

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2003-0076

WASTE DISCHARGE REQUIREMENTS
FOR
SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT
SACRAMENTO REGIONAL WASTEWATER TREATMENT PLANT
BIOSOLIDS AND SOLIDS STORAGE AND DISPOSAL FACILITIES
CLASS II LAND TREATMENT UNITS
UNCLASSIFIED SOLIDS STORAGE BASINS
CLASS III LANDFILL
CONSTRUCTION, CLOSURE, POST-CLOSURE MAINTENANCE
AND CORRECTIVE ACTION
SACRAMENTO COUNTY

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

1. The Sacramento Regional County Sanitation District (hereafter Discharger) owns and operates treatment, storage and disposal facilities for digested sludge (or 'biosolids') and solids generated from the Sacramento Regional Wastewater Treatment Plant. The facilities were previously regulated by Waste Discharge Requirements (WDRs) Order Nos. 98-087 and 5-01-263 in conformance with Title 27, California Code of Regulations (27 CCR), Division 2, Subdivision 1 (hereafter Title 27).
2. The facilities regulated by these WDRs include twenty unclassified Solids Storage Basins (SSBs), five Class II Dedicated Land Disposal (DLD) land treatment units (LTUs), and a closed Class III grit and screenings landfill. The facility is about eight miles south of Sacramento and one mile east of the town of Freeport, in Section 19, R5E, T7N, MDB&M, as shown on Attachment A, and a site plan of the facility is shown on Attachment B. Attachments A and B are incorporated herein and made part of this Order. The plant process area and waste management facilities occupy about 935 acres of the 3300-acre site.
3. The Discharger has identified an increase in the concentration of inorganic constituents (salts) in samples from groundwater monitoring wells downgradient from the waste management units when compared to samples from upgradient groundwater monitoring wells. Soil pore-water monitoring also detected elevated inorganic constituents in the unsaturated zone beneath the DLDs. The increased inorganic concentrations consisted primarily of nitrate, chloride, and total dissolved solids.

Because of these groundwater impacts, WDRs Order No. 98-087 had required the Discharger to cease discharge to the unlined DLDs by 1 November 2001 and complete closure of two DLDs by 1 November 2003. The Discharger had also proposed to line the other three DLDs pursuant to §20435(r)(2) of Title 27, which requires LTUs to be lined,

closed or practices to be changed if a release is discovered at an LTU . Previous WDRs Order No. 5-01-263 included requirements for lining of the DLDs and prohibited the discharge of waste to the unlined DLDs. This Order continues the requirements for lining of the DLDs and prohibits the discharge of waste to the unlined DLDs.

4. The Discharger submitted a DLD closure plan during November 1999. Regional Board staff had significant concerns about the proposed closure method presented in the DLD closure plan. At the request of the Discharger, Order No. 5-01-263 extended the closure time schedule by one year to give the Discharger time to thoroughly investigate closure alternatives, develop the closure design, prepare an amended RWD and obtain revised WDRs for closure, and construct the closure system. Order No. 5-01-263 required the Discharger to submit an addendum to the DLD closure plan by 15 March 2002 and to submit an amended Report of Waste Discharge (RWD) for revision of waste discharge requirements for DLD closure by 15 December 2002. Order No. 5-01-263 also required that all five DLDs be either lined or closed by the extended 1 November 2004 deadline. This Order continues the requirement to either line or close the DLDs by 1 November 2004.
5. The Discharger completed liner installation for DLDs 2 and 4 during 2002. The Discharger has reported that DLD 3 will be lined during 2003 and that DLDs 1 and 5 will be closed during 2004.
6. The Discharger submitted an amended DLD closure plan on 15 March 2002. The closure plan proposed to close DLDs 1 and 5 using an evapotranspirative (ET) cover by planting vegetation in existing DLD soils. The cover would also be graded to drain by increasing existing slopes from the existing East/West (0.5%) and North/South (0.3%) to the "maximum extent possible". Runoff from the final cover would continue to be captured and routed to the treatment plant headworks. The primary mechanism of an ET cover is uptake of moisture by the evaporation and plant transpiration. Further information about the proposed DLD closure is given in later findings of this Order.
7. The Discharger submitted an amended Report of Waste Discharge (RWD) on 13 December 2002, to obtain Regional Board approval for the DLD closure requirements. The amended RWD contains the Final Closure Plan and the Final Post-Closure Maintenance Plan for DLDs 1 and 5. Based on comments from Regional Board staff about the March 2002 closure plan, the Final Closure Plan proposes to increase the grade of the primary slopes of the final cover to a nominal 1% for drainage. Further details of the demonstration by the Discharger that the proposed final cover system will protect water quality and will meet the performance standards of Title 27 are outlined in later findings of this Order.
8. The Discharger has evaluated alternate methods for biosolids disposal and is proposing to construct a Biosolids Recycling Facility (BRF) to process biosolids for commercial uses. Recycling of a portion of the biosolids would reduce the amount that would otherwise be discharged to the lined DLDs. The BRF would not be regulated by this Order.

WASTES AND THEIR CLASSIFICATION

9. The Discharger proposes to continue to discharge anaerobically digested primary and secondary sludge and scum to the SSBs. The digested sludge has about 0.4 to 3% solids. The solids are composed of about 50 to 80% volatile solids. Digested sludge may also contain variable concentrations of contaminants, such as heavy metals, chlorinated hydrocarbons and pathogens. When the digested sludge is placed in the SSBs, it undergoes further stabilization, i.e., reduction of volatile solids and pathogens. The reduction of volatile solids tends to concentrate constituents such as, heavy metals, inorganic chemicals, and stable chlorinated hydrocarbons (i.e., Aroclor (PCBs) compounds).
10. The SSBs function as sewage sludge treatment and storage units. Pursuant to §20090 of Title 27, treatment associated with a wastewater treatment facility may be exempted from the provisions of Title 27 given that the facility is regulated by Waste Discharge Requirements. The SSBs meet these criteria and are exempt from the provisions of Title 27.
11. The stabilized sludge (or biosolids) is in an anaerobic and chemically reduced state when it is harvested from the SSBs and discharged to the DLDs. When it is exposed to an aerobic environment it becomes oxidized and, due to microbial action, gains an acid generating potential, which could increase the solubility of several heavy metals. The Discharger conditions the DLD soils by adding lime to prevent heavy metals from solubilizing.
12. The stabilized sludge is 'undewatered sludge' and is essentially a liquid waste containing constituents at concentrations that if released under ambient conditions at the facility have the potential to degrade waters of the state. The stabilized sludge is classified as a 'designated waste' pursuant to the criteria set forth in §20210 of Title 27.

DESCRIPTION OF THE SITE

13. Existing on-site land use consists of the Regional Plant facility and a significant acreage for buffer isolation for the treatment processes. Land within 1,000 feet of the facility is used for agriculture and open space flood plain.
14. The average annual precipitation is about 17 inches. About 90 percent of the precipitation occurs between November and April. The 100-year, 24-hour precipitation event for the facility is 4.10 inches.
15. The site is on a low-lying alluvial basin at the confluence of Morrison, Beacon and Laguna Creeks. Currently, Morrison, Beacon, and Laguna Creeks converge on the north side of the property and drain westerly into the Beach-Stone Lakes Basin. This Basin discharges to the Sacramento and Mokelumne Rivers.

16. The Regional Plant is surrounded by a levee system ranging from 20.7 to 22.0 feet above mean sea level (MSL). A flood hazard analysis, based on full flow in Morrison Creek Floodway and a break in the Sacramento River levee found that a 400-year flood scenario would yield a water surface elevation of 17.5 MSL and that a minimum 3.2 feet of freeboard would be maintained with the existing levee system.
17. The beneficial uses of these surface waters include: domestic, municipal, agricultural and industrial supply; groundwater recharge; recreation; esthetic enjoyment; freshwater replenishment; freshwater habitat, migration, spawning and preservation and enhancement of fish, wildlife, and other aquatic resources.
18. Water quality monitoring of the DLDs included collection and analysis of storm water runoff samples. The results indicated that runoff was enriched with soluble constituents, especially in the runoff from the first storm event of the rainy season. The runoff also contains trace and/or below detectable levels of heavy metals, chlorinated hydrocarbon pesticides and PCBs. Storm water runoff from both the DLDs and the landfill is collected in storm water basins and routed to the headworks of the Regional Plant for treatment.
19. The Discharger has constructed about 66 groundwater monitoring wells at the facility. The wells monitor two water bearing zones from 30 to 50 feet below ground surface (bgs) and 60 to 75 feet bgs. Groundwater data indicate the groundwater flow direction in the shallow groundwater zone is to the east-southeast.
20. The beneficial uses of groundwater are domestic, municipal, agricultural, and industrial supply.

WASTE MANAGEMENT UNITS

Class III Landfill

21. The 23-acre landfill received grit, screenings, ash, and inert construction wastes. The landfill, closed in 1994, had a capacity of about 1.16 million cubic yards. The landfill is covered by a 1-foot vegetative layer, a 1-foot thick low permeability layer, and a foundation layer with a minimum thickness of two feet. This Order includes post-closure maintenance requirements for the landfill.

Unclassified Solids Storage Basins (SSBs)

22. Twenty SSBs receive about 6,000 tons of wet sludge per day for storage and stabilization. The sludge typically remains in the SSBs for three to five years. The SSBs are designed as facultative lagoons to control odors and to enhance sludge stabilization. Stored sludge is removed seasonally using a floating hydraulic dredge, which pumps the stabilized sludge to the DLDs.

23. The SSBs are regulated by these waste discharge requirements. A groundwater monitoring program is required to determine if leakage from the SSBs is occurring and impacting groundwater quality. In the event a condition of pollution is detected by the groundwater monitoring program the Discharger is required to implement an evaluation monitoring program and/or a corrective action program to the extent necessary to ensure that water quality protection standards are achieved.

Class II Dedicated Land Disposal Areas (DLDs)

24. There are five 37-acre DLD units that have received the stabilized sludge (biosolids) from the SSBs. Discharge of biosolids will continue at DLD units that receive liners. Biosolids are applied to the DLDs as a semi-liquid (about 7% solids) by subsurface injection to the upper 6 to 8 inches. The biosolids are applied to the DLDs during the dry season (typically from May through October). The Discharger applies lime as needed to maintain the proper soil pH and prevent leaching of heavy metals. The DLDs are graded to prevent ponding.
25. §20250 of Title 27 states that the maximum depth of a Class II LTU treatment zone shall not exceed 5 feet from the initial soil surface. The site specific soil conditions and waste characteristics indicate that the upper five feet would not achieve the performance goals of §20250 for the degradation, immobilization and transformation of nutrients and salts. However, it was initially thought that the deeper soils, in the deep percolation zone, would meet the performance goals of §20250 and would protect against water quality impairment. Pursuant to §20080 of Title 27, the DLDs were considered as engineered alternative LTUs for the five-foot treatment zone prescriptive standards under Regional Board Order No. 90-151. Subsequent monitoring demonstrated that the nutrients and salts are readily transported through the unsaturated zone to groundwater. These requirements prohibit discharge to the unlined DLDs and provide a time schedule to either line or close each of the five DLDs.

DLD Liner Systems

26. Pursuant to §20435(r)(2) of Title 27, the Discharger proposed lining DLDs 2, 3 and 4 due to groundwater impacts. Prior to lining a DLD, the Discharger proposed to excavate existing biosolids waste and native soil to a depth of about five-feet. The liner is then constructed, and the soil and biosolids are placed on the liner system. The DLD liner system, from top to bottom, is as follows:
- an LCRS consisting of 12-inches of 3/8-inch pea gravel, filter fabric and drainage piping;
 - a 60-mil HDPE geomembrane;
 - native clayey soils that have been moisture conditioned and compacted;
 - an LCRS sump and sump pump; and

- two pan lysimeters underlying pipe penetrations of the liner which are the lowest points in the LCRS.

The Discharger also proposed that the Construction Quality Assurance program require the native soils to be fine-grained soils with significant clay content that are SC, CL or CH per the Unified Soil Classification System and that visual classification would be conducted on a 100-foot horizontal grid. Any area of soil that is not classified as SC, CL or CH must be excavated to a depth of one-foot and replaced by fine-grained clayey soils. Laboratory testing for particle size distribution, Atterberg Limits and moisture-density are also conducted. Liner system installation was completed for DLDs 2 and 4 during 2002.

27. The Discharger also proposed to line DLD storm water runoff areas (runoff zones) that are adjacent to each of the DLDs. A low area of about 5-acres exists adjacent to each of the 37-acre DLDs where storm water is collected and gravity drained to a sanitary sewer and routed back to the treatment plant headworks. The Discharger proposed to line each of the runoff zones adjacent to the lined DLDs using a 45-mil polypropylene geomembrane. The Discharger reported that these areas can pass runoff from a 10-year, 24-hour storm event with virtually no backup from the sanitary sewer system. During an extreme event in 1995, the Discharger reports that runoff backed up into the runoff zone areas to a depth of 2 to 3 feet for a period of about 24-hours. The Discharger reported that gates controlling the runoff zone outlets are not closed as an operational practice, even during large storm events. The Discharger has proposed that these gates may be closed to minimize flows to the treatment plant headworks under an emergency situation when operations staff may deem it necessary for the protection of public safety or property, or preservation of the facility equipment. These emergency situations would be when upstream overflows or public damage is likely, or if simultaneous failures of treatment plant influent pumps and/or process units occur that require immediate cutback in plant flow. The proposed 45-mil polypropylene liner will significantly reduce any percolation of DLD storm water runoff in the runoff zones during times when storm water backs up into them. The runoff zones for DLDs 2 and 4 were lined during 2002. The Discharger proposes to line the runoff zones for the remaining DLDs during liner construction or closure, as applicable.
28. The WDRs Order No. 98-087 required the Discharger to maintain DLD soil pH above 6.5 in order to prevent heavy metals from solubilizing from the DLD soils. The Discharger proposed a reduction in the required pH limit to 5.0, with a target operating range of 5.2 to 5.5. The Discharger has reported that research on biosolids amended soils has shown that metals solubility is influenced to a greater extent by cation exchange capacity and organic matter content than by pH, and that metals in biosolids are complexed with organic compounds which greatly reduces solubility and inhibits migration from the treatment zone. As a result, the Discharger reports that they do not anticipate substantial metals migration at the reduced pH. In order to assess whether the pH reduction is increasing the solubility of metals, the Discharger proposes to monitor metals concentrations in the infiltrate (leachate) and perform an annual trend analysis. Order No. 5-01-263 approved a reduced DLD soil

pH limit of 5.0, but allowed Executive Officer to require an increase in the DLD soil pH if Regional Board staff finds that the trend in soluble metals concentrations in the infiltrate is increasing. This Order continues this requirement.

Closure of DLDs 1 and 5 (Class II LTUs)

29. Closure requirements for Land Treatment Units are given in §21420 of Title 27, which states:

“During the closure and post-closure period, the discharger shall:

- (1) continue all operations necessary to maximize degradation, transformation, or immobilization of waste constituents within the treatment zones;
- (2) continue all ground water and unsaturated zone monitoring in compliance with Article 1, Subchapter 3, Chapter 3, Subdivision 1 of this division (§20380 *et seq*);
- (3) continue all operations of the treatment zones to prevent runoff of waste constituents; and
- (4) maintain the precipitation and drainage control systems.”

The Class II performance standard is given in §20310(a) of Title 27, which states:

“Class II waste management units (Class II “Units”) shall be designed and constructed to prevent migration of wastes from the Units to adjacent geologic materials, ground water, or surface water, during disposal operations, closure, and the post-closure period.”

The closure requirements given by this Order for DLDs 1 and 5 are intended to meet the LTU closure requirements given in §21420 of Title 27 and the performance standard given in §20310(a) of Title 27.

30. The December 2002 amended RWD submitted by the Discharger states that the proposed closure for DLDs 1 and 5 is an engineered alternative to the prescriptive requirements of Title 27. Title 27 provides a prescriptive requirement for closure of solid waste landfills under §21090; however, Title 27 does not provide a prescriptive requirement for closure of a land treatment unit. Despite this, the Discharger provided a demonstration in the amended RWD attempting to show that the proposed closure for DLDs 1 and 5 meets or exceeds the performance of a prescriptive final cover for a solid waste landfill as would be required under §20080 for an engineered alternative to the prescriptive requirement. Although the information provided by the Discharger may (or may not) adequately demonstrate that the proposed closure meets or exceeds the performance of a prescriptive final cover for a solid waste landfill, the findings of this Order only provide the information necessary for the closure requirements for LTUs pursuant to the Title 27 standards quoted in Finding No. 29, above.

31. The Discharger proposes to close DLDs 1 and 5 using an evapotranspirative (ET) cover and to line the runoff zones using a 45-mil polypropylene liner as described in Finding No. 27. The ET cover would consist of vegetating the existing DLD soils. The cover would also be graded to drain by increasing existing slopes to a nominal 1 percent (%). Runoff from the final cover would continue to be captured and routed to the treatment plant headworks. The primary mechanism of an ET cover for minimizing infiltration of rainwater is uptake of moisture by evaporation and plant transpiration. The proposed vegetation for the final cover is a mixture of various grasses and forbs. As proposed in the March 2002 amended DLD closure plan, the Discharger began pilot testing of four different mixtures of grasses and forbs in the DLD soils during October 2002. Preliminary results of the pilot testing are expected sometime during May or June 2003. The pilot study consists of 32 test plots with the four mixes of grasses and forbs being tested under varying degrees of soil amendments and irrigation. This Order requires approval of the final selection of vegetation for the cover by the Executive Officer.
32. The final grading design for DLDs 1 and 5 proposed by the Discharger will utilize a “saw-tooth” design to provide the nominal 1% slope for drainage. The general objectives for development of the final grading design as stated by the Discharger in the amended RWD are:
 - (1) Minimize infiltration to reduce contaminant migration;
 - (2) Promote runoff and prevent ponding;
 - (3) Control erosion; and
 - (4) Comply with applicable regulations.
33. The Discharger performed computer modeling to predict how much infiltration would pass through the 10-foot treatment zone at DLDs 1 and 5 after they are closed with the proposed final cover. The Discharger used geological and constituent concentration data in the modeling that was collected from four soil borings advanced at DLDs 1 and 5 during 2001. The geology and constituent concentrations were known at several depth intervals both within and beneath the 10-foot treatment zone. The infiltration performance was estimated using the UNSAT-H computer program. Input parameters included 30 years of rainfall data during the wettest 30-year period (1954-1983), vegetation data, and soil property data. Infiltration at the bottom of the treatment zone (10-foot depth) was calculated to be 0.008 centimeters per year (cm/yr). For comparison, the Discharger also modeled the performance of a Title 27 prescriptive final cover for a landfill. The predicted infiltration for this cover was 0.6 cm/yr. Finally, the Discharger estimated that the infiltration at DLDs 1 and 5 during historical operations was 13.4 cm/yr.
34. The Discharger also performed computer modeling to predict what the impact to groundwater might be that would result from the predicted infiltration through the proposed final cover. The Discharger used the MULTIMED computer program. The modeling

predicted no impacts to groundwater at the point-of-compliance (downgradient edge of the units) through a period of 5,000 years.

35. The DLD soil monitoring conducted by the Discharger indicates high levels of nitrate as nitrogen, especially in the upper 2 to 3 feet. Nitrate as nitrogen has been the primary constituent-of-concern to drive corrective action activities at the facility due to high concentrations in the waste, and groundwater impacts above the primary maximum contaminant level of 10 milligrams per liter. The Discharger has predicted that significant de-nitrification of the DLD soils will occur in the first several years after closure. The Discharger has also predicted that the vegetation planted directly in the DLD soils will uptake salts and nitrates. The Discharger proposes to periodically harvest and remove the vegetation. The purpose of the harvesting is to permanently remove salts and nitrates from the DLD soils, thereby reducing their threat to water quality. The Discharger proposes to conduct plant tissue analyses on the harvested biomass to determine the available disposal or beneficial reuse options.
36. The Discharger proposes to conduct monitoring of the performance of the DLD closure during the post-closure maintenance period. Post-closure monitoring will be conducted at two monitoring points that will be installed at DLD 1 and DLD 5 (four total). The Discharger proposes to monitor DLD soil moisture at various depths using neutron probe logging in the upper 20 feet. The Discharger also proposes to collect DLD soil samples semi-annually at each monitoring station for laboratory analysis of moisture and constituent concentrations. Each monitoring station would also include two suction lysimeters to monitor soil pore liquid installed to depths of 10 and 20 feet bgs. During the initial 5-years after closure, the Discharger proposes that the data collected would represent baseline data for use to determine the performance of the closure after the vegetative cover has been fully established. The Discharger proposes to develop action levels for infiltration and contaminant migration that would be used to determine when mitigation measures might be required to further reduce contaminant migration. This Order includes requirements for monitoring of the closure and mitigation if the closure is found to be insufficient.
37. The Discharger submitted a document entitled *Mitigation Alternatives for Closure Design* (Mitigation Plan) in Appendix G of the December 2002 amended RWD. This document proposes ways to mitigate problems with the closure of DLDs 1 and 5 such as failure to establish adequate vegetation, destruction of vegetation by fire, and unfavorable soil chemistry. Proposed mitigation measures include planting of salt tolerant woody species and addition of organic matter to soil. This Order requires the Discharger to implement the proposed mitigation measures as proposed in the Mitigation Plan if the applicable conditions described in the Mitigation Plan are found to exist by either the Discharger or by Regional Board staff.

38. Based on information submitted by the Discharger, and the Discharger's proposal to monitor the performance of the proposed final cover, the Regional Board finds that the closure meets the closure requirements and performance standards of Title 27.

CORRECTIVE ACTION PROGRAM

39. During December 1995, the Discharger implemented a corrective action program to remediate groundwater impacts that consists of groundwater extraction from ten extraction wells at the downgradient edge of the DLDs. The intent of the program is to capture and remove nitrate and salt impacted groundwater. The extracted groundwater is discharged to the wastewater treatment plant secondary effluent or constructed wetlands under an NPDES permit. The Discharger expanded the corrective action program by installing an additional seven groundwater extraction wells during the summer of 2000. The new extraction wells were connected to the treatment plant and brought on-line during 2002. The new wells have increased the overall groundwater pumping rate from 0.25 million gallons per day to approximately 1.0 million gallons per day. The Discharger has evaluated processes for pollutant source control from the existing DLDs prior to closure. These processes include: (1) injecting biosolids closer to the surface of the DLDs, (2) discing sooner to promote evaporation, and (3) regrading/rolling the DLDs prior to the winter to promote storm water runoff. The Discharger is also developing alternate methods for disposal of biosolids.

CEQA AND OTHER CONSIDERATIONS

40. The action to revise WDRs for these waste management facilities is exempt from the provisions of the California Environmental Quality Act (CEQA)(Public Resources Code §21000, et seq.), in accordance with Title 14, CCR, §15301.
41. The County of Sacramento, Department of Environmental Review determined the project for closure of DLDs 1 and 5 to be Categorical Exempt from the provisions of CEQA. A Notice of Exemption dated 14 January 2003 for the closure project was filed with the County of Sacramento County Clerk. A copy of the Notice of Exemption has been placed in the December 2002 amended Report of Waste Discharge submitted by the Discharger.
42. This Order implements:
- a. the Water Quality Control Plan for the Sacramento River Basin and the San Joaquin Basin, Fourth Edition, and
 - b. the prescriptive standards and performance goals of Title 27 California Code of Regulations (CCR) Division 2 Subdivision 1, effective 18 July 1997, and subsequent revisions.

43. Section 13267(b) of California Water Code 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 proposed to discharge within its region, or any citizen or domiciliary, or political agency or entity of this state who had discharged, discharges, or is suspected of discharging, or who proposed 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. The monitoring and reporting program required by this Order and the attached "Monitoring and Reporting Program No. R5-2003-0076" are necessary to assure compliance with these waste discharge requirements. The Discharger operates the facility that discharges the waste subject to this Order.
44. The Regional Board has notified the Discharger and interested agencies and persons of its intention to revise the WDRs for this facility.
45. In a public hearing, the Regional Board heard and considered all comments pertaining to this facility and discharge.

IT IS HEREBY ORDERED, pursuant to Sections 13263 and 13267 of the California Water Code, that Order No. 5-01-263 is rescinded, and that the Sacramento Regional County Sanitation District, its agents, successors, and assigns, in order to meet the provisions of Division 7 of the California Water Code and the regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS:

General Prohibitions

1. The discharge of 'hazardous waste' at this facility is prohibited. For the purposes of this Order, the term 'hazardous waste' is as defined in Title 27.
2. The discharge of solid or liquid waste or leachate to surface waters, surface water drainage courses, or groundwater is prohibited.
3. The discharge of waste to areas not adequately prepared and maintained to prevent fly and vector breeding and odors is prohibited.
4. The discharge of wastes which have the potential to reduce or impair the integrity of containment structures or which, if commingled with other wastes in the units, could produce violent reaction, heat or pressure, fire or explosion, toxic by-products, or reaction products which in turn:

- a. require a higher level of containment than provided by the unit,
- b. are 'restricted hazardous wastes', or
- c. impair the integrity of containment structures,

is prohibited.

Dedicated Land Disposal Areas (DLDs)

5. The discharge of waste of any form to the DLDs when the soil is saturated is prohibited.
6. The discharge of 'non-hazardous solid waste', including screenings and grit, not associated with the biosolids disposal operation, to the DLDs is prohibited. For the purposes of this Order, the term 'non-hazardous solid waste' is as defined in Title 27.
7. The discharge of wastes to unlined DLDs is prohibited.

Solids Storage Basins (SSBs)

8. The bypass and over flow of waste discharged to the SSBs, prior to being discharged to the DLDs, is prohibited.

Landfill

9. The discharge of new waste to the landfill is prohibited.

B. DISCHARGE SPECIFICATIONS:

General Specifications

1. Wastes shall only be discharged into, and shall be confined to, the waste management facilities specifically designed for their containment and/or treatment, as stated in the findings of this Order, and as shown on Attachment B.
2. The discharge of liquid and semi-solid waste to the SSBs is limited to digested sludge, secondary effluent from the Regional Plant, filtrate/centrate, thickener effluent, and freshwater. However, chemicals for treatment or other wastes may be discharged to the SSBs after approval by the Executive Officer.
3. All wells within 500 feet of the waste management facilities shall have sanitary seals which meet the requirements of the Sacramento County Environmental Health Department or shall be properly abandoned. A record of the sealing and/or

abandonment of such wells shall be sent to the Regional Board and to the State Department of Water Resources.

4. Water used for facility maintenance shall be limited to the minimum amount necessary for dust control.

Dedicated Land Disposal Area (DLDs)

5. Biosolids for the lined DLDs shall be covered within 24-hours after application if it poses an odor and/or vector nuisance. Injection of biosolids is considered covered unless improper application results in ponding or spillage during application, in which case the biosolids must be covered if it threatens to cause an odor and/or vector problem.
6. If odor conditions result from discing at the lined DLDs, discing shall be discontinued until the disposal units sufficiently dry and/or critical odor transport conditions are no longer present.
7. The pH of the zone of incorporation (the upper 5 feet) of the lined DLDs shall be maintained at or above 5.0. The pH limit may be increased by the Executive Officer if Regional Board staff finds that the concentration of dissolved metals is increasing in the DLD infiltrate.
8. The surface of the lined DLDs shall be graded, smooth and free from significant depressions to encourage runoff and to prevent ponding. Until the beginning of closure activities, the surface of DLDs that are not to receive a liner system shall be graded, smooth and free from significant depressions and rolled to encourage runoff and to prevent ponding. There shall be no ponding of storm water on the surface of the DLDs.
9. DLD runoff zones associated with lined DLD units shall be provided with a minimum 45-mil polypropylene geomembrane (or other equivalent) liner prior to any restriction or control gate closure that would detain storm water in the runoff zone.
10. The gates that control flow out of the DLD runoff zones shall not be closed except in an emergency situation as described in Finding No. 27 and shall be immediately opened once the emergency situation has passed.
11. The LCRS for the lined DLDs shall be designed to transmit twice the maximum anticipated daily volume of infiltrate (leachate) to the sump without clogging.
12. Annual testing of the LCRS in each lined DLD shall be conducted as specified in the RWD to demonstrate that the LCRS is not clogged and is capable of transmitting all

infiltrate to the sump. Results of the testing shall be reported in the Annual Monitoring Report as specified in Monitoring and Reporting Program (MRP) No. R5-2003-0076.

13. Each lined DLD pan lysimeter shall be monitored in accordance with MRP No. R5-2003-0076. In the event that liquid detected in any pan lysimeter is shown to be infiltrate by comparison with liquids in the sump, then biosolids applications shall cease on the side of the DLD unit associated with that lysimeter until the leak is repaired. The liquid shall be removed from the pan lysimeter on a regular basis until the repairs are completed. An Evaluation Monitoring Program shall also be proposed in accordance with the Standard Provisions and Reporting Requirements to assess whether the release has impacted the underlying unsaturated zone or groundwater.

Solids Storage Basins (SSBs)

14. Operation of the SSBs shall not result in odor nuisance conditions and shall not result in the degradation of underlying groundwater.

Water Quality Protection Standards

15. The concentrations of indicator parameters or waste constituents in waters passing through the Points of Compliance shall not exceed the Water Quality Protection Standards established pursuant to the findings of the Detection Monitoring Program report and established in MRP No. R5-2003-0076.

Protection from Storm Events

16. The waste management facilities (including the SSBs, DLDs and landfill) shall be designed, constructed, and operated to prevent inundation or washout due to floods with a 100-year return period. All related containment structures shall be constructed and maintained to prevent, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, washout, and overtopping under 100-year, 24-hour precipitation conditions.
17. Precipitation and drainage control systems shall be designed and constructed to accommodate the anticipated volume of precipitation and peak flows from surface runoff under 10-year, 24-hour precipitation conditions.
18. Surface drainage from Regional Plant tributary areas and Regional Plant internal site drainage from surface or subsurface sources shall not contact or percolate through wastes.

19. Annually, prior to the anticipated rainy season but no later than **1 November**, any necessary erosion control measures shall be implemented, and any necessary construction, maintenance, or repairs of precipitation and drainage control facilities shall be completed to prevent erosion or flooding of the facility and to prevent surface drainage from contacting or percolating through wastes. The Discharger shall submit information describing measures taken to comply with this specification in the annual monitoring summary report to the Regional Board.

C. CONSTRUCTION SPECIFICATIONS

Lined DLDs and DLD Runoff Zones

1. The construction of the lined DLDs shall be under the direct supervision of a California registered civil engineer or certified engineering geologist.
2. The Discharger shall submit a Construction Quality Assurance (CQA) Plan to the Regional Board for approval by Regional Board staff at least 30-days prior to construction of any lined DLDs. The CQA Plan shall include specifications for moisture conditioning and compaction of the soil underlying the HDPE geomembrane layer as well as testing requirements that are at a minimum as described in the RWD.
3. The DLD liner systems shall be constructed, at a minimum, with components listed in Finding No. 26, and construction quality assurance shall be performed in accordance with the approved CQA Plan.
4. DLD runoff zones shall be lined with a minimum 45-mil polypropylene liner during construction of DLD liner systems or during closure of unlined DLDs, as applicable.
5. The receiving surface for the HDPE layer of the DLD liner systems shall be flat rolled to be smooth and shall be free from significant organic material or any stones that protrude above the surface.
6. The Discharger may propose changes to the liner system design prior to construction, provided that approved components are not eliminated, and the engineering properties of the components are not substantially reduced. The proposed changes may be made following approval by the Executive Officer. Substantive changes to the design require reevaluation and approval by the Regional Board.
7. Following the completion of construction of a Unit or portion of a Unit, and prior to discharge onto the newly constructed liner system, the final documentation required in §20324(d)(1)(C) of Title 27 shall be submitted to the Executive Officer for review and approval. The report shall be certified by a California registered civil engineer or a certified engineering geologist. It shall contain sufficient information and test

results to verify that construction was in accordance with the design plans and specifications, with the requirements of this Order, and with the performance goals of Title 27.

8. A third party independent of both the Discharger and the construction contractor shall perform all of the construction quality assurance monitoring and testing during the construction of a liner system.
9. Closure of lined DLDs shall not proceed in the absence of closure waste discharge requirements that include findings and specifications that are written in accordance with the Dischargers demonstration that the proposed closure method will protect water quality.

D. CLOSURE SPECIFICATIONS

General Closure Specifications

1. The closure of the waste management facilities, including the DLDs, shall be under the direct supervision of a California registered civil engineer or certified engineering geologist.
2. The closure of each unit of all facilities shall be provided with at least two permanent monuments, installed by a licensed land surveyor, from which the location and elevation of all wastes, containment structures, and monitoring facilities can be determined throughout the post-closure maintenance period.
3. The Discharger shall continue to monitor groundwater and the vadose zone per MRP No. R5-2003-0076 throughout the post-closure maintenance period.
4. The post-closure maintenance period shall continue until the Regional Board determines that remaining wastes in the DLDs, landfill, and SSBs do not threaten water quality.

Closure of Unlined Dedicated Land Disposal Areas (DLDs)

5. The Discharger shall submit to the Regional Board an annual update of the Closure and Post-Closure Maintenance Plan by **1 May** each year.
6. All DLDs shall be closed in accordance with §21420 of Title 27. During the closure and post-closure period, the Discharger shall:
 - a. continue all operations necessary to maximize degradation, transformation, or immobilization of waste constituents within the treatment zones;

- b. continue all ground water and unsaturated zone monitoring in compliance with Title 27, §21420;
 - c. continue all operations of the treatment zones to prevent runoff of waste constituents; and
 - d. maintain the precipitation and drainage control systems
for the closed and inactive DLDs.
7. At closure, DLD 1 and 5 slopes shall be graded to a nominal slope of one percent (1%) for drainage and shall tie into surface water collection swales nominally sloped at one-half percent (0.5%) or greater. Perimeter conveyance channels adjacent to the DLDs shall be sloped at a minimum two-tenths percent (0.2%).
8. At closure, DLDs 1 and 5 shall receive vegetation that shall be selected to require a minimum of irrigation and maintenance, and that will maximize moisture uptake during the rainy season. The selected vegetation shall be based on the performance of grass mixtures from the pilot study and shall be approved by the Executive Officer as part of the final closure design.

Post-Closure Maintenance of Unlined DLDs

9. All vegetation shall be maintained over DLDs 1 and 5 to maximize uptake of moisture in the DLD soils.
10. Both DLDs 1 and 5 shall be equipped with two monitoring stations as described in the December 2002 Final Closure Plan and the Final Post-Closure Maintenance Plan (FPCMP). Monitoring of the stations shall be conducted as described in the FPCMP.
11. At the end of the five-year baseline period following closure of DLDs 1 and 5, the Discharger shall develop “action levels” for infiltration and contaminant migration that would trigger the assessment and implementation of enhancements to the closure of DLDs 1 and 5. The proposed action levels shall be submitted for approval by the Executive Officer in accordance with Provision No. 9.b.
12. Vegetation on DLDs 1 and 5 shall be harvested at least **annually**. The Discharger shall conduct plant tissue analysis on the harvested biomass to determine the available disposal or beneficial reuse options. Disposal or reuse of plant biomass shall be in accordance with applicable regulatory requirements.
13. The Discharger shall maintain the final cover for DLDs 1 and 5 as specified in D.7 above, and repair any areas of ponding.

14. The Discharger shall perform the mitigation measures described in the *Mitigation Alternatives for Closure Design* (Mitigation Plan) in Appendix G of the December 2002 amended RWD if any of the applicable conditions described in the Mitigation Plan are found to exist by either the Discharger or by Regional Board staff.
15. The Discharger shall perform all post-closure maintenance activities specified in the facility's Final Closure and Post-Closure Maintenance Plans that are not specifically referred to in this Order.

Class III Landfill Post-Closure Maintenance

16. The closed landfill shall be maintained with a final cover consisting, at a minimum, of a two-foot thick foundation layer which may contain waste materials, overlain by a one-foot thick clay cover that has an hydraulic conductivity of no more than 1×10^{-6} cm/sec, and finally by a one-foot thick vegetative soil layer.
17. Vegetation shall be maintained over the closed landfill unit. Vegetation shall be selected to require a minimum of irrigation and maintenance and shall have a rooting depth not in excess of the vegetative layer thickness.
18. The closed landfill unit shall be graded to at least a three percent grade and maintained to prevent ponding.

Closure of the Solids Storage Basins (SSBs)

19. The Discharger shall submit to the Regional Board an annual update of the SSBs Closure and Post-Closure Maintenance Plan by **1 May** each year.
20. At closure of the SSBs, all residual wastes, including liquids, sludges, precipitates, settled solids and liner materials and adjacent natural geological materials contaminated by wastes shall be completely removed and discharged to a waste management facility approved by the Regional Board. If after reasonable attempts to remove contaminated natural geologic materials, the Discharger demonstrates that removal of all remaining contamination is infeasible, then the units shall be closed as approved by the Executive Officer.

E. FINANCIAL ASSURANCE

The Discharger shall maintain assurances of financial responsibility for initiating and completing corrective action for all known and reasonably foreseeable releases from the facility. The Discharger shall also maintain an irrevocable closure fund or other means to ensure closure and post-closure maintenance of each wastes management unit. Post-closure maintenance financial

assurance for DLDs 1 and 5 shall be sufficient to fund the annual post-closure maintenance costs as estimated in the most recent annual Closure and Post-closure Maintenance Plan update.

F. PROVISIONS

1. The Discharger shall comply with the Standard Provisions and Reporting Requirements, dated August 1997, which are hereby incorporated into and made part of this Order. The Standard Provisions and Reporting Requirements contain important provisions and requirements with which the Discharger must comply. A violation of any of the Standard Provisions and Reporting Requirements is a violation of this Order.
2. The Discharger shall comply with all applicable provisions of Title 27 CCR that are not specifically referred to in this Order.
3. The Discharger shall comply with MRP No. R5-2003-0076, which is attached and made part of this Order. This compliance includes, but is not limited to, maintenance of waste containment facilities and precipitation and drainage controls. The Discharger shall continue to monitor groundwater and the vadose zone throughout the active life of the waste management units and the post-closure maintenance period. A violation of MRP No. R5-2003-0076 is a violation of this Order.
4. The Discharger shall maintain legible records of the volume and type of each waste discharged at each DLD, the landfill, and the SSBs and the manner and location of discharge. Such records shall be maintained at the facility until the beginning of the post-closure maintenance period. These records shall be available for review by representatives of the Regional Board and of the State Water Resources Control Board at any time during normal business hours. At the beginning of the post-closure maintenance period, copies of these records shall be sent to the Regional Board.
5. The post-closure maintenance period shall continue until the Regional Board determines that remaining wastes in the waste management units will not threaten water quality.
6. The Regional Board will review this Order periodically and may revise requirements when necessary.
7. In event of any change in control or ownership of this treatment and disposal system, the Discharger shall notify this Regional Board of such change and notify the succeeding owner or operator of the existence of this Order.

8. The Discharger has detected an exceedance of Water Quality Protection Standards listed in MRP No. R5-2003-0076. The Discharger shall continue to operate and maintain the groundwater treatment system to remediate groundwater contamination.
9. The Discharger shall complete the tasks outlined in the WDRs and attached MRP No. R5-2003-0076 in accordance with the following time schedule:

| <u>Task</u> | <u>Compliance Date</u> |
|--|------------------------|
| a. Complete lining or closure of each of the five DLDs. | 1 November 2004 |
| b. Submit proposed "action levels" for infiltration and contaminant migration for DLDs 1 and 5 for approval by the Executive Officer as described in Closure Specification No. 11. | 1 March 2010 |

I, THOMAS R. PINKOS, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Region Water Quality Control Board, Central Valley Region, on 25 April 2003.

THOMAS R. PINKOS, Executive Officer

Attachments

WLB

INFORMATION SHEET

ORDER NO. R5-2003-0076

SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT
SACRAMENTO REGIONAL WASTEWATER TREATMENT PLANT
BIOSOLIDS AND SOLIDS STORAGE AND DISPOSAL FACILITIES
CLASS II LAND TREATMENT UNITS
UNCLASSIFIED SOLIDS STORAGE BASINS
CLASS III LANDFILL
CONSTRUCTION, CLOSURE, POST-CLOSURE MAINTENANCE
AND CORRECTIVE ACTION
SACRAMENTO COUNTY

The Sacramento Regional County Sanitation District (Discharger) owns and operates the Sacramento Regional Wastewater Treatment Plant (Regional Plant). The Regional Plant collects and treats wastewater from the metropolitan Sacramento area. The Regional Plant is near Freeport, about two miles east of the Sacramento River.

The Discharger operates waste management facilities for storage and disposal of sludge from the Regional Plant. The facilities occupy about 935 of the 3500-acre site. These facilities include Solids Storage Basins (SSBs), five 37-acre Dedicated Land Disposal areas (DLDs), and a grit and screenings landfill. The SSBs, DLDs, and landfill first began operating in November 1979. The Discharger closed the landfill in 1994.

Pursuant to Title 27 Section 20090, treatment or storage associated with a wastewater treatment facility may be exempt from the provisions of Title 27 if waste discharge requirements regulate the facility. The SSBs were designed as sewage sludge treatment and storage units, thus the SSBs are exempt from the provisions of Title 27. The Discharger removes stabilized sludge (or biosolids) from the SSBs and injects it into the DLD soils during the months of low precipitation and high evaporation.

The Discharger designed the DLDs to promote decomposition of the stabilized sludge and to provide permanent disposal of the sludge removed from the SSBs. The DLD design required waste decomposition to occur within a specific treatment zone. The Discharger has shown that the treatment zone has not completely transformed or immobilized nitrates and salts and that these pollutants have had an adverse impact on ground water quality. The Discharger has exceeded Water Quality Protection Standards in downgradient groundwater monitoring wells and found waste constituents outside the DLD treatment zone. These conditions were a violation of waste discharge requirements and the Discharger has been required to take corrective action measures. Corrective action measures have included closure of the landfill, groundwater extraction and treatment, grading the DLDs to promote runoff, discontinuing discharge to unlined DLDs after 1 November 2001, and a proposal to line some DLDs and to close others.

The Discharger completed liner installation at DLDs 2 and 4 during 2002. This Order requires the Discharger to line or closed all of the DLDs by 1 November 2004, and includes construction requirements for the lined the DLDs and closure requirements for unlined

SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT
BIOSOLIDS AND SOLIDS STORAGE AND DISPOSAL FACILITIES
SACRAMENTO COUNTY

DLDs. This Order also includes requirements for lining of the 5-acre storm water runoff collection areas that exist adjacent to each of the DLDs.

Surface water drainage from the facility is to the Sacramento and Mokelumne Rivers. Storm water runoff from both the DLDs and the landfill is collected in storm water collection areas and routed to the headworks of the Regional Plant for treatment.

25 April 2003
WLB

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2003-0076

FOR

SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT
SACRAMENTO REGIONAL WASTEWATER TREATMENT PLANT
BIOSOLIDS AND SOLIDS STORAGE AND DISPOSAL FACILITIES

CLASS II LAND TREATMENT UNITS

UNCLASSIFIED SOLIDS STORAGE BASINS

CLASS III LANDFILL

CONSTRUCTION, CLOSURE, POST-CLOSURE MAINTENANCE

AND CORRECTIVE ACTION

SACRAMENTO COUNTY

The Discharger shall maintain water quality monitoring systems that are appropriate for detection monitoring and corrective action and that comply with the provisions of Title 27, California Code of Regulations (CCR), Division 2, Subdivision 1, Chapter 3, Subchapter 3.

Waste Discharge Requirements Order No. R5-2003-0076 and the Standard Provisions and Reporting Requirements dated August 1997 require compliance with this Monitoring and Reporting Program. Failure to comply with this Program, or with the Standard Provisions and Reporting Requirements, constitutes non-compliance with the WDRs and with the Water Code, which can result in the imposition of civil monetary liability.

The Discharger's monitoring data indicate waste constituents are present in groundwater and in the vadose zone. Waste constituents include elevated concentration of nitrate, chloride, and salts. In 1995, the Discharger implemented a corrective action program that consisted of a groundwater extraction and treatment system. The Discharger shall continue to operate the cleanup system and monitor the effectiveness of the corrective action program.

A. REPORTING

The Discharger shall report monitoring data and information as required in this Monitoring and Reporting Program and as required in the Standard Provisions and Reporting Requirements. Reports which do not comply with the required format will be **REJECTED** and the Discharger shall be deemed to be in non-compliance with the WDRs. In reporting the monitoring data required by this program, the Discharger shall arrange the data in tabular form so that the date, the constituents, the concentrations, and the units are readily discernible. The Discharger shall summarize the data to clearly illustrate compliance with waste discharge requirements or the lack thereof. A short discussion of the monitoring results, including notations of any water quality violations, shall precede the tabular summaries.

The Discharger shall report field and laboratory test results in semi-annual monitoring reports. The Discharger shall submit the semi-annual monitoring reports to the Board by **31 January** (fall report) and **31 July** (spring report) of each year. The spring report shall constitute the semi-

annual report for data collected between the previous 1 January and 30 June. The fall report shall constitute the semi-annual report for data collected between 1 July and 31 December of the previous calendar year. The fall report shall also constitute the annual report for the previous calendar year summarizing data collected over the entire calendar year. The annual report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous twelve months, so as to show historical trends. The Discharger shall report to the Board the results of any monitoring done more frequently than specified herein.

The Discharger shall report method detection limits and practical quantitation limits. The report shall include all method peaks, including those which the Discharger cannot quantify and/or specifically identify.

B. REQUIRED MONITORING REPORTS

1. Water Quality Protection Standard Report

The Discharger submitted a water quality protection standard in October 1992. The Discharger shall describe any changes to the water quality protection standard in the annual monitoring report.

2. Corrective Action Monitoring Report

The Discharger shall submit reports of the results of corrective action monitoring in accordance with the schedules specified in this Monitoring and Reporting Program.

3. Annual Monitoring Summary Report

The Discharger shall submit the Annual Monitoring Summary Report as specified in the Standard Provisions and Reporting Requirements and in this Monitoring and Reporting Program.

Standard Observations

Each monitoring report shall include a summary and certification of completion of all Standard Observations for the waste management unit, for the perimeter of the WMU, and for the receiving waters. The Discharger shall conduct standard observations weekly and shall include those elements as defined in the Standard Provisions and Reporting Requirements.

C. MONITORING

If the Discharger, through a detection monitoring program, or the Board finds that there is a measurably significant increase in indicator parameters or waste constituents over the water quality protection standards (established pursuant to Monitoring and Reporting

Program No. R5-2003-0076) at or beyond the Points of Compliance, the Discharger shall notify the Board or acknowledge the Board's finding in writing within seven days, and shall immediately resample for the constituent(s) or parameter(s) at the point where the standard was exceeded. Within 90 days, the Discharger shall submit to the Board the results of the resampling and either:

- a. a report demonstrating that the water quality protection standard was not, in fact, exceeded; or
- b. an amended Report of Waste Discharge for the establishment of an evaluation monitoring program, per Section 20415 and 20425 of Title 27, which is designed to evaluate changes in water quality due to the release from the facility.

If the Discharger, through an evaluation monitoring program, or the Board verifies that water quality protection standards have been exceeded at or beyond the Points of Compliance, the Discharger shall notify the Board or acknowledge the Board's finding in writing within seven days. Within 180 days, the Discharger shall submit to the Board an amended Report of Waste Discharge for the establishment of a corrective action program, per Section 20430 of Title 27, which is designed to remediate releases from the facility and to achieve compliance with the water quality protection standards.

D. REQUIRED MONITORING PROGRAMS

1. Solids Storage Basins Monitoring

The Discharger shall monitor the digested sludge discharged to the Solids Storage Basin (SSB) areas and the supernate (liquid) in the SSBs for the parameters listed in Table 1. Sludge shall be monitored **monthly** with semi-annual reporting. Supernate shall be monitored **semi-annually** with semi-annual reporting. SSB supernate samples shall be collected from each SSB. Samples from the SSBs within each SSB battery shall be composited into one sample for laboratory analysis (one composite sample from each of the three batteries). The annual report shall include a summary that discusses operational and control strategies implemented to prevent odor and nuisance conditions.

2. Lined Dedicated Land Disposal Areas Monitoring - Waste Discharge and Soil Monitoring

Waste Discharge:

The Discharger shall monitor the stabilized sludge (biosolids) discharged to the lined Dedicated Land Disposal (DLD) areas for the parameters listed in Table 2. The monitoring shall occur at **least two times** per SSB harvested during the sludge removal season. The annual report shall include a summary that discusses operation and control of the DLDs.

TABLE 1 - SSB MONITORING PROGRAM

| Sludge Monitoring: | | Supernate (Liquid) Monitoring: | |
|---|--------------|---------------------------------------|--------------|
| <u>Parameter</u> | <u>Units</u> | <u>Parameter</u> | <u>Units</u> |
| Quantity Discharged | tons/day | Total Suspended Solids | mg/L |
| Total Solids | percent | Total Dissolved Solids | mg/L |
| Volatile Solids | percent | Specific Conductance | µmhos/cm |
| Specific Conductance | | Ammonia Nitrogen (NH ₄ -N) | mg/L |
| µmhos/cm | | Nitrate as N | mg/L |
| pH | Number | Nitrite as N | mg/L |
| Chloride | mg/kg | Chloride | mg/L |
| Soluble Sulfate | mg/kg | Sulfate | mg/L |
| Calcium | mg/kg | Sodium | mg/L |
| Magnesium | mg/kg | Calcium | mg/L |
| Potassium | mg/kg | | |
| Sodium | mg/kg | | |
| Total Phosphorus | mg/kg | | |
| Total Nitrogen | mg/kg | | |
| Nitrate as Nitrogen | mg/kg | | |
| Nitrite | mg/kg | | |
| Total Kjeldahl Nitrogen | mg/kg | | |
| Ammonia | mg/kg | | |
| Arsenic | mg/kg | | |
| Cadmium | mg/kg | | |
| Chromium | mg/kg | | |
| Copper | mg/kg | | |
| Lead | mg/kg | | |
| Mercury | mg/kg | | |
| Molybdenum | mg/kg | | |
| Nickel | mg/kg | | |
| Selenium | mg/kg | | |
| Silver | mg/kg | | |
| Zinc | mg/kg | | |
| Organochlorine Pesticides, PCBs (EPA Method 3540/8080) | mg/kg | | |

**TABLE 2 – LINED DLD WASTE DISCHARGE
 MONITORING PROGRAM**

| <u>Parameter</u> | <u>Units</u> |
|---|---------------------|
| Biosolids Source | Slurry or Dewatered |
| Application Rate | Dry tons/acre |
| Total Solids | percent |
| Volatile Solids | percent |
| Specific Conductance | µmhos/cm |
| pH | Number |
| Chloride | mg/kg |
| Soluble Sulfate | mg/kg |
| Calcium | mg/kg |
| Magnesium | mg/kg |
| Potassium | mg/kg |
| Sodium | mg/kg |
| Total Phosphorus | mg/kg |
| Total Nitrogen | mg/kg |
| Nitrate as Nitrogen | mg/kg |
| Nitrite | mg/kg |
| Total Kjeldahl Nitrogen | mg/kg |
| Ammonia | mg/kg |
| Arsenic | mg/kg |
| Cadmium | mg/kg |
| Chromium | mg/kg |
| Copper | mg/kg |
| Lead | mg/kg |
| Mercury | mg/kg |
| Molybdenum | mg/kg |
| Nickel | mg/kg |
| Selenium | mg/kg |
| Silver | mg/kg |
| Zinc | mg/kg |
| Organochlorine Pesticides, PCBs (EPA Method 3540/8080) | mg/kg |

Soil Monitoring:

Semiannually, the Discharger shall monitor soil pH at two locations from each lined DLD. The Discharger shall report the amount of lime applied to the DLDs to maintain the soil pH above the minimum level required by the WDRs.

The lined DLD monitoring shall include annual monitoring of the soil beneath the DLDs for the parameters listed in Table 3. The Discharger shall collect and analyze samples from two locations at each DLD. The Discharger shall sample each location at the following depths below the surface: 6-inches, 18-inches and 36-inches. The Discharger shall collect the samples prior to the end of the annual application of stabilized sludge (biosolids) to the DLDs.

| TABLE 3 – LINED DLD SOIL MONITORING PROGRAM | |
|---|---------------------|
| <u>Parameter</u> | <u>Units</u> |
| Moisture Content | Percent |
| Cation Exchange Capacity | meq/100 mg |
| pH | Number |
| Total Kjeldahl Nitrogen | mg/kg |
| Total Sulfur | mg/kg |
| Arsenic | mg/kg |
| Cadmium | mg/kg |
| Chromium | mg/kg |
| Copper | mg/kg |
| Lead | mg/kg |
| Mercury | mg/kg |
| Nickel | mg/kg |
| Selenium | mg/kg |
| Silver | mg/kg |
| Zinc | mg/kg |
| Organochlorine Pesticides, PCBs (EPA Method 3540/8080) | mg/kg |

3. Groundwater Corrective Action Monitoring Program

Once each Spring and Fall, the Discharger shall monitor all Monitoring Points assigned to corrective action monitoring and all Background Monitoring Points (for each monitored medium) for the parameters listed in this Program.

For any given monitored medium, the Discharger shall collect a sufficient number of samples from all Monitoring Points and Background Monitoring Points to satisfy the data analysis requirements for a given Reporting Period. The Discharger shall collect the samples in a manner that ensures sample independence to the greatest extent feasible.

The Discharger shall perform statistical or non-statistical analysis when the monitoring data are available.

4. Groundwater Monitoring

Groundwater sampling shall include an accurate determination of the groundwater surface elevation and field parameters (pH, temperature, electrical conductivity, turbidity) for all monitoring points. The Discharger shall measure groundwater elevations prior to purging and sampling the wells to fulfill the groundwater gradient and direction requirements. For each monitored groundwater body, the Discharger shall measure the water level in each well (in feet and hundredths, MSL) and determine groundwater gradient and direction at least semi-annually, including the times of expected highest and lowest water level elevations for the respective groundwater body. The Discharger shall display this information on a water table contour map and/or groundwater flow net for the site and submit the map with the semi-annual monitoring reports.

The Discharger shall measure groundwater elevations for all background and downgradient wells for a given groundwater body within a period of time short enough to avoid temporal groundwater flow variations which could preclude accurate determination of groundwater gradient and direction.

The groundwater monitoring well network shall consist of the background and downgradient monitoring wells listed in Table 4. Attachment B shows the well locations. The Discharger shall collect samples from the wells at the frequencies and for the parameters specified in Table 5.

5. Extraction Well Monitoring

The extraction well system shall consist of the following extraction wells: MW-228R, MW-233, MW-235, MW-236, MW-303, MW-306, MW-307, MW-308, MW-313, and MW-315, MW-328, MW-329, MW-330, MW-331, MW-332, MW-333 and MW-334. The Discharger shall monitor and report the average flow and accumulated flow of extracted groundwater. The Discharger shall report on the cleanup system effectiveness and hydraulic influence on a semi-annual basis. Groundwater contour maps shall indicate the radius of influence of the extraction well system.

TABLE 4 - GROUNDWATER MONITORING WELLS

Shallow Saturated Zone Wells:

Background (north side):

MW-219 MW-220 MW-221

Background (south side):

MW-222R

Downgradient (north side):

MW-223 MW-224R‡ MW-226R MW-227R MW-228R*
 MW-230‡ MW-231‡ MW-232 MW-233* MW-234‡
 MW-236* MW-237

Downgradient (south side):

MW-225 MW-229R MW-235*

First Aquifer Wells:

Background (north side):

MW-301 MW-326

Background (south side):

MW-316

Downgradient (north side):

MW-303* MW-304‡ MW-305 MW-306* MW-310
 MW-311 MW-312 MW-313* MW-314 MW-315*
 MW-318 MW-319 MW-320 MW-322 MW-323
 MW-324 MW-328* MW-329* MW-330* MW-331*
 MW-333* MW-334* MW-335 MW-336 MW-337
 MW-339 MW-340 MW-341

Downgradient (south side):

MW-307* MW-308* MW-309 MW-317 MW-321
 MW-325 MW-332* MW-338

Other Wells:

MW-106R MW-401 MW-402 MW-403 MW-404
 MW-405 MW-406 MW-407 MW-408

* Elevation data only ‡ Wells to be abandoned/replaced

TABLE 5 - GROUNDWATER MONITORING PROGRAM

| <u>Parameter</u> | <u>Units</u> | <u>Frequency</u> |
|---|-----------------------|------------------|
| Field Parameters | | |
| Temperature | °F | Semi-Annually |
| Groundwater Elevation | Ft. & hundredths, MSL | Semi-Annually |
| Specific Conductance | µmhos/cm | Semi-Annually |
| pH | Number | Semi-Annually |
| Turbidity | Turbidity units | Semi-Annually |
| Monitoring Parameters | | |
| Total Dissolved Solids | mg/l | Semi-Annually |
| Chloride | mg/l | Semi-Annually |
| Nitrate as Nitrogen | mg/l | Semi-Annually |
| Arsenic | µg/l | Semi-Annually |
| Chromium | µg/l | Semi-Annually |
| Constituents of Concern | | |
| Cadmium | µg/l | Annually |
| Calcium | mg/l | Annually |
| Copper | µg/l | Annually |
| Magnesium | mg/l | Annually |
| Potassium | mg/l | Annually |
| Total Alkalinity | mg/l | Annually |
| Total Kjeldahl Nitrogen | mg/l | Annually |
| Nickel | µg/l | Annually |
| Sodium | mg/l | Annually |
| Zinc | µg/l | Annually |
| Sulfate | mg/l | Annually |
| Nitrite | mg/l | Annually |
| Inorganic Parameters ¹ | mg/l | 5 Years |
| Trace Metals ² | µg/l | 5 Years |
| Organochlorine Pesticides, PCBs, (EPA Method 8080) | µg/l | 5 Years |

¹ Inorganic parameters shall include: Ammonia, Phosphate, and Total Organic Carbon.

² Trace Metals shall include: Barium, Cobalt, Lead, Mercury, Molybdenum, Selenium, Silver, and Vanadium.

6. Lined DLD Infiltrate (LCRS) Monitoring

The Discharger shall monitor infiltrate (leachate) that collects in each of the lined DLD sump. Samples shall be collected in accordance with Table 6.

| TABLE 6 – LINED DLD INFILTRATE (LCRS) MONITORING PROGRAM | | |
|---|---------------------|-------------------------|
| <u>Parameter</u> | <u>Units</u> | <u>Frequency</u> |
| Field Parameters | | |
| Flow Volume | gallons | Monthly Total |
| Specific Conductance | µmhos/cm | Bi-Monthly |
| pH | Number | Bi-Monthly |
| Nitrate as Nitrogen | mg/l | Bi-Monthly |
| LCRS Flow Test | pass/fail | Annually |
| Monitoring Parameters | | |
| Arsenic | µg/l | Twice Annually |
| Barium | µg/l | Twice Annually |
| Cadmium | µg/l | Twice Annually |
| Chromium | µg/l | Twice Annually |
| Cobalt | µg/l | Twice Annually |
| Copper | µg/l | Twice Annually |
| Lead | µg/l | Twice Annually |
| Mercury | µg/l | Twice Annually |
| Molybdenum | µg/l | Twice Annually |
| Nickel | µg/l | Twice Annually |
| Selenium | µg/l | Twice Annually |
| Silver | µg/l | Twice Annually |
| Vanadium | µg/l | Twice Annually |
| Zinc | µg/l | Twice Annually |
| Ammonia | mg/l | Annually |
| Chloride | mg/l | Annually |
| Nitrate | mg/l | Annually |
| Phosphate | mg/l | Annually |
| Sulfate | mg/l | Annually |
| Total Kjeldahl Nitrogen | mg/l | Annually |
| Total Organic Carbon | mg/l | Annually |
| Total Dissolved Solids | mg/l | Annually |
| Organochlorine Pesticides, PCBs (EPA Method 8080) | µg/l | Annually |

7. Lined DLD Liner Leak Detection (Vadose Zone) Monitoring

The Discharger shall monitor each of the pan lysimeters in each of the lined DLDs. The pan lysimeters shall be inspected for the presence of liquid **at least quarterly**. When liquid is present, a sample shall be collected and analyzed in accordance with Table 7 and the indicated priorities 1, 2 and 3 (also see Discharge Specification No. 13).

TABLE 7 – LINED DLD LINER LEAK DETECTION MONITORING PROGRAM

| <u>Parameter</u> | <u>Units</u> | <u>Frequency</u> |
|------------------------------|------------------|------------------|
| Field Parameters | | |
| Free Liquid | Presence/Absence | Quarterly |
| Volume Evacuated | gallons | As Present |
| Specific Conductance(1) | µmhos/cm | As Present |
| pH(1) | Number | As Present |
| Nitrate as Nitrogen(1) | mg/l | As Present |
| Monitoring Parameters | | |
| Arsenic(2) | µg/l | As Required |
| Barium(2) | µg/l | As Required |
| Cadmium(2) | µg/l | As Required |
| Chromium(2) | µg/l | As Required |
| Cobalt(2) | µg/l | As Required |
| Copper(2) | µg/l | As Required |
| Lead(2) | µg/l | As Required |
| Mercury(2) | µg/l | As Required |
| Molybdenum(2) | µg/l | As Required |
| Nickel(2) | µg/l | As Required |
| Selenium(2) | µg/l | As Required |
| Silver(2) | µg/l | As Required |
| Vanadium(2) | µg/l | As Required |
| Zinc(2) | µg/l | As Required |
| Ammonia(1) | mg/l | As Required |
| Chloride(1) | mg/l | As Required |
| Nitrate(1) | mg/l | As Required |
| Phosphate(1) | mg/l | As Required |
| Sulfate(1) | mg/l | As Required |
| Total Kjeldahl Nitrogen(1) | mg/l | As Required |
| Total Organic Carbon(1) | mg/l | As Required |
| Total Dissolved Solids(1) | mg/l | As Required |
| Organochlorine Pesticides(3) | µg/l | As Required |

8. Surface Water Monitoring

The Discharger has reported that no surface water from waste discharge areas regulated by these WDRs flows off-site. All surface water is returned to the treatment plant headworks. Therefore, these WDRs do not require surface water monitoring.

9. DLD 1 & 5 Post Closure Monitoring Program

The Discharger shall monitor the closed DLDs as outlined in the Discharger's December 2002 Final Post Closure Maintenance Plan (FPCMP) or subsequent updates. Any changes to closed DLD monitoring proposed in FPCMP updates shall not become effective unless approved by Regional Board staff.

E. WATER QUALITY PROTECTION STANDARD

The Water Quality Protection Standard (Standard) shall consist of the following elements:

1. Constituents of Concern;
2. Concentration Limits;
3. Monitoring Points;
4. Points of Compliance; and
5. Compliance Period.

Each of these is described as follows:

1. Constituents of Concern

The 'COC list' (list of Constituents of Concern required under 27 CCR 20395) shall include all parameters listed in Tables 1, 2, 3, 5, 6, 7, 8 and 9 and in Monitoring and Reporting Program No. R5-2003-0076.

2. Concentration Limits

The Discharger shall determine the Concentration Limit for any given Constituent of Concern or Monitoring Parameter in a given monitored medium (i.e., the uppermost aquifer) at waste management units. The Discharger shall use the limits as the basis of comparison with data from the Monitoring Points in that monitored medium. The Discharger shall use background wells to establish concentration limits for each constituent of concern. The following describes the statistical procedures for monitoring data:

The Discharger shall establish concentration limits for each monitored medium beneath each portion of the facility. The Discharger shall determine concentration

limits based on all previous quarters of data collected from the background wells specified in this program.

If less than 10% of the results for a given constituent from the monitored medium in the background well(s) exceeds the detection limit, the concentration limit shall equal the detection limit.

If greater than 10% but less than 50% of the results exceed the detection limit, the statistical analysis shall be the test of proportions.

If greater than 50% but less than 85% of the results exceed the detection limit, the Discharger shall adjust the data mean and standard deviation by Cohen's Maximum Likelihood Estimation calculations. The prediction interval (using the adjusted mean and standard deviation) shall determine the concentration limit.

If greater than 85% of the data is greater than the detection limit, the Discharger shall use the prediction interval method to determine the concentration limit (no adjustment).

The Discharger shall use the control chart method for pH concentration limits.

The groundwater concentration limits for groundwater are listed in Tables 8 and 9. The Discharger shall determine the vadose zone concentration limits when sufficient data is available.

TABLE 8 - GROUNDWATER CONCENTRATION LIMITS
Shallow Saturated Zone

| <u>Parameter</u> | <u>Units</u> | <u>Concentration Limit</u> | |
|------------------------|--------------|----------------------------|-------------------|
| | | <u>North Side</u> | <u>South Side</u> |
| Specific Conductance | µmhos/cm | 978 | 3371 |
| Total Dissolved Solids | mg/l | 569 | 1836 |
| pH | Number | 6.6-8.0 | 6.7-7.9 |
| Ammonia | mg/l | TP | TP |
| Calcium | mg/l | 82 | 230 |
| Chloride | mg/l | 236 | 765 |
| Magnesium | mg/l | 55 | 187 |
| Nitrate as Nitrogen | mg/l | 4.85 | 8.75 |
| Nitrite | mg/l | ND | ND |
| Phosphate, as P | mg/l | 5.37 | 2.81 |
| Potassium | mg/l | 4.13 | 18.8 |
| Sulfate | mg/l | 15.4 | 3.58 |
| Sodium | mg/l | 61 | 502 |

ND Non-detect at the appropriate method detection limit.

- The Discharger shall develop concentration limits for this parameter.

TP Test of proportions.

TABLE 8 - CONCENTRATION LIMITS (Continued)
Shallow Saturated Zone

| <u>Parameter</u> | <u>Units</u> | <u>Concentration Limit</u> | |
|--|--------------|----------------------------|-------------------|
| | | <u>North Side</u> | <u>South Side</u> |
| Total Alkalinity | mg/l | 487 | 487 |
| Total Kjeldahl Nitrogen | mg/l | 0.952 | 1.49 |
| Total Organic Carbon | mg/l | - | - |
| Arsenic | µg/l | TP | ND |
| Barium | µg/l | - | - |
| Cadmium | µg/l | TP | 1.98 |
| Chromium | µg/l | ND | ND |
| Cobalt | µg/l | - | - |
| Copper | µg/l | TP | ND |
| Lead | µg/l | TP | TP |
| Mercury | µg/l | ND | ND |
| Molybdenum | µg/l | - | - |
| Nickel | µg/l | ND | ND |
| Selenium | µg/l | ND | ND |
| Silver | µg/l | ND | ND |
| Vanadium | µg/l | - | - |
| Zinc | µg/l | ND | ND |
| Organochlorine Pesticides, PCBs (EPA Method 8080) | µg/l | ND | ND |

ND Non-detect at the appropriate method detection limit.

- The Discharger shall develop concentration limits for this parameter.

TP Test of proportions.

3. Monitoring Points

The groundwater monitoring points for corrective action monitoring shall be the monitoring wells listed in Table 4 and as shown on Attachment B. The vadose zone monitoring points shall be the pan lysimeters located beneath the DLD liners, as described in DLD Liner Leak Detection (Vadose Zone) Monitoring.

TABLE 9 - GROUNDWATER CONCENTRATION LIMITS
First Aquifer

| <u>Parameter</u> | <u>Units</u> | <u>Concentration Limit</u> | |
|--|--------------|----------------------------|-------------------|
| | | <u>North Side</u> | <u>South Side</u> |
| Specific Conductance | µmhos/cm | 805 | 1652 |
| Total Dissolved Solids | mg/l | 476 | 1007 |
| pH | Number | 6.7-7.9 | 7.2-7.5 |
| Ammonia | mg/l | TP | - |
| Calcium | mg/l | 68 | 183 |
| Chloride | mg/l | 54 | 413 |
| Magnesium | mg/l | 42 | 176 |
| Nitrate as Nitrogen | mg/l | 10.9 | 0.756 |
| Nitrite | mg/l | ND | ND |
| Phosphate, as P | mg/l | ND | - |
| Potassium | mg/l | 3.63 | 44 |
| Sodium | mg/l | 63 | 262 |
| Sulfate | mg/l | 11.5 | - |
| Total Alkalinity | mg/l | 348 | 493 |
| Total Kjeldahl Nitrogen | mg/l | TP | TP |
| Total Organic Carbon | mg/l | - | - |
| Arsenic | µg/l | 113 | TP |
| Barium | µg/l | - | - |
| Cadmium | µg/l | TP | ND |
| Chromium | µg/l | ND | ND |
| Cobalt | µg/l | - | - |
| Copper | µg/l | ND | ND |
| Lead | µg/l | TP | - |
| Mercury | µg/l | ND | - |
| Molybdenum | µg/l | - | - |
| Nickel | µg/l | ND | ND |
| Selenium | µg/l | ND | - |
| Silver | µg/l | ND | ND |
| Vanadium | µg/l | - | - |
| Zinc | µg/l | ND | ND |
| Organochlorine Pesticides, PCBs (EPA Method 8080) | µg/l | ND | ND |

ND Non-detect at the appropriate method detection limit.

- The Discharger shall develop concentration limits for this parameter.

TP Test of proportions.

4. Points of Compliance

The Points of Compliance for groundwater shall be the vertical surface located at the hydraulically downgradient limit of the waste management units that extends through the uppermost aquifer underlying the units.

5. Compliance Period

The Compliance Period is the number of years equal to the active life of the waste management unit plus the closure period. Each time the Discharger exceeds the Water Quality Protection Standard (i.e., a release is discovered), the facility begins a Compliance Period on the date the Board directs the Discharger to begin an Evaluation Monitoring Program. If the Discharger's Corrective Action Program (CAP) has not achieved compliance with the Standard by the scheduled end of the Compliance Period, the Compliance Period is automatically extended until the facility has been in continuous compliance for at least three consecutive years.

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

Ordered by: _____
THOMAS R. PINKOS, Executive Officer

25 April 2003
(Date)

WLB