CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2004-0003

WASTE DISCHARGE REQUIREMENTS
FOR
SACRAMENTO COUNTY
BOYS RANCH WASTEWATER TREATMENT FACILITY
SACRAMENTO COUNTY

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

1. Sacramento County (hereafter Discharger) submitted a Report of Waste Discharge (RWD), dated 30 May 2001, for updated Waste Discharge Requirements (WDRs) for the Sacramento County Boys Ranch wastewater treatment facility. Supplemental information was received on 16 August 2001.

2. Based on the RWD and information in the case file, staff prepared tentative WDRs and the Regional Board subsequently adopted WDRs Order No. 5-01-256 on 19 October 2001. That Order prescribes requirements for the Discharger's Boys Ranch wastewater treatment facility. The Discharger filed a petition with the State Water Resources Control Board (State Board) seeking a stay and review of WDRs Order No. 5-01-256.

3. On 18 January 2002, the Executive Officer formalized an agreement with the Discharger in which the Discharger withdrew its request for a stay in consideration of the Regional Board's agreement to voluntarily stay certain provisions of Order No. 5-01-256.

4. On 11 February 2003, the Executive Officer executed a *Stipulation for Order of the State Water Resources Control Board* that formalized an agreement reached between the Regional Board and the Discharger with respect to certain disputed specifications, provisions, and monitoring requirements of Order No. 5-01-256.

5. On 26 March 2003, the Executive Officer issued Revised Monitoring and Reporting Program No. 5-01-256 pursuant to the *Stipulation for Order of the State Water Resources Control Board.*

6. On 16 September 2003, the State Board adopted Order No. WQO-2003-0014 (State Board Order), which documented the State Board's ruling on the Discharger's petition. The State Board Order upheld the requirements of WDRs Order No. 5-01-256 that (1) required the Discharger to install groundwater monitoring wells and to comply with the pond dissolved oxygen requirement of 1.0 mg/l, and (2) - established interim groundwater limitations. In addition, the State Board Order validated the Regional Board's rejection of a groundwater mixing zone. The State Board, however, remanded the WDRs to the Regional Board, directing the Regional Board to revise the WDRs to (1) confine the groundwater limitations and groundwater monitoring to waste constituents identified in the discharge or to constituents that may degrade groundwater as a result of the discharge, and (2) remove the conditional requirement to install aeration equipment.

7. On 16 October 2003, the Discharger filed suit in Sacramento County Superior Court against the State Board and the Regional Board (Sacramento Superior Court Case No. 03CS011521). The Discharger alleged that the State Board improperly upheld the groundwater limitation for total coliform organisms and requested a peremptory writ of mandate to vacate State Board Order No. WQO-2003-0014 and require the Regional Board to modify the groundwater limitation for total coliform.

8. On 26 November 2003, the Discharger submitted additional analytical results to characterize the wastewater pursuant to the Executive Officer's request. Per State Board Order No WQO-2003-0014, this data has been used to help determine the constituents for which to establish groundwater limitations and require groundwater monitoring.

9. Based on the above, Order No. 5-01-256 is in need of revision to implement the agreements the Executive Officer reached with the Discharger, to consider new evidence and facts made available since its adoption, and to consider appropriate discharge requirements in accordance with State Board Order No. WQO-2003-0014.

Existing Facility and Discharge

10. For the purposes of this Order, the term "wastewater treatment facility" (WWTF) shall mean the sanitary sewage collection and transport system, as well as the components of the wastewater treatment plant.

11. The Boys Ranch is 12 miles south of Folsom and approximately one mile west of Scott Road on Boys Ranch Road, in northeastern Sacramento County. The WWTF (on Assessor's Parcel Numbers 008-060-001; -003; -004; and -028; and 08-020-008; and -024) is owned and operated by Sacramento County. The WWTF is in Section 18, T8N, R8E, MDB&M, as shown on Attachment A, which is attached hereto and made part of the Order by reference.

12. The WWTF receives primarily domestic wastewater from the Boys Ranch, a youth correctional facility. At the time the RWD was submitted in 2001, the facility population was approximately 100 wards and 70 staff, but the Discharger projected that the population would to increase to 120 wards in 2002.

13. The WWTF consists of a gravity collection system, a 9,000-gallon temporary storage/holding tank, a sewage distribution box, and two unlined percolation/evaporation ponds as shown on Attachment B, which is attached hereto and made part of the Order by reference.

14. The two ponds cover a total surface area of approximately 2.9 acres. The pond berms are approximately three feet above ground surface while the inverts are approximately four feet below grade. The wastewater ponds are adjacent to the southern property boundary of the Boys Ranch. Wastewater is concentrated through evaporation, and infiltrates into the bottom soils of the ponds. The water balance indicates that approximately 7.6 inches of wastewater infiltrates through the ponds each month.

15. Based on data from a flow meter installed in January 2002, the current average daily influent flow to the WWTF is approximately 6,000 gallons per day (gpd). Using a total monthly flow equivalent to 15,000 gpd for each month of the year, the Discharger's water balance indicates that the hydraulic treatment and disposal capacity of the existing pond system is adequate to accommodate a monthly average flow rate of 15,000 gpd.

16. The Discharger's self-monitoring reports indicate that the dissolved oxygen concentrations in the raw sewage evaporation/percolation ponds have ranged from 0.6 to 18.2 mg/L. Dissolved oxygen concentrations of less than 1.0 mg/L are indicative of insufficient oxygen for an aerobic treatment environment. Odors that develop when there is insufficient oxygen can travel many miles on breezes, as in the early morning. When the cause of such deficiencies is not readily corrected, it can lead to nuisance odor conditions. Although odor complaints have not been received about the Boys Ranch ponds, it is appropriate to monitor pond performance and the potential to create nuisance conditions.

17. Based on analytical data from sampling events on 21 and 22 October 2003, which were provided by the Discharger on 26 November 2003, influent to the wastewater ponds and effluent in the ponds is characterized as follows:

	Analytical Result (mg/L except as noted)	
Constituent/Parameter	Wastewater Influent	Wastewater in Pond
BOD_5	240 to 1,000	110
Total Suspended Solids	130 to 270	600 to 790
Total Dissolved Solids	550 to 1,200	1200
Volatile Dissolved Solids	44 to 65	32 to 49
Total Kjeldahl Nitrogen	34 to 140	67 to 77
Nitrite Nitrogen	<0.10 to 1.7	<0.1
Nitrate Nitrogen	0.11 to 0.45	<0.10
Ammonia Nitrogen	17 to 30	1.4 to 1.6
PH	8.1 standard pH units	9.9 to 10 standard pH units
Chloride	48 to 140	300 to 310
Total Coliform Organisms	50,000,000 MPN/100mL	240,000 MPN/100mL
Total Fecal Organisms	8,000,000 MPN/100mL	130,000 MPN/100mL
Aluminium [1]	30 to 40 µg/L	<10 to 10 µg/L
Arsenic [1]	0.9 to 1.3 µg/L	10 µg/L
Barium [1]	36 to 57 µg/L	14 to 18 µg/L
Boron [1]	0.7	2.1 to 2.2
Cadmium [1]	<0.1 µg/L	<0.1 µg/L
Calcium	37 to 40	32 to 37
Chromium, total	2.8 to 4.1 µg/L	2.8 to 4 µg/L
Chromium, hexavalent	2 to 7 µg/L	<2 to 3 µg/L
Copper [1]	8.9 to 28 µg/L	11 to 12 µg/L

	Analytical Result (mg/L except as noted)	
Constituent/Parameter	Wastewater Influent	Wastewater in Pond
Iron [1]	70 to 190 µg/L	<0.5
Lead [1]	<0.25 to 0.26 µg/L	<0.25 µg/L
Magnesium [1]	9.8 to 11	1.6 to 1.9
Manganese [1]	15 to 21 µg/L	2 to 4.2 µg/L
Mercury [1]	0.0020 to 0.0053 µg/L	0.0019 µg/L
Nickel [1]	2.0 to 3.3 µg/L	9.4 to 9.6 µg/L
Potassium	14 to 58	59 to 63
Sodium	89 to 170	300
Silver [1]	<0.1	<0.1 µg/L
Sulfate	60 to 100	86 to 87
Vanadium [1]	<2 µg/L	17 to 18 µg/L
Zinc [1]	10 to 30 µg/L	<10 to 10 µg/L

[1] Samples were filtered prior to preservation, so results represent dissolved concentrations.

18. As part of its RWD, the Discharger stated that boiler blowdown is discharged to ground outside the boiler building, but did not characterize the discharge. Boiler blowdown typically contains elevated concentrations of dissolved solids that may degrade groundwater and sometimes must be classified as designated waste (as defined in California Water Code (CWC) Section 13173). The Discharger needs to properly characterize the discharge and if, designated waste, it is appropriate to require that the Discharger contain the waste and dispose of it off-site at a properly permitted facility. If not designated waste, the Discharger must evaluate whether continued separate discharge, or a discharge to the WWTF, best satisfies the discharge requirements set forth herein.

Sanitary Sewer System

19. The Discharger's sanitary sewer system component of the WWTF collects wastewater using sewers, pipes, pumps, and/or other conveyance systems and directs this raw sewage to the unlined ponds. The RWD describes the conveyance system as consisting of 2,200 feet of 6-inch gravity sewer line.

20. A "sanitary sewer overflow" is defined as a discharge to ground or surface water from the sanitary sewer system at any point upstream of the wastewater treatment ponds. Temporary storage and conveyance facilities (such as wet wells, tanks, highlines, etc.) may be part of the sanitary sewer system and discharges to these facilities are not considered sanitary sewer overflows, provided that the waste is fully contained within these temporary storage/conveyance facilities.

21. At this facility, sanitary sewer overflows consist of varying mixtures of domestic sewage, and industrial wastewater. The chief causes of sanitary sewer overflows can include grease

blockages, root blockages, debris blockages, sewer line flood damage, manhole structure failures, vandalism, pump station mechanical failures, power outages, storm or groundwater inflow/infiltration, lack of capacity, and contractor caused blockages.

22. Sanitary sewer overflows often contain high levels of suspended solids, pathogenic organisms, toxic pollutants, nutrients, oxygen demanding organic compounds, oil and grease, and other waste constituents. Sanitary sewer overflows can cause temporary exceedances of applicable water quality objectives, pose a threat to public health, adversely affect aquatic life, and impair the public recreational use and aesthetic enjoyment of surface waters in the area.

23. The WWTF experienced four sanitary sewer overflows between December 1999 and October 2001. The Discharger reported that two of these spills were caused from corrosion damage along 450 feet section of steel influent pipe. The Discharger replaced the damaged section of pipe with PVC pipe; however, sanitary sewer overflows have continued to occur after the sewer line replacement. The Discharger has since developed a plan for routine inspection and maintenance to prevent sanitary sewer overflows.

24. The Discharger is expected to take all necessary steps to adequately maintain, operate, and prevent discharges from its sanitary sewer collection system. The Discharger submitted an acceptable sanitary sewer operation, maintenance overflow prevention and response plan, and is expected to implement its plan.

Site-Specific Conditions

25. The WWTF site is within a small valley and is relatively level at an elevation of approximately 140 feet above mean sea level (MSL). An ephemeral stream tributary to Carson Creek flows adjacent to the eastern wastewater pond.

26. The land surrounding the Boys Ranch is zoned for agricultural and residential uses. The residential parcels are a minimum of forty acres. As there is no public water supply utility in the area, all residences must rely on individual wells for domestic and agricultural supply.

27. According to a geological investigation report prepared for the Discharger in August 2002, a total of six exploratory trenches were excavated to approximately 11 feet below ground surface (bgs) on two separate dates in July and August of 2002. Surface soils encountered were primarily sandy and silty clays to a depth of approximately seven to nine feet bgs. The surface clays are underlain by interbedded sands and gravels of unknown vertical and lateral extent. Clays were encountered in the bottom of two of the trenches below the coarse-grained material. Groundwater readily seeped into the trenches through the coarse-grained material and stabilized at approximately 10 feet bgs.

28. The Discharger operates an agricultural supply well approximately 400 feet west of the wastewater ponds, as shown on Attachment A. According to information supplied by the Discharger in February 2002, the well is approximately 150 feet deep with perforations from 67

to 150 feet below the ground surface. It was constructed without a sanitary seal in 1958 to a depth of 218 feet and subsequently backfilled to 150 feet below ground surface in 1970. The original Well Driller's Report filed with the Department of Water Resources indicates that, beneath six feet of topsoil, the driller encountered a four-foot thick layer of coarse gravel overlaying a ten-foot layer of clay. Alternating layers or lenses of gravel, sand, clay, sandstone, and shale extended to the bottom of the well boring at 218 feet.

29. The average annual precipitation in the vicinity of the Boys Ranch facility is 18.6 inches, and the 100-year total annual precipitation is 31.2 inches.

30. The reference evapotranspiration rate (ET_0) for the northeastern Sacramento County area is approximately 57 inches per year.

31. The Boys Ranch facility is within the Middle Sierra Hydrologic Area (No. 532.22), as depicted on interagency hydrologic maps prepared by the Department of Water Resources in August 1986.

Groundwater Considerations

32. As described in Finding No. 27 above, groundwater near the wastewater disposal ponds was encountered at approximately 10 feet bgs (or approximately six feet below the base of the ponds) in the summer of 2002. Based on water table elevation measurements, the calculated gradient at that time was towards the southwest.

33. Groundwater samples were obtained from each of the six backhoe trenches for a preliminary assessment of groundwater quality in the vicinity of the wastewater ponds, as summarized in the table below. Approximate trench locations are depicted on Attachment B. Based on the presumptive southwesterly gradient, trenches N and E were upgradient of the ponds, and trenches SW and S were downgradient of the ponds. It has yet to be determined whether groundwater in the upgradient trenches was out of the influence of waste management activities at the site, and therefore whether or not it represents true background conditions**.**

	Analytical Result by Trench ID No. (mg/L except as noted) [1]					
Constituent/Parameter	N	E	SE	SW	NW	S
Total dissolved solids	725	305	380	510	420	555
Volatile dissolved solids	83	82	79	52	82	52
Electrical conductivity (µmhos/cm)	315	380	585	680	490	775
Total organic carbon	<5	<5	6.9	20	12	29
Chloride	19	19	61	58	55	77
Nitrate as nitrogen	10	18	6.1	13	9.1	5

	Analytical Result by Trench ID No. (mg/L except as noted) [1]					
Constituent/Parameter	N	E	SE	SW	NW	S
Nitrite as nitrogen	ND [2]	ND [2]	ND [2]	ND [2]	ND [2]	ND [2]
Ammonia as nitrogen	<1	<1	<1	<1	<1	<1
Total Kjeldahl nitrogen	2.5 [3]	0.78 [3]	0.5 [3]	0.56 [3]	0.49	0.82
Boron, dissolved	0.06 [3]	0.004 [3]	0.002 [3]	0.25	0.093	0.26
Iron, dissolved	0.13	0.13 [3]	0.13 [3]	0.13 [3]	0.14 [3]	0.20 [3]
Manganese, dissolved (µg/L)	2.4 [3]	9.2	5.1	1.2 [3]	2.9	57
Sodium	30	12	23	56	44	62
pH (standard units)	6.8	6.5	6.5	6.7	6.6	6.1
Total coliform organisms (MPN/100 mL)	40	4,500 [4]	65	450	12,000 [4]	260
Fecal coliform organisms (MPN/100 mL)	<2	<2	<2	<2	<2	<2

[1] Mean of reported results for two sampling events two months apart.
[2] Not detected. Reporting limits varied from 0.1 to 1.5 mg/L.
[3] Not detected in one analysis; value shown is the single detection.
[4] Mean of two disparate values.

34. These data, although not conclusive, indicate that groundwater quality beneath the wastewater ponds may be degraded by total dissolved solids (TDS), electrical conductivity (EC), chloride, and sodium. Because of the potential for environmental cross-contamination in open exploratory trenches, the total coliform organism data cannot be interpreted. It is appropriate that the Discharger install permanent groundwater monitoring wells, determine true background groundwater quality, and complete a formal evaluation of groundwater degradation. It is also appropriate to require groundwater monitoring for all constituents detected in the pond effluent, as well as those that are breakdown products of the wastewater constituents and those that could be leached from the soil as a result of conditions caused by the discharge.

35. Analytical data from a water sample obtained from the Discharger's agricultural supply well in July 2001 indicate that the TDS concentration was low (180 mg/L), nitrate was not detected, and total coliform organisms were present at a density of 8 MPN/100 mL.

36. The Discharger obtains its domestic water supply from a well approximately 10,000 feet west of the ponds. Analytical data for samples obtained from the domestic water supply well in December 1999 and July 2001 are summarized below.

	Analytical Result (mg/L except as noted)	
Constituent/Parameter	December 1999	July 2001
Total dissolved solids	200	--
PH	6.7 pH units	7.8 pH units
Nitrate	<2.0	--
Alkalinity as CaCO3	74	140
Hardness as CaCO3	89	100
Calcium	16	25
Chloride	29	--
Magnesium	12	9.4
Sodium	26	70
Sulfate	31	--
Total coliform organisms	--	<2.2 MPN/100mL

-- Not analyzed.

State Board Resolution No. 68-16

37. State Board Resolution No. 68-16 ("Statement of Policy with Respect to Maintaining High Quality of Waters of the State") (hereafter Resolution No. 68-16) requires the Regional 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 Regional Board's policies (e.g., quality that that does not conform to water quality objectives). In addition, Resolution No. 68-16 requires that discharges of waste to existing high quality waters "be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained."

38. Some degradation of groundwater by some of the typical waste constituents released with a discharge from a domestic wastewater treatment plant (after effective source control, treatment, and control) that provides utility service for a public institution is consistent with maximum benefit to the people of California. Degradation of groundwater by waste constituents (e.g., toxic chemicals) other than those specified in the groundwater limitations in this Order, and by waste constituents that can be effectively removed by conventional treatment and soil attenuation (e.g., total coliform bacteria) is not of maximum benefit. When allowed, the degree of degradation permitted depends upon many factors (i.e., natural background water quality, the waste

constituent, the beneficial uses and most stringent water quality objective, source control measures, and waste constituent treatability).

39. An increase in the resident and employee population at the Boy's Ranch, if projections are realized, would respond to the demands of the juvenile justice system of Sacramento County, and therefore sufficient reason exists to accommodate growth and groundwater degradation around the wastewater treatment plant, provided that the terms of the Water Quality Control Plan for the Sacramento and San Joaquin River Basins (Basin Plan) are met.

Basin Plan, Beneficial Uses, and Regulatory Considerations

40. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition*, (Basin Plan) designates beneficial uses, establishes water quality objectives, contains implementation plans and policies to achieve the objectives for all waters of the basin, and incorporates by reference plans and policies adopted by the State Board. Pursuant to CWC Section 13263(a), waste discharge requirements must implement the Basin Plan.

41. Surface water drainage is to Carson Creek, a tributary of Deer Creek, which in turn discharges to the Cosumnes River.

42. The Basin Plan designates the beneficial uses of Cosumnes River as municipal and domestic supply; agricultural supply; water contact recreation; non-contact water recreation; warm freshwater habitat; cold freshwater habitat; migration of aquatic organisms; spawning reproduction and/or early development; and wildlife habitat.

43. The Basin Plan designates the beneficial uses of underlying groundwaters as municipal and domestic supply, agricultural supply, industrial service supply, and industrial process supply.

44. The Basin Plan establishes numerical and narrative water quality objectives for surface water and groundwater within the basin. Numerical water quality objectives are maximum limits directly applicable to the protection of designated beneficial uses of the water. The Basin Plan requires that the Regional Board, on a case-by-case basis, follow specified procedures to determine maximum numerical limitations that apply the narrative objectives when it adopts waste discharge requirements.

45. The Basin Plan specifies a numerical water quality objective for ground waters for Bacteria that states, in part, the following:

> *"The following objectives apply to all ground waters of the Sacramento and San Joaquin River Basins, as the objectives are relevant to the protection of designated beneficial uses."*

"Bacteria

In ground waters used for domestic or municipal supply (MUN), the most probable number of coliform organisms over any seven-day period shall be less than 2.2/100mL."

Groundwater, as described in the Basin Plan (page I-1.00), includes all subsurface waters that occur in fully saturated zones and fractures within soils and other geologic formations.

46. The Regional Board applies the bacteria objective to all ground waters designated as municipal or domestic supply (MUN), not just those waters currently used for MUN.[1] This interpretation is consistent with the CWC and the Basin Plan The Regional Board has consistently interpreted the objective to apply to groundwater designated for MUN. The Regional Board has a long-standing pattern and practice of adopting WDRs that reflect this interpretation. The following excerpts from the Basin Plan clearly support the plain meaning of the Basin Plan as well as the Regional Board's established pattern and practice:

    a. The introductory paragraph on Water Quality Objectives for Ground Waters (page III-9.00 of the Basin Plan) states: *"The following objectives apply to all ground waters of the Sacramento and San Joaquin River Basins, as the objectives are relevant to the protection of designated beneficial uses."*

    b. The Policy for Application of Water Quality Objectives (page IV-16.00) states: *"Water quality objectives apply to all waters within a surface water or ground water resource for which beneficial uses have been designated, rather than at intake, wellhead, or other point of consumption."* This clearly contradicts the Discharger's position that the water quality objective for bacteria in groundwater applies only to those water actually used for MUN purposes.

    c. State Board Resolution No. 88-63 (Adoption of Policy Entitled "Sources of Drinking Water") defines all groundwaters of the State to be suitable or potentially suitable for MUN uses, and states that they should be designated as MUN in Basin Plans unless at least one the following three criteria are satisfied:

        - The total dissolved solids concentration of the resource exceeds 3,000 mg/L and it is not reasonably expected by the Regional Board to supply a public water system.

        - The resource is contaminated such that it cannot be reasonably treated for domestic use using either Best Management Practices or best economically achievable treatment practices.

        - The water source does not provide sufficient water to supply a single well capable of producing an average sustained yield of 200 gallons per day.

    Accordingly, the Regional Board designated all groundwaters as suitable or potentially suitable for MUN in the Basin Plan (pages II-2.00 and -3.00). Regardless of the data that a

[1] See further, the attached "Information Sheet", which is incorporated into this Order by reference.

Discharger or other interested party may provide supporting a determination that a particular resource should be excepted from the MUN designation, the Regional Board can only "de-designate" a particular resource through amendment of the Basin Plan.

47. The Basin Plan includes a water quality objective for Chemical Constituents that, at a minimum, requires waters designated as domestic or municipal supply to meet 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, Table 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) of Section 64449, 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 that the Regional Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.

48. The Basin Plan contains narrative water quality objectives for Chemical Constituents, Tastes and Odors, and Toxicity. The Toxicity objective, in summary, requires that groundwater 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. The Chemical Constituents objective requires that groundwater "shall not contain chemical constituents in concentrations that adversely affect beneficial uses". The Tastes and Odors objective requires that groundwater "shall not contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses". Chapter IV, Implementation, of the Basin Plan contains the "Policy for Application of Water Quality Objectives". This Policy specifies, in part, that compliance with narrative water quality objectives may be evaluated considering numerical criteria and guidelines developed and/or published by other agencies and organizations.

49. State Board Order No. WQO-2003-0014 upheld the Regional Board's interpretation of the Basin Plan with respect to implementation of the bacteria objective, stating: *"The Basin Plan contains a water quality objective for bacteria that applies to groundwater that states: 'In groundwaters used for domestic or municipal supply (MUN) the most probable number of coliform organisms over any seven-day period shall be less than 2.2/100 ml'. Since the groundwater is designated for municipal or domestic supply, a groundwater limitation for coliform of less than 2.2 MPN/100ml is appropriate."*

50. State Board Order No.WQO-2003-0014 also upheld the Regional Board's use of numeric groundwater limits, stating: *"The Regional Board adequately substantiates the need for groundwater limits in the Order's Findings and Information Sheet."* The State Board also ruled that numeric groundwater limits must be restricted to those constituents present in the waste, breakdown products of constituents present in the waste, and those that might be leached from the soil beneath the wastewater ponds. Therefore, the following groundwater limitations of this Order were developed to comply with State Board Order No.WQO-2003-0014:

a. Boron, which was found to be present in the wastewater at concentrations ranging from 0.7 to 2.2 µg/L, has the potential to degrade groundwater quality because there is little potential for vadose zone attenuation. The groundwater has the designated beneficial use of agricultural supply. According to Ayers and Westcot[2], boron can damage sensitive crops if present in excess of 0.7 mg/L in irrigation water, thereby impairing agricultural use of the water resource. The applicable water quality objective to protect the agricultural use from discharges of boron is the narrative Chemical Constituents objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. A numerical groundwater limitation of 0.7 mg/L for boron, based on Ayers and Westcot, is appropriate to implement the narrative Chemical Constituents objective to protect the agricultural use of groundwater.

b. Chloride, which was found to be present in the wastewater at concentrations ranging from 48 to 310 mg/L, has the potential to degrade groundwater quality because there is little potential for vadose zone attenuation. According to Ayers and Westcot, chloride can damage sensitive crops if present in excess of 106 mg/L in irrigation water applied by sprinklers, thereby impairing agricultural use of the water resource. The applicable water quality objective to protect the agricultural use from discharges of chloride is the narrative Chemical Constituents objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. A numerical groundwater limitation of 106 mg/L for chloride, based on Ayers and Westcot, is appropriate to implement the narrative Chemical Constituents objective to protect the agricultural use of groundwater.

c. Iron, which was found to be present in the wastewater at concentrations ranging from 70 to 190 µg/L, has the potential to degrade groundwater quality because there is little potential for vadose zone attenuation. The Chemical Constituents objective prohibits concentrations of chemical constituents in excess of California MCLs in groundwater that is designated as municipal or domestic supply. The California secondary MCL for iron is 0.3 mg/L, and groundwater beneath the facility is designated as municipal or domestic supply. It is therefore appropriate to adopt a numerical groundwater limitation of 0.3 mg/L for iron to implement the Chemical Constituents objective to protect the municipal and domestic use of groundwater.

d. Manganese, which was found to be present in the wastewater at concentrations ranging from 2 to 21 µg/L, has the potential to degrade groundwater quality because there is little potential for vadose zone attenuation. In addition, naturally occurring manganese can be solubilized from soil under reducing conditions caused by contact with domestic wastewater. The Chemical Constituents objective prohibits concentrations of chemical constituents in excess

[2] 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). This paper contains the results of studies of the impacts of various chemicals on agricultural uses including crop irrigation and stock watering. Therefore, it is appropriate to use the data contained therein to apply the narrative Chemical Constituent water quality objective.

of California MCLs in groundwater that is designated as municipal or domestic supply. The California secondary MCL for manganese is 50 µg/L, and groundwater beneath the facility is designated as municipal or domestic supply. It is therefore appropriate to adopt a numerical groundwater limitation of 50 µg/L for manganese to implement the Chemical Constituents objective to protect the municipal and domestic use of groundwater.

e. Sodium, which was found to be present in the wastewater at concentrations ranging from 89 to 300 mg/L, has the potential to degrade groundwater quality because there is little potential for vadose zone attenuation. According to Ayers and Westcot, sodium can damage sensitive crops if present in excess of 69 mg/L in irrigation water, thereby impairing agricultural use of the water resource. The applicable water quality objective to protect the agricultural use from discharges of chloride is the narrative Chemical Constituents objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. A numerical groundwater limitation of 69 mg/L for sodium, based on Ayers and Westcot, is appropriate to implement the narrative Chemical Constituents objective to protect the agricultural use of groundwater.

f. Total dissolved solids, which were found to be present in the wastewater at concentrations ranging from 550 to 1,200 mg/L, has the potential to degrade groundwater quality because there is little potential for vadose zone attenuation. According to Ayers and Westcot, dissolved solids can damage sensitive crops if present in excess of 450 mg/L in irrigation water, thereby impairing agricultural use of the water resource. The applicable water quality objective to protect the agricultural use from discharges of total dissolved solids is the narrative Chemical Constituents objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. A numerical groundwater limitation of 450 mg/L for total dissolved solids, based on Ayers and Westcot, is appropriate to implement the narrative Chemical Constituents objective to protect the agricultural use of groundwater.

g. Nitrite, which was found to be present in the wastewater at concentrations up to 1.7 mg/L as nitrogen, has the potential to degrade groundwater quality because there is little potential for vadose zone attenuation. The Chemical Constituents objective prohibits concentrations of chemical constituents in excess of California MCLs in groundwater that is designated as municipal or domestic supply. The California primary MCL for nitrite is 1 mg/L as nitrogen, and groundwater beneath the facility is designated as municipal or domestic supply. It is therefore appropriate to adopt a numerical groundwater limitation of 1.0 mg/L for nitrite as nitrogen to implement the narrative Chemical Constituents objective to protect the municipal and domestic use of groundwater.

h. Nitrate, which was found to be present in the wastewater at concentrations up to 0.45 mg/L as nitrogen, has the potential to degrade groundwater quality because there is little potential for vadose zone attenuation. The Chemical Constituents objective prohibits concentrations of chemical constituents in excess of California MCLs in groundwater that is designated as municipal or domestic supply. The California primary MCL for nitrate is equivalent to 10

mg/L as nitrogen, and groundwater beneath the facility is designated as municipal or domestic supply. It is therefore appropriate to adopt a numerical groundwater limitation of 10 mg/L for nitrate as nitrogen to implement the narrative Chemical Constituents objective to protect the municipal and domestic use of groundwater.

i. Ammonia, which was found to be present in the wastewater at concentrations ranging from 1.4 to 30 mg/L as nitrogen, has the potential to degrade groundwater quality because there is little potential for vadose zone attenuation. According to Amoore and Hautala[3], the odor of ammonia can be detected in water at a concentration of 1.5 mg/L (as ammonia), and concentrations that exceed this value can impair the municipal or domestic use of the resource due to the adverse odor. The applicable water quality objective to protect the agricultural use from discharges of chloride is the narrative Tastes and Odors objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. A numerical groundwater limitation of 1.5 mg/L for ammonia (as ammonia), based on Amoore and Hautala, is appropriate to implement the narrative Tastes and Odors objective to protect the municipal and domestic use of groundwater.

j. pH, which ranged from 8.1 to 10 standard units in the wastewater, has the potential to degrade groundwater quality because there is little potential for buffering in the vadose zone. According to Ayers and Westcot, pH less than 6.5 or greater than 8.4 can damage sensitive crops if present in irrigation water, thereby impairing agricultural use of the water resource. The applicable water quality objective to protect the agricultural use from discharges of substances that affect pH is the narrative Chemical Constituents objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. Anumerical groundwater limitation range of 6.5 to 8.4 for pH, based on Ayers and Westcot, is appropriate to implement the narrative Chemical Constituents objective to protect the agricultural use of groundwater.

51. CWC Section 13241 requires the Regional Board to consider various factors, including economic considerations, when adopting water quality objectives into its Basin Plan. CWC 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. The interim groundwater limitations implement adopted water quality objectives in the manner prescribed by the Basin Plan. No additional analysis of Section 13241 factors is required.

[3] Amoore, J.E. and E. Hautala, *Odor as an Aid to Chemical Safety: Odor Thresholds Compared with Threshold Limit Values and Volatilities for 214 Industrial Chemicals in Air and Water Dilution*, Journal of Applied Toxicology, Vol. 3, No. 6, (1983). These authors studied the concentration of chemicals in air which caused adverse odors and then calculated the concentration in water that would be equivalent to that amount in air. Therefore, it is appropriate to use the data contained therein to apply the narrative Tastes and Odors water quality objective.

52. Under the "Antidegradation" section, the attached Information Sheet lists the various waste constituents identified thus far as fitting the restriction of Finding No. 51, along with limits of each constituent necessary to maintain beneficial uses known to be adversely affected at certain concentrations of the waste constituent in groundwater. The listing identifies the constituent, the beneficial use and its associated limit, as well as the technical reference for the limit. Some limits become less restrictive when the water supply is limited to certain applications of a beneficial use, but that requires additional factual information. Interim groundwater limitations for each constituent reflect the most restrictive listed limit for the waste constituent, except if background quality is greater, in which cast background becomes the interim limitation.

Treatment and Control Practices

53. The wastewater treatment plant relies upon passive aerobic treatment of the wastewater in shallow ponds. The system requires minimal energy and operator attention when organic loading is kept within the design parameters. Trained operators inspect the WWTF weekly for operation and maintenance, and on-site staff observes the ponds and sewer systems daily to identify problems that might cause a spill.

54. Some degradation of groundwater beneath the wastewater treatment plant can be found consistent with Resolution No. 68-16 provided that:

    a. The degradation is limited in area;

    b. The discharger minimizes the degradation by fully implementing, regularly maintaining, and optimally operating best practicable treatment and control (BPTC) measures;

    c. The degradation is limited to waste constituents typically encountered in domestic wastewater as listed in the groundwater limitations in this Order; and

    d. The degradation does not result in water quality less than that prescribed in the Basin Plan.

55. The Discharger's waste characterization (Finding No. 17, influent) indicates that conservative and nonconservative waste constituents are discharged to ponds in concentrations considerably greater than the background water quality characterized by the Discharger (Finding No. 33) and is concentrated further before release (Finding No. 17, pond). The discharge has the potential to degrade groundwater with these nonconservative constituents, depending upon the effectiveness of attenuation. The degree of potential groundwater degradation from waste constituents has not been quantified. Based on the known concentrations it is possible that degradation of groundwater will occur from the release waste constituents and that the degradation will eventually cause exceedances of interim groundwater limitations.

56. Increases in concentration through use, such as increasing TDS from 550 to 1200 mg/L and chloride from 48 to 310 mg/L (Finding No. 17), suggest that activities are taking place within the installation that contribute high salts with little or no control on minimizing the effect, or consideration of the concentrating effect of the disposal method.

57. The impact on groundwater and the appropriate level of degradation that would comply with Resolution 68-16 have not been fully evaluated. The Discharger's current treatment and control may not constitute BPTC as intended by Resolution No. 68-16 for the following reasons, and groundwater degradation, if any, from the characterized wastewater may not be found consistent with Resolution No. 68-16:

    a. There is little separation between the base of the ponds and the water table. A significant separation and the presence of low permeability soils in the vadose zone would enhance microbial degradation of organic wastewater constituents, filtration of pathogenic organisms, and nitrification/denitrification of nitrogen.

    b. There is no engineered system to prevent migration of waste constituents.

    c. There is no active treatment system to remove organic waste constituents, nitrify/denitrify nitrogen, remove salinity constituents, or control the pH.

    d. There is no active disinfection system to remove pathogenic organisms.

58. It is appropriate that the Discharger determine background groundwater quality and evaluate whether any of the waste constituents discharged have degraded groundwater quality. If groundwater quality has been degraded by a waste constituent, then the Executive Officer will establish a schedule for the Discharger to evaluate BPTC for acceptable degradation, if any, from the waste constituent. Implementation of the approved strategies developed from that work will ensure that BPTC and the highest water quality consistent with the maximum benefit to the people of the State will be achieved.

59. The Discharger has not provided sufficient geologic data to establish that a natural barrier protects both the shallow and deep groundwater from the impacts of leaching waste constituents. The Discharger has suggested that it will provide deep monitoring wells near the wastewater ponds to demonstrate that the first saturated zone beneath the wastewater ponds is confined. However, as noted above in Finding No. 46, proof of confinement is not sufficient to justify degradation above water quality objectives or to support "de-designation" of the beneficial uses of groundwater through a Basin Plan amendment.

60. A discharge of wastewater that overloads soils with nutrients and organics can result in anaerobic conditions in the soil profile, creation of organic acids and decreases in soil pH. Under these conditions, iron and manganese in the soil can solubilize and leach into groundwater. An evaluation that assesses whether the shallow ponds generate these soil conditions and create consequential impacts on the groundwater is appropriate. It is, therefore, appropriate to establish interim groundwater limits, and to require the Discharger to monitor for these constituents in the groundwater.

61. This Order establishes interim groundwater limitations for the WWTF that will not unreasonably threaten 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 Resolution 68-16. Based on the results of the

scheduled tasks, the Regional Board may reopen this Order to reconsider groundwater limitations and other requirements to comply with Resolution 68-16.

Other

62. The United States Environmental Protection Agency (EPA) has promulgated biosolids reuse regulations in 40 CFR 503, *Standard for the Use or Disposal of Sewage Sludge,* which establishes as management criteria for protection of ground and surface waters, sets application rates for heavy metals, and establishes stabilization and disinfection criteria.

63. The State Board adopted Order No. 97-03-DWQ (General Permit No. CAS000001) specifying waste discharge requirements for discharges of storm water associated with industrial activities, and requiring submittal of a Notice of Intent by all affected industrial dischargers. The design flow at this wastewater treatment plant is less than 1.0 mgd and therefore the Discharger is not required to apply for a stormwater NPDES permit.

64. Because the facility has been in operation since the 1950s and operations have not changed substantially since that time, it is a Class I exempt activity pursuant to Title 14 California Code of Regulations (CCR) Section 15301 and is, therefore, exempt from the California Environmental Quality Act (CEQA) pursuant to Public Resources Code Section 21080(b)(9). The action to adopt waste discharge requirements for the facility is exempt from the provisions of the CEQA, in accordance with Title 14 CCR Section 15301.

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

66. The monitoring and reporting program required by this Order and the attached Monitoring and Reporting Program No. R5-2004-0003 are necessary to assure compliance with these waste discharge requirements. The Discharger operates the facility that discharges the waste subject to this Order and is, therefore, subject to CWC Section 13267(b).

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

68. 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 CCR Section 20005 et seq. (hereafter Title 27). While the wastewater treatment facility is exempt from Title 27, the data analysis methods of Title 27 may be appropriate for determining whether the discharge complies with the terms for protection of groundwater specified in this Order.

69. The discharge authorized herein and the treatment and storage facilities associated with the discharge, except for discharges of residual sludge and solid waste, and possibly the boiler blowdown, are exempt from the requirements of Title 27. The exemption, pursuant to Title 27 Section 20090(a), is based on the following:

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

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

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

70. 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.

Public Notice

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

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

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

IT IS HEREBY ORDERED that pursuant to Section 13263 and 13267 of the CWC, Order No. 5-01-256 is rescinded and Sacramento County, 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:

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

A. Discharge Prohibitions:

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

2. Bypass or overflow of untreated or partially treated waste is prohibited.

3. Discharge of sewage from a sanitary sewer system at any point upstream of the wastewater ponds is prohibited.

4. Discharge of waste classified as hazardous, as defined in Title 23 CCR Sections 2510 and 2521(a) (hereafter Chapter 15), or 'designated', as defined in CWC section 13173, is prohibited.

5. Surfacing of wastewater outside or downgradient of the ponds is prohibited.

6. The discharge of wastewater to areas different than those described in Findings No. 13 and 14 is prohibited.

B. Discharge Specifications:

1. The monthly average inflow shall not exceed 15,000 gpd.

2. 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 the Groundwater Limitations.

3. Neither the treatment nor the discharge shall cause a condition of pollution or nuisance as defined in CWC Section 13050.

4. Objectionable odors originating at this facility shall not be perceivable beyond the limits of the wastewater treatment and disposal areas.

5. As a means of discerning a threat of noncompliance with Discharge Specification No. 4, the dissolved oxygen content in the upper zone (one foot) of all wastewater ponds shall not be less than 1.0 mg/l.

6. The wastewater treatment and storage ponds shall not have a pH of less than 6.5 or greater than 10.5.

7. The Discharger shall operate all systems and equipment to maximize treatment of wastewater and optimize the quality of the discharge.

8. The ponds shall be managed to prevent the breeding of mosquitoes. In particular,
   a. An erosion control program should assure that small coves and irregularities are not created around the perimeter of the waste surface;

b. Weeds shall be minimized through control of water depth, harvesting, and/or herbicides; and

c. Dead algae, vegetation, and debris shall not accumulate on the water surface.

9. All treatment, storage, and disposal areas shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.

10. The freeboard in all ponds shall never be less than two feet as measured vertically from the water surface to the lowest point of potential overflow.

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

12. On or about **1 October** each year, available pond storage capacity shall at least equal the volume necessary to comply with Discharge Specifications No. 10 and No. 11.

13. Public contact with wastewater ponds shall be precluded through such means as fences and signs, or other acceptable alternatives.

C. Solids Disposal Requirements:

Sludge, as used 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 screenings generated during preliminary treatment. Residual sludge means sludge that will not be subject to further treatment at the facility. 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, and clarifiers as needed to ensure optimal plant operation.

2. Treatment and storage of sludge shall be confined to the treatment facility property, and shall be conducted in a manner that precludes infiltration of waste constituents into soils in a mass or at concentrations that will violate the Groundwater Limitations of this Order.

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

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 disposal sites operated in accordance with valid waste discharge requirements issued by a regional water quality control board will satisfy this specification.

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

D. Groundwater Limitations:

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

   a. Contain any of the following constituents in concentrations greater than those listed below or greater than ambient background groundwater quality, whichever is greater:

Constituent	Units	Limitation
Boron	mg/L	0.7
Chloride	mg/L	106
Iron	mg/L	0.3
Manganese	mg/L	0.05
Sodium	mg/L	69
Total Coliform Organisms	MPN/100 mL	<2.2 over any seven day period
Total Dissolved Solids [1]	mg/L	450
Nitrite (as N)	mg/l	1
Nitrate (as N)	mg/L	10
Ammonia (as ammonia)	mg/L	1.5

[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, and potassium].

   b. Exhibit a pH of less than 6.5 or greater than 8.4 pH units.

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

E. Provisions:

1. All of the following reports shall be submitted pursuant to CWC section 13267 and shall be prepared as described by Provision 3.

   a. By **29 February 2004**, the Discharger shall submit a groundwater monitoring well installation workplan. The workplan shall describe the installation of sufficient monitoring wells to allow evaluation of the groundwater quality upgradient and downgradient of the ponds. Every monitoring well shall be constructed to yield representative samples from the first saturated zone and to comply with applicable well standards. The workplan shall be consistent with, and include the items listed in, the first section of Attachment C, "*Items to be Included in a Monitoring Well Installation Workplan and a Monitoring Well Installation Report of Results."*

   b. By **30 June 2004**, the Discharger shall submit a *Monitoring Well Installation Report* that describes the installation of groundwater monitoring wells and contains the items found in the second section of Attachment C.

   c. By **15 July 2004**, the Discharger shall submit a *Boiler Blowdown Compliance Report*. The report shall contain sufficient analytical data to fully describe whether the boiler blowdown waste should be classified as designated waste. If designated waste, the Discharger shall describe how it either (a) made facility modifications such that all boiler blowdown waste is fully contained in a tank and disposed of off-site at a permitted facility, or (b) shall submit a RWD for a Title 27 impoundment. If not designated waste, the Discharger shall describe how (a) it has made facility modification such that the waste is discharged into the facility's sanitary sewer system, (b) shall estimate the resulting change in character and volume of the total discharge, and (c) shall estimate the resulting change in groundwater quality.

   d. By **30 September 2005**, the Discharger shall submit a *Background Groundwater Quality Study Report*. For each groundwater monitoring parameter/constituent identified in the MRP, the report shall present a summary of monitoring data, calculation of the concentration in background monitoring wells, and comparison of background groundwater quality to that in wells used to monitor impacts from the discharge. Determination of background quality should be made using the methods described in Title 27, Section 20415(e)(10), and shall be based on data from at least four consecutive quarterly (plus any more frequent) groundwater monitoring events. For each monitoring parameter/constituent, the report shall compare measured concentrations in the downgradient monitoring wells against the calculated background concentration, as well as the interim numeric limitations set forth in Groundwater Limitation D.1.a.

   e. If, after consideration of the information provided pursuant to Provision E.1.d, the Discharger or Executive Officer determines that a particular waste constituent listed in

Groundwater Limitation D.1.a of this Order has degraded the underlying groundwater, then **within 120 days of notification by the Executive Officer**, the Discharger shall submit a *BPTC Evaluation Workplan* that sets forth the scope and schedule for a systematic and comprehensive technical evaluation of the waste constituent(s) to determine whether additional best practicable treatment and control is necessary to establish that BPTC has been applied and consequent groundwater degradation minimized. The workplan shall contain a preliminary evaluation of each component of the wastewater treatment plant and propose a time schedule for completing the comprehensive technical evaluation of appropriate treatment and control for each waste constituent causing degradation. The schedule to complete the evaluation shall be as short as practicable, and shall not exceed one year. A technical report containing a complete BPTC evaluation and statistically quantifying effluent quality and consequent groundwater quality for the waste constituents shall be submitted in accordance with the schedule approved by the Executive Officer.

f. **At least 60 days prior** to any sludge removal and disposal, the Discharger shall submit a *Biosolids Management Plan*. The plan shall estimate quantity of biosolids to be removed from the ponds; method of removal; method of drying; leachate and runoff controls for any temporary on-site biosolids drying and storage areas to prevent water quality impacts; a sampling and analysis plan; and the name, location, and permitting information for the selected biosolids disposal site.

2. In accordance with California Business and Professions Code sections 6735, 7835, and 7835.1, engineering and geologic evaluations and judgments shall be performed by or under the direction of registered professionals competent and proficient in the fields pertinent to the required activities. All technical reports specified herein that contain workplans for, that describe the conduct of investigations and studies, or that contain technical conclusions and recommendations concerning engineering and geology shall be prepared by or under the direction of appropriately qualified professional(s), even if not explicitly stated. Each technical report submitted by the Discharger shall contain the responsible licensed professional's signature and/or stamp of the seal. As described in the Monitoring and Reporting Program, this provision applies to the submittal of quarterly groundwater monitoring reports but not to the submittal of monthly or annual reports.

3. Upon completion of the tasks set forth in Provision E.1, the Regional Board shall consider the evidence provided and make a determination regarding whether the Discharger has justified its treatment and control as BPTC and determine the final numeric groundwater limitations that are consistent with Resolution No. 68-16.

4. The Discharger shall comply with Monitoring and Reporting Program No. R5-2004-0003, which is part of this Order, and any revisions thereto as ordered by the Executive Officer.

5. The Discharger shall comply with the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements", dated 1 March 1991, which are attached hereto and made

part of this Order by reference. This attachment and its individual paragraphs are commonly referenced as "Standard Provision(s)."

6. The Information Sheet, which is attached hereto, is an integral part of this Order .

7. Upon the reduction, loss, or failure of the sanitary sewer system resulting in a sanitary sewer overflow, the Discharger shall take any necessary remedial action to (a) control or limit the volume of sewage discharged, (b) terminate the sewage discharge as rapidly as possible, and (c) recover as much as possible of the sewage discharged (including wash down water) for proper disposal. The Discharger shall implement all applicable remedial actions including, but not limited to, the following:

   a. Interception and rerouting of sewage flows around the sewage line failure;

   b. Vacuum truck recovery of sanitary sewer overflows and wash down water;

   c. Use of portable aerators where complete recovery of the sanitary sewer overflows are not practicable and where severe oxygen depletion is expected in surface waters; and

   d. Cleanup of sewage-related debris at the overflow site.

8. The Discharger shall provide certified wastewater treatment plant operators in accordance with Title 23 CCR, Division 3, Chapter 26.

9. The Discharger shall report promptly to the Regional Board any material change or proposed change in the character, location, or volume of the discharge.

10. The Discharger shall report to the Regional 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."

11. The Discharger shall not allow pollutant-free wastewater to be discharged into the wastewater 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 are essentially free of waste constituents.

12. The Discharger shall submit to the Regional Board on or before each compliance report due date, the specified document or, if appropriate, a written report detailing compliance or noncompliance with the specific schedule date and task. If noncompliance is being reported, then the Discharge shall state the reasons for such noncompliance and provide an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Regional Board in writing when it returns to compliance with the time schedule.

13. In the event of any change in control or ownership of land or waste discharge facilities described herein, 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.

14. 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 recession of this Order.

15. A copy of this Order shall be kept at the discharge facility for reference by operating personnel. Key operating personnel shall be familiar with its contents.

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

I, THOMAS R. PINKOS, 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 29 January 2004.

original signed by
THOMAS R. PINKOS, Executive Officer

AMENDED

ALO: 1/29/04

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2004-0003
FOR
SACRAMENTO COUNTY
BOYS RANCH WASTEWATER TREATMENT FACILITY
SACRAMENTO COUNTY

This Monitoring and Reporting Program (MRP) describes requirements for monitoring influent, effluent, groundwater, surface water, and biosolids. This MRP is issued pursuant to Water Code Section 13267. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer. Specific sample station locations shall be approved by Regional Board staff prior to implementation of sampling activities.

All samples should be representative of the volume and nature of the discharge or matrix of material sampled. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form.

Field test instruments (such as those used to test pH and dissolved oxygen) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are field calibrated prior to each monitoring event;
3. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are submitted as described in the "Reporting" section of this MRP.

INFLUENT MONITORING

The Discharger shall conduct influent monitoring of the wastewater entering the wastewater ponds. Samples shall be collected at the same frequency and at approximately the same time as the raw sewage pond samples and should be obtained at the diversion box prior to discharge into the raw sewage ponds. Grab samples are considered representative of the influent. Influent monitoring shall include, at a minimum, the following:

Constituents	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Flow	gallons	Metered	Daily	Monthly
BOD_5 [1]	mg/l	Grab	Quarterly	Quarterly

[1] BOD_5 denotes five-day, 20° Celsius Biochemical Oxygen Demand.

WASTEWATER AND POND MONITORING

Wastewater samples shall be collected from the wastewater ponds. Grab samples are considered representative of the wastewater. Wastewater and pond monitoring shall include, at a minimum, the following:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Dissolved Oxygen [1, 2]	mg/l	Grab	Weekly	Monthly
Freeboard [3]	0.1 Feet	Measurement	Weekly	Monthly
Berm Seepage [4]	NA	Observation	Weekly	Monthly
Odors	--	Observation	Weekly	Monthly
pH [1, 2]	std.	Grab	Weekly	Monthly
BOD_5 [5]	mg/l	Grab	Monthly	Monthly
Total Dissolved Solids	mg/l	Grab	Monthly	Monthly
Electrical Conductivity	µmhos/cm	Grab	Monthly	Monthly
Nitrate as Nitrogen	mg/l	Grab	Monthly	Monthly
Total Kjeldahl Nitrogen	mg/l	Grab	Monthly	Monthly
Standard Minerals [6]	mg/l	Grab	Annually	Annually

1 pH and dissolved oxygen monitoring may be conducted with a hand held meter provide meter calibration logs are maintained. The dissolved oxygen readings must be collected before 10:00 a.m.

2 If ponds are too low to take a reading, then this shall be noted in the report.

3 Freeboard shall be measured once per week as long as there is at least three feet of freeboard in each pond. If the freeboard in either pond is less than three feet, then freeboard shall be measured twice weekly.

4 Pond containment berms shall be observed for signs of seepage or surfacing water along the exterior toe of the berm. If surfacing water is found, then a sample shall be collected and tested for pH and total dissolved solids.

5 BOD_5 denotes five-day, 20° Celsius Biochemical Oxygen Demand.

6 Standard Minerals shall include, at a minimum, the following: Barium, Boron, Calcium, Chloride, Iron, Magnesium, Manganese, Potassium, Sodium, Sulfate, Total Alkalinity (including alkalinity series), and Hardness.

GROUNDWATER MONITORING

Beginning with the second quarter of 2004, the Discharger shall implement the following groundwater monitoring program. Prior to construction of any groundwater monitoring wells, the Discharger shall submit plans and specifications to the Board for review and approval. Once installed, all new wells shall be added to the MRP, and shall be sampled and analyzed according to the schedule below.

Prior to purging, groundwater elevations shall be measured, and the wells shall be purged at least three well volumes until pH and electrical conductivity have stabilized prior to sampling. Depth to groundwater shall be measured to the nearest 0.01 feet. Water table elevations shall be calculated and used to determine groundwater gradient and direction of flow. Samples shall be collected using approved EPA methods.

Groundwater monitoring shall include, at a minimum, the following:

Constituent	Units	Type of Sample	Sampling and Reporting Frequency [3]
Depth to Groundwater	0.01 feet	Measurement	Quarterly
Groundwater elevation [1]	0.01 Feet	Measurement	Quarterly
Gradient	feet/feet	Calculated	Quarterly
Gradient Direction	degrees	Calculated	Quarterly
pH	std.	Grab	Quarterly
Total Dissolved Solids	mg/l	Grab	Quarterly
Nitrate as Nitrogen	mg/l	Grab	Quarterly
Ammonia Nitrogen	mg/l	Grab	Quarterly
Total Coliform Organisms [2]	MPN/100 ml	Grab	Quarterly
Boron	mg/l	Grab	Quarterly
Chloride	mg/l	Grab	Quarterly
Iron	mg/l	Grab	Quarterly
Manganese	mg/l	Grab	Quarterly
Sodium	mg/l	Grab	Quarterly
Standard Minerals [4]	mg/l	Grab	Annually

[1] Groundwater elevation shall be determined based on depth-to-water measurements using a surveyed measuring point elevation on the well and a surveyed reference elevation.

[2] Using a minimum of 15 tubes or three dilutions. If the results from sampling any monitoring well show that total coliform organisms exceed the Groundwater Limitation, then the Discharger shall immediately notify staff and, if it so desires, may conduct supplemental sampling events within a seven-day period. These events shall include depth to groundwater, groundwater elevation, gradient, and gradient direction for all wells. Voluntary supplemental groundwater monitoring and reporting shall comply with all requirements herein.

[3] Beginning with the second quarter of 2004.

[4] Standard Minerals shall include, at a minimum, the following elements/compounds: Calcium, Magnesium, Potassium, Sulfate, Total Alkalinity (including alkalinity series), and Hardness.

BIOSOLIDS MONITORING

The Discharger shall keep records regarding the quantity of biosolids stored on site, the quantity removed for disposal, and any sampling and analytical data The records shall also indicate that steps taken to reduce odor and other nuisance conditions. Records shall be stored onsite and available for review during inspections. If biosolids are transported off-site for disposal, then the Discharger shall submit records identifying the hauling company, the amount of biosolids transported, the date removed from the facility, the location of disposal, and copies of all analytical data required by the entity accepting the waste. All records shall be submitted as part of the Annual Monitoring Report.

REPORTING

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, sample type (e.g., effluent, pond, etc.), and reported analytical result for each sample are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with waste discharge requirements and spatial or temporal trends, as applicable. The results of any monitoring done more frequently than required at the locations specified in the Monitoring and Reporting Program shall be reported in the next scheduled monitoring report.

As required by the California Business and Professions Code Sections 6735, 7835, and 7835.1, all Groundwater Monitoring Reports shall be prepared under the direct supervision of a Registered Engineer or Geologist and signed by the registered professional.

A. Monthly Monitoring Reports

Monthly reports shall be submitted to the Regional Board on the **1st day of the second month following sampling** (i.e. the January Report is due by 1 March). At a minimum, the reports shall include:

1. Results of influent and wastewater pond monitoring;
2. A scaled facility map depicting locations where freeboard is measured;
3. A comparison of monitoring data to the discharge specifications and an explanation of any violation of those requirements. Data shall be presented in tabular format;
4. If requested by staff, copies of laboratory analytical report(s); and
5. A calibration log verifying calibration of all hand held monitoring instruments and devices used to comply with the prescribed monitoring program.

B. Quarterly Monitoring Reports

Beginning with the second quarter of 2004, the Discharger shall establish a quarterly sampling schedule for groundwater such that samples are obtained approximately every three months. Quarterly monitoring reports shall be submitted to the Board by the **1st day of the second month after the quarter** (i.e. the January-March quarterly reports is due by May 1st) each year. The Quarterly Report shall include the following:

1. Results of groundwater monitoring. The results of regular monthly monitoring reports for March, June, September and December may be incorporated into their corresponding quarterly monitoring report;
2. A narrative description of all preparatory, monitoring, sampling, and analytical testing activities for the groundwater monitoring. The narrative shall be sufficiently detailed to verify compliance with the WDR, this MRP, and the Standard Provisions and Reporting Requirements. The narrative shall be supported by field logs for each well documenting depth to groundwater; parameters measured before, during, and after purging; method of purging; calculation of casing volume; and total volume of water purged;

3. Calculation of groundwater elevations, an assessment of groundwater flow direction and gradient on the date of measurement, comparison of previous flow direction and gradient data, and discussion of seasonal trends if any;
4. A narrative discussion of the analytical results for all groundwater locations monitored including spatial and temporal tends, with reference to summary data tables, graphs, and appended analytical reports (as applicable);
5. A comparison of the monitoring data to the groundwater limitations and an explanation of any violation of those requirements;
6. Summary data tables of historical and current water table elevations and analytical results;
7. A scaled map showing relevant structures and features of the facility, the locations of monitoring wells and any other sampling stations, and groundwater elevation contours referenced to mean sea level datum; and
8. Copies of laboratory analytical report(s) for groundwater monitoring.

C. Annual Report

An Annual Report shall be prepared as the fourth quarter monitoring report. The Annual Report shall include all monitoring data required in the monthly/quarterly schedule. The Annual Report shall be submitted to the Regional Board by **1 February** each year. In addition to the data normally presented, the Annual Report shall include the following:

1. The contents of the regular quarterly monitoring report for the last quarter of the year and groundwater results for analyses required annually;
2. If requested by staff, tabular and graphical summaries of all data collected during the year;
3. An evaluation of the groundwater quality beneath the wastewater treatment facility;
4. A discussion of compliance and the corrective action taken, as well as any planned or proposed actions needed to bring the discharge into full compliance with the waste discharge requirements;
5. A discussion of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program;
6. A copy of the certification for each certified wastewater treatment plant operator working at the facility and a statement about whether the Discharger is in compliance with Title 23, CCR, Division 3, Chapter 26.
7. Results of the wastewater pond annual monitoring;
8. A summary of information on the disposal of sludge and/or solid waste;
9. A discussion of whether the Discharger anticipates removing biosolids or ripping the ponds in the coming year, and if so, the anticipated schedule for cleaning, drying, and disposal;
10. A summary of maintenance and repair activities performed on the collection system; and
11. A forecast of influent flows, as described in Standard Provisions No. E.4.

A letter transmitting the self-monitoring reports shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. Pursuant to the Standard Provisions and Reporting Requirements, the transmittal letter shall contain a statement by the discharger or the discharger's authorized agent, under penalty of perjury, that to the best of the signer's knowledge, the report is true, accurate, and complete.

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

Ordered by: original signed by
THOMAS R. PINKOS, Executive Officer

29 January 2004
(Date)

AMENDED

ALO:1/29/04

INFORMATION SHEET

ORDER NO. R5-2004-0003
SACRAMENTO COUNTY
BOYS RANCH WASTEWATER TREATMENT FACILITY
SACRAMENTO COUNTY

Background
The Sacramento County Boys Ranch is a youth correctional facility with a population of approximately 120 wards and 70 staff. The Boys Ranch is 12 miles south of Folsom and approximately one mile west of Scott Road on Boys Ranch Road, in Sacramento County. The WWTF consists of a gravity collection system, a 9,000-gallon temporary storage/holding tank, a sewage distribution box, and two raw sewage evaporation/percolation ponds.

The Regional Water Quality Control Board, Central Valley Region (Regional Board) is reissuing Waste Discharge Requirements (WDRs) Order No. 5-01-256 for this facility as directed by State Water Resources Control Board Order WQO-2003-0014 and as agreed by the Executive Officer. The Discharger filed suit in Sacramento County Superior Court seeking a writ of mandate to overturn the Orders of the Regional Board and State Board (Sacramento Superior Court Case No. 03CS011521)

Sanitary Sewer Overflows
The WWTF has experienced four sanitary sewer overflows since December1999. The Discharger reported that two of these spills were caused from corrosion damage along 450 feet section of steel influent pipe. The Discharger replaced the damaged section of pipe with PVC pipe; however, sanitary sewer overflows continued to occur after the sewer line replacement. The Discharger has recently prepared a sanitary sewer operation, maintenance, overflow prevention, and response plan and on-site staff observe the ponds and sewer system daily. This Order requires that the Discharger implement its plan.

Basin Plan, Beneficial Uses, and Regulatory Considerations
Surface water drainage from the WWTF is to the Cosumnes River via Deer and Carson Creeks. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition* (Basin Plan), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies to achieve the objectives for all waters of the Basin. Beneficial use designations determine the water quality objectives that apply to a water body. For example, pursuant to the Chemical Constituents objective, waters designated as municipal and domestic supply must meet the maximum contaminant levels (MCLs) for drinking water. The Basin Plan sets forth the applicable beneficial uses (industrial process, industrial service, agricultural, and municipal and domestic supply in this instance) of groundwater, procedure for application of water quality objectives, and the process for and factors to consider in allocating waste assimilation capacity.

Bacteria Water Quality Objective
The Discharger objected to groundwater limitations with respect to bacteria contained in previous Order No. 5-01-256. The State Board, in Order WQO-2003-0014, supported the groundwater limitations adopted by the Regional Board. This revised Order, therefore, does not modify the groundwater limitations from the previous WDRs Order No. 5-01-256, but provides further clarification and findings with respect to those limitations.

The Basin Plan contains a numerical water quality objective for Bacteria that states in part:

> *"The following objectives apply to all ground waters of the Sacramento and San Joaquin River Basins, as the objectives are relevant to the protection of designated beneficial uses.*
>
> ***"Bacteria***
>
> *In ground waters used for domestic or municipal supply (MUN), the most probable number of coliform organisms over any seven-day period shall be less than 2.2/100mL."*

Groundwater, as described in the Basin Plan (page I-1.00), includes all subsurface waters that occur in fully saturated zones and fractures within soils and other geologic formations.

In testimony before the State Board and in the Complaint for Writ of Mandate, the Discharger expressed disagreement with the application of the bacteria objective to waters not in current use for domestic or municipal supply. The Discharger asserted that because the Basin Plan states, in part, "In ground waters used for domestic or municipal supply (MUN)," the bacteria objective applies only to waters in current use for municipal or domestic water supply. The Discharger's interpretation of the Basin Plan, however, is not consistent with the Porter-Cologne Water Quality Control Act (Porter-Cologne Act, California Water Code (CWC) Division 7), the express requirements of the Basin Plan, State Board Resolution 68-16 ("Statement of Policy with Respect to Maintaining High Quality of Waters in California"), or the long-standing pattern of interpretation of the bacteria objective by the Regional Board. With respect to the Porter-Cologne Act, CWC section 13263, requires waste discharge requirements to protect beneficial uses. To require protection only of current uses would not be consistent with the stated policy of the Porter-Cologne Act to protect the waters of the state for "use and enjoyment by the people of the state"(CWC section 13000). With respect to the Basin Plan, several provisions clarify the intent of the Regional Board with respect to the bacteria objective. Although three of the five water quality objectives for groundwaters in the Basin Plan do not include express reference to designated beneficial uses, taken in proper context, however, there is no uncertainty of intent. The introduction to the groundwater section of Chapter III of the Basin Plan (page III-9.00) is unambiguous about where all the water quality objectives must be applied, stating: "The following objectives apply to ***all ground waters*** of the Sacramento and San Joaquin River Basins, as the objectives are relevant to the protection of ***designated beneficial uses***." (Emphasis added)

Confirming language is found in the Policy for Application of Water Quality Objectives (page IV-16.00 of the Basin Plan), which states, "Water quality objectives apply to all waters within a surface water or ground water resource for which beneficial uses have been designated, rather than at an intake, wellhead or other point of consumption." Clearly, the intent of the Basin Plan is to apply water quality objectives not just to waters currently used, but also to waters designated for use.

The language of the objective references "MUN." The term "MUN", as used throughout the Basin Plan, refers to waters that have the designated beneficial use of domestic or municipal supply, regardless of whether the waters are currently being used for that purpose. In other words, since "MUN" is a

designation (not an actual use), waters "used for MUN" and waters "designated as MUN" have the same meaning.

State Board Resolution No. 68-16 requires the Regional Board to maintain the high quality of waters of the state unless allowing some change in water quality "will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than" the Basin Plan standards.

The intent of State Board Resolution No. 68-16 and the entire basin planning process is to protect water quality, whether or not the water is actually used. Allowing degradation of groundwater designated MUN in violation of water quality objectives merely because the water is not currently being used for that purpose flies in the face of the entire Porter-Cologne Act regulatory scheme. Such a policy would permit dischargers to eliminate all beneficial uses in water bodies not currently being used, regardless of the potential for use or feasibility of attaining the use. Future beneficial uses would not be protected.

Further, Chapter II of the Basin Plan (page II-3.00) states that all ground waters in the Region are considered suitable or potentially suitable for MUN unless otherwise designated, and once designated that consideration of de-designation of MUN must first satisfy specific exception criteria established by State Board Resolution No. 88-63 ("Sources of Drinking Water Policy"). Resolution No. 88-63 itself says regional boards should designate all waters MUN that do not qualify for exception. The State Board has indicated that these exceptions must occur by means of amendment to the Basin Plan. Groundwater, as described in Chapter I of the Basin Plan (page I-1.00), includes all subsurface waters that occur in fully saturated zones and fractures within soils and other geologic formations. The broad application of the MUN designation to subsurface waters and rigorous criteria for determining exceptions indicate that both the Regional Board and State Board intended to protect all ground waters of the Sacramento River and San Joaquin River Basins.

In summary, the current Sacramento River and San Joaquin River Basin Plan clearly establishes, and State Board Resolution No. 88-63 says it should establish, that all ground waters (including those beneath wastewater ponds and reclamation areas) are designated MUN unless they have been subsequently formally de-designated. No ground waters have been de-designated by amendment to the Basin Plan. The water quality objective for bacteria in the Basin Plan, when taken in context, clearly establishes that the water quality objective applies to all ground waters designated as municipal or domestic supply (MUN).

Application of the Bacteria Water Quality Objective [1]

The coliform water quality objective is expressed in the Basin Plan, and this Order, as less than 2.2 MPN/100 mL over any seven-day period. A coliform result over 2.2 MPN/100 mL in a quarterly groundwater constituents is typically not rapid enough to require more frequent monitoring, the MRP requires only quarterly groundwater sampling. If the Discharger desires to collect multiple coliform samples over a seven-day period, then it is free to perform more frequent monitoring than required by

[1] Excerpted from Regional Board Staff Memorandum titled "Supplemental Information Regarding Basin Plan Amendment of Water Quality Objective for Bacteria in Groundwater" from Thomas Pinkos to Celeste Cantu, dated 8 January 2004.

the MRP. As described in *Standard Methods for Examination of Water and Wastewater* (American Public Health Association, et al, 20th Edition), microbal data is typically positively skewed and a geometric mean if it collects multiple samples over a seven-day period. As stated in the MRP, the Discharger must report the results of any sampling at intervals more frequent than those required by the MRP.

The consistent practice of the Regional Board has been to apply the bacteria water quality objective to all ground water designated for use as MUN. A review of 142 permits issued by the Regional Board from 1992 through 2003, twenty of which implement the *Water Quality Control Plan for the Tulare Lake Basin Plan* (hereafter Tulare Lake Basin Plan) demonstrates the application of the objective.

All the permits reviewed that identified MUN as a beneficial use in findings cited the beneficial uses designated in the Basin Plan. None of the permits cited a beneficial use as being determined from a survey of supply wells in the discharge area or from the potential for supply wells in the area. Permits typically contained the following two findings:

1. The Basin Plan designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Water Resources Control Board. Pursuant to §13263(a) of the California Water Code (CWC), waste discharge requirements must implement the Basin Plan.
2. The beneficial uses of underlying groundwater are municipal and domestic water supply, agricultural supply, industrial service supply, and industrial process supply.

Of the142 permits, seven do not identify MUN as a beneficial use. None of the 135 permits with a finding of MUN had a separate finding that determined ground water underlying the wastewater facility was not designated MUN. Five of the seven permits that do not identify MUN as a beneficial use contained no finding as to why. During this review, these exceptions were identified as errors of fact that will be corrected when the next permit update occurs (one permit was corrected in 1998). The other two permits cited the poor natural quality of groundwater that made MUN infeasible pursuant to criteria of State Board Resolution 88-63 (both municipalities import surface water supplies).

Of the 142 permits, 90 contain a groundwater limitation that specifies no degradation of groundwater and/or that total coliform organisms shall not exceed 2.2 MPN/100mL in groundwater. Of the six permits that failed to identify MUN as a beneficial use, two of them require that the effluent be disinfected and the other four specify a groundwater limitation of no degradation or of a total coliform that does not exceed 2.2 MPN/100mL. The "no degradation" limitation would normally equate to "less than 1.1 MPN/100mL," as determined by Standard Method 9223(B).

All 142 permits, including the 52 permits that contain no groundwater limitation, include a prohibition of pollution of groundwater. The lack of a groundwater limitation typically would be based on insignificant infiltration of bacteria to groundwater (e.g., an NPDES discharge that uses no ponds or unlined sludge drying beds), insignificant threat of degradation of groundwater from bacteria (due to disinfection criteria applied before infiltration into and attenuation within the soil profile), or

insignificant threat of degradation of groundwater from bacteria due to the character of the discharge and the site's hydrogeology (e.g., low discharge rate and attenuation in unsaturated soil profile). However, as pollution is an alteration of groundwater that unreasonably affects the water for beneficial use, the proscription means total coliform in groundwater cannot violate the water quality objective of "less than 2.2 MPN/100mL." Hence, permits that do not contain a groundwater limitation still implement the water quality objective for bacteria.

No permit allowed use of a mixing zone within which the WQO could be exceeded.

In summary, while the Regional Board has not consistently identified all ground waters designated as MUN by the Basin Plan in all the permits issued over the last eleven years, the exceptions are few and were based on errors. All permits disallow degradation of groundwater, limit degradation to the total coliform population quantified in the water quality objective, and/or prohibit exceedance of the water quality objective. No permit limited the water quality objective to situations of proven actual domestic use of the ground water.

The Regional Board also implements the terms of the Tulare Lake Basin Plan in permits for discharges that occur in the Tulare Lake Basin. The water quality objective for bacteria in the Tulare Lake Basin was once expressed in terms similar to the water quality objective in the Sacramento and San Joaquin Rivers Basin Plan. In 1995, the water quality objective in the Tulare Lake Basin Plan was clarified in the same manner currently proposed for the Sacramento and San Joaquin Rivers Basin Plan.

Twenty permits of the 142 permits reviewed implement the Tulare Lake Basin Plan. Eight of these permits preceded the amendment to that basin plan. Whether the permit was adopted before or after the amendment, no difference occurred in application of the water quality objective.

To clarify the intent of the Bacteria objective, the Regional Board on 31 January 2003 adopted an amendment to the language of the objective so that it reads as follows: "In ground waters designated for use as domestic or municipal supply (MUN), the most probable number of coliform organisms over any seven-day period shall be less than 2.2/100mL." This amendment to the Basin Plan is currently pending approval by the State Board and the Office of Administrative Law. The water quality objective for bacteria in groundwater in the Tulare Lake Basin was once expressed in terms similar to the language in the Sacramento River and San Joaquin River Basin Plan. In 1995, the Tulare Lake Basin Plan was similarly amended to clarify the applicability of this objective.

Antidegradation

State Board Resolution No. 68-16 ("Statement of Policy with Respect to Maintaining High Quality of Waters of the State") requires the Regional 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 Regional Board's policies (e.g., quality that that does not conform to water quality objectives). In addition, Resolution No. 68-16 requires that discharges of waste to existing high quality waters "be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a)

pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained." 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 Board Resolution No. 68-16).

Resolution No. 68-16 is applied on a case-by-case, constituent-by-constituent basis in determining whether a certain degree of water quality degradation can be justified. It is incumbent upon the Discharger to provide technical information for the Regional 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 or control (BPTC);
- The extent the discharge will impact the quality of each aquifer; and
- The expected degree of degradation below water quality objectives.

The Regional Board must comply with CWC Section 13263 in setting appropriate discharge conditions. The Regional Board is required, with respect to the waters of the state 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 to protect those uses. The Regional Board need not authorize the full utilization of the waste assimilation capacity of the groundwater (CWC Section 13263(b)) and must consider other waste discharges and factors that affect that capacity.

The WWTF was constructed in 1966. Certain waste constituents in domestic 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 as governmental correctional facilities are a necessity and therefore provide a 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.

Although one-time grab groundwater samples have been collected, quarterly groundwater monitoring has not been conducted at the site and therefore data are not available to establish the most appropriate groundwater limits. In addition, certain aspects of waste treatment and control practices have not been and are unlikely to be justified as representative of best practicable treatment or control. Reasonable time is necessary to gather specific information about the WWTF and the site to make informed, appropriate, long-term decisions. This proposed Order, therefore, establishes interim groundwater limitations at a concentration protective of the beneficial uses of groundwater of the State pending the Discharger's completion of certain tasks and provides time schedules to complete specified tasks. The

Discharger is expected to identify, implement, and adhere to BPTC as individual practices are reviewed and upgraded in this process. During this period, degradation may occur from certain constituents, but is not authorized to exceed the interim groundwater limitations.

Water quality objectives define the least stringent limits that could apply as water quality limitations for groundwater at this location, except where natural background quality unaffected by the discharge already exceeds the objective. The values below are concentrations directly from the Basin Plan, or derived indirectly using Basin Plan procedures for implementation of narrative water quality objectives, and must be met to maintain specific beneficial uses of groundwater. They are based on numeric and narrative water quality objectives. Consistent with the Policy for Application of Water Quality Objectives in the Basin Plan, criteria of appropriate agencies have been used to implement narrative water quality objectives**.** Unless natural background for a constituent proves higher, the interim groundwater quality limitations 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	1.5	MUN [1]	Taste and Odor [2]
Boron	mg/L	0.7	AGR [3]	Boron Sensitivity [4]
	mg/L	1.0	MUN[1]	Calif. Drinking Water Action Level[11]
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]
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]
Sodium	mg/L	69	AGR [3]	Sodium sensitivity on certain crops [4]
Total Dissolved Solids	mg/L	450[8]	AGR [3]	Salt sensitivity [4]
		500	MUN [1]	Recommended Secondary MCL [5]
		1,000	MUN [1]	Recommended Upper MCL [5]
Total Coliform Organisms	MPN/100 ml	<2.2	MUN [1]	Basin Plan
pH	pH Units	6.5 to 8.5	MUN [1]	Secondary MCL [10]
		6.5 to 8.4	AGR [3]	Protect sensitive crops [4]

1 Municipal and domestic supply

2 J.E. Amoore and E. Hautala, *Odor as an Aid to Chemical Safety: Odor Thresholds Compared with Threshold Limit Values and Volatilities for 214 Industrial Chemicals in Air and Water Dilution*, Journal of Applied Toxicology, Vol. 3, No. 6 (1983).

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 Title 22, CCR, section 64439
9 Title 22, CCR, section 64439
10 Title 40, Code of Federal Regulations, Section 143.3
11 California Department of Health Services, Division of Drinking Water and Environmental Management, Drinking Water Action Levels, http://www.dhs.cahwnet.gov/ps/ddwem.

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 beneficial use protection unless they 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.

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. As chloride concentrations in most groundwaters in the region are much lower than in treated municipal wastewater, chloride is a useful indicator parameter for evaluating the extent to which effluent reaches groundwater. Boron is another TDS constituent that may occur in wastewater in concentrations greater than natural background groundwater depending on the source water and to the extent residents use cleaning products containing boron. Other indicator constituents for monitoring for groundwater degradation due to recharged effluent include total coliform bacteria, ammonia, total nitrogen, and Trihalomethanes (THMs), by-products of chlorination. Since the WWTF does not presently chlorinate their effluent, THMs are not included in the monitoring program or interim groundwater limitations. Dissolved iron and manganese are useful indicators to determine whether components of the WWTF with high-strength waste constituents are ineffective in containing waste. Exceptionally high TDS and nitrogen also typifies this type of release.

In compliance with State Board Order No. WQO-2003-0014 and based on wastewater characterization data provided by the Discharger in November 2003, this Order assigns numeric groundwater limitations only for constituents shown to be present in the wastewater, known potential breakdown products of domestic wastewater, or known to potentially leach from soil as a result of domestic wastewater discharge to land.

Treatment Technology and Control

Selecting appropriate treatment and control technologies so that the soil underlying the disposal area can accept the residual waste constituent loading while preventing unacceptable levels of groundwater degradation is a critical aspect of land disposal system siting and design[2]. Given the character of municipal wastewater, secondary treatment technology is generally sufficient to control degradation of groundwater from decomposable organic constituents when there is sufficient separation between the base of the land discharge area and the water table. Adding disinfection significantly reduces populations of pathogenic organisms, and significant layers of fine-grained soils in the vadose zone can reduce them further by filtration. Neither organics nor total coliform organisms, the indicator parameter

[2] USEPA Office of Research and Development, Manual of Wastewater Treatment and Disposal for Small Communities, EPA/625/R-92/006, Washington, D.C. (1992).

for pathogenic organisms, should be found in groundwater beneath a well-sited, well-designed, well-operated facility.

Municipal wastewater typically contains nitrogen in concentrations greater than water quality objectives, which vary according to the form of nitrogen. Nitrogen concentrations can be controlled by an appropriate secondary treatment system to nitrify and denitrify the wastewater (e.g., oxidation ditch) or tertiary treatment for nitrogen reduction[3]. Agronomic reuse of treated wastewater on harvested crops is an effective means to convert wastewater nitrogen into plant matter and nitrogen gas[4]. The effectiveness of these approaches varies, but one or more of them should be able achieve a nitrogen concentrations in groundwater well below the water quality objectives. The proposed interim groundwater limitations for nitrogen are based on the water quality objectives, which is the maximum limitation allowed.

Many waste constituents that are forms of salinity pass through conventional domestic wastewater treatment process unchanged except through evapoconcentration. Clay soils have a significant ability to assimilate some of the salinity through cation exchange, whereas sands and other soil types have relatively little[5]. However, in most cases, the combination of a continuous hydraulic head and constant salt loading in a wastewater pond will ultimately overwhelm the natural attenuation capacity of the underlying soil. Therefore, effective control of long-term effects often 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). The proposed Order sets interim limits that apply water quality objectives while site-specific, constituent-specific limits are developed in conjunction with a background water quality investigation and a BPTC evaluation of source control and pretreatment. The next Order will likely contain effluent limits for salt components other than chloride that, if met, assure groundwater quality will be controlled to an acceptable level.

A discharge of wastewater that overloads soils with nutrients and organics can result in anaerobic conditions in the soil profile, creation of organic acids and a decrease in soil pH. Under these conditions, iron and manganese compounds in the soil can solubilize and leach into groundwater. Anaerobic conditions can also lead to the presence of ammonia in the groundwater. Such overloading is preventable through appropriate system design and operation. The proposed groundwater limitations for pH, iron, manganese, and ammonia apply the water quality objectives.

Title 27

Title 27 California Code of Regulations (CCR) section 20005 et seq. ("Title 27"), contains regulations to address certain waste discharges to land for treatment, storage, processing, or disposal. Title 27 establishes a waste classification system, specifies siting and construction standards for full containment of designated and non-hazardous wastes, requires extensive monitoring of groundwater and

[3] Metcalf, and Eddy, Inc., Wastewater Engineering Treatment, Disposal and Reuse (3rd Ed.), McGraw-Hill, Inc., New York, (1991).

[4] Brown and Caldwell, Kennedy Jenks, Komex H_20 Science, Manual of Good Practice for Land Application of Food Process/Rinse Water, California League of Food Processors, Sacramento (2003).

[5] Dragun, James, The Soil Chemistry of Hazardous Materials, Hazardous Materials Control Research Institute, Silver Spring MD, (1988).

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 the discharge to land of residual sludge and solid waste generated as part of the treatment process [Title 27 section 20090(a)]. The conditions require that WDRs have been issued or waived and 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 all water quality objectives. The conditions for sludge, solid waste, and biosolids management proposed in this Order are intended to assure this be evaluated along with other aspects of BPTC, pursuant to Resolution No. 68-16.

Discharge Prohibitions and Specifications

The water balance shows that the existing ponds' capacity is adequate to accommodate the current monthly average flow of 6,000 gpd and the design flow of 15,000 gpd. This Order maintains the flow limit based on the existing ponds' capacity to comply with the freeboard requirements.

The discharge specifications regarding dissolved oxygen and freeboard are included to prevent nuisance conditions and unauthorized discharges, and are applied to all such facilities.

Monitoring Requirements

CWC Section 13267 authorizes the Regional Board to require monitoring and technical reports as necessary to investigate the impact of a waste discharge on waters of the state. In recent years there has been increased emphasis on obtaining all necessary information, assuring the information is timely as well as representative and accurate, and thereby improving accountability of any discharger for meeting the conditions of discharge. CWC Section 13268 authorizes assessment of administrative civil liability where appropriate. The required reports are consistent with CWC section 13267 because the Discharger is responsible for the discharges subject to the proposed Order and the reports are necessary to assure compliance with the proposed Order.

The proposed Order contains similar monitoring requirements as those found in Revised Monitoring and Reporting Program No. 5-01-256. The Discharger is required to monitor the influent, effluent, wastewater pond, and groundwater. To determine the efficiency of the Discharger's operation, the Discharger is required to monitor influent for BOD. In order to adequately characterize its wastewater effluent, the Discharger is required to monitor for BOD, coliform, TDS, and nitrogen. To ensure that disposal ponds do not create nuisance conditions or unauthorized discharges, the Discharger is required to monitor freeboard and dissolved oxygen content on a weekly basis.

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.

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. The requirements that apply to this facility may be modified in the future based on new information.

AMENDED

ALO: 1/29/04