosolids, followed by prolonged inundation, likely contributed to the elevated concentrations of nitrogen and TDS in groundwater sampled from MW-1 in December 1998.

Basin Plan and Regulatory Considerations

51. The *Water Quality Control Plan for the Tulare Lake Basin, Second Edition*, (hereafter Basin Plan) designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting waters of the basin, and incorporates by references plans and policies adopted by the State Water Resources Control Board. These requirements implement the Basin Plan.

52. The Basin Plan identifies existing and potential beneficial uses of the Tule River south of Lake Success as municipal supply, agricultural supply, industrial service supply, industrial process supply, water contact recreation, noncontact water recreation, warm fresh water habitat, wildlife habitat, and groundwater recharge.

53. The Basin Plan identifies existing and potential beneficial uses of area groundwater as domestic, industrial, and agricultural supply.

54. 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 evaporation of reclaimable wastewater is not an acceptable permanent disposal method where the opportunity exists to replace an existing use or proposed use of fresh water with recycled water.

55. Section 13050(h) of the California Water Code defines water quality objectives as "... the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention or nuisance within a specific area."

56. The Basin Plan establishes numerical and narrative water quality objectives for surface and groundwaters within the basin, and recognizes that water quality objectives are achieved primarily through the Board's adoption of waste discharge requirements and enforcement orders. Where numerical water quality objectives are listed, these are the limits necessary for the reasonable protection of beneficial uses of the water. Where compliance with narrative water quality objectives is required, the Board will, on a case-by-case basis, adopt numerical limitations in orders which will implement the narrative objectives to maintain existing and anticipated beneficial uses of waters in the subject area.

57. The Basin Plan identifies numerical water quality objectives for waters designated as municipal supply. These are the maximum contaminant levels (MCLs) specified in the following provisions of Title 22, California Code of Regulations: Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of section 64431, Table 64444-A (Organic Chemicals) of section 64444, and Table 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) and 64449-B (Secondary Maximum Contaminant Levels-Ranges) of section 64449. The Basin Plan's incorporation of these provisions by reference is prospective, and includes future changes to the incorporated provisions as the changes take effect. The Basin Plan recognizes that the Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.

58. The Basin Plan contains narrative water quality objectives for chemical constituents in and toxicity of groundwater that address constituents in the discharge that are potentially harmful to beneficial uses. The toxicity objective requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in plants or animals. The chemical constituent objective states groundwater shall not contain chemical constituents in concentrations that adversely affect beneficial uses. Guidelines for identifying the quality of irrigation water necessary to sustain various crops were compiled by Ayers and Westcot in 1985 (Food and Agriculture Organization of the United Nations — Irrigation Drainage Paper No. 29). The Basin Plan recognizes these Guidelines for providing relevant numerical criteria to evaluate compliance with the previously described narrative water quality objectives. The Guidelines are intended for use in estimating the potential hazards to crop production associated with long term use of the particular water being evaluated. The Guidelines divide water quality characteristics as having relative degree of restriction on use: "None, Slight to Moderate, and Severe." 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. Below is a table of numerical criteria adapted from the Guidelines:

Problem and Related Constituent	None	Slight to Moderate
Salinity of irrigation water (µmhos/cm)	< 700	700 – 3,000
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

Problem and Related Constituent	None	Slight to Moderate
From FOLIAR absorption		
Sodium (mg/L)	< 69	> 69
Chloride (mg/L)	< 106	> 106
Miscellaneous		
NH_4-N (mg/L) (for sensitive crops)	< 5	5 – 30
NO_3 (mg/L) (for sensitive crops)	< 5	5 – 30
HCO_3 (mg/L) (only with overhead sprinklers)	< 90	90 – 520
pH	normal range = 6.5 – 8.4	

59. The existing and anticipated beneficial uses of area groundwater for agricultural supply include irrigation of crops sensitive to salt and boron. As indicated in Finding No. 43, crops in the WWTF vicinity are currently not irrigated by sprinklers.

60. According to the Guidelines described in Finding No. 58, reductions in crop yields are not evident when irrigating walnuts and most row crops with water having an EC of less than 1,100 µmhos/cm. The UC Cooperative Extension states that boron sensitive crops (e.g., walnuts) may show injury when irrigated with water with boron ranging from 0.5 to 1.0 mg/L and reductions in crop yields when irrigated with water with boron ranging from 1.0 to 2.0 mg/L.

61. Sodium and chloride can cause foliar damage to crops that are sprinkler irrigated. Trees, vines, and woody species are the most susceptible. To protect crops near the WWTF that could be sprinkler irrigated (e.g., corn), the applied water should not contain values of sodium or chloride above 230 and 350 mg/L, respectively, according to *Agricultural Salinity Assessment and Management*, published by the American Society of Civil Engineers.

62. As explained in the attached Information Sheet, this Order implements interim numerical water quality objectives to maintain existing and anticipated beneficial uses of area groundwater for the production of crops that are sensitive to salt (i.e., sodium and chloride), boron, or both. The numerical values reflect the level of quality necessary for sprinkler application, as these are more restrictive than for flood irrigation. These objectives include pH (6.5 to 8.5) and the following expressed as mg/L: sodium (230) and boron (1.4). It is reasonable to conclude that the drinking water level for nitrate-nitrogen of 10 mg/L and chloride of 250 mg/L is adequately protective of existing and anticipated agricultural land uses.

63. Section 13241 of the Water Code requires the Regional Board to consider various factors, including economic considerations, when adopting water quality objectives into its Basin Plan. Water Code Section 13263 requires the Regional Board to address the factors in Section 13241 in

adopting waste discharge requirements. The State Board, however, has held that a Regional Board need not specifically address the Section 13241 factors when implementing existing water quality objectives in waste discharge requirements because the factors were already considered in adopting water quality objectives. These waste discharge requirements implement adopted water quality objectives. Therefore, no additional analysis of the Section 13241 factors is required.

64. The discharge authorized herein and the treatment and storage facilities associated with the discharge, except for discharges of residual sludge and solid waste, are exempt from the requirements of Title 27, California Code of Regulations (CCR), section 20380 et seq. (hereafter Title 27). The exemption, pursuant to Title 27 CCR section 20090(a), is based on the following:

- The waste consists primarily of domestic sewage and treated effluent;
- The waste discharge requirements are consistent with water quality objectives; and
- the treatment and storage facilities described herein are associated with a municipal wastewater treatment plant.

65. State regulations that prescribe procedures for detecting and characterizing the impact of waste constituents from waste management units on groundwater are found in Title 27. While the WWTF is exempt from Title 27, the data analysis methods of Title 27 may be appropriate in some ways to determine whether the discharge complies with the terms for protection of groundwater specified in this Order.

66. In the process of crop irrigation, evaporation and crop transpiration remove water from 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. The leached salts eventually enter groundwater and concentrate above the uppermost layer of the uppermost aquifer. As this is the general condition throughout the agricultural Tulare Lake Basin, water supply wells for all beneficial uses typically are constructed to extract groundwater from below this level.

67. Accordingly, monitoring of groundwater within the vicinity of the discharge should be by means of wells extracting water representative of the depth of the uppermost zone. Site-specific studies to determine the appropriate zone and geographical locations should be conducted by the Discharger. The use of municipal wastewater for irrigation at agronomic rates will have a comparable impact on groundwater as freshwater extracted and used for irrigation of the same crop. Beneficial reuse of wastewater conserves freshwater resources and is encouraged by the Basin Plan and agronomic application rates of wastewater cause comparable impact as widespread freshwater irrigation practices. Accordingly, benefits of groundwater monitoring in wastewater reuse areas do not justify the cost, provided the rates of wastewater applications do not exceed reasonable agronomic rates.

68. Infiltration from wastewater treatment and wastewater disposal ponds results in wastewater intersecting and accumulating on and in the uppermost layer of the uppermost groundwater until dispersed horizontally and vertically into the main mass of the aquifer. Monitoring within the

aquifer should evaluate water representative of the depth of the uppermost zone affected by the discharge. Site-specific studies to determine the appropriate zone and geographical locations should be conducted by the Discharger subject to Executive Officer approval.

69. 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 recognizes that degradation is unavoidable until a valley wide drain is constructed to carry salts out of the basin. Until the drain is available, the Basin Plan describes numerous salt management recommendations and requirements. The latter includes the requirement that discharges to land from wastewater treatment facilities not have an EC greater than source water plus 500 µmhos/cm. If source water is from more than one source, the Basin Plan indicates that source water EC shall be a weighted average of all sources. Accordingly, the Basin Plan allows for salinity degradation and focuses on controlling the rate of increase.

70. California Water Code (CWC) section 13267 authorizes the Board to require anyone who discharges waste that could affect the quality of water, as the Discharger does, to furnish, under penalty of perjury, technical and monitoring program reports.

71. California Department of Water Resources standards for the construction and destruction of groundwater wells (hereafter DWR Well Standards), as described in *California Well Standards Bulletin 74-90* (June 1991) and *Water Well Standards: State of California Bulletin 94-81* (December 1981), and any more stringent standards adopted by the Discharger or county pursuant to CWC section 13801, apply to all monitoring wells.

72. Draft EIR. The Discharger submitted a draft EIR, dated May 2000, for expanding its WWTF. The draft EIR described the proposed expansion of the WWTF, wastewater treatment alternatives, and their possible environmental impacts. The mitigation measures in the draft EIR did not adequately protect groundwater from sludge handling operations. By letter dated 28 July 2000, the Board advised the Discharger that existing and proposed sludge handling operations could have a significant effect on water quality and recommended that the final EIR describe methods the Discharger would employ to ensure that sludge management operations do not degrade groundwater.

73. Final EIR. On 6 September 2000, the City certified an EIR for the WWTF expansion in accordance with CEQA and State CEQA Guidelines. The Final EIR recommended that, prior to lining sludge drying beds, a groundwater monitoring well be installed to determine the effect of sludge drying beds on groundwater quality.

74. As a responsible agency, the Board found the City's EIR for the WWTF expansion project inadequate with respect to its sludge handling mitigation measures. To address the Board's concerns, the City indicated by letter dated 29 March 2001 that it will line all of its sludge handling facilities as part of its facility expansion project.

Degradation

75. State Water Resources Control Board (SWRCB) Resolution No. 68-16 (hereafter Resolution 68-16 or the "Antidegradation" Policy) requires the Board in regulating the discharge of waste to maintain high quality waters of the state until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in the Board's policies (e.g., quality that exceeds water quality objectives).

76. The Board finds that some degradation of groundwater beneath the WWTF and reclamation and disposal areas is consistent with Resolution 68-16 provided that:

- the degradation is confined to a specified area
- the discharger minimizes the degradation by fully implementing, regulary maintaining, and optimally operation best practicable treatment and control (BPTC) measures
- the degradation is limited to waste constituents typically encountered in municipal wastewater as specified in the groundwater limitations in this Order.
- the degradation does not result in water quality less than that prescribed in the Basin Plan

77. Some degradation of groundwater by some of the typical waste constituents released with discharge from a municipal wastewater utility after effective source control, treatment, and control is consistent with maximum benefit to the people of California. The technology, energy, water recycling, and waste management advantages of municipal utility service far exceed any benefits derived from a community otherwise reliant on numerous concentrated individual wastewater systems, and the impact on water quality will be substantially less. 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., BOD, total coliform organisms) is prohibited. When allowed, the degree of degradation allowed depends upon many factors (i.e., background water quality, the waste constituent, the beneficial uses and most stringent water quality objective, source control measures, waste constituent treatability).

Treatment Control and Practice

78. The WWTF described in Finding Nos. 6 and 7 provides treatment and control of the discharge that incorporates:

- technology for secondary treatment of municipal wastewater
- biosolids handling and treatment for reuse
- disinfection
- constituent attenuation within the vadose zone

- concrete treatment structures
- recycling of wastewater on cropped properties
- a pretreatment program
- an active inflow and infiltration (I/I) rehabilitation program
- a capital recovery fund
- an operation and maintenance (O&M) manual
- staffing to assure proper operation and maintenance

79. The WWTF uses an unlined sludge facultative lagoon, unlined sludge drying beds, and an unlined biosolids stockpile area and, therefore, may not constitute BPTC as used in Resolution 68-16. To address the Board's concerns regarding existing sludge handling facilities, the Discharger proposed to line all of its sludge handling facilities, as indicated in Finding No. 74. While the Discharger has been monitoring first encountered groundwater in the WWTF vicinity since 1992, the existing impacts on the uppermost aquifer and the appropriate level of degradation that complies with Resolution 68-16 have not been evaluated.

80. This Order, therefore, establishes schedules of tasks to evaluate BPTC for each treatment, storage, and disposal component of the WWTF and to characterize groundwater for all waste constituents.

81. This Order establishes interim groundwater limitations that will not unreasonably threaten present and anticipated beneficial uses or result in groundwater quality that exceeds water quality objectives set forth in the Basin Plan. This Order contains tasks for assuring that BPTC and the highest water quality consistent with the maximum benefit to the people of the State will be achieved. Accordingly, the discharge is consistent with the antidegradation provisions of Resolution 68-16. Based on the results of the scheduled tasks, the Board may reopen this Order to reconsider groundwater limitations and other requirements to comply with Resolution 68-16.

82. 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.

General Findings

83. The Discharger is not required to obtain coverage under a National Pollutant Discharge Elimination System General Industrial Storm Water Permit because all storm water runoff is diverted back to the headworks of the WWTF, and does not discharge to a water of the United States.

84. The Board considered all the above and the supplemental information and details in the attached Information Sheet, which is incorporated by reference herein, in establishing the following conditions of discharge.

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

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

IT IS HEREBY ORDERED that Waste Discharge Requirements Order No. 91-164 is rescinded and that, pursuant to CWC sections 13263 and 13267, the City of Hanford, its agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following at the City's wastewater treatment facility:

[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. The direct discharge of wastes to surface waters or surface water drainage courses is prohibited.

2. The discharge of wastes to storm water retention basins is prohibited, except as allowed in Provision E.2 of Standard Provisions and Reporting Requirements.

3. The discharge of treated wastewater to storage ponds in a manner that causes groundwater levels to rise on neighboring properties and obstruct the free use of those properties is prohibited.

4. The bypass or overflow of untreated or partially treated waste is prohibited, except as allowed in Provision E.2 of Standard Provisions and Reporting Requirements.

5. Discharge of waste classified as 'hazardous' as defined in section 2521(a) of Title 23, CCR, section 2510 et seq., or 'designated' as defined in section 13173 of the California Water Code, is prohibited.

6 Recycling of effluent to areas lacking either Board-adopted water reclamation requirements or waiver of said requirements is prohibited.

B. Discharge Specifications

1. **Until Provision F.5 is satisfied,** the monthly average discharge to the storage ponds shall not exceed 5.5 mgd.

2. **After Provision F.5 is satisfied,** the monthly average discharge to the storage ponds shall not exceed 6.9 mgd.

3. **After Provision F.6 is satisfied,** the monthly average discharge to storage ponds shall not exceed 8.0 mgd.

4. The monthly average EC of the discharge shall not exceed the flow-weighted average EC of the source water plus 500 µmhos/cm. The flow-weighted average for the source water shall be a moving average for the most recent twelve months.

5. The discharge to the equalization basin shall not exceed the following limits:

Constituent	Units	Monthly Average	Daily Maximum
BOD_5[1]	mg/L	40	80
TSS	mg/L	40	80
Settleable Solids	mL/L	0.2	1.0

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

6. The discharge to the equalization basin shall not contain a seven-day median concentration of total coliform organisms that exceeds 23 MPN/100 mL or more than one sample that exceeds 240 MPN/100 mL in any 30-day period.

7. Effluent discharged to approved use areas that require, at a minimum, disinfected secondary-23 recycled water shall not contain effluent coliform concentrations that exceed 23 MPN/100 mL, nor shall discharges to the recycled water conveyance facilities (or effluent storage ponds dedicated to recycled water storage) resume until the discharge's total coliform count is below 23 MPN/100 mL for three consecutive days.

8. The discharge shall not have a pH less than 6.5 or greater than 8.5.

9. The discharge shall be free of discoloration that causes nuisance or adversely affects beneficial uses.

10. Objectionable odors originating at the WWTF shall not be perceivable beyond the limits of the wastewater treatment and storage area.

11. As a means of discerning compliance with Discharge Specification B.10, the dissolved oxygen content in the upper zone (one foot) of wastewater in all ponds shall not be less than 1.0 mg/L.

12. 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.

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

14. The Discharger shall preclude public access to the treatment and effluent storage facilities through methods such as fences, signs, or other acceptable means.

15. Freeboard shall never be less than two feet in any pond (measured vertically from the lowest elevation of the pond embankment).

16. 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.

17. Disposal 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.

18. On **15 November** of each year, available storage capacity in storage ponds shall be at least equal to the volume necessary to comply with Discharge Specification B.17.

19. 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. Sludge Management and Biosolids Disposal 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 undergone sufficient treatment and testing to qualify for reuse pursuant to federal and state regulations as a soil amendment for agriculture, silviculture, horticulture, and land reclamation.

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 site, 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 shall comply with General Biosolids Order (State Water Resources Control Board 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)*. The Discharger must file a "Notice of Intent" for each biosolids use project to be eligible for coverage under the General Biosolids Order. Alternatively, use of biosolids as a soil amendment shall comply with valid waste discharge requirements issued by a regional water quality control board.

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 Board. If during the life of this Order the State accepts primacy for implementation of 40 CFR 503, the Board may also initiate enforcement where appropriate.

D. Groundwater Limitations

Release of waste constituents from any storage, treatment, or disposal component associated with the WWTF shall not cause groundwater under and beyond the WWTF, as determined by an approved well monitoring network, to:

1. Contain any of the following constituents in concentration greater than as listed or greater than background quality, whichever is greater:

Constituent	Units	Limitation
Boron	mg/L	1.4
Chloride	mg/L	250
Iron	mg/L	0.3

Constituent	Units	Limitation
Manganese	mg/L	0.05
Sodium	mg/L	230
Total Coliform Organisms	MPN/100 mL	nondetect
EC	µmhos/cm	1,100
Total Dissolved Solids[1]	mg/L	660
Total Nitrogen	mg/L	10
Nitrite (as N)	mg/L	1
Nitrate (as N)	mg/L	10
Ammonia (as N)	mg/L	0.5
Total Trihalomethanes	µg/L	100

[1] A cumulative impact limit that accounts for several dissolved constituents in addition to those listed here separately [e.g., alkalinity (carbonate and bicarbonate), calcium, hardness, phosphate, potassium, etc.]

2. Contain any constituent not identified in Groundwater Limitation D.1 in concentrations greater than background quality (whether chemical, physical, biological, bacteriological, radiological, or some other property or characteristic).

3. Impart taste, odor, or color that creates nuisance or impairs any beneficial use.

4. Contain concentrations of chemical constituents in amounts that adversely affect agricultural uses.

E. Pretreatment Requirements

1. 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, Board, or other appropriate parties, as provided in the Clean Water Act (CWA), as amended, for noncompliance.

2. The Discharger shall implement and enforce its approved Industrial Pretreatment Program (IPP). The Discharger's approved IPP is hereby made an enforceable condition of this permit. The EPA or Board may initiate enforcement action against an industrial user for noncompliance with applicable standards and requirements as provided in the CWA.

3. The Discharger shall enforce the requirements promulgated under sections 307(b), (c), and (d) and section 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.

4. The Discharger shall perform the pretreatment functions required in 40 CFR Part 403, including, but not limited to:

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

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

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

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

   e. Publish a list of significant violators as required by 40 CFR 403.8(f)(2)(vii), where "significant violations" and "significant noncompliance" are as defined by the EPA in Pretreatment Compliance Monitoring and Enforcement Guidance, pp. 3-48 through 3-52; and

   f. Conduct inspections in accordance with provisions of 40 CFR 403.8(f)(1)(v) and 403.8(f)(2)(v) and ensure 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.

F. Provisions

1. The Discharger shall comply with Monitoring and Reporting Program (MRP) No. 5-01-153, which is part of this Order, and any revisions thereto as ordered by the Executive Officer.

2. 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).

3. The Discharger shall not allow pollutant-free wastewater to be discharged into the collection, treatment, and disposal system in amounts that significantly diminish the system's capability to comply with this Order. Pollutant-free wastewater means rainfall, groundwater, cooling waters, and condensates that without treatment are essentially free of pollutants.

4. By **15 October 2001**, the Discharger shall submit a sludge management plan that satisfies the information requirements of Attachment C *Information Needs For Sludge Management Plan.* A California registered civil engineer experienced in sludge disposal must prepare and certify

the sludge management plan. Following written approval of the sludge management plan from the Executive Officer, this Provision shall be considered satisfied.

5. The Discharger shall provide written certification from a California registered civil engineer that the 2.5 mgd oxidation ditch facility is online, operational, and capable of consistently complying with the terms and conditions of this Order. Upon written acceptance of the certification by the Executive Officer, this Provision shall be considered satisfied.

6. For the Discharger to be permitted to increase its discharge to 8.0 mgd subsequent to satisfying Provision F.5, it must provide a technical report that describes modifications completed to increase storage ponds capacity to a level sufficient to comply with the terms and conditions of this Order, including Title 22, CCR, section 60341 et seq. and Discharge Prohibition A.3. A California registered civil engineer must prepare and certify the technical report. Following written approval of the technical report from the Executive Officer, this Provision shall be considered satisfied.

7. **Within 30 days** following receipt of written notification from Lakeside Ditch Company indicating its plans to refuse to accept WWTF effluent, the Discharger shall submit an irrigation management plan that indicates how it will manage WWTF effluent to ensure that it has adequate disposal capacity to comply with the terms and conditions of this Order.

8. By **1 December 2001**, the Discharger shall complete a hydrogeologic investigation within the area affected and potentially affected by the WWTF and submit a technical report to the Executive Officer. The technical report, which shall be prepared and professionally certified by a geologist registered to practice in California, shall describe the underlying geology, existing wells (active and otherwise), local well construction practices and standards, well restrictions, and hydrogeology. The report shall recommend a representative monitoring zone of the uppermost aquifer. The recommendations shall be reviewed and approved as appropriate by the Executive Officer.

9. **Within 90 days of the satisfaction of Provision F.8,** the Discharger shall submit for Executive Officer approval, a technical report proposing a modified groundwater monitoring network. The technical report shall consist of a Monitoring Well Installation Workplan for a network that satisfies Attachment D, *Standard Monitoring Well Provisions for Waste Discharge Requirements*. The network shall consist of at least two background monitoring wells and two wells downgradient of the storage ponds, and one well downgradient of sludge handling facilities. Monitoring wells shall be constructed to yield representative samples from the zone approved by the Executive Officer pursuant to Provision F.8 and shall comply with applicable Well Standards. Implementation of the Monitoring Well Installation Workplan shall be subject to the prior approval of the Executive Officer

10. The Discharger shall comply with the following compliance schedule in implementing the groundwater monitoring network approved by the Executive Officer in Provision F.9:

Task		Compliance Date
a.	Implement Monitoring Well installation Workplan	150 days following Workplan approval by the Executive Office
b.	Complete Monitoring Well Installation	60 days following Workplan implementation
c.	Submit Monitoring Well Installation Report of Results	30 days following Project Completion
d.	Commence Groundwater Monitoring	30 days following Project Completion

Technical reports submitted pursuant to this Provision shall be prepared and certified by a California registered civil engineer or geologist.

11. After satisfying Provision F.10.d, the Discharger shall continue monitoring in accordance with the groundwater monitoring program described in the MRP for **one full year** at least at the frequency specified in the MRP. **Within 90 days of completing one full year of sampling**, the Discharger shall submit a written technical report that characterizes the groundwater quality of each monitoring well. The technical report shall be prepared and certified by a California registered civil engineer or geologist. The report shall indicate for each constituent identified in the MRP the background concentration in background well(s), and the actual concentration in each compliance monitoring well. Determinations of background quality shall be made using the methods described in Title 27, section 20415(e)(10). The report shall compare actual concentrations in each compliance monitoring well with numeric limitations and background concentrations of Groundwater Limitations D.1 and D.2 and report the compliance results. For purposes of the Report, the Discharger will recommend background limitations for waste constituents not listed in Groundwater Limitation D.1, and for those listed in D.1 where background concentrations are greater than identified. Subsequent use of a concentration as a background limitation will be subject to the discretion of the Executive Officer.

12. By **15 January 2002**, the Discharger shall submit for Executive Officer approval a written work plan in the form of a technical report that sets forth a schedule for a systematic and comprehensive technical evaluation of each component of the WWTF's waste treatment and control to determine for each waste constituent best practicable treatment and control as used in Resolution 68-16. The technical report shall contain a preliminary evaluation of each component and propose a time schedule for completing the comprehensive technical evaluation. The technical report shall be prepared and certified by a California registered civil engineer. The schedule to complete all comprehensive technical evaluations shall be as short as practicable, and shall not exceed **one year**.

13. By the schedule approved by the Executive Officer pursuant to Provision F.12, but no later than **15 June 2004**, the written comprehensive technical evaluation shall be submitted with the Discharger's written recommendations for WWTF modifications (e.g., component upgrade and retrofit). The report shall include specific methods the Discharger proposes as a means to measure processes and assure continuous optimal performance of BPTC measures. Comprehensive technical evaluations shall be prepared and certified by a California registered civil engineer. The source of funding and proposed schedule for modifications shall be identified. The schedule shall be as short as practicable but in no case shall completion of the necessary improvement exceed **four years** past the Executive Officer's approval of the comprehensive technical evaluation unless the schedule is reviewed and specifically approved by the Board. The component evaluation, recommended improvements, and schedule are subject to the Executive Officers review and approval.

14. By **15 June 2004**, the Discharger shall submit a technical report that proposes specific numeric groundwater limitations that reflect full implementation of BPTC for Board consideration, and describe how these were determined considering actual data from compliance monitoring wells, impact reductions through full implementation of BPTC, reasonable growth, the factors in Water Code section 13241, etc. The Discharger should submit results of a validated groundwater model to support its proposal.

15. Upon completion of tasks set forth in Provisions F.12 through F.14, the Board shall consider the evidence provided and make a determination regarding whether the Discharger has justified BPTC and the appropriate final numeric groundwater limitations that comply with Resolution 68-16.

16. **By 180 days prior** to modifying WWTF sludge handling facilities as part of the WWTF expansion work, the Discharger shall submit for Executive Officer approval a technical report containing a work plan and implementation schedule for assessing waste constituent accumulation within the soil profile under its existing sludge handling facilities. At a minimum, the work plan shall propose: (1) monitoring locations, including control location(s); (2) sampling interval depths; (3) a list of constituents to be analyzed; (4) analytical methods for proposed constituents; and an implementation schedule. **Within 30 days** of receiving written approval of the work plan from the Executive Officer, the Discharger shall commence the soil assessment work. **Within 60 days** following the completion of soil assessment, the Discharger shall submit a written technical report describing the results of the soil assessment work, and in particular, an evaluation of whether waste constituent distribution warrants remedial work or groundwater investigation. This Provision shall be satisfied following written acceptance by the Executive Officer of the technical report. All reports submitted pursuant to this provision shall be prepared and certified by a California registered civil engineer.

17. The Discharger shall report to the Board any toxic chemical release data it reports to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to section 313 of the "Emergency Planning and Community Right to Know Act of 1986."

18. The Discharger shall implement best practicable treatment and control, including proper operation and maintenance, to comply with this Order.

19. If the Board determines that waste constituents in the discharge have reasonable potential to cause or contribute to an exceedance of a limit for groundwater, 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.

20. The Discharger shall submit to the 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 Board by letter when it returns to compliance with the time schedule.

21. The Discharger must comply with all conditions of this Order, including timely submittal of technical and monitoring reports as directed by the Executive Officer. 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.

22. 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 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.

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

I, GARY M. CARLTON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 14 June 2001.

GARY M. CARLTON, Executive Office

Order Attachments:

Monitoring and Reporting Program
A. Location Map
B. Flow Process Diagram
C. Information Needs for Sludge Management Plan
D. Standard Monitoring Well Provisions for Waste Discharge Requirements
Information Sheet
Standard Provisions (1 March 1991 version) (separate attachment to Discharger only)

RAS:fmc:6/14/01

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. 5-01-153
FOR
CITY OF HANFORD
WASTEWATER TREATMENT FACILITY
KINGS COUNTY

Specific sample station locations shall be established with concurrence of Board staff, and a description of the stations shall be submitted to the Board and attached to this Order.

INFLUENT MONITORING

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

Constituent/Parameter	Units	Type of Sample	Frequency
Flow	mgd	Metered	Continuous
BOD_5[1]	mg/L	24-hr Composite	Weekly
Total Suspended Solids (TSS)	mg/L	24-hr Composite	Weekly
Settleable Solids	mL/L	Grab	Weekly

[1] Five-day, 20° Celsius biochemical oxygen demand

EFFLUENT MONITORING

The Discharger shall collect effluent samples at a point in the system following treatment and before discharge to the equalization basin. Effluent samples shall be representative of the volume and nature of the discharge. Time of collection of a grab sample shall be recorded. Effluent monitoring shall include at least the following:

Constituent	Units	Type of Sample	Frequency
Color	Unitless	Observation	Daily
Settleable Solids	mL/L	Grab	Daily
pH	pH units	Grab	Daily
Total Coliform Organisms	MPN[2]/100 mL	Grab	Daily
BOD_5	mg/L	Grab	Weekly
TSS	mg/L	Grab	Weekly
EC[3]	µmhos/cm	Grab	Weekly
Total Dissolved Solids[4]	mg/L	Grab	Twice/Month[5]
Ammonia as N	mg/L	Grab	Twice/Month

Constituent	Units	Type of Sample	Frequency
Total Kjeldahl Nitrogen	mg/L	24-hr Composite	Twice/Month
Nitrate-Nitrogen	mg/L	24-hr Composite	Twice/Month
Total Nitrogen	mg/L	Calculated	Twice/Month
Sodium Adsorption Ratio	Unitless	Calculated	Monthly
General Minerals[6]	mg/L	Grab	Quarterly[7]

[1] If results of monitoring indicate that a pollutant appears to violate effluent limitations, but monitoring frequency is not sufficient to validate violation, the sampling frequency shall be increased to confirm the magnitude and duration of violation
[2] Most probable number
[3] Conductivity at 25°C
[4] TDS referenced hereafter in this program shall be determined using EPA Method No. 160.1 for combined organic and inorganic TDS and EPA Method No. 160.4 for inorganic TDS.
[5] Concurrent with EC sampling
[6] General Minerals Analyte List is detailed below.
[7] January, April, July and October

General Minerals Analyte List

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

Sample Collection and Preservation: Using proper sampling methods and appropriate sample containers is critical in obtaining valid results for general minerals analyses. Please follow laboratory directions and secure sample containers as appropriate for requesting analyses for general minerals (including total dissolved metals). **Any sample placed in an acid-preserved bottle must first be filtered** through a 0.45 µm nominal pore size filter or you risk the chance of increasing the concentration of metals to nonrepresentative values and making cation/anion balance impossible. If field filtering is not feasible, collect samples in unpreserved containers and submit to the laboratory within 24-hours with a request (on the chain-of-custody form) to immediately filter then preserve the sample.

Sample Analysis: Inform the laboratory that you are interested in "total dissolved metals" and write this on your chain-of-custody form in the same box as "General Minerals." This step should help insure that the laboratory filters samples before they are preserved. You must request these analyses separately on your chain-of-custody form.

SOURCE WATER MONITORING

The Discharger shall establish source sample stations where representative samples of the City of Hanford's water supply can be obtained. The results shall be reported as a flow weighted average and be supplemented with supporting calculations. Source water monitoring shall include:

Constituent	Units	Type of Sample	Frequency
EC	µmhos/cm	Grab	Quarterly[1]
TDS	mg/L	Grab	Once every three years[2]

[1] January, April, July and October
[2] Coincident with monitoring required by the California Department of Health Services

PRETREATMENT MONITORING

The Discharger shall submit annually a report to the Regional Board, with copies to EPA Region 9 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, including noncompliance with pretreatment audit/compliance inspection requirements, the Discharger shall also include reasons for noncompliance and state how and when the Discharger shall comply with such conditions and requirements. The annual pretreatment report is due by **28 February of each year.** In addition to the information required in the annual pretreatment report, the Discharger shall submit a quarterly report **by the 1st day of the second month following the end of each calendar quarter.** The report shall contain, but not be limited to, the items in Standard Provision E.7.

If none of the items in Standard Provision E.7 exists, at a minimum a letter indicating that all industries are in compliance and no violations or changes to the pretreatment program have occurred during the quarter must be submitted. The information required in the fourth quarter report shall be included as part of the annual report.

Signed copies of the reports shall also be submitted to the EPA Regional Administrator and the State Board at the following addresses, or as advised in writing subsequent to adoption of this Order:

Regional Administrator
U.S. EPA, Region 9
Water Management Division (W-5-2)
75 Hawthorne Street
San Francisco, CA 94105

Pretreatment Program Manager
Division of Water Quality
State Water Resources Control Board
P.O. Box 944213
Sacramento, CA 94244-2130

SLUDGE MONITORING

To monitor whether discharges to the WWTF are interfering with the treatment process or lessening biosolids quality, the Discharger shall collect a composite sample of sludge at least annually in accordance with EPA's POTW SLUDGE SAMPLING AND ANALYSIS GUIDANCE DOCUMENT, AUGUST 1989, and test for the following metals:

Arsenic	Copper	Nickel
Cadmium	Lead	Selenium
Molybdenum	Mercury	Zinc

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 sewage sludge, or removal of sewage sludge from the WWTF, the monitoring and record keeping requirements of 40 CFR 503 shall be met.

STORAGE POND MONITORING

Permanent markers shall be placed in the storage ponds with calibration indicating the water level at design capacity and available operational freeboard. The freeboard shall be monitored on all ponds to the nearest tenth of a foot. Storage pond monitoring shall include at least the following:

Constituent	Units	Type of Sample	Frequency
Freeboard	feet	Observation	Weekly
Dissolved Oxygen	mg/L	Grab[1]	As Required[2]

[1] Samples shall be collected from opposite to the inlet of storage ponds and analyzed for dissolved oxygen. Samples shall be collected between 0800 and 0900 hours. Time of sampling shall be reported.

[2] If offensive odor detected by or brought to the attention of WWTF personnel, monitor affected pond(s) daily until dissolved oxygen > 1.0 mg/L.

The Discharger shall inspect the condition of storage 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 Discharge Specifications B.10, B.11, B.12, or B.15, 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 Discharge Specification B.18.

GROUNDWATER MONITORING

Prior to collecting samples, the 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.

At least quarterly and concurrently with groundwater quality sampling, the Discharger shall measure the water level in each well. The Discharger shall report groundwater level data as groundwater depth (in feet and hundredths) and as groundwater surface elevation (in feet and hundredths above mean sea level). The horizontal geodetic location for each monitoring well shall be provided where the point of beginning shall be described by the California State Plane Coordinate System, 1983 datum.

In reporting the results of the first quarterly sampling event under the expanded groundwater monitoring network, 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.

Samples shall be collected quarterly from the approved monitoring wells and analyzed for the following:

Constituent	Units	Type of Sample	Frequency
EC	µmhos/cm	Grab	Quarterly[1]
TDS	mg/L	Grab	Quarterly[1]
Total Coliform Organisms	MPN/100 mL	Grab	Quarterly[1]
Total Organic Carbon	mg/L	Grab	Quarterly[1]
Ammonia as N	mg/L	Grab	Quarterly[1]
Nitrate-Nitrogen	mg/L	Grab	Quarterly[1]
Total Kjeldahl Nitrogen	mg/L	Grab	Quarterly[1]
Total Nitrogen	mg/L	Calculated	Quarterly[1]
General Minerals	mg/L	Grab	Quarterly[1]

[1] January, April, July, and October

After one full year of groundwater monitoring, the Discharger shall analyze monitoring data from background well(s) to compute background water quality values for each monitored constituent and to perform an initial assessment of whether there is evidence of an impact from the discharge. To complete this task, the Discharger shall use monitoring data from background and boundary wells in an appropriate data analysis method as described in Title 27, section 20415(e)(7-9) (hereafter Data Analysis Method). 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 perform the Data Analysis Method on the following constituents.

Groundwater Constituents to Evaluate Using Data Analysis Method

Alkalinity (as $CaCO_3$)	Phosphorus, Total Dissolved (P)
Ammonia nitrogen (as NH_3-N)	Potassium
Calcium	Sodium
Chloride	Sulfate
Hardness (as $CaCO_3$)	Total Dissolved Solids (TDS)
Iron	Total Kjeldahl Nitrogen (TKN)
Magnesium	Total Nitrogen
Nitrate nitrogen (as NO_3-N)	Total Organic Carbon (TOC)

If the Discharger during any quarterly data evaluation finds statistically significant evidence of an increase at boundary wells compared to background levels of TKN or TOC, or evidence of exceedances of Groundwater Limitation D.1, the Discharger shall conclude that it is in violation of waste discharge requirements unless it can demonstrate an offsite source. The Discharger shall describe the data analysis method used as well as the criteria it used for determining "statistically significant evidence," and submit within two weeks, of confirmation, a written report pursuant to Standard Provision B.1.

REPORTING

The Discharger shall report monitoring data and information as required in this Monitoring Reporting Program and as required in the Standard Provisions and Reporting Requirements.

Monthly monitoring reports shall be submitted to the Board by the **1st day of the second month** following sample collection, and include, at a minimum, monitoring data collected during the month (e.g., effluent pH and TSS). Samples taken annually shall be submitted with the monthly monitoring report following sample collection. In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents or parameters, and the concentrations or measurements are readily discernible. The data shall be summarized in a manner that clearly illustrates whether the discharge complies with waste discharge requirements. Incidences of noncompliance shall be identified, along with a description of corrective measures taken or planned to be taken to regain compliance. If any pollutant is monitored 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 monthly monitoring report. Such increased frequency shall be indicated in the tabulated data summarized in the monthly monitoring report.

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

1. The names, titles, certificate grade, and general responsibilities of persons operating and maintaining the wastewater treatment facility.

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

3. A certified statement of when monitoring and instrument devices were last calibrated (Standard Provision C.4).

4. A certified statement that the Operation & Maintenance Manual was reviewed within the last year as appropriate and been updated as necessary to reflect current treatment processes with appropriate procedures for troubleshooting.

5. The results of an annual evaluation conducted pursuant to Standard Provision E.4.

6. The most recent City of Hanford Annual Water Quality Report.

7. A summary of annual sludge monitoring data, including:

   a. Annual sludge production in dry tons and percent solids.

   b. A schematic diagram showing sludge handling facilities and solids flow diagram.

   c. Depth of application and drying times for sludge-drying beds.

   d. A description of disposal methods for grit, screenings, sludge, and biosolids, include the following information related to the disposal methods used at the WWTF. If more than one method is used, include the percentage of annual grit, screenings, sludge, or biosolids 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) including specific application areas within large sites 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).

8. A summary of groundwater monitoring, including:

   a. Hydrographs showing the groundwater elevation in each approved well for at least the previous five years. 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 of the background plots shall be the same as that used to plot downgradient elevation data;

   b. A description and graphical presentation of the gradient and direction of groundwater flow under the area encompassing the Facility and its storage ponds;

   c. Graphs of the laboratory analytical data for all samples taken from each approved well within at least the previous five calendar years. Each such graph shall plot the concentration over time of one or more tabulated constituent for a given monitoring well, at a scale appropriate to show trends or variations in water quality. The graphs shall plot each datum, rather than plotting mean values. For any given constituent, the scale for the background plots shall be the same as that used to plot downgradient data;

   d. All monitoring analytical data obtained during the previous four quarterly reporting periods, presented in tabular form, as well as 3.5" computer diskettes (or submitted separately via e-mail), either in MS-DOS / ASCII format or in another file format acceptable to the Executive Officer (e.g., Microsoft Excel); and

   e. A comprehensive discussion of the compliance record, and the result of any corrective actions taken or planned that may be needed to bring the Discharger into full compliance with the waste discharge requirements.

The report shall discuss 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, as a condition of in response to this Order shall comply with the signatory requirements in Standard Provision B.3. Reports submitted concerning facility performance must also be signed and certified by the chief plant operator. When reports contain laboratory analyses performed by the Discharger and the chief plant operator is not in the direct line of supervision of the laboratory, reports must also be signed and certified by the chief of the laboratory.

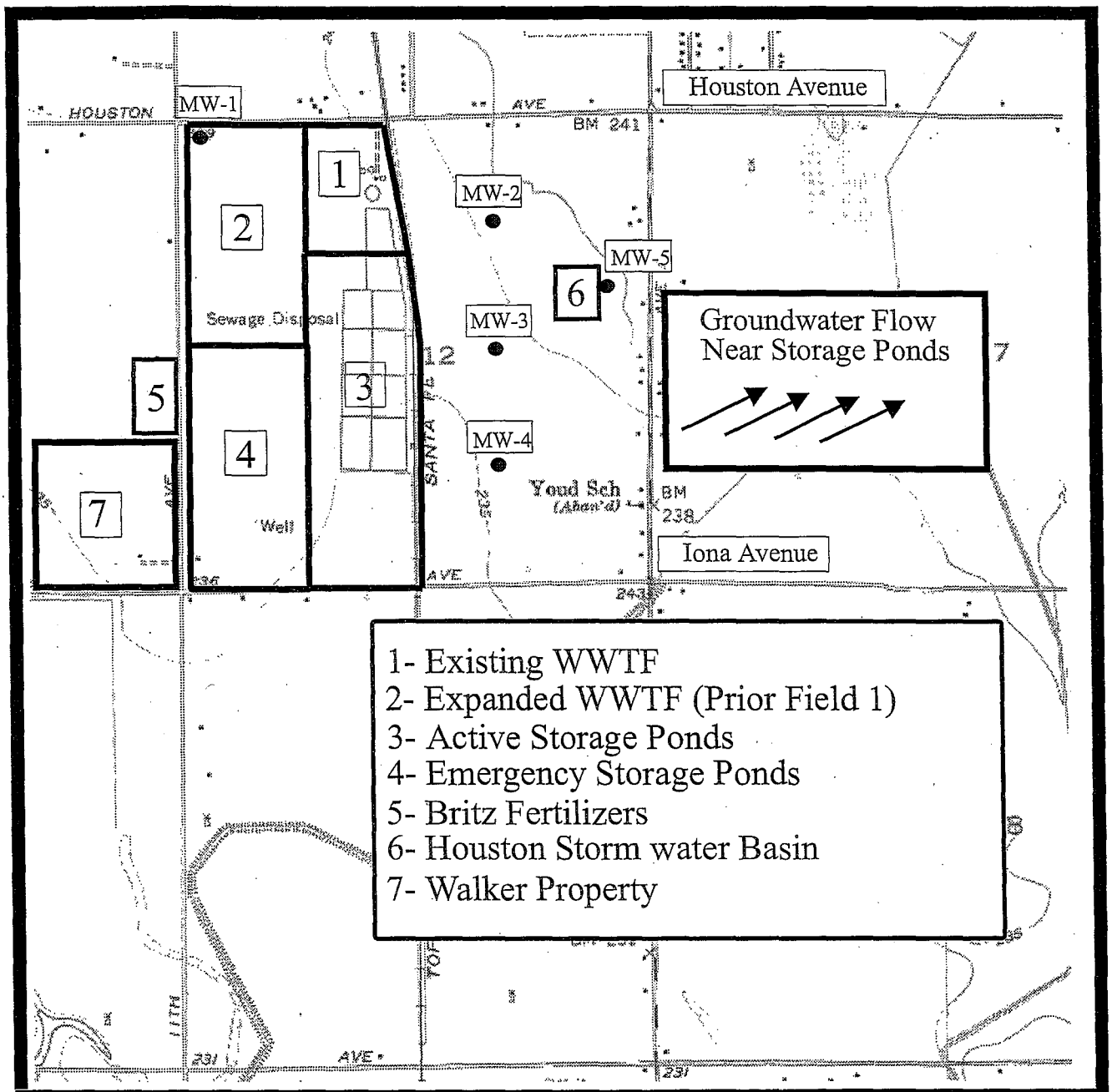
The Discharger shall implement the above monitoring program as of the date of this Order.

Ordered by:

GARY M. CARLTON, Executive Officer

14 June 2001
(Date)

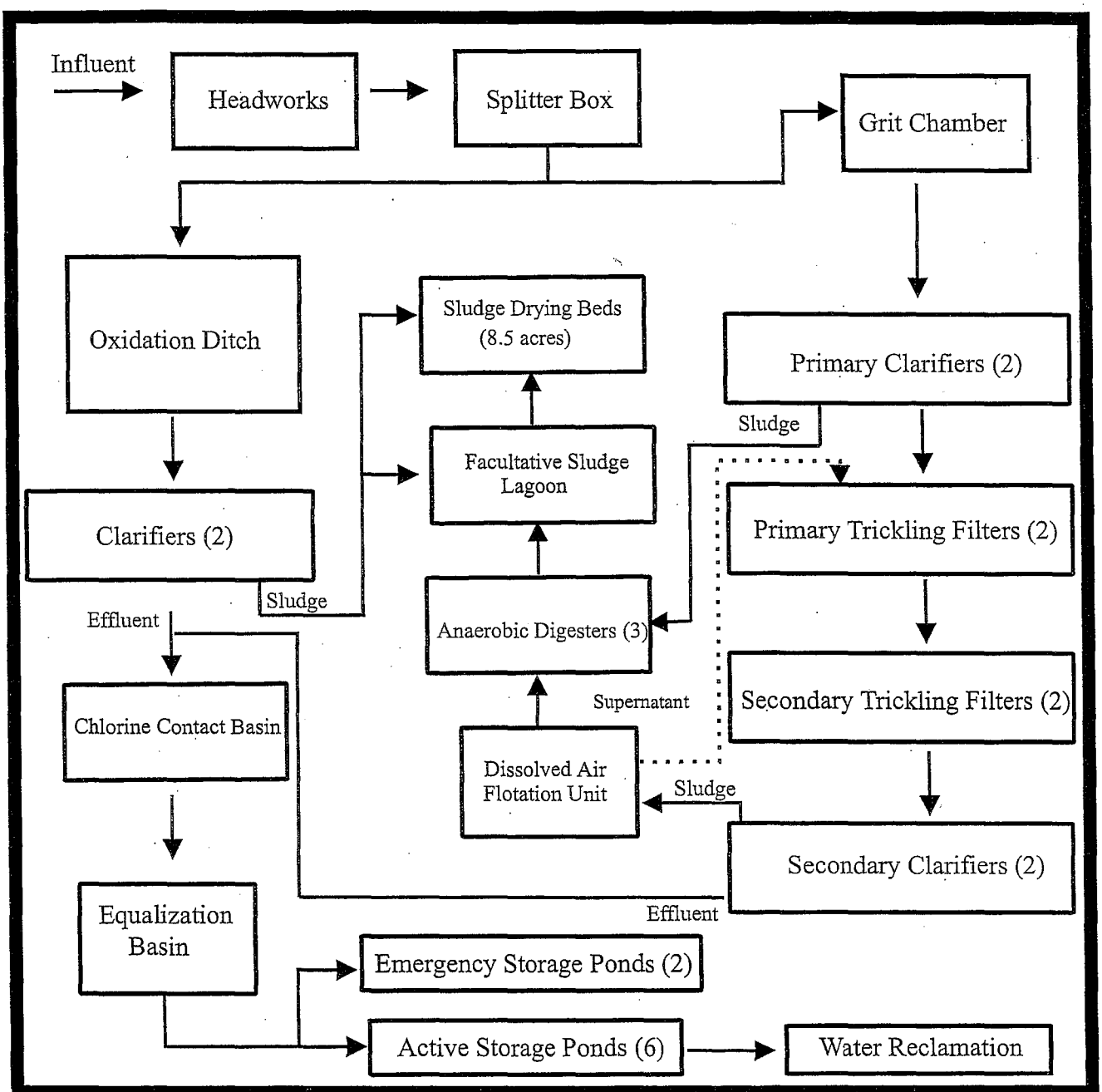
RAS/jlk:6/14/01



ATTACHMENT A
WASTE DISCHARGE REQUIREMENTS ORDER NO. 5-01-153
LOCATION MAP

CITY OF HANFORD
WASTEWATER TREATMENT FACILITY
KINGS COUNTY

Section 12, T19S, R22E, MDB&M
Hanford 7.5 Min. Quad Map



ATTACHMENT B
WASTE DISCHARGE REQUIREMENTS ORDER NO. 5-01-153

FLOW SCHEMATIC

CITY OF HANFORD
WASTEWATER TREATMENT FACILITY
KINGS COUNTY

WASTE DISCHARGE REQUIREMENTS ORDER NO. 5-01-153
FOR
CITY OF HANFORD
WASTEWATER TREATMENT FACILITY
KINGS COUNTY

ATTACHMENT C
INFORMATION NEEDS FOR SLUDGE MANAGEMENT PLAN

A. Wastewater Treatment Facility (WWTF)

1. Describe treatment processes at the wastewater treatment facility.
2. List significant industrial users (SIUs) that discharge to the wastewater treatment facility and describe how SIUs affect sludge production, sludge handling, and biosolids disposal.
3. Indicate whether the WWTF has an adopted source control ordinance or a pretreatment program, and if the latter whether the program is approved by the Board.
4. Indicate whether WWTF accepts septage and, if so, describe septage handling operation facilities.
5. Provide a WWTF site map showing:
   a. existing sludge handling facilities (e.g., sludge drying beds and sludge storage areas)
   b. abandoned sludge handling facilities (if applicable)
   c. location of groundwater monitoring wells, if any, and groundwater gradient.

B. Sludge Production

1. Provide a schematic diagram showing solids flow and sludge handling operations; include, where applicable, supernatant flow and handling operations.
2. Specify the quantity of sludge expected to annually accumulate in each wastewater treatment process, how it is quantified, and the expected removal frequency.
3. For sludge handling facilities with sludge drying beds:
   a. Describe number and size of sludge drying beds.
   b. Describe sludge drying bed construction (e.g., liner, leachate collection system).
   c. If sludge drying beds are not lined, thoroughly describe measures taken to ensure that area groundwater is not adversely affected by sludge drying operations.
   d. Indicate the expected frequency with which sludge will be applied to and removed from sludge drying beds.
4. Describe how biosolids are transferred to onsite biosolids storage facility (if applicable). If biosolids are removed directly from sludge drying beds, provide a plan that indicates when during the year you expect to dispose of biosolids and explain that whoever is responsible for disposing of your biosolids will be able to remove and dispose it at this time.

C. Biosolids Characterization

1. Describe proposed sampling procedures by indicating number of samples, sample locations, and sample composition. For reference consult *POTW Sludge Sampling an Analysis Guidance Document*, published by the EPA Publication No. 833-B-89-100.
2. Describe the methods proposed to meet the necessary levels of pathogen reduction (i.e., Class A or B according to 40 CFR 503.32) for the proposed method of sludge disposal.
3. Describe the methods proposed to meet vector reduction requirements, in accordance with 40 CFR Part 503.33.

D. Biosolids Storage

1. If on-site biosolids storage is used,
   a. Describe:
      i. Size of biosolids storage area
      ii. How frequently it will be used (emergency basis only or routine use)
      iii. Typical storage duration
      iv. Leachate controls
      v. Erosion controls
      vi. Run-on/runoff controls
   b. Indicate measures that will be taken to ensure that area groundwater is not adversely affected by the biosolids storage facility.
   c. For biosolids storage facilities that contain biosolids between 1 October and 30 April, describe how facilities are designed and maintained to prevent washout or inundation from a storm or flood with a return frequency of 100 years.
   d. Provide a map of showing setback distances from (where applicable)
      i. Property lines
      ii. Domestic water supply wells
      iii. Non-Domestic water supply wells
      iv. Public roads and occupied onsite residences
      v. Surface waters, including wetlands, creeks, ponds, lakes, underground aqueducts, and marshes
      vi. Primary agricultural drainage ways
      vii. Occupied non-agricultural buildings and off-site residences

viii. Primary tributary to a waterway or reservoir used for domestic water supply

ix. Domestic surface water supply intake

E. Spill Response Plan

1. Emergency contacts and notification procedures
2. Personal protective equipment requirements
3. Response instructions for
   a. spill during biosolids transport
   b. storage facility failure
   c. when hazardous or other unauthorized material is found

F. Method of Disposal

1. Describe and provide the following information related to biosolids disposal method(s). If more than one method will be utilized, include the percentage of annual biosolids production expected to be disposed of by each method.
   a. Landfill Disposal
      i. Name(s) and location(s) of landfill(s).
      ii. Waste discharge requirements order numbers adopted by the Regional Board that regulate the landfill(s).
      iii. Present classification of the landfill(s).
      iv. Name and telephone number of the contact person at the landfill(s).

   b. Incineration
      i. Name(s) and location(s) of incineration site(s).
      ii. Waste discharge requirements order numbers adopted by the Regional Board that regulate the incineration site(s).
      iii. Method of disposal of ash from the incineration site(s).
      iv. Names and locations of facilities receiving ash from the incineration site(s), if applicable.
      v. Name and telephone number of the contact person at the incineration site(s).
   c. Composting
      i. Name(s) and location(s) of composting site(s).

ii. Waste discharge requirements order numbers adopted by the Regional Board that regulate the composting site(s).

iii. Name and telephone number of the contact person at the composting site(s).

d. Land Application

i. Ownership of the site(s) where biosolids are applied.

ii. Assessor Parcel Numbers (APNs) of site(s) where biosolids are applied.

iii. Waste discharge requirements order numbers adopted by the Regional Board that regulate the biosolids application site(s).

WASTE DISCHARGE REQUIREMENTS ORDER NO. 5-01-153
FOR
CITY OF HANFORD
WASTEWATER TREATMENT FACILITY
KINGS COUNTY

ATTACHMENT D
STANDARD MONITORING WELL PROVISIONS

Prior to installation of groundwater monitoring wells, the Discharger shall submit a workplan containing at least the information specified in this document. Wells may be installed after the executive officer's approval of the workplan. Upon installation of the monitoring wells, the Discharger shall submit a report of results, as described below. A registered geologist, certified engineering geologist, or civil engineer registered or certified by the State of California must sign all workplans and reports.

Monitoring Well Installation Workplan

A. General Information:
   - Monitoring well locations and rationale
   - Survey details
   - Equipment decontamination procedures
   - Health and safety plan
   - Topographic map showing any existing monitoring wells, proposed wells, waste handling facilities, utilities, and other major physical and man-made features.

B. Drilling Details: describe drilling and logging methods

C. Monitoring Well Design:
   - Casing diameter
   - Borehole diameter
   - Depth of surface seal
   - Well construction materials
   - Diagram of well construction
   - Type of well cap
   - Size of perforations and rationale
   - Grain size of sand pack and rationale
   - Thickness and position of bentonite seal and sand pack
   - Depth of well, length and position of perforated interval

D. Well Development:
   - Method of development to be used
   - Method of determining when development is complete
   - Method of development water disposal

E. Surveying Details: discuss how each well will be surveyed to a common reference point

F. Soil Sampling (if applicable):
- Cuttings disposal method
- Analyses to be run and methods
- Sample collection and preservation method
- Intervals at which soil samples are to be collected
- Number of soil samples to be analyzed and rationale
- Location of soil samples and rationale
- QA/QC procedures

G. Well Sampling:
- Minimum time after development before sampling (48 hours)
- Well purging method and amount of purge water
- Sample collection and preservation method
- QA/QC procedures

H. Water Level Measurement:

The elevation reference point at each monitoring well shall be within 0.01 foot. Ground surface elevation at each monitoring well shall be within 0.1 foot. Method and time of water level measurement shall be specified.

I. Proposed time schedule for work.

Monitoring Well Installation Report of Results

A. Well Construction:
- Number and depth of wells drilled
- Date(s) wells drilled
- Description of drilling and construction
- Approximate locations relative to facility site(s)
- A well construction diagram for each well must be included in the report, and should contain the following details:
  - Total depth drilled
  - Depth of open hole (same as total depth drilled if no caving occurs)
  - Footage of hole collapsed
  - Length of slotted casing installed
  - Depth of bottom of casing
  - Depth to top of sand pack
  - Thickness of sand pack
  - Depth to top of bentonite seal
  - Thickness of bentonite seal

Thickness of concrete grout
Boring diameter
Casing diameter
Casing material
Size of perforations
Number of bags of sand
Well elevation at top of casing
Depth to ground water
Date of water level measurement
Monitoring well number
Date drilled
Location

B. Well Development:

Date(s) of development of each well
Method of development
Volume of water purged from well
How well development completion was determined
Method of effluent disposal
Field notes from well development should be included in report.

C. Well Surveying: provide reference elevations for each well and surveyor's notes

D. Water Sampling:

Date(s) of sampling
How well was purged
How many well volumes purged
Levels of temperature, EC, and pH at stabilization
Sample collection, handling, and preservation methods
Sample identification
Analytical methods used
Laboratory analytical data sheets
Water level elevation(s)
Groundwater contour map

E. Soil Sampling (if applicable):

Date(s) of sampling
Sample collection, handling, and preservation method
Sample identification
Analytical methods used
Laboratory analytical data sheets

INFORMATION SHEET

ORDER NO. 5-01-153
CITY OF HANFORD
WASTEWATER TREATMENT FACILITY
KINGS COUNTY

The City of Hanford wastewater treatment facility (WWTF or Facility) provides sewerage service to industrial, commercial, and residential customers within the city limits. Waste Discharge Requirements (WDRs) Order No. 91-164 currently regulates the WWTF and its discharge of up to 4.0 million gallons per day (mgd) of disinfected secondary-treated wastewater to onsite storage ponds. Effluent is reused on nearby farmland. The storage ponds also provide some disposal capacity by evaporation and percolation. The WWTF is about two miles south of Hanford and bounded on the north by Houston Avenue, on the west by 11th Avenue, on the south by Iona Avenue, and on the east by the AT&SF Railroad. The WWTF was originally constructed in 1948. Four upgrades and expansions have occurred since then, with the most recent one in 1993.

In March 1992, the City (or Discharger) submitted a Report of Waste Discharge (RWD) in support of an increase in permitted discharge flow from 4.0 to 5.5 mgd. Revised WDRs reflecting the increase were not processed. In the absence of revised WDRs, and pursuant to section 13264(2)(D) of the California Water Code, the Discharger initiated the increase in discharge flow as proposed in its March 1992 RWD.

The WWTF currently includes a headworks, primary clarifiers (2), primary trickling filters (2), secondary trickling filters (2), secondary clarifiers (2), a dissolved air flotation unit, anaerobic digesters (3), a facultative sludge lagoon, sludge drying beds (16), an effluent equalization basin, a gaseous chlorination system, a chlorine contact basin, and an effluent pumping station.

The Discharger submitted a RWD, dated 24 November 1999, in support of a project to expand the design capacity of its wastewater treatment facility (WWTF) from 5.5 to 8.0 mgd. The Discharger submitted the following supporting documents to complete the RWD: (a) *Recycled Water Engineering Report* (including Addendum Nos. 1, 2, and 3), (b) 29 February 2000 letter that addressed deficiencies in the RWD, and (c) *Wastewater Treatment and Disposal Engineering Report* (revised April 2000). The Discharger plans to provide an additional 2.5 mgd secondary treatment capacity by constructing an oxidation ditch facility and upgrading other WWTF units. A new headworks will reportedly be installed with two mechanical bar screens, an influent pump station, a parshall flume, and a two-way splitter box to deliver flows to both the trickling filter and oxidation ditch facilities. Secondary treated wastewater from the oxidation ditch facility will be discharged to the trickling filter plant for chlorination prior to discharge to storage ponds. A flow process diagram of the existing and proposed expanded Facility is shown in Attachment B. The RWD indicates that the Discharger intended to begin constructing the separate 2.5 mgd oxidation ditch facility in January 2001, with an expected completion date of July 2002.

The Discharger has eight interconnected effluent storage ponds that encompass an area of 144 acres. The Discharger plans to use two storage ponds (Ponds 5 and 8) for emergency effluent storage when the discharge does not meet Title 22 requirements. Effluent that does not meet Title 22 requirements will either evaporate or percolate to groundwater. The Discharger uses six storage ponds (surface area 77 acres) to store effluent for reclamation and for disposal by evaporation or percolation. The six storage ponds provide 805 acre-feet of storage, which is adequate for a design flow of up to 6.9 mgd in a 100-year rain event. Addendum No. 3 of the *Recycled Water Engineering Report* indicates that, to

provide adequate storage capacity for a design flow of 8.0 mgd in a 100-year rain event, the Discharger will need an additional 160 acre-feet of storage. The Discharger has indicated that it will deepen the six active storage ponds to provide the additional storage.

Pretreatment

The following three significant industrial users: El Mexicano, Mid-America Dairy, and Pirelli Armstrong Tire, discharge about 0.3 mgd of waste into the WWTF collection system. Pirelli Armstrong Tire recently closed its Hanford Plant. Other industrial users discharging include a paper manufacturer, radiator shops, auto shops, dry cleaners, and photo processors. On 3 February 1998, the Hanford City Council adopted Ordinance No. 98-02 amending Chapter 13.08 of Title 13 of the Hanford Municipal Code, which implements its Industrial Pretreatment Program (IPP). The Discharger's IPP was developed consistent with Title 40, Code of Federal Regulations (CFR), Part 403. The Discharger submitted its IPP for review and approval on 6 March 1998 and staff determined it complete on 11 August 2000. The pretreatment requirements included in this Order implement its approval. WWTF effluent is characterized on occasion by color. Staff observed the effluent to be dark gray on 27 August 1999 and slightly brown on 19 December 2000. The color appears to be due, in part, to dyes in the influent that originate from a paper manufacturer (International Paper).

Sludge Management

The Discharger pumps sludge from secondary clarifiers in the trickling filter plant to a dissolved air flotation (DAF) unit and from primary clarifiers to three anaerobic digesters, sludge from the DAF unit is pumped to three anaerobic digesters, while supernatant from the DAF unit is routed to the primary trickling filter, sludge and supernatant from the three anaerobic digesters are pumped to the unlined facultative sludge lagoon, from which it is discharged to unlined sludge drying beds. The Discharger proposes to pump sludge from secondary clarifiers in the oxidation ditch facility to the unlined facultative sludge lagoon or directly to unlined sludge drying beds.

Supernatant from the anaerobic digestion of trickling filter sludge typically has concentrations of TSS from 500 to 5,000 mg/L; BOD_5 from 500 to 5,000 mg/L; and ammonia as NH_3 from 400 to 600 mg/L, according to EPA's *Process Design Manual for Sludge Treatment and Disposal*, Publication Number 625/1-74-006. Supernatant and leachate from sludge are likely of similar quality. Supernatant from aerobic and anaerobic digestion should be routed back to the headworks of WWTFs due to its high concentrations of BOD_5 and total nitrogen, according to *Introduction to Environmental Engineering* by Mackenzie Davis and David Cornwell. *Introduction to Environmental Engineering* also indicates that lagoons that store sludge "should be equipped with sealed bottoms to protect groundwater." Communities with populations over 20,000 should consider using an alternative to sludge drying beds for sludge dewatering (e.g., a belt filter press), according to *Wastewater Engineering* by Metcalf & Eddy. *Wastewater Engineering* states that most water from sludge drying beds is removed by gravity drainage. Leachate from sludge drying beds should be collected and returned to the headworks of a WWTF, according to such authoritative sources as *Water Supply and Pollution Control* by Warren Viessman, Jr. and Mark Hammer, *Wastewater Engineering* by Metcalf and Eddy, and EPA's *Process Design Manual for Sludge Treatment and Disposal.*

For years, the Discharger has discharged sludge and supernatant from anaerobic digesters to an unlined facultative sludge lagoon, from which it is discharged to unlined sludge drying beds. There is a reasonable potential that groundwater degradation, and possibly pollution, has occurred. The Discharger's existing sludge handling facilities should not have unreasonably degraded groundwater, according to Discharger's consultant, Carollo Engineers, since such unlined facilities are "self-sealing" through continued use. While such unlined sludge handling facilities often exhibit slower infiltration rates through time, groundwater monitoring data is lacking for these or similar facilities to determine whether this assumption is valid. On its face, it appears best practicable treatment and control would necessitate that the Discharger collect all leachate from sludge drying bed operations and return it to the headworks of the WWTF, to ensure that groundwater is not degraded. The only possible justification for allowing current practices to continue is to establish that they have not degraded groundwater.

Currently, the Discharger's groundwater monitoring network is inadequate to evaluate the impact of its sludge handling operations on area groundwater and it is necessary to evaluate the impact. If resulting evidence indicates degradation has occurred to groundwater passing under the Facility's sludge management operations, the Discharger must implement best practicable treatment and control (BPTC). BPTC for sludge handling should include, at a minimum, the following: (a) ensuring that the facultative sludge lagoon is lined and that the integrity of the liner is maintained; (b) ensuring that sludge drying beds are lined and that the integrity of the liner is maintained; (c) collecting any leachate from sludge drying beds and routing it back to the headworks of the WWTF; (d) routing any supernatant from the DAF unit, anaerobic digesters, and/or facultative lagoon back to the headworks of the WWTF; and (e) lining the biosolids stockpile area. By letter dated 29 March 2001, the Discharger indicated that it would line all of its sludge handling facilities.

Water Reclamation

To ensure that it had adequate reclamation areas, the Discharger submitted an Irrigation Management Plan in 1992. In 1998 the Discharger terminated its agreement with its main recycler, Sanchez Brothers Farming. A 15 March 1999 staff inspection report found that the Discharger violated its disposal pond freeboard requirements and caused rising groundwater levels on neighboring properties, in part, due to a significant reduction in the amount of farmland available for reclamation. The table below shows the City's recycled water users, the Board-adopted Water Reclamation Requirements (WRRs), their 1992 acreage, and the amount of acreage documented in a 15 March 1999 staff inspection report:

Recycled Water User	WRR Order No.	1992 Acreage	1999 Acreage
D&P Sanchez	88-113 and 98-097 (Rescinded)	382.88	0
Loftis	91-166	31.00	0
Alcala	91-167	288.82	35
Brum	91-235 (Rescinded)	46.66	0
G&T Sanchez	88-113	244.50	234
Walker	91-168	357.74	0
	Total	1,351.60	269

As shown above, the Discharger's available reclamation areas decreased considerably between 1992 and 1999. Subsequent to the 15 March 1999 staff inspection report, Hakker Brothers purchased the acreage owned by G&T Sanchez and became regulated by Order No. 99-128, and the Board rescinded Order Nos. 88-113 and 98-097 for D&P Sanchez at its meeting of 29 October 1999.

By letter dated 20 May 1999, the Discharger requested approval of an emergency discharge of WWTF effluent to Lakeside Ditch for a period of no more than one year. Effluent disposal under the proposed emergency discharge would occur by percolation and evaporation, but violate Order No. 91-164, Discharge Prohibition A.1. By letter dated 10 June 1999, the Board indicated that it would not initiate an enforcement action for the Discharger's proposed emergency discharge provided the discharge complied with a series of conditions developed in consultation with the California Department of Health Services (DHS).

On 27 October 2000, the Board adopted WDRs Order No. 5-00-222, a "Master Reclamation Permit for Lakeside Ditch Company and the City of Hanford" for recycling WWTF effluent on approved use areas within Lakeside Ditch Company's 11,500-acre service area, and WDRs Order No. 5-00-223, a "Master Reclamation Permit for the City of Hanford" for recycling WWTF effluent on a 1,600-acre use area, and on up to 12,000 acres of farmlands along the ten-mile pipeline route to the 1,600-acre use area. These Orders have eliminated the Discharger's effluent disposal capacity problems. The Master Reclamation Permit for Lakeside Ditch Company (LDC) and the City of Hanford now regulate the farmland reclamation covered by WRRs Order Nos. 91-166, 91-167, 91-168, and 99-128. Accordingly, staff is proposing in a separate action that the Board rescind these Orders at the 27 July 2001 Board meeting. The Discharger will primarily recycle treated wastewater under the terms and conditions of Order No. 5-00-222. The Discharger has a long-term agreement with LDC that requires LDC to notify the Discharger two years before it will refuse to accept treated wastewater. Should LDC refuse to accept treated wastewater, the Discharger plans to build a ten-mile-long pipeline to the City-owned 1,600-acre use area and recycle treated wastewater there under the terms and conditions of Order No. 5-00-223.

Compliance Issues

During the heavy rain year of 1997-1998, the Discharger lacked effluent disposal capacity and applied a great portion of its effluent to Field 1, which resulted in standing water from about November 1997 through August 1998. Recycled water that does not percolate in a timely manner can cause nuisance and vectors conditions. In the summer of 1998, the local mosquito abatement district investigated an encephalitis outbreak in the Hanford area and documented the mosquito species culex tarsalis breeding in Field 1. This mosquito species is a known carrier of the encephalitis virus.

Effluent Limitation Violations. The Discharger periodically exceeded its effluent EC limitation (i.e., 500 µmhos/cm over source water) from May through December 1999, normally by 100 to 200 µmhos/cm. An effluent sample, collected on 24 September 1999, was about 2,000 µmhos/cm over the prescribed EC limitation. To address the violations, the Discharger required industrial users that were violating their TDS limits to either (1) change their operating procedures or (2) install equipment to reduce EC loadings to the WWTF. From January through November 2000, the Discharger violated its effluent EC limit once in March by 300 µmhos/cm. The Discharger also violated its effluent fecal

coliform limit several times in May 2000 and was in threatened violation in September and November 2000. Further, the Discharger violated its average and maximum effluent BOD_5 limitation in September and November 2000.

Rising Groundwater Levels. The Discharger experienced critical lack of disposal capacity following the termination of its reclamation agreement with Sanchez Brothers Farming. To increase disposal capacity, the Discharger created two disposal ponds (i.e., Ponds 5 and 8) along 11th Avenue. The Discharger began discharging effluent to Ponds 5 and 8 in November of 1998. Discharge to these two ponds contributed to rising groundwater levels at nearby Britz Fertilizers. The rising groundwater threatened the structural integrity of concrete pier footings that support two 12,000-gallon capacity anhydrous ammonia tanks. To mitigate the effects of rising groundwater levels from effluent percolation, the Discharger (a) stopped discharging to Ponds 5 and 8, and (b) dug a six-foot-deep groundwater interception trench along the northern and eastern boundaries of the Walker property adjacent to 11th Avenue and pumped groundwater draining to the trench to a segment of nearby Sand Slough. The Discharger recently backfilled the trench, as rising groundwater levels have not been a problem since the Discharger ceased discharging to Ponds 5 and 8.

Groundwater Conditions

The Discharger uses four monitoring wells to monitor the effect of percolating effluent on groundwater. Regional groundwater flows southeast and occurs about 90 feet below ground surface. However, depth to groundwater in the four monitoring wells near the storage ponds has ranged from about 15 to 40 feet below ground surface from 1994 through 2000. The supposed upgradient well (MW-1) is in the northwest corner of Field 1, while the supposed downgradient wells (MW-2, MW-3, and MW-4) are east of the percolation ponds, as shown in Attachment A. The Discharger recently installed a fifth monitoring well (MW-5) directly east of the Houston Street storm water basin, as the Discharger began temporarily discharging effluent to the storm water basin in October 1998 due to a lack of effluent disposal capacity. The Discharger stopped discharging effluent to the storm water basin in April 1999. The table below provides construction data for the four monitoring wells the Discharger's uses to monitor the effect of storage ponds on groundwater:

MW No.	Average Depth to Groundwater (ft)[1]	Cased Depth (ft)	Perforated Interval (ft)	Top of Casing Elevation (ft)
1	26.3	47	17-47	230.74
2	38.1	65	35-65	228.67
3	31.6	57	27-57	230.36
4	33.7	55	25-55	229.66

[1] Depth to groundwater data is from 1994 through 2000.

As indicated above, the perforation intervals differ for the four wells that comprise the current groundwater monitoring network (1, 2, 3 and 4). However, depth to groundwater also varies in the four monitoring wells. As such, the monitoring wells measure similar strata of groundwater, which is necessary to appropriately evaluate the effect of WWTF operations on groundwater.

While monitoring wells are constructed appropriately, they are not satisfactorily positioned to monitor the effect of WWTF operations on area groundwater. MW-1 is about 2,000 feet northwest of the storage ponds. As groundwater in the area of the disposal ponds flows to the northeast, MW-1 is not upgradient of WWTF operations. MW-2, MW-3, and MW-4 are all about 1,000 feet to the east of the storage ponds. Therefore, the effects of percolating effluent will be significantly diluted by area groundwater before it reaches these wells. Self-monitoring data from February 1994 through June 2000 appear to confirm this finding. The concentrations of nitrate-nitrogen in MW-1 are much higher (average around 23 mg/L) when compared to WWTF effluent (average around 10 mg/L) or to the Discharger's downgradient monitoring wells (average around 3 to 9 mg/L). If MW-1 were providing background groundwater quality data, downgradient concentrations would be expected to be between 10 and 23 mg/L (i.e., between percolating effluent and background data). A time-scale plot of nitrate-nitrogen and TDS concentrations in the Discharger's supposed upgradient well (i.e., MW-1) and three downgradient wells are shown in Figures 1 and 2 below:

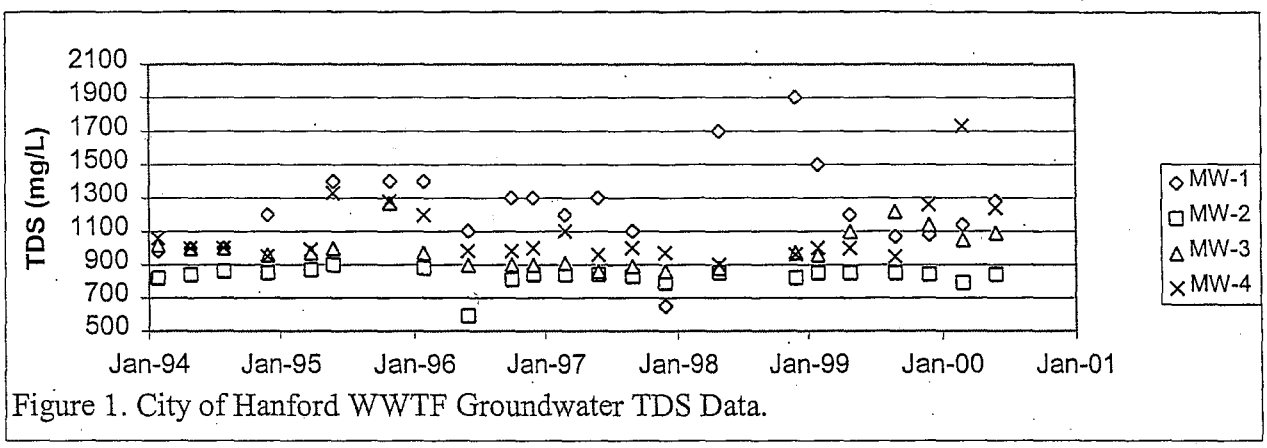


Figure 1. City of Hanford WWTF Groundwater TDS Data.

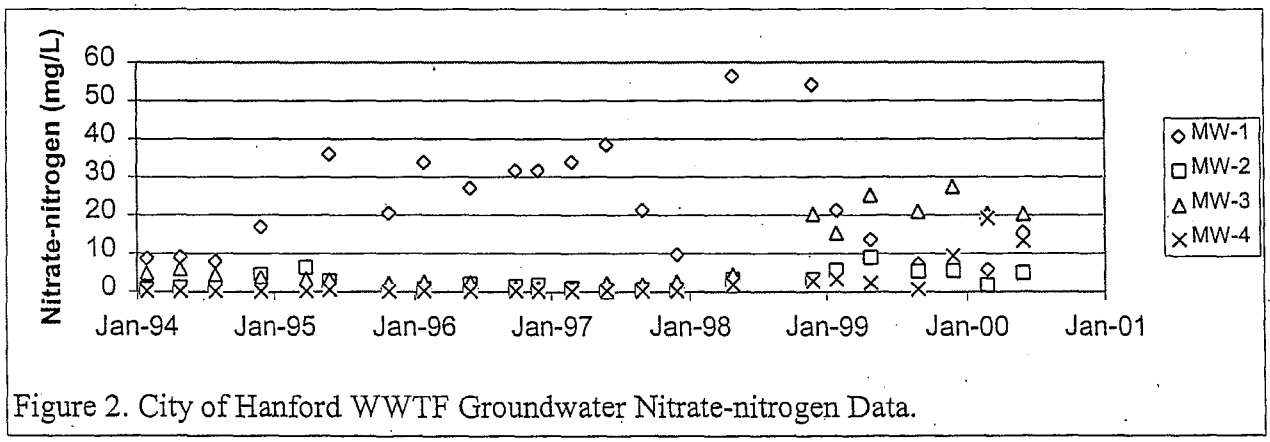


Figure 2. City of Hanford WWTF Groundwater Nitrate-nitrogen Data.

After applying biosolids to Field 1 in 1997, the Discharger inundated Field 1 with effluent from about November of 1997 through August 1998. Groundwater samples collected from MW-1 (in the northwest corner of Field 1) in May and December of 1998 revealed nitrate-nitrogen concentrations of 56.4 and 54.2 mg/L, and TDS concentrations of 1,700 and 1,900 mg/L. These levels are well above the historic

average for these constituents in MW-1. As such, it is reasonable to conclude that the Discharger's repeated application of biosolids to Field 1, followed by inundating Field 1 for a prolonged period, contributed to these elevated nitrogen and TDS concentrations in groundwater passing through MW-1.

The hydrographs in Figures 3 and 4, below, show groundwater elevations and depth to groundwater in the four monitoring wells from 1994 through 2000:

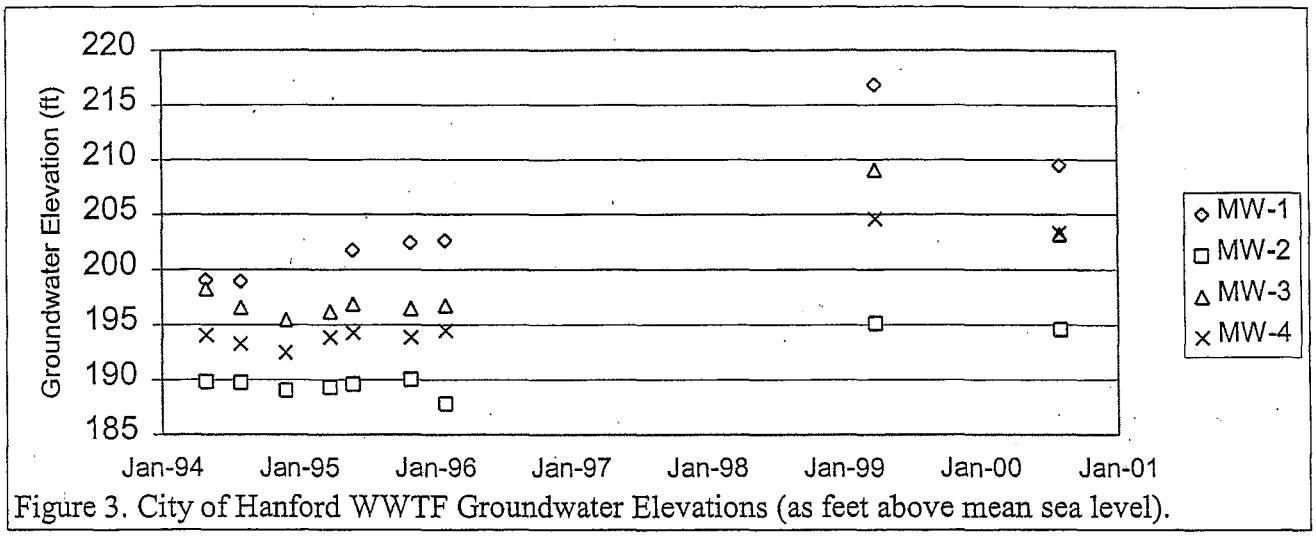


Figure 3. City of Hanford WWTF Groundwater Elevations (as feet above mean sea level).

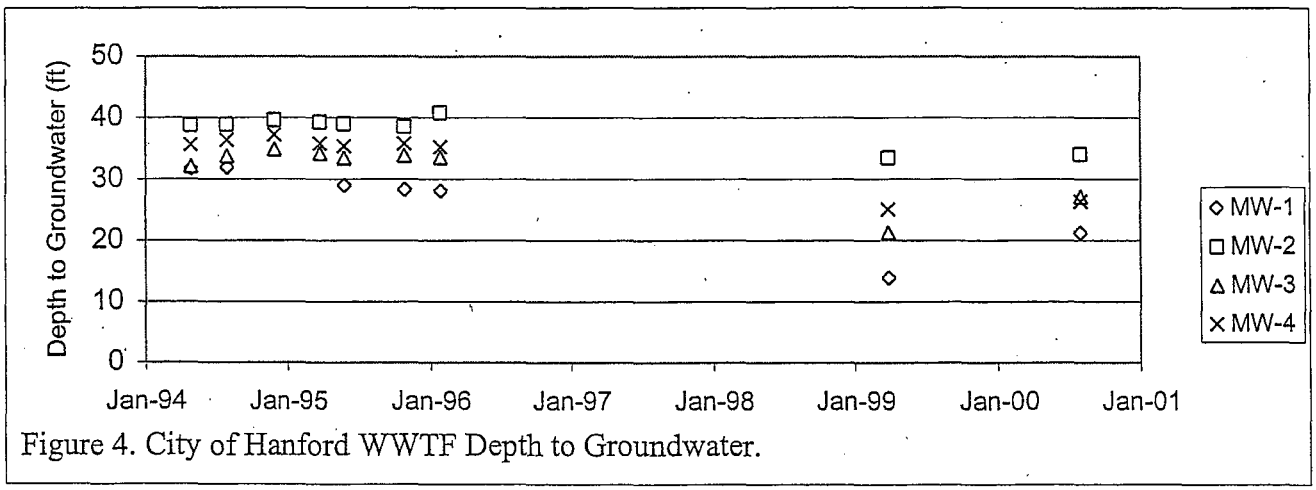


Figure 4. City of Hanford WWTF Depth to Groundwater.

Water Quality Control Plan for the Tulare Lake Basin

The Board adopted a *Water Quality Control Plan for the Tulare Lake Basin, Second Edition* (hereafter Basin Plan), which designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for waters of the Basin. The Basin Plan identifies existing and potential beneficial uses of the Tule River south of Lake Success as municipal supply, agricultural supply, industrial service supply, industrial process supply, water contact recreation, noncontact water

recreation, warm fresh water habitat, wildlife habitat, and groundwater recharge. The Basin Plan identifies existing and potential beneficial uses of area groundwater as domestic, industrial, and agricultural supply.

The Basin Plan indicates that degradation of groundwater in the Tulare Lake Basin by salts is unavoidable without a plan for removing the salts from the Basin. In the absence of a valley wide drain to carry salts out of the valley, the Basin Plan indicates that the only other solution is to manage the rate of degradation by minimizing the salt loads to groundwater. The Board implements this policy, in part, by prescribing effluent salinity limits in waste discharge requirements for all discharges to land in the Basin. The Basin Plan's discharge salinity limit consists of narrative and numerical limits:

> "The incremental increase in salts from use and treatment must be controlled to the extent possible. The maximum EC shall not exceed the EC of the source water plus 500 µmhos/cm. When the source water is from more than one source, the EC shall be a weighted average of all sources."

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 evaporation of reclaimable wastewater is not an acceptable permanent disposal method where the opportunity exists to replace an existing use or proposed use of fresh water with recycled water. Since the WWTF will have a design flow of 8.0 mgd, the Basin Plan also requires that the WWTF provide at least secondary treatment. Secondary treatment consists of 80 percent BOD and total suspended solids (TSS) removal or a monthly average effluent BOD and TSS concentration of not more than 40 mg/L each, whichever is more restrictive.

Antidegradation

The antidegradation directives of section 13000 of the California Water Code 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," or "Antidegradation" Policy). Resolution 68-16 is applied on a case-by-case, constituent-by-constituent basis in determining whether a certain degree of degradation can be justified. It is incumbent upon the Discharger to provide technical information for the Board to evaluate that fully characterizes:

- all waste constituents to be discharged, the background quality of the uppermost layer of the uppermost aquifer
- the background quality of other waters that may be affected
- the underlying hydrogeologic conditions
- waste treatment and control measures
- how treatment and control measures are justified as best practicable treatment and control

- the extent the discharge will impact the quality of each aquifer
- the expected degradation compared to water quality objectives

In allowing a discharge, the Board must comply with CWC section 13263 in setting appropriate conditions. The 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 Board need not authorize the full utilization of the waste assimilation capacity of the groundwater (CWC 13263(b)) and must consider other waste discharges and factors that affect that capacity. The applicable beneficial uses (industrial, agricultural, and domestic supply in this instance), procedure for application of water quality objectives, and the process for and factors to consider in allocating waste assimilation capacity are set forth in the Basin Plan.
This discharge has been occurring for years. Previous conditions of discharge have specified that no degradation is allowed. However, 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. Some degradation for certain constituents is consistent with maximum benefit to the people of California because the technology, energy, water recycling, and waste management advantages of municipal utility service to the State far outweigh the environmental impact damage of a community that would otherwise be reliant on numerous concentrated individual wastewater systems. Economic prosperity of valley communities is of maximum benefit to the people of California, and therefore sufficient reason to accommodate increases in wastewater discharge provided terms of reasonable degradation are defined and met. The proposed Order authorizes some degradation consistent with the maximum benefit to the people of the State.

Groundwater monitoring data at this site is insufficient to establish the most appropriate receiving water limits. In addition, as explained elsewhere in this information sheet, certain aspects of waste treatment and control practices have not been and are unlikely to be justified as representative of BPTC. Reasonable time is necessary to gather specific information about the facility and the site to make informed, appropriate, long-term decisions. This proposed Order, therefore, establishes interim receiving water limitations to assure protection of the beneficial uses of waters of the State pending the completion of certain tasks and provides time schedules to complete specified tasks. The tasks provide that the Discharger is expected to identify, implement, and adhere to best practicable treatment and control as individual practices are reviewed and upgraded in this process. During this period, degradation may occur from certain constituents, but by interim conditions can never exceed water quality objectives (or background water quality should it exceed objectives) or cause nuisance.

Water quality objectives define the least stringent limits that could apply as water quality limitations for groundwater at this location, except where background quality unaffected by the discharge already exceeds the objective. The values below 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 quality limit established in the proposed Order is the most stringent of the values listed for the listed constituents.

Constituent	Units	Value	Beneficial Use	Criteria or Justification
Ammonia	mg/L	0.5	MUN[1]	Taste and Odor[2]
Boron	mg/L	0.7	AGR[3]	Boron sensitivity[4]
Chloride	mg/L	106	AGR[3]	Chloride sensitivity on certain crops irrigated via sprinklers[4]
		142	AGR[3]	Chloride sensitivity on certain crops[4]
		250	MUN[1]	Recommended Secondary MCL[5]
		500	MUN[1]	Upper Secondary MCL[5]
Conductivity (EC)	µmhos/cm	700	AGR[3]	Salt sensitivity[4]
		900	MUN[1]	Recommended Secondary MCL[5]
		1,600	MUN[1]	Upper Secondary MCL[5]
Iron	mg/L	0.3	MUN[1]	Secondary MCL[6]
Manganese	mg/L	0.05	MUN[1]	Secondary MCL[6]
Nitrate as N	mg/L	10	MUN[1]	Primary MCL[7]
Nitrite as N	mg/L	1	MUN[1]	Primary MCL[7]
pH	pH Units	6.5 to 8.5	MUN	Secondary MCL[8]
Sodium	mg/L	69	AGR[3]	Sodium sensitivity on certain crops[4]
Total Coliform Organisms	MPN/100 mL	2.2	MUN[1]	Basin Plan
Total Dissolved Solids	mg/L	450	AGR[3]	Salt sensitivity[4]
		500	MUN[1]	Recommended Secondary MCL[5]
		1,000	MUN[1]	Recommended Upper MCL[5]
Total Trihalomethanes	µg/L	100	MUN	MCL[9]
Chloroform	µg/L	1.1	MUN[1]	Narrative Toxicity Criteria[10]
Bromodichloromethane	µg/L	0.27	MUN[1]	Narrative Toxicity Criteria[10]
Dibromochloromethane	µg/L	0.37	MUN[1]	Narrative Toxicity Criteria[10]
Bromoform	µg/L	4.3	MUN[1]	Narrative Toxicity Criteria[10]

1 Municipal and domestic supply
2 Council of the European Union, On the Quality of Water Intended for Human Consumption, Council Directive 98/83/EC (3 November 1998).
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, California Code of Regulations (CCR), section 64449, Table 64449-B
6 Title 22, CCR, section 64449, Table 64449-A
7 Title 22, CCR, section 64431, Table 64431-A
8 United States Environmental Protection Agency
9 Title 22, CCR, section 64439
10 California Environmental Protection Agency, Office of Environmental Health Hazard Assessment Cancer Potency Factor as a Drinking Water Level, *California Environmental Protection Agency Toxicity Criteria Database*

Municipal wastewater contains numerous dissolved inorganic waste constituents (i.e., salts, minerals) that together comprise total dissolved solids (TDS). Each component constituent is not individually critical to any beneficial use. Constituents that are critical are individually listed. 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 that allows for the rapid estimation of TDS from EC measurements.

Treatment Technology and Control

Given the character of municipal wastewater, secondary treatment technology is generally sufficient to control degradation of groundwater from decomposable organic constituents. Adding disinfection significantly reduces populations of pathogenic organisms, and reasonable soil infiltration rates and unsaturated soils can reduce them further. Neither organics nor total coliform, the indicator parameter for pathogenic organisms, should be found in groundwater in a well-designed, well-operated facility. Hence, the groundwater limits proposed for these constituents are nondetect, which is less than the water quality objective.

Municipal wastewater typically contains nitrogen in concentrations greater than water quality objectives, which vary according to the form of nitrogen. Degradation by nitrogen can be controlled by an appropriate secondary treatment system (e.g., oxidation ditch), tertiary treatment for nitrogen reduction, and agronomic reuse on harvested crops. The effectiveness varies, but generally best practicable treatment and control should be able to control nitrogen degradation at a concentration well below the water quality objectives. The proposed interim limitation reflects water quality objectives.

Waste constituents that are forms of salinity pass through the treatment process and soil profile and effective control of long-term affects relies upon effective source control and pretreatment measures. In the best of circumstances, long-term land discharge of treated municipal wastewater will degrade groundwater with salt (as measured by TDS and EC) and the individual components of salts (e.g., sodium, chloride). Not all TDS constituents pass through the treatment process and soil profile in the same manner or rate. Chloride tends to pass through both rapidly to groundwater. The proposed Order sets water quality objectives for the interim while site-specific, constituent-specific limits are developed in conjunction with a BPTC evaluation of source control and pretreatment. The next Order will likely contain effluent limits for salt components that, if met, assure groundwater quality will be controlled to an acceptable level.

Other indicator constituents for monitoring for groundwater degradation due to recharged effluent include total coliform organisms, ammonia, total nitrogen, and total trihalomethanes (when the effluent is chlorinated). Total trihalomethanes (TTHMs) are chlorinated organic materials that are toxic at low concentrations. Common TTHMs include bromoform, bromodichloromethane, dibromochloromethane, and chloroform. While the State drinking water regulations (i.e., Title 22, CCR, section 64439) establish a maximum contaminant level for TTHMs of 100 µg/L, the actual concentrations at which THMs components are considered "toxic" to humans are much lower (e.g., chloroform's human health toxicity limit is 1.1 µg/L). The Basin Plan states that groundwaters "shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life associated with designated beneficial uses." As indicated in the above table, groundwater limitations necessary to enforce the Basin Plan's narrative toxicity objective are significantly lower than that necessary to meet the maximum contaminant level for TTHMs in drinking water.

Boron is another TDS constituent that may occur in wastewater in concentrations greater than groundwater depending on the source water, to the extent residents use cleaning products containing boron, and whether any industrial dischargers utilize boron (e.g., glass production, cosmetics). 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. 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. It is inappropriate to allow degradation of groundwater with such constituents, so proposed limitations are nondetect.

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. Dissolved iron and manganese, along with elevated alkalinity, hardness and nitrogen concentrations, 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. Though iron and manganese limits are set at the water quality objective, groundwater pH is expected to remain the same as background.

Title 27

Title 27, CCR, section 20380 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 is acceptable.

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, except for residual sludge and solid waste generated as part of the treatment process [section 20090(a) of Title 27]. The condition requires that the discharge not result in violation of any water quality objective in groundwater.

Treatment and storage facilities for sludge that are part of the WWTF are considered exempt from Title 27 under section 20090(a), under the condition 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, degradation of groundwater must be consistent with Resolution 68-16 and in no case greater than water quality objectives. The conditions for sludge, solid waste, and biosolids management proposed in the interim Order are intended to assure this and must all be evaluated along with other aspects of BPTC.

Proposed Order Terms and Conditions

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 current treatment process incorporates secondary treatment technology.

The Discharger's discharge of effluent to Ponds 5 and 8 contributed to rising groundwater levels at nearby Britz Fertilizers, which threatened the structural integrity of concrete pier footings that support two 12,000-gallon-capacity anhydrous ammonia tanks. This Order prohibits the discharge of effluent to storage ponds in a manner that causes groundwater levels to rise on neighboring properties to the extent that it inhibits the beneficial uses of those properties. The Discharger also discharged treated wastewater to a storm water retention pond from October 1998 through April 1999. This Order prohibits the discharge of wastes to storm water retention basins.

The effluent limits prescribed in this Order for BOD_5, TSS, and EC, are based on the Basin Plan. This Order carries over the effluent limitations for BOD_5, TSS, settleable solids, EC and total coliform organisms from the previous Order. The discharge specifications regarding dissolved oxygen and freeboard are consistent with Board policy for the prevention of nuisance conditions, and are applied to all such facilities. Since treated wastewater will be used for reclamation by farmers and be visible to the public when it is conveyed through the Lakeside Ditch Canal, this Order requires that treated wastewater be free of discoloration that causes nuisance or adversely affects beneficial uses.

Title 22, section 60323, requires recyclers of treated municipal wastewater to submit an engineering report detailing the use of recycled water, contingency plans, and safeguards. WDRs Order No. 5-00-222 for Lakeside Ditch Company and the City of Hanford and Order No. 5-00-223 for the City

of Hanford incorporate the Discharger's contingency plan and prohibit the discharge of recycled water to use areas when effluent coliform concentrations exceed 23 MPN/100 mL, and do not allow the Discharger to resume discharging recycled water to use areas until the coliform count remains below 23 MPN/100 mL for three consecutive days. This Order also includes this specification.

As described previously, the proposed Order prescribes interim limitations to protect area groundwater for existing and anticipated beneficial uses until the Discharger proposes for Board consideration site-specific, constituent-specific limits in conjunction with a demonstration of BPTC of source control, pretreatment, treatment and effluent disposal. Groundwater in the WWTF vicinity is currently used for domestic, industrial and agricultural beneficial uses. Urban growth in the vicinity may necessitate use of area groundwater for municipal supply. To protect these existing and anticipated uses, the proposed Order's limitations are equivalent to water quality objectives necessary for area groundwater to continue to be an anticipated source of agriculture, domestic, and municipal supply.

To ensure protection of area groundwater for municipal and domestic beneficial uses, the proposed Order's limitations are equivalent to drinking water standards for nitrate-nitrogen, iron, manganese, and Total Trihalomethanes, and within the allowable levels for TDS and EC. Further, the proposed Order prescribes a narrative groundwater limitation that requires that the discharge not impart taste, odor, or color that creates nuisance. The ammonia-nitrogen limitation is based on the taste- and odor-threshold for human consumption.

To ensure protection of area groundwater for agriculture supply, the proposed Order's limitations are based on present and anticipated land uses in the WWTF vicinity and water quality objectives to protect these crop types. According to the UC Cooperative Extension, the primary crops near the WWTF are cotton, alfalfa, corn, walnuts, almonds, canning tomatoes, and wine grapes. Currently, all crops are furrow or flood irrigated. Since most of the farms are technologically limited and area soils are slightly saline, flood and furrow irrigation methods are likely to persist. While present and anticipated crops near the WWTF are unlikely to incorporate sprinkler irrigation, the proposed Order sets groundwater limitations, in part, to protect sprinkler irrigation of chloride or sodium sensitive crops (e.g., corn). The proposed Order also prescribes numerical groundwater limitations for EC and boron to protect salt-sensitive corps (e.g., walnuts and corn) and boron sensitive crops (e.g., walnuts).

To prevent sodium and chloride from causing foliar damage on crops near the WWTF that could be sprinkler irrigated (e.g., corn), Agricultural Salinity Assessment and Management, published by the American Society of Civil Engineers indicates that irrigation water should not contain concentrations of sodium above 230 mg/L or chloride above 350 mg/L. Accordingly, the proposed Order sets a sodium limit of 230 mg/L. Since the recommended chloride limit for protecting municipal use is more restrictive, the proposed Order set this limit at 250 mg/L.

Groundwater near the WWTF has levels of EC and TDS that are above the lower recommended level (i.e., 900 µmhos/cm for EC and 500 mg/L for TDS) for protecting municipal use. Crop yields for pertinent crops in the area (e.g., walnuts and row crops) do not experience reductions in yields if the EC level is below 1,100 µmhos/cm, according to guidelines for identifying the quality of irrigation water compiled by Ayers and Westcot in 1985 (Food and Agriculture Organization of the United Nations —

Irrigation Drainage Paper No. 29). Accordingly, the proposed Order sets an EC limit of 1,100µmhos/cm and TDS limit of 660 mg/L (EC limit*0.6), as this is protective for agriculture use and within the range that is protective for municipal use.

Area groundwater flows in a northeasterly direction. Urban development and cotton and corn cropland dominate land use to the north and northeast of the WWTF. Cropland immediately east of the WWTF is dominated by cotton and corn, and includes a 19-acre walnut orchard. With respect to boron sensitivity, area crops are sensitive to boron in concentrations exceeding the following: alfalfa (>4.0 mg/L), cotton and corn (>2.0 mg/L), and walnut (>1.0 mg/L) (Wilcox, L.V., Boron Injury to Plants, USDA Bulletin 211, 1960). The Discharger reports that effluent boron concentration is about 0.9 mg/L and reflects the relatively high boron content in the City's source water and not boron contributed by industrial discharges. Given the relatively low percolation of soils underlying WWTF storage ponds, and the concentration effect of evaporation, the concentration of boron in first-encountered groundwater immediately downgradient of theWWTF is likely to exceed 0.9 mg/L. Because the dominant crops downgradient of the WWTF storage ponds are semitolerant and tolerant to boron, the proposed Order prescribes an interim boron groundwater limit of 1.4 mg/L, which is adequate to maintain the beneficial use for area groundwater for irrigating crops that are boron semitolerant (e.g., corn).

Monitoring Requirements

Section 13267 of the CWC authorizes the 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.

This Order contains influent and effluent monitoring of all constituents that required monitoring in the previous Order, with the addition of effluent monitoring for TDS and general minerals. The addition of effluent TDS and general minerals monitoring is to develop a more accurate characterization of the discharge and its impact on groundwater. To determine whether the Discharger is in compliance with Discharge Specification B.4, it is required to monitor its source water quarterly for EC and semiannually for TDS. To determine the efficiency of the Discharger's operation, the Discharger is required to monitor influent weekly for settleable solids, BOD_5 and TSS. In order to adequately characterize its wastewater effluent, the Discharger is required to monitor daily for color, pH, settleable solids, and total coliform organisms; weekly for TSS, EC, and BOD_5; twice/month for TDS, ammonia, TKN, nitrate-nitrogen; and quarterly for general minerals. To ensure that storage ponds do not create nuisance conditions, the Discharger is required to monitor freeboard and dissolved oxygen content weekly.

This Order requires the Discharger to collect a composite sample of sludge at least annually, 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. Further, this Order requires that storage, use and disposal of biosolids comply with the self-implementing federal regulations of 40 CFR 503, which are subject to enforcement by the US Environmental Protection Agency not the Board, and 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).

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 waste quality, application rates, and groundwater.

Title 27 regulations pertaining to groundwater monitoring and the detection and characterization of waste constituents in groundwater have been in effect and successfully implemented for many years. No regulation currently specifies similar criteria more suitable for a situation where extensive infiltration into groundwater occurs. However, where, as here, such infiltration occurs, it is appropriate that the Title 27 groundwater monitoring procedures be extended and applied on a case-by-case basis under Water Code section 13267.

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 will monitor the quality of groundwater unaffected by the discharge and serve as 'background.' Other monitoring wells will be for determining compliance with Groundwater Limitations D.1, D.2, D.3, and D.4.

The Discharger must monitor groundwater for constituents present in the discharge and 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 groundwater sampling events. The proposed Order requires the Discharger to monitor groundwater quarterly for EC, TDS, total coliform organisms, total organic carbon, ammonia, nitrates, TKN, and general minerals in monitoring wells near its storage ponds, sludge drying beds, and facultative sludge lagoon. Further, the proposed Order requires the Discharger to monitor groundwater elevations quarterly. For each constituent where no increase in concentration is authorized over background, the Discharger must, as part of each monitoring event, compare concentrations of constituents found in each monitoring well to the background concentration to determine compliance.

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 contains interim limitations. 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 in accordance with procedures set forth in the Basin Plan that requires consideration of multiple factors. 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.

Several other more likely reasons for reconsidering terms of the Order exist, and the Order may be opened for this purpose at the Board's discretion. For example, Board procedures require periodic review of the effectiveness of requirements at a frequency proportional to the threat the discharge has to water quality with update as appropriate. The Order will definitely be reopened for consideration of BPTC and establishing final numeric groundwater limitations. It is also conceivable that monitoring of compliance may identify a waste constituent, possibly a toxic waste constituent, that violates or threatens to violate groundwater limitations, establishing a need to consider an appropriate numeric effluent limit for that waste constituent.

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