

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2007-0107

WASTE DISCHARGE REQUIREMENTS
FOR
COUNTY OF SACRAMENTO
DEPARTMENT OF WASTE MANAGEMENT AND RECYCLING
KIEFER LANDFILL, CLASS III LANDFILLS
CONSTRUCTION, OPERATION, CLOSURE,
POST-CLOSURE MAINTENANCE, AND CORRECTIVE ACTION
SACRAMENTO COUNTY

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

1. The County of Sacramento, Municipal Services Agency, Department of Waste Management and Recycling (hereafter Discharger) owns and operates the Kiefer Landfill, a Class III municipal solid waste (MSW) disposal facility. The landfill has been in operation since 1967 accepting waste from various areas within Sacramento County.
2. The facility is at the intersection of Grant Line Road and Kiefer Boulevard, in the eastern portion of Sacramento County, about 15 miles east of the City of Sacramento, one mile north of Sloughhouse, and six miles northwest of the City of Rancho Murieta, in Sections 22, 26, 27, 34, and 35, T8N, R7E, MDB&M, as shown on Attachment A, which is incorporated herein and made part of this Order by reference.
3. The Kiefer Landfill's permitted facility boundary encompasses 1,084 acres. The total permitted landfill footprint of 660 acres consists of 232-acre Landfill Unit 1 and 428-acre Landfill Unit 2. Landfill Unit 1 includes the 165-acre, unlined Module M1 and the 67-acre, lined Module M1-L. Landfill Unit 2 includes lined Modules M2 through M11, of which only Module M2 has been constructed as of the adoption of this Order. The Assessor's Parcel Numbers are APNs 126-090-16, 17, 18, 19, 20, and 21, and APN 126-090-02 (Landfill Units 1 and 2).
4. On 30 March 2007, the Discharger submitted an amended Report of Waste Discharge (RWD) and Joint Technical Document (JTD) for the landfill. The information in the amended RWD/JTD has been used in writing these waste discharge requirements (WDRs). The RWD/JTD contains the applicable information required in Title 27, California Code of Regulations (CCR), Chapter 4, Subchapter 3, Article 4. The RWD/JTD and supporting documents contain information related to this revision of the WDRs:
 - a. Implementation of an alternative (evapotranspirative) final cover over the unlined landfill areas (refer to Finding Nos. 62 through 71 of this Order).

- b. A liner performance demonstration update for landfill Module M3 and future modules (refer to Finding Nos. 49 through 51 of this Order).
 - c. Acceptance of treated wood waste in the lined modules at the landfill (refer to Finding No. 17 of this Order).
 - d. Revisions to the Detection Monitoring Program for surface water (refer to Finding No. 35 of the Order).
 - e. Clarification of leachate management alternatives (refer to Finding Nos. 47 and 48 of this Order).
5. On-site support facilities include the office, scalehouse, access roads, materials recovery and storage areas (for wood, tires, construction materials, appliances, etc.), an inert waste processing area, a landfill gas flaring plant, a landfill gas-to-energy plant, an extracted groundwater treatment plant, pipelines, the active landfill face, and other facilities (see Attachment B, Site Map, which is incorporated herein and made part of this Order by reference). The Discharger also plans on expanding the site's entrance facilities including replacement of scale facilities, upgrading of surface water and sediment control features, and construction of a public drop-off facility for antifreeze, batteries, motor oil, latex paint, and universal wastes (aka an "ABOP" facility).
 6. Previous WDR Order Nos. 89-207, 95-078, 99-053, and R5-2002-0187 classified the landfill facility as a Class III waste disposal site for the discharge of municipal solids wastes in accordance with the regulations in effect when the orders were issued. This Order continues to classify the landfill facility as a Class III facility that accepts MSW in accordance with Title 27, CCR Section 20005, et seq. (Title 27).
 7. On 9 October 1991, the United States Environmental Protection Agency (USEPA) promulgated federal MSW regulations under the Resource Conservation and Recovery Act (RCRA), Subtitle D (Title 40, Code of Federal Regulations (40 CFR), Part 258), hereafter referred to as "Subtitle D". These regulations apply to all California Class II and Class III landfills which accept MSW, including the Kiefer Landfill.

SITE DESCRIPTION

8. The measured hydraulic conductivity of the native soils underlying the Unit ranges between 1.8×10^{-6} and 1.8×10^{-4} centimeters per second (cm/sec) based on packer and infiltration testing conducted in the field in 1988. Saturated hydraulic conductivity testing conducted during 2006 during borrow-source investigation for final cover material ranged from 7.8×10^{-8} and 2.2×10^{-4} cm/sec. Areas with relatively clean sand soils with saturated hydraulic conductivity greater than 1×10^{-3} cm/sec also underlie the site.

9. The area surrounding the site is low rolling Sierra Foothill terrain, with natural elevations varying between 110 and 230 feet above mean sea level (MSL). The landfill filled a shallow south-trending valley such that there is natural high ground to the east and west.
10. Surrounding land uses include pasture, livestock grazing, crop growing, and residential.
11. There are 19 private wells within one mile of the site, including at least eight used for irrigation, two for domestic supply, and one for livestock. Numerous additional domestic and irrigation wells are located south of the site along Highway 16 near Sloughouse.
12. The average annual precipitation at the Sacramento City National Weather Service Station is 17.87 inches. The facility receives an average of 19 inches of precipitation per year based on a 1966 Sacramento County isohyetal map. The mean pan evaporation is 66.9 inches per year as measured at the Folsom Dam Station.
13. The 100-year, 24-hour precipitation event is estimated to be 4.39 inches at the Sacramento City National Weather Service Station.
14. A revised Flood Insurance Rate Map published by the Federal Emergency Management Agency (FEMA) on 12 October 1999 indicates that approximately 4.5 acres of the southern portion of the proposed Sedimentation Basin A will occupy the revised FEMA 100-year floodplain. This basin will be constructed adjacent to Module M10 sometime during or after the filling of Module M9 (refer to Attachment B). The current landfill does not occupy any of the temporary storage volume for a 100-year flood, nor restrict the 100-year flood. The proposed expansion area of the landfill's Sedimentation Basin A will reduce the existing flood volume by approximately 14,500 cubic yards. This volume will be replaced by excavating an equal quantity of soil below the floodplain elevation of 108 feet MSL onsite or adjusting the configuration of the basin to avoid the floodplain altogether. This will satisfy the floodplain requirements of Subtitle D (40 CFR 258.11).

WASTE CLASSIFICATION AND UNIT CLASSIFICATION

15. The Discharger discharges nonhazardous solid waste, including municipal solid waste to Class III waste management units at the landfill. These classified wastes may be discharged only in accordance with Title 27, Resolution No. 93-62, and Subtitle D as required by this Order.
16. Special wastes discharged at the landfill include treated infectious wastes, triple-rinsed empty pesticide containers, non-friable asbestos, and dead animal carcasses using special disposal and handling procedures. The landfill also accepts POTW grit and screenings, and biosolids with a minimum 20 percent solids and no free moisture. Biosolids are only accepted from the Sacramento Regional Wastewater Treatment Plant on an infrequent, emergency basis. The landfill also accepts construction and demolition debris.

17. The Discharger proposes to accept treated wood waste at the landfill. "Treated wood" means wood that has been treated with a chemical preservative for purposes of protecting the wood against attacks from insects, microorganisms, fungi, and other environmental conditions that can lead to decay of the wood and the chemical preservative is registered pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Sec. 136 and following). Existing law regulates the control of hazardous waste, but exempts from the hazardous waste control laws, wood waste that is exempt from regulation under RCRA, if (a) the wood waste is disposed of in a municipal landfill that meets certain requirements imposed pursuant to the Porter-Cologne Water Quality Control Act for the classification of disposal sites, and (b) the landfill meets other specified requirements outlined in Sections 25143.1.5 and 25150.7 of the Health and Safety Code. Section 25150.8 of the Health and Safety Code also provides that if treated wood waste is accepted by a solid waste landfill that manages and disposes of the treated wood waste in the manner specified, the treated wood waste shall be deemed to be a solid waste, and not a hazardous or designated waste. The Discharger has reported that all treated wood waste accepted at the landfill will be handled and disposed of in accordance with the provisions outlined in Sections 25143.1.5, 25150.7, and 25150.8 of the Health and Safety Code.
18. The Discharger uses alternative daily cover (ADC) to conserve cover soil, save air space, and to prevent the formation of barriers for leachate within the waste mass. Materials used for ADC on a regular basis include temporary geosynthetic tarps and processed green waste. Other ADC materials used on a periodic basis are compost materials, processed construction and demolition wastes and materials, shredded tires (mixed with soil), and wood ash (non-hazardous, non-designated ash from wood-fired energy generation facilities).

WASTE MANAGEMENT UNIT SITING

19. Section 20240 (c) of Title 27 requires that *new* landfills be "sited, designed, constructed and operated", to ensure or maintain at least five feet of separation between the contained wastes and the highest anticipated level of the groundwater table. Existing landfills are to be "operated" to maintain the required separation. The Discharger has adequately demonstrated that there will be greater than five feet of separation from groundwater at the lowest area of Landfill Unit 2 (the leachate collection sump for Module M10 will have an elevation of about 90 feet MSL). Calculations indicate that at least 16 feet of separation can be maintained based on a maximum groundwater elevation of 61 feet MSL in the vicinity of Module M10, and a calculated maximum capillary rise of 13 feet. During 2006, the highest elevation of groundwater in the vicinity of Module M10 was about 55 feet MSL.

20. The Discharger has provided the necessary document certifications related to seismic design pursuant to Section 20240(d) of Title 27 for design and construction of each existing landfill module at the site.

21. The Landfill Unit 2 expansion area footprint will be set back at least 50 feet from the site boundary, which, along with a minimum 60-foot wide drainage bench along the site boundary, will provide for at least a 110-foot buffer between the property line and the landfilled waste.

SITE GEOLOGY

22. Quaternary alluvium, the Laguna Formation, the Mehrten Formation, and the Valley Springs Formation, in that order, underlie the site. These formations dip slightly to the west and are summarized as follows:

- The Quaternary alluvium is confined to an area south of Landfill Unit 1.
- The Laguna Formation is present as a thin gravel layer, which outcrops on the southern part of the site.
- The base of the landfill cuts the Mehrten Formation, which underlies the Laguna, in the southern part of the site. It varies from 300 to 350 feet in thickness and is subdivided into upper and lower units.
- The upper Mehrten is subdivided into three sand sequences (the "shallow", "middle", and "deep" zones), which are composed of sandstone, siltstone, and claystone, and separated by mudstone. The beds have varying thickness and lateral continuity. Some of the thicker beds appear to be more laterally extensive, and split into several thinner, finer-grained beds. In the northern portion of the site the shallow zone beds are thicker and coarser, whereas to the south they appear to split, thin, and pinch out.
- The Lower Mehrten consists of thick sand and gravel beds with possibly some volcanic mudflow. The sand appears relatively uniform in thickness and widespread in extent.
- The underlying Valley Springs Formation consists of volcanic sandstone ("lava sand") and claystone.

23. The Bear Mountains and Melones fault zones, part of the Sierra Foothills fault system, are approximately 10 and 19 miles east of the facility, respectively. Neither of these fault zones is considered active. The closest Holocene faults are approximately 40 miles from the site with Maximum Probable Earthquake (MPE) magnitude of 5.7 to 6.4 that would result in Peak Ground Acceleration (PGA) of 0.02 to 0.05 g at the site. The San Andreas Fault, located approximately 90 miles to the southwest and an MPE of 8.0 would result in a PGA of 0.06 g at the site.

SURFACE WATER AND GROUNDWATER CONDITIONS

24. The *Water Quality Control Plan for Sacramento and San Joaquin River Basins, Fourth Edition* (hereafter Basin Plan), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin.
25. The northern part of the site is in the Franklin/Florin Hydrologic Sub-Areas (HSAs), Morrison Creek Hydrologic Area (HA) of the Valley-American Hydrologic Unit (HU) in the Sacramento Hydrologic Basin Planning Area (as depicted on the interagency hydrologic maps prepared by the Department of Water Resources in August 1986), and is naturally drained by Laguna Creek, a seasonal water tributary to the Sacramento River.
26. The southern portion of the site is in the Lower Deer Creek HSA, Lower Cosumnes-Dry Creek HA of the North Valley Floor HU in the San Joaquin River Basin Planning Area, and is naturally drained by Deer Creek, tributary to the Cosumnes River, thence the Mokelumne River.
27. The designated beneficial uses of these surface waters are municipal and domestic supply, agricultural supply, industrial service supply, industrial process supply, navigation, water contact recreation, non-contact water recreation, warm freshwater habitat, cold freshwater habitat, wildlife habitat, migration of aquatic organisms, and spawning, reproduction, and/or early development.
28. The designated beneficial uses of the groundwater, as specified in the Basin Plan, are domestic and municipal water supply, agricultural supply, industrial service supply, and industrial process supply.
29. Groundwater is present in three discrete zones. The shallow A-zone and deeper B-zone produce groundwater from discontinuous sand units in the upper Mehrten Formation. The A-zone lies between approximately 60 and -20 feet mean sea level (MSL), with first encountered groundwater at about 60 to 190 feet below ground surface. The B-zone lies between approximately -20 and --100 feet MSL. The deep C-zone is located within laterally extensive sands of the lower Mehrten and underlying Valley Springs Formation at approximately -150 to -180 feet MSL.
30. Monitoring data indicates background groundwater quality in the A-zone has an electrical conductivity (EC) typically ranging between 140 and 250 micromhos/cm, with total dissolved solids (TDS) typically ranging between 110 and 220 milligrams per liter (mg/L). The B-zone and C-zone background groundwater data are similar to the A-zone data.
31. The direction of groundwater flow is toward the southwest, but is locally to the west in some areas. The average groundwater gradient is approximately 0.0025 feet per foot. The average groundwater velocity is typically about 85 to 135 feet per year.

32. Most regional and on-site groundwater production is from the Lower Mehrten and Valley Springs Formations, which are part of the extensive groundwater aquifer system underlying the Sacramento Valley. The regional gradients are to the southwest, and are influenced by recharge from the American and Cosumnes Rivers, and heavy pumping near Elk Grove. West of the facility, the Laguna Formation is also a source of water supply.
33. Storm water runoff from the Landfill Unit 1 landfill is captured in an inner perimeter drainage ditch called the "on-site channel" along the north and east perimeter of Landfill Unit 1. The on-site channel empties into the "main" sedimentation basin at the southeast end of the landfill. The purpose of the sedimentation basin is to retain runoff, allowing for settling of sediments, evaporation, and percolation. Any excess water is then discharged to Deer Creek via the offsite channel. Storm water runoff from Module M2 and areas on the northwest part of the landfill drains to Sedimentation Basin B that is adjacent to Module M2. Refer to Attachment B for locations of these basins.
34. The Landfill Expansion will result in direct loss of 6.07 acres delineated as jurisdictional wetlands (including 1.546 acres of vernal pools or vernal pool complexes) that are habitat for vernal pool tadpole shrimp and vernal pool fairy shrimp. Indirect effects would occur on 2.10 acres of habitat of the vernal pool fairy shrimp, vernal pool tadpole shrimp, and Sacramento Orcutt grass. The Discharger has demonstrated compliance with the requirements of Section 258.12 of Subtitle D as follows:
- a. 40CFR258.12 (a) (1) — "Where applicable under Section 404 of the Clean Water Act ... the presumption that practicable alternative to the proposed landfill is available which does not involve wetlands is clearly rebutted" –

The Discharger's *Final Supplemental Environmental Impact Report* (August 1998, State Clearinghouse Number 92052096) states that (Page 4-83), "... based on the assessment of alternatives presented in this EIR, no single alternative, or combination of alternatives, emerges as the environmentally superior alternative." The Discharger has obtained a permit from the Department of the Army, which granted Permit Number 199000250 on 24 February 2005 pursuant to Section 404 of the Clean Water Act (33 U.S.C. 403). The Army Permit is based upon "*Environmental Assessment, Statement of Findings, and review and compliance determination according to the 404(b) 1 guidelines for the Corps Permit Application*", dated 22 November 2002.

- b. 40 CFR 258.12 (a) (2) — "The construction or operation of the MSWLF unit will not: (i) Cause or contribute to violations of any applicable State water quality standard, (ii) Violate any applicable toxic effluent standard or prohibition under Section 307 of the Clean Water Act," –

The requirements in these WDRs help to ensure that the proposed project will not violate applicable water quality standards relating to the discharge of waste to land.

In the event of a release, however, Title 27 provides a script for evaluation monitoring and corrective action to restore groundwater quality objectives. NPDES Permit No. CA0083681 (Order No. R5-2007-0014) further requires the Discharger to remove volatile organic components (VOCs) from extracted groundwater to non-detect levels prior to discharge to Deer Creek, minimizing the potential for a violation of surface water quality standards or toxic effluent limitations under Section 307 of the Clean Water Act. The implementation of best management practices required under the General Storm Water Permit for Industrial Activities for landfill operations, and, as applicable, under the General Storm Water Permit for Construction Activities, similarly protects surface waters. The Discharger also obtained a Water Quality Certification from the Regional Water Board issued on 25 January 2005 certifying that any discharge from the County of Sacramento's Kiefer Landfill Expansion Project will comply with applicable provisions of §301, §302, §303, §306, and §307 of the Clean Water Act. The Order also certifies that any such "discharge is also regulated under Regional Board Resolution No. R5-2003-0008, 'Waiver of Reports of Waste Discharge and Waste Discharge Requirements for Specific types of Discharge'."

- c. 40 CFR 258.12 (a) (2) "The construction or operation of the MSWLF unit will not: (iii) Jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of a critical habitat, protected under the Endangered Species Act of 1973 ..." –

The 8 February 2005 Biological Opinion for the subject Army Permit states, "... the proposed Kiefer Landfill Expansion Project is not likely to jeopardize the continued existence of the vernal pool fairy shrimp, vernal pool tadpole shrimp, and Sacramento Orcutt grass. No critical habitat for these species has been designated in the Project's action area; therefore none will be affected."

- d. 40 CFR 258.12 (a) (3) — "The MSWLF unit will not cause or contribute to significant degradation of wetlands. The owner or operator must demonstrate the integrity of the MSWLF unit and its ability to protect ecological resources by addressing the following factors:
- (i) Erosion ... of ... native soils ... used to support the MSWLF unit;
 - (ii) Erosion ... of ... fill materials ... used to support the MSWLF unit;
 - (iii) The volume and chemical nature of the waste managed in the MWLF unit;
 - (iv) Impacts on fish, wildlife, ... and their habitat from release of the solid waste;
 - (v) The potential effects of catastrophic release of waste to the wetland ... , and"
 - (vi) Any additional factors ... to demonstrate ... resources in the wetland are sufficiently protected." –

The proposed project design, as described in these WDRs, meets the waste containment criteria for a Class III landfill under Title 27, minimizing the potential for a

release of solid wastes or leachate which could impact wetlands. The project design also meets the Title 27 requirements for WMU slope and seismic stability, and those for erosion and drainage controls, minimizing the potential for a release of wastes caused by a loss in structural integrity of the WMU, migration of eroded soils or wastes, or migration of waste constituents in drainage. In addition to these factors, the collection of landfill leachate and disposal at an authorized off site facility should be sufficient to minimize the potential for a catastrophic release which could impair fish, wildlife, and other aquatic resources and their habitats.

- e. 40 CFR 258.12 (a) (4) "To the extent required under section 404 of the Clean Water Act ... , steps have been taken to achieve no net loss of wetlands ..." –

The Discharger has compensated for the direct loss of 6.07 acres of jurisdictional wetlands at 1.5 times rate of replacement, as follows. For the 0.55 acres lost in Phase 1 (for Module M2), the Discharger has purchased 0.825 acres of restoration credit in the Service's Vernal Pool Compensation Fund Account. For the remaining 5.52 acres to be lost in Phase 2, the Discharger has purchased 8.28 acres of restoration credit at the Laguna Terrace Vernal Pool Preserve owned by Wildlands, Inc. The Discharger will also compensate for the direct loss of 6.07 acres of jurisdictional wetlands, as well as for the indirect impact of 2.10 acres of habitat for vernal pool fairy shrimp, vernal pool tadpole shrimp, and Sacramento Orcutt grass, by establishing a 243.88 acre area to be designated the Kiefer Landfill Wetland Preserve, which includes 20.55 acres of vernal pools, 0.29 acres of vernal pool swale, 0.43 acre of ephemeral streams, and 222.61 acres of annual grasslands.

GROUNDWATER, SURFACE WATER, AND UNSATURATED ZONE MONITORING

35. Under former Monitoring and Reporting Program (MRP) No. R5-2002-0187, the Discharger monitored surface water runoff at two locations at the landfill. The Discharger proposed to relocate its sampling points to improve data quality and usefulness. The background surface water monitoring location (SW-1) was located in the upstream end of the perimeter drainage ditch for Landfill Unit 1 in an area that will eventually be buried by future Module M8. The downstream sampling location (SW-2) was in the tributary to Deer Creek near the outfall from the main sedimentation basin. Monitoring location SW-2 would only represent runoff from the landfill during extremely wet winters at or near the 100-year wet season due to the large size of the main sedimentation basin. These surface water monitoring locations have been replaced with upstream (RSW-001) and downstream (RSW-003) monitoring locations in Deer Creek at locations that would be representative of all current and future landfill impacts, and are shown on Attachment B of this Order.
36. The groundwater monitoring system at the landfill consists of detection monitoring wells within the each of the three zones (A, B, and C-zones) and corrective action monitoring

wells within the A and B-zones. There are currently 32 monitoring wells in the A-zone, 21 wells in the B-zone, and 5 wells in the C-zone. Additional monitoring wells will be installed as future modules are constructed. A complete listing of monitoring wells and their associated monitoring programs is given in MRP No. R5-2007-0107, a part of this Order. The monitoring system is shown on Attachment C, which is incorporated herein and made part of this Order by reference. The detection monitoring program for groundwater at the landfill satisfies the requirements contained in Title 27.

37. The unsaturated zone monitoring system at the landfill includes suction lysimeters and pan lysimeters, as well as numerous landfill gas monitoring probes. The unsaturated zone monitoring network consists of one background suction lysimeter (LYS-10U), and six downgradient suction lysimeters (LYS-1U, 2U, 7U, 13UN, 13US, and 14U). Seven active suction lysimeters are located beneath Module M1-L (VZ-1, 2, 3, 4, 8, 9, and 10). Pan lysimeters are and will be located beneath the sumps each of the lined Modules M2 through M11 (LYS-M2 through LYS-M11). The unsaturated zone monitoring network is shown on Attachment D, which is incorporated herein and made part of this Order by reference. The detection monitoring program for the unsaturated zone at the landfill satisfies the requirements contained in Title 27.
38. Volatile organic compounds (VOCs) are often detected in a release from a landfill, and are the primary waste constituents detected in groundwater beneath a municipal solid waste landfill. Since volatile organic compounds are not naturally occurring and thus have no background value, they are not amenable to the statistical analysis procedures contained in Title 27 for the determination of a release of wastes from a Unit.
39. Title 27 CCR Sections 20415(e)(8) and (9) provide for the non-statistical evaluation of monitoring data that will provide the best assurance of the earliest possible detection of a release from a Unit in accordance with Title 27 CCR Section 20415(b)(1)(B)2.-4. However, Title 27 CCR does not specify a specific method for non-statistical evaluation of monitoring data.
40. The Regional Water Board may specify a non-statistical data analysis method pursuant to Title 27 CCR Section 20080(a)(1). Section 13360(a)(1) of the California Water Code allows the Regional Water Board to specify requirements to protect underground or surface waters from leakage from a solid waste site, which includes a method to provide the best assurance of determining the earliest possible detection of a new release or the migration of an existing release.
41. In order to provide the best assurance of the earliest possible detection of a release of non-naturally occurring waste constituents from a Unit, this Order specifies a non-statistical method for the evaluation of monitoring data.
42. The specified non-statistical method for evaluation of monitoring data provides two criteria (or triggers) for making the determination that there has been a release of non-naturally

occurring waste constituents from a Unit. The presence of two non-naturally occurring waste constituents above their respective method detection limit (MDL), or one non-naturally occurring waste constituent detected above its practical quantitation limit (PQL), indicates that a release of waste from a Unit has occurred. Following an indication of a release, verification testing will be conducted to determine whether there has been a release from the Unit, or there is a source of the detected constituents other than the landfill, or the detection was a false detection. Although the detection of one non-naturally occurring waste constituent above its MDL is sufficient to provide for the earliest possible detection of a release, the detection of two non-naturally occurring waste constituents above the MDL as a trigger is appropriate due to the higher risk of false-positive analytical results and the corresponding increase in sampling and analytical expenses from the use of one non-naturally occurring waste constituent above its MDL as a trigger.

GROUNDWATER DEGRADATION AND CORRECTIVE ACTION

43. A release of waste constituents from the landfill to groundwater was discovered in 1989. Numerous detection and corrective action monitoring wells have since been installed in the A, B, and C-zones of the Mehrten formation, as identified on Attachment C.
44. Monitoring of the A Zone shows the presence of various VOCs, including, but not limited to, tetrachloroethene, trichloroethene, 1,2-dichloroethene, and vinyl chloride. The A-zone VOC plume extends beyond the landfill footprint about 4,000 feet to the southwest to MW-41. The source area was identified as the unlined landfill Module M1. The plume has also migrated down into the B-zone, where concentrations are lower and the plume is less extensive. No VOCs have been detected in the C-zone since 1999 when trace levels were still present in MW-2C, and all C-zone wells are currently in the detection monitoring program.
45. In 1995, the Discharger installed a groundwater extraction system, including several A-zone extraction wells and a pump and treat system. Groundwater is currently extracted from 14 wells at a combined average rate of about 1,000 gallons per minute. The extraction wells are shown in Attachment C. The system includes two air stripper towers, a carbon absorption filter, and several extraction wells. Pump and treat remediation began in April 1995, with the objective of containing the spread of the plume and reducing VOC levels in the source area. According to the monitoring reports submitted by the Discharger through 2006, groundwater extraction has removed over 700 pounds of VOCs from the groundwater since 1995, and resulted in an approximate 75 percent reduction in mass of VOCs in the groundwater. Discharge of treated groundwater is to Deer Creek under NPDES Permit No. CA0083681 (Order No. R5-2007-0014).
46. In 1997, the Discharger installed a landfill gas control system. The system includes a gas flaring facility and a landfill gas-to-energy plant with a combined extraction rate capability of 10,500 standard cubic feet per minute. The system currently includes 211 vertical

extraction wells, 9 horizontal extraction wells, and 10 leachate cleanouts. Module M1 is connected to the system via vertical extraction wells. A total of 108 of these extraction points have been installed since 2002 contributing to an approximate 70 percent increase in landfill gas extraction capacity during that time period. The lined Modules M1-L and M2 are connected to the system primarily by horizontal piping within the waste mass, and by connection to the leachate collection and removal system (LCRS) for the modules. Future Modules M3 through M11 will also be connected to the landfill gas extraction system, and its extraction capability will be expanded as needed. Limited landfill gas extraction is also performed to remediate pockets of landfill gas that still exist in the subsurface outside of the landfill modules.

LEACHATE MANAGEMENT

47. The Discharger contracts for a hauling service to pump leachate directly from leachate sumps and storage tanks on an as-needed basis. The hauler then transports the leachate to the Sacramento Regional Wastewater Treatment Plant for disposal.
48. As part of the amended RWD/JTD submitted on 30 March 2007, the Discharger requested to be allowed to return leachate to the units from which it came to reduce leachate management costs. Title 27 CCR 20340(g) requires that leachate be returned to the unit from which it was came or be discharged in a manner approved by the Regional Water Board. This section also references State Water Board Resolution No. 93-62 regarding liquids restrictions in 40CFR 258.28 for MSW landfills. 40CFR 258.28 states that liquid waste may not be placed in MSW landfill units unless the waste is leachate or gas condensate derived from the landfill unit and it is designed with a composite liner and leachate collection system. Therefore, leachate from the LCRS of the composite lined units at the Kiefer Landfill may be returned to unit from which it came. This Order includes requirements for returning leachate back to the units such that it is not exposed to surface water runoff, will not cause instability of the landfill, and will not seep from the edges of the units.

LINER PERFORMANCE DEMONSTRATION

49. On 15 September 2000 the Regional Water Board adopted Resolution No. 5-00-213 *Request For The State Water Resources Control Board To Review The Adequacy Of The Prescriptive Design Requirements For Landfill Waste Containment Systems To Meet The Performance Standards Of Title 27*. The State Board responded, in part, that “a single composite liner system continues to be an adequate minimum standard” however, the Regional Water Board “should require a more stringent design in a case where it determines that the minimum design will not provide adequate protection to a given body of groundwater.”

In a letter dated 17 April 2001, the Executive Officer notified Owners and Operators of Solid Waste Landfills that “the Board will require a demonstration that any proposed

landfill liner system to be constructed after 1 January 2002 will comply with Title 27 performance standards. A thorough evaluation of site-specific factors and cost/benefit analysis of single, double and triple composite liners will likely be necessary.”

50. During 2002, the Discharger submitted liner performance demonstration reports that included computer modeling indicating that a single composite liner system with barrier layers consisting of 60-mil high density polyethylene (HDPE) and a geosynthetic clay liner (GCL) would meet the performance standards of Title 27. Based on Regional Water Board staff concerns about the proposed liner system, the Discharger proposed and installed a double composite liner system on the base of Module M2 (single composite on the side slopes) and conducted extensive monitoring of the system as required by previous WDRs Order No. R5-2002-0187. The data from this monitoring was to be used to demonstrate whether the proposed single composite liner system meets the performance standard.
51. On 30 March 2007, the Discharger submitted a *Final Liner Performance Demonstration Update* report. The report included detailed analysis and assessment of the data collected from Module M2 and compared the data with other data collected during historical liner system assessment projects conducted in cooperation with the United States Environmental Protection Agency (USEPA). The data from Module M2 indicates that the upper single composite liner system performed favorably compared with other HDPE/GCL composite liner systems studied by USEPA, having captured approximately 99.7% of leachate generated by Module M2. This is compared with an average 98.9% efficiency for the 28 landfills evaluated by USEPA. The Discharger’s report concludes that either the single composite liner system, or the double composite liner system, meet the Title 27 performance standards. The report also notes that the secondary composite base liner system provides redundancy and additional protection and recommends that Module M3 be constructed with the same double composite liner system on the base as Module M2. This Order requires a double composite liner system on the base, and single composite liner system on the side slopes, for Module M3 and all future landfill modules at the Kiefer Landfill. This Order also finds that the proposed liner system meets the Title 27 performance standards at the Kiefer Landfill.

LINER CONSTRUCTION AND ENGINEERED ALTERNATIVE

52. On 17 June 1993, the State Water Resources Control Board adopted Resolution No. 93-62 implementing a State Policy for the construction, monitoring, and operation of municipal solid waste landfills that is consistent with the federal municipal solid waste regulations promulgated under Subtitle D.
53. Resolution No. 93-62 requires the construction of a specified composite liner system at new municipal solid waste landfills, or expansion areas of existing municipal solid waste landfills, that receive wastes after 9 October 1993.

54. Resolution No. 93-62 also allows the Regional Water Board to consider the approval of engineered alternatives to the prescriptive standard. Section III.A.b. of Resolution No. 93-62 requires that the engineered alternative liner systems be of a composite design similar to the prescriptive standard.
55. Title 27 CCR Section 20080(b) allows the Regional Water Board to consider the approval of an engineered alternative to the prescriptive standard. In order to approve an engineered alternative in accordance with Title 27 CCR Sections 20080(c)(1) and (2), the Discharger must demonstrate that the prescriptive design is unreasonably and unnecessarily burdensome and will cost substantially more than an alternative which will meet the criteria contained in Title 27 CCR Section 20080(b), or would be impractical and would not promote attainment of applicable performance standards. The Discharger must also demonstrate that the proposed engineered alternative liner system is consistent with the performance goal addressed by the particular prescriptive standard, and provides protection against water quality impairment equivalent to the prescriptive standard in accordance with Title 27 CCR Section 20080(b)(2).
56. Section 13360(a)(1) of the California Water Code allows the Regional Water Board to specify the design, type of construction, and/or particular manner in which compliance must be met in waste discharge requirements or orders for the discharge of waste at solid waste disposal facilities.
57. Module M1-L of Landfill 1 was constructed in phases approved in previous WDRs Order No. 95-078 and Order No. 99-053 as an engineered alternative design (EAD) to the prescriptive Title 27 and Subtitle D designs. The formerly approved EAD allowed for substituting a GCL for one foot of clay in Phase II and two feet of clay for subsequent phases. The Discharger justified the EAD based on the lack of available onsite clay and inadequate shear properties of local offsite clay, which made it unsuitable for WMU construction. The proposed double composite liner system using HDPE and GCL that was constructed at Module M2 and is proposed for all future modules provides additional protection compared with the previously approved EAD.
58. The proposed liner system includes a primary LCRS consisting of one foot of gravel ($k \geq 0.1$ cm/sec) on the base and two feet of sand ($k \geq 1 \times 10^{-3}$ cm/sec) on the side slopes. Calculations submitted by the Discharger indicate that this LCRS design, along with the leachate collection piping, is capable of transmitting twice the anticipated maximum volume of leachate that can be generated by the landfill under conditions when only 15 feet of waste has been placed.
59. The Discharger also proposes to construct a primary LCRS sump and a secondary LCRS sump, each equipped with dedicated pumps for removal of leachate. A pan lysimeter will also be constructed beneath the sump area of each landfill module to comply with the unsaturated zone monitoring requirements of Title 27, as was done at Module M2.

60. The Discharger's proposed liner system will be designed, constructed, and operated in accordance with the criteria set forth in Title 27, the provisions in State Water Resources Control Board Resolution No. 93-62 for municipal solid wastes, and this Order.
61. Construction will proceed only after all applicable final design plans and construction quality assurance plans have been approved.

MODULE M1 CLOSURE AND ENGINEERED ALTERNATIVE FINAL COVER

62. During 1990, a prescriptive final cover (one foot of 1×10^{-6} cm/sec clay and one foot vegetative soil) was installed on approximately 34 acres of unlined Module M1. This portion of the landfill has received its final closure. The remainder of Module M1 (approximately 131 acres) has interim cover of thicknesses ranging from one foot to seven feet, and averaging three feet. Waste continues to be placed in the module periodically to bring it to final grade for closure. Final grades necessary to begin closure have nearly been reached with the exception of some low areas that still need fill to achieve the required 3% slope for drainage. The final grade upon closure will be a 325 feet MSL at the crown down to 120 feet MSL at the toe.
63. The Discharger previously proposed, and previous WDRs required, a composite final cover using an HDPE geomembrane and GCL for the remainder of Module M1, as well as M1-L and all of Landfill Unit 2.
64. On 30 March 2007, the Discharger submitted an *Engineered Alternative Design Report* as part of the amended RWD/JTD with information supporting an alternative final cover system for the unclosed portions of the unlined Module M1. The proposed alternative final cover is an evapotranspirative (ET) cover, also known as a water balance cover. This type of cover functions by storing moisture between the soil particles during the rainy season, and releasing that moisture during the growing season and dry season through plant uptake and evaporation. The cover would be installed over Module M1 in phases over a period of up to five years. As with the engineered alternative liner system, the Discharger must make the demonstrations required in Title 27, as listed in Finding No. 55 of this Order. The demonstration is described in the following Findings.
65. In preparation for the design of the proposal alternative final cover, the Discharger has completed several studies and design reports. The largest of these was a six year pilot study of two test sections conducted under the Alternative Covers Assessment Project (ACAP), a USEPA program conducted in coordination with Dr. Craig Benson of the University of Wisconsin, and Dr. Bill Albright of the Desert Research Institute. The Kiefer Landfill project was one of many ACAP projects conducted in California and the United States. In summary, the project consisted of two large test sections (20 meters by 30 meters) of constructed final cover using onsite soils similar to those that are expected to be used in the eventual final cover for the landfill. The "thin" test section was 43 inches (3.6 feet) thick, and the "thick" test section was 96 inches (8 feet) thick. Each section was

underlain by a large pan lysimeter (10 meters by 20 meters) designed to capture and record any moisture that drained through the soil cover. The results indicated that the thin test section allowed drainage averaging about 51 millimeters (mm) per year, and that the thick test section allowed drainage averaging about 2.5 mm/year. The report also concluded that the drainage seen from the thin test section was due to moisture not being adequately removed from the soil prior to the next rainy season, and that the reason was that the proper vegetation to remove the moisture was not maintained. It should be noted that the thin test section performed well through the first and second rainy seasons, but began draining during the third rainy season because sufficient moisture was not removed after the second rainy season.

66. Other studies performed by the Discharger related to the alternative final cover include:

- a. A soil borrow source study to assess the suitability and availability of onsite soils for the alternative cover, including nutrients for plants.
- b. A study of the thickness and properties of the existing interim cover soils on Module M1.
- c. A design report for selection, monitoring, and maintenance of vegetation for the alternative final cover.
- d. Hydrogeologic modeling of the alternative final cover to establish ranges of acceptable soil properties, and the total thickness of the alternative final cover.

Results of these studies and design details regarding the proposed alternative final cover are included in the Discharger's *Engineered Alternative Design Report* submitted as part of the RWD/JTD.

67. The proposed engineered alternative final cover for the remainder of Module M1 is a six-foot thick evapotranspirative cover using onsite soils meeting design specifications and that are compacted to between 75 and 90 percent of standard proctor (ASTM D698). High compaction is not desirable since it reduces moisture storage capacity and root penetration. Onsite soil types potentially meeting design specifications were found to be select silty sand (with a high percentage of silt), sandy silt, and sandy clay. The proposed design also includes native or naturalized vegetation selected to be low maintenance, to maximize extraction of moisture at all depths during the growing season, and to persist after establishment without being subject to plant community shifts. Vegetation is also selected as a mixture of annuals and perennials, and to have varying rooting depths. Selected final cover vegetation includes coyote bush at 194 plants per acre, purple needle grass at 8 pounds per acre (lb/ac), blue wildrye at 10 lb/ac, western yarrow at 0.5 lb/ac, arroyo lupin at 5 lb/ac, and gumplant at 5 lb/ac. Final vegetation design may be adjusted based on the performance of field vegetation test plots yet to be conducted.

68. Computer modeling of the proposed final cover was performed using UNSAT-H, a one-dimensional unsaturated flow and energy balance model that is commonly used in the landfill industry. To be conservative, modeling was conducted using the properties of acceptable soil from the borrow source investigation that had the lowest moisture holding capacity. The model was calibrated by comparing its predictions with the results of the ACAP study, and was tested for sensitivity by varying the input parameters. The model was run with the rainfall input data from the 1982 to 2005 time period, and sparse vegetation was assumed. The model results indicated an average of 1.6 mm/year of drainage through the cover.

69. Advantages of an evapotranspirative final cover over a prescriptive clay cover were summarized by the Discharger.

An evapotranspirative final cover:

- a. Provides an equivalent or higher degree of groundwater protection since the prescriptive clay cover is often subject to desiccation cracking that can increase permeability several orders of magnitude.
- b. Eliminates the need to import low permeability soils for admixing with onsite soils for the low permeability clay layer.
- c. Can be constructed by operations personnel using onsite equipment.
- d. Can be more easily repaired than a prescriptive clay cover or a cover containing a geomembrane layer.
- e. Provides improve stability compared with multilayer covers that are susceptible to sliding along the interfaces.
- f. Is more permeable to landfill gas, reducing the potential for landfill gas impacts to groundwater.
- g. Provides a better long-term final cover compared with clay (desiccation) or geomembranes (previously required final cover for Module M1) that will eventually degrade.

70. The Discharger has adequately demonstrated that the proposed engineered alternative liner final cover is consistent with the performance goal for final covers given in Title 27 because it will minimize percolation, and it will provide protection against water quality impairment equivalent to or better than the prescriptive standard. The Discharger has also adequately demonstrated that the prescriptive cover would be unreasonably and unnecessarily burdensome and would cost substantially more than the proposed alternative. This Order approves the use of the proposed alternative final cover for the

unlined Module M1. This Order continues to approve the use of the previously approved composite final cover for Module M1 in the event that the alternative cover does not perform as anticipated or cannot be constructed as envisioned.

71. The Discharger is required to submit an updated Partial Final Closure and Post-Closure Maintenance Plan for review and approval that meets the requirements of Title 27 and this Order prior to closure of the remainder of Module M1.

CLOSURE OF LINED LANDFILL MODULES

72. The Discharger's Preliminary Closure and Post-Closure Maintenance Plan (PCPCMP), and its periodic updates, describe the planned closure configuration for both the remaining unclosed area of Landfill Unit 1, and all of Landfill Unit 2. The composite final cover design proposed in the PCPCMP was approved in previous WDRs Order Nos. 99-053 and R5-2002-0187. With the approval of an evapotranspirative cover for the remainder of unlined Module M1, the composite final cover will not be used for Module M1 unless the evapotranspirative cover does not function as anticipated or cannot be constructed as envisioned. The composite final cover design will be used for all composite-lined modules. The composite final cover design is as follows:

Side Slopes:

- minimum one-foot vegetative cover soil
- one-foot wide geocomposite drain strips placed on five-foot centers
- 60 mil HDPE geomembrane (double textured)
- GCL ($k \leq 1 \times 10^{-9}$ cm/sec) or minimum one-foot thick clay layer ($k \leq 1 \times 10^{-6}$ cm/sec)
- a minimum two-foot thick soil foundation layer (one foot of which will be intermediate cover)

Top Deck:

- minimum one-foot vegetative cover soil
- 60 mil HDPE geomembrane (double textured)
- GCL ($k \leq 1 \times 10^{-9}$ cm/sec) or minimum one-foot thick clay layer ($k \leq 1 \times 10^{-6}$ cm/sec)
- a minimum two-foot thick soil foundation layer (one foot of which will be intermediate cover)

73. The top deck will be sloped at 3% for adequate drainage. Perimeter slopes in the existing landfill area will be no greater than 3:1 (horizontal-to-vertical) in M1, 4:1 in M-1L, and the final slopes in the expansion area will range from 4:1 to 5:1 to provide visual relief. Erosion control and access will be achieved by constructing 15-foot wide benches at least every 50 vertical feet.
74. Permanent excavation and landfill slopes have a minimum safety factor of 1.6 and 1.5, respectively. The landfill cover will have a safety factor of 1.3 under saturated conditions and 1.7 under unsaturated conditions. Since the facility is not near any known active faults, the Discharger assumed low seismic activity for the purposes of landfill cover slope

stability calculations, estimating a displacement from a maximum probable earthquake of less than one foot.

75. The Discharger is required to submit a Partial Final Closure and Post-Closure Maintenance Plan for review and approval that meets the requirements of Title 27 and this Order prior to each phase of closure of Module M1-L and Landfill Unit 2.

POST-CLOSURE MAINTENANCE

76. The Discharger submitted a December 2003 update of the JTD that included a Partial Final Closure and Post-Closure Maintenance Plan (PFCPMP) for portions of Module M1 anticipated at that time to occur between 2006 and 2010. This report was submitted in part to satisfy the Title 27 requirement to submit partial final closure plans and final closure plans at least two years in advance of closure work. The PFCPMP includes, among other things, procedures and plans for inspection, monitoring, and maintenance of the closed landfill. This Order requires the Discharger to submit an updated PFCPMP for Module M1 for the evapotranspirative cover design. This Order also requires the Discharger to inspect, monitor, and maintain the closed portions of the landfill in accordance with the applicable PFCPMP.
77. The Discharger's *Engineered Alternative Design Report* referred to in Finding No. 64 of this Order includes a Post-Construction Monitoring and Maintenance Program for monitoring and maintenance for the evapotranspirative final cover proposed for Module M1. Briefly, the monitoring program will include inspection after extreme rainfall events, frequent vegetation monitoring during the first year and less frequent during the following two years. Monitoring will also include verification of the function of the cover using moisture sensors to support future regulatory approval of the use of the alternative cover in lined areas of the landfill. Maintenance will include control of invasive weeds, replanting of seeds or shrubs as needed, removal of dead shrubs as needed, repair of localized erosion, and corrective action for any areas of vegetation that are being affected by landfill gas. This Order requires the Discharger to monitor and maintain the vegetation for the evapotranspirative final cover in accordance with the proposed Post-Construction Monitoring and Maintenance Program, which will become part of the PFCPMP.

FINANCIAL ASSURANCES

78. The 2006 cost estimate for closure for the maximum area expected to need closure at any one time (212 acres) is \$19,491,899 in 2006 dollars. The financial assurance mechanism for closure consists of an enterprise fund. The required amount of financial assurance is maintained by the California Integrated Waste Management Board (CIWMB) and is adjusted annually for inflation. Closure monies are placed in trust fund within the County of Sacramento Refuse Enterprise Fund. This Order requires the Discharger to maintain closure and post-closure financial assurances with the CIWMB as required by Title 27.
79. The financial assurance mechanism for post-closure maintenance is a pledge of revenue agreement with the CIWMB. The 2006 cost estimate for post-closure maintenance is \$17,630,830 in 2006 dollars. The post-closure maintenance costs will be funded from refuse collection revenues collected during the post-closure period.
80. The Discharger has provided \$800,000 to cover the costs of corrective action for a known or reasonably foreseeable release (RFR) at the existing landfill. The financial assurance mechanism is a pledge of revenue. It is estimated that this level of funding will also be sufficient to cover corrective action costs for an RFR at the first two expansion modules (Modules M2 and M3). Regional Water Board staff approved the plan and amount funded for the existing landfill, pending further development of estimates for the expansion modules. The plan includes expanding existing facilities in place for corrective action to address any reasonably foreseeable release.

CEQA AND OTHER CONSIDERATIONS

81. The action to revise waste discharge requirements for this existing facility is exempt from the provisions of the California Environmental Quality Act (CEQA), Public Resource Code Section 21000, et seq., and the CEQA guidelines, in accordance with Title 14 CCR, Section 15301.
82. The Discharger prepared a final environmental impact report (EIR) for the proposed expansion in December 1994. The EIR identified significant environmental impacts associated with the landfill expansion project and included a site mitigation plan for each significant impact. The County Board of Supervisors (Supervisors) did not certify the EIR at that time, however, because it did not include project alternatives. After public hearings, the Supervisors appointed an advisory committee to develop alternatives for the project. The alternatives were presented in an August 1998 Supplemental EIR. On October 22, 1998, the Supervisors certified the EIR and Supplemental EIR for the landfill expansion as adequate and complete, and on 10 November 1998, finalized approval of the project.

83. The EIR identified the following potential significant water quality impacts:

- a. Spread of existing groundwater contamination.
- b. Leachate may infiltrate groundwater.
- c. Landfill gas may impact groundwater.
- d. Storm water runoff may contact landfill wastes and increase leachate.
- e. Expansion will displace areas of wetlands.

84. The EIR evaluated the impacts and found that the implementation of a corrective action plan and compliance with Title 27 and Subtitle D will provide adequate water quality protection and reduce potential impacts to a less-than-significant level. These waste discharge requirements include requirements that avoid or substantially lessen significant impacts to water quality.

85. This Order implements:

- a. *The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition;*
- b. The prescriptive standards and performance goals of Chapters 1 through 7, Subdivision 1, Division 2, Title 27, of the California Code of Regulations, effective 18 July 1997, and subsequent revisions;
- c. The prescriptive standards and performance criteria of RCRA Subtitle D, 40 CFR Part 258; and
- d. State Water Resources Control Board Resolution No. 93-62, *Policy for Regulation of Discharges of Municipal Solid Waste*, adopted 17 June 1993, and revised on 21 July 2005.

86. 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 having discharged or 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 having discharged or 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 regional 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."

87. The technical reports required by this Order and the attached "Monitoring and Reporting Program No. R5-2007-0107" are necessary to assure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

PROCEDURAL REQUIREMENTS

88. All local agencies with jurisdiction to regulate land use, solid waste disposal, air pollution, and to protect public health have approved the use of this site for the discharges of waste to land stated herein.
89. The Regional Water Board notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
90. The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.
91. Any person affected by this action of the Regional Water Board may petition the State Water Resources Control Board to review the action in accordance with Sections 2050 through 2068, Title 23, California Code of Regulations. The petition must be received by the State Water Resources Control Board, Office of Chief Counsel, P.O. Box 100, Sacramento, California 95812, within 30 days of the date of issuance of this Order. Copies of the laws and regulations applicable to the filing of a petition are available on the Internet at http://www.waterboards.ca.gov/water_laws/index.html and will be provided on request.

IT IS HEREBY ORDERED, pursuant to Sections 13263 and 13267 of the California Water Code, that Order No. R5-2002-0187 is rescinded, and that the County of Sacramento, Municipal Services Agency, Department of Waste Management and Recycling, 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

1. The discharge of 'hazardous waste' or 'designated waste' is prohibited. For the purposes of this Order, the term 'hazardous waste' is as defined in Title 23, California Code of Regulations, Section 2510 et seq., and 'designated waste' is as defined in Title 27.
2. The discharge of wastes outside of a Unit or portions of a Unit specifically designed for their containment is prohibited.
3. The discharge of waste to a closed Unit is prohibited.
4. The discharge of waste constituents to the unsaturated zone or to groundwater is prohibited.

5. The discharge of solid or liquid waste or leachate to surface waters, surface water drainage courses, or groundwater is prohibited.
6. Discharges of waste to either a landfill unit that has not received wastes or to a lateral expansion of a landfill unit are prohibited, unless the discharge is to an area equipped with a containment system which meets requirements in "D. Construction Specifications", below.
7. The discharge of liquid or semi-solid waste (i.e., waste containing less than 50 percent solids) to the landfill is prohibited, with the following exceptions:
 - a. De-watered sewage or water treatment sludge as provided in Section 20220(c) of Title 27 may be disposed of on lined areas.
 - b. Leachate used for dust control over lined areas in compliance with Discharge Specification No. B.8.
 - c. Leachate that is returned to the unit from which it was generated in compliance with the requirements of this Order.
8. The discharge of solid waste containing free liquid or moisture in excess of the waste's moisture holding capacity is prohibited.
9. The disposal of containerized liquids at this facility is prohibited.
10. The discharge of waste within 50 feet of surface waters is prohibited.
11. 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 unit, 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.
12. The disposal of wastes containing greater than one percent (>1%) friable asbestos is prohibited.

B. DISCHARGE SPECIFICATIONS

1. Nonhazardous wastes shall be discharged to either:
 - a. To an existing unlined Unit (*existing MSWLF unit* as defined in 40 CFR 258.2); or
 - b. To a Unit equipped with a composite liner containment system which meets the requirements for both liners and leachate collection and removal systems specified under D. Construction Specifications.

2. The discharge shall remain within the designated disposal area at all times.
3. "Treated wood" wastes may be discharged, but only to an area equipped with a composite liner and leachate collection and removal system, as described in Construction Specification D.2, and only if the wastes are handled in accordance with California Health and Safety Code Sections 25143.1.5 and 250150.7. "Treated wood" means wood that has been treated with a chemical preservative for purposes of protecting the wood against attacks from insects, microorganisms, fungi, and other environmental conditions that can lead to decay of the wood and the chemical preservative is registered pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Sec. 136 and following). This may include but is not limited to waste wood that has been treated with chromated copper arsenate (CCA), pentachlorophenol, creosote, acid copper chromate (ACC), ammoniacal copper arsenate (ACA), ammoniacal copper zinc arsenate (ACZA), or chromated zinc chloride (CZC).
4. Treated wood must be managed to ensure consistency with Sections 25143.1.5 and 25150.7 of the Health and Safety Code. If a verified release is detected from the waste management unit where treated wood is disposed, the disposal of treated wood shall be terminated at the unit with the verified release until corrective action ceases the release.
5. Discharge Specifications B.3 and B.4, above, apply only to treated wood waste that is a hazardous waste solely due to the presence of a preservative in the wood, and is not subject to regulation as a hazardous waste under the federal act.
6. A minimum separation of 13 feet shall be maintained between wastes or leachate and the highest anticipated elevation of underlying groundwater including the capillary fringe.
7. Prior to the discharge of waste to a waste management module, all wells within 500 feet of the module shall have sanitary seals which meet the requirements of the Sacramento County Health Department or shall be properly abandoned. A record of the sealing and/or abandonment of such wells shall be sent to the Regional Water Board and to the State Department of Water Resources.
8. Leachate from a lined landfill sump or lysimeter shall be discharged either to a publicly owned treatment works under permit, or to the composite-lined landfill unit from which it was generated. Leachate returned to a landfill unit shall be managed such that it does not cause instability of the waste, does not cause leachate seeps, does not generate additional landfill gas that is not extracted from the landfill by an active landfill gas extraction system, does not cause contaminants to enter surface water runoff, and does not cause leachate volumes to exceed the maximum capacity of the LCRS or violation of Construction Specification No. 11 of this Order.

C. FACILITY SPECIFICATIONS

1. The Discharger shall, in a timely manner, remove and relocate any wastes discharged at this facility in violation of this Order. If the Discharger is unable to remove and relocate the waste, the Discharger shall submit a report to the Regional Water Board explaining how the discharge occurred, why the waste cannot be removed, and any updates to the waste acceptance program necessary to prevent re-occurrence.
2. The Discharger shall immediately notify the Regional Water Board of any flooding, unpermitted discharge of waste off-site, equipment failure, slope failure, or other change in site conditions which could impair the integrity of waste or leachate containment facilities or precipitation and drainage control structures.
3. Water used for facility maintenance shall be limited to the minimum amount necessary for dust control and construction.
4. The Discharger shall maintain in good working order any facility, control system, or monitoring device installed to achieve compliance with the waste discharge requirements.
5. Methane and other landfill gases shall be adequately vented, removed from the Unit, or otherwise controlled to prevent the danger of adverse health effects, nuisance conditions, degradation, or the impairment of the beneficial uses of surface water or groundwater due to migration through the unsaturated zone.
6. Surface drainage within the waste management facility shall either be contained on-site or be discharged in accordance with applicable storm water regulations.
7. The Discharger shall maintain a *Storm Water Pollution Prevention Plan and Monitoring Program and Reporting Requirements* in accordance with State Water Resources Control Board Order No. 97-03-DWQ, or retain all storm water on-site.

D. CONSTRUCTION SPECIFICATIONS

1. Each landfill unit phase constructed after the effective date of this Order shall be designed and constructed in accordance with Title 27 and this Order and approved by Board staff prior to operation. Prior to the beginning of construction for each new construction phase, a Final Design Report shall be submitted to the Board for review and approval and shall include, but not be limited to, the engineered design plans for the WMU, the contract specifications, a construction quality assurance (CQA) plan to verify that construction specifications will be met, and a revised water quality monitoring plan. Approval of the final design report shall be obtained from Board staff prior to construction of the landfill liner or final cover. A final construction report shall be submitted after each phase of construction and must be approved prior to the

discharge of waste into the constructed phase. The final construction report shall include, but not be limited to, as-built plans for the WMU, a CQA report with a written summary of the CQA program and all test results, analyses, and copies of the inspector's original field notes, and a certification as described in the Standard Provisions and Reporting Requirements.

2. Landfill Modules M2 through M11 of Landfill Unit 2 shall be constructed with a double composite liner on the base and a single composite liner on the sidewalls at a minimum as follows:

Primary Liner System: Base

- minimum one-foot operations layer
- nonwoven geotextile filter fabric (minimum eight oz. per square yard)
- one-foot gravel drainage layer ($k \geq 0.1$ cm/sec)
- 60-mil HDPE geomembrane (bottom side textured)
- geosynthetic clay liner ($k \leq 5 \times 10^{-9}$ cm/sec)
- a compositely lined sump

Secondary Liner System: Base

- one-foot gravel drainage layer ($k \geq 0.1$ cm/sec), or a geosynthetic drainage layer
- 60-mil HDPE geomembrane (bottom side textured)
- geosynthetic clay liner ($k \leq 5 \times 10^{-9}$ cm/sec)
- a compositely lined sump

Liner System: Side Slopes

- a. Minimum two-foot sand operations layer/drainage layer ($k \geq 1 \times 10^{-3}$ cm/sec)
 - b. 60-mil HDPE geomembrane (bottom side textured)
 - c. geosynthetic clay liner ($k \leq 5 \times 10^{-9}$ cm/sec)
3. Landfill Modules M1-L and M2 through M11 shall be equipped with in-fill landfill gas extraction systems and landfill gas shall also be removed from the primary LCRS when present at detectable levels.
 4. All WMU containment structures shall meet the general criteria set forth in Section 20320 of Title 27.
 5. The Discharger may propose changes to the liner system design prior to construction, provided that approved components are not eliminated, the engineering properties of the components are not substantially reduced, and the proposed liner system results in the protection of water quality equal to or greater than the design prescribed by Title 27 and this Order. The proposed changes may be made following approval by the Executive Officer. Substantive changes to the design require reevaluation as an engineered alternative and approval by the Regional Water Board.

6. If the Discharger proposes to construct a liner system in which a GCL is placed on top of a subgrade, the subgrade for the bottom and the side slopes of the Unit shall be prepared in an appropriate manner using accepted engineering and construction methods so as to provide a smooth surface that is free from rocks, sticks, or other debris that could damage or otherwise limit the performance of the GCL.
7. Construction shall proceed only after all applicable construction quality assurance plans have been approved.
8. 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 Title 27 CCR Section 20324(d)(1)(C) shall be submitted for review and approval. The report shall be certified by a 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, and with the prescriptive standards and performance goals of Title 27.
9. 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.
10. LCRSs shall be designed, constructed, and maintained to collect twice the anticipated daily volume of leachate generated by the WMU and to prevent the buildup of hydraulic head on the underlying liner at any time. The depth of fluid in any LCRS sump shall be kept at or below the minimum needed to ensure efficient pump operation.
11. Leachate generation by a landfill unit shall not exceed 85% of the design capacity of the sump pump. If leachate generation exceeds this value or if the depth of fluid in an LCRS exceeds the minimum needed for efficient pump operations, then the Discharger shall immediately cease the discharge of sludges, leachate, and other high-moisture wastes to the landfill unit and shall notify the Board in writing within seven days. Notification shall include a timetable for corrective action necessary to reduce leachate production.
12. If monitoring reveals substantial or progressive increases of leachate generation above the design leachate flow volume landfill module such that the depth of fluid on any portion of the LCRS (excluding the leachate removal pump sump) exceeds 30 cm, the Discharger shall immediately notify Regional Water Board staff by telephone, and shall follow up the notification in writing within seven days. The notification shall include a timetable for remedial or corrective action necessary to achieve compliance with the leachate depth limitation.

13. New landfill units and lateral expansions shall not be located in wetlands unless the Discharger has successfully completed, and the Board has approved, all demonstrations required for such discharge under 40 CFR 258.12(a).
14. Both active and closure landfill units shall be designed, constructed, and operated to prevent inundation or washout due to floods with a 100-year return period. Class III landfill modules and 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.
15. Precipitation and drainage control systems shall be constructed on both active and closure landfill units. They shall be designed and constructed to accommodate the anticipated volume of precipitation and peak flows from surface runoff under 100-year, 24-hour precipitation conditions contained in the Standard Provisions and Reporting Requirements referenced in Provision H.4 below.

E. CLOSURE SPECIFICATIONS

1. At closure, the remaining unclosed portion of Module M1 shall receive an evapotranspirative final cover generally meeting the proposed specifications in the Discharger's January 2007 *Engineered Alternative Design Report* and as described in Finding Nos. 64 through 71 of this Order. At a minimum, the final cover shall consist of at least six feet of soil and vegetation. The final design shall be submitted in a Final Partial Closure and Post-Closure Maintenance Plan at least 120 days prior to planned construction, and the cover shall meet the specifications of the approved final design. Final cover designs shall be supported by a slope stability analysis as required by Title 27. Module M1 may receive the composite final cover described in Finding No. 72 in the event that the alternative cover does not function as anticipated or cannot be constructed as envisioned.
2. At closure, landfill Modules M1-L and M2 through M11 shall receive a composite final cover in accordance with the prescriptive standards of Subtitle D and Title 27, or the engineered alternative composite design described in Finding No. 72 of this Order. Final cover designs shall be supported by a slope stability analysis as required by Title 27.
3. Vegetation shall be planted and maintained over each closed landfill module. Vegetation shall be selected to require a minimum of irrigation and maintenance and for composite final covers, shall have a rooting depth not in excess of the vegetative layer thickness.
4. Closed landfill units shall be graded and maintained at least a three-percent (3%) grade to prevent ponding.

5. Landfill units shall be closed in accordance with an approved Partial Final Closure Plan or Final Closure Plan meeting the requirements of Title 27, Subtitle D, and this Order.

F. POST-CLOSURE MAINTENANCE SPECIFICATIONS

1. During the closure and post-closure maintenance period, the Discharger shall conduct routine maintenance of the final cover, areas with interim cover, the precipitation and drainage control facilities, the groundwater, unsaturated zone and landfill gas monitoring systems, the landfill gas extraction system, and any facilities associated with corrective action.
2. The Discharger shall, in a timely manner, repair any areas of the final cover that have been damaged by erosion, cracking, differential settlement, subsidence or any other causes that could allow ponding of surface water or percolation of surface water into the wastes.
3. The Discharger shall inspect, monitor, and maintain closed landfill units in accordance with the applicable Partial Final Post-Closure Maintenance Plan or Final Post-Closure Maintenance Plan.
4. The Discharger shall monitor and maintain the vegetation for the evapotranspirative final cover in accordance with the Post-Construction Monitoring and Maintenance Program in the Discharger's January 2007 *Engineered Alternative Design Report* or an approved Partial Final Post-Closure Maintenance Plan.

G. DETECTION MONITORING SPECIFICATIONS

1. The Discharger shall submit for review and approval a groundwater detection monitoring program demonstrating compliance with Title 27 for any Unit expansion.
2. The Discharger shall comply with the detection monitoring program provisions of Title 27 for groundwater, surface water, and the unsaturated zone, and in accordance with Monitoring and Reporting Program No. R5-2007-0107. A detection monitoring program for a new Unit shall be installed, operational, and one year of monitoring data collected prior to the discharge of wastes [Title 27 CCR Section 20415(e)(6)].
3. The Discharger shall provide Regional Water Board staff a minimum of **one week** notification prior to commencing any field activities related to the installation, repair, or abandonment of monitoring devices, and a minimum 48 hour notification prior to the semiannual groundwater sampling event associated with a detection monitoring program, evaluation monitoring program, or corrective action program. In addition, by 31 January of each year, the Discharger shall provide the Regional Water Board with an estimated monthly schedule of the year's planned monitoring activities for these programs. This schedule may be included as part of the Annual Monitoring Report.

4. The Discharger shall comply with the Water Quality Protection Standard as specified in this Order, Monitoring and Reporting Program No. R5-2007-0107, and the Standard Provisions and Reporting Requirements, dated April 2000.
5. The Water Quality Protection Standard for organic compounds which are not naturally occurring and not detected in background groundwater samples shall be taken as the detection limit of the analytical method used (i.e., US-EPA methods 8260 and 8270). The repeated detection of one or more non-naturally occurring organic compounds in samples above the Water Quality Protection Standard from detection monitoring wells is evidence of a release from the Unit.
6. The concentrations of the constituents of concern in waters passing the Point of Compliance shall not exceed the concentration limits established pursuant to Monitoring and Reporting Program No. R5-2007-0107.
7. For each monitoring event, the Discharger shall determine whether the landfill is in compliance with the Water Quality Protection Standard using procedures specified in Monitoring and Reporting Program No. R5-2007-0107 and Title 27 CCR Section 20415(e).
8. The Discharger shall establish and maintain an approved Sample Collection and Analysis Plan. The Sample Collection and Analysis Plan shall at a minimum include:
 - a. Sample collection procedures describing purging techniques, sampling equipment, and decontamination of sampling equipment;
 - b. Sample preservation information and shipment procedures;
 - c. Sample analytical methods and procedures;
 - d. Sample quality assurance/quality control (QA/QC) procedures; and
 - e. Chain of Custody control.
9. For any given monitored medium, the samples taken from all monitoring points and background monitoring points to satisfy the data analysis requirements for a given reporting period shall all be taken **within a span not to exceed 30 days**, unless a longer time period is approved, and shall be taken in a manner that ensures sample independence to the greatest extent feasible. Specific methods of collection and analysis must be identified. Sample collection, storage, and analysis shall be performed according to the most recent version of USEPA Methods, such as the latest editions, as applicable, of: (1) Methods for the Analysis of Organics in Water and Wastewater (USEPA 600 Series), (2) Test Methods for Evaluating Solid Waste (SW-846, latest edition), and (3) Methods for Chemical Analysis of Water and Wastes

(USEPA 600/4-79-020), and in accordance with the approved Sample Collection and Analysis Plan.

10. If methods other than USEPA-approved methods or Standard Methods are used, the exact methodology shall be submitted for review and approval prior to use.
11. The **methods of analysis and the detection limits** used must be appropriate for the expected concentrations. For the monitoring of any constituent or parameter that is found in concentrations which produce more than 90% non-numerical determinations (i.e., "trace" or "ND") in data from background monitoring points for that medium, the analytical method having the lowest method detection limit (MDL) shall be selected from among those methods which would provide valid results in light of any matrix effects or interferences.
12. **"Trace" results** - results falling between the MDL and the practical quantitation limit (PQL) - shall be reported as such, and shall be accompanied both by the estimated MDL and PQL values for that analytical run.
13. **MDLs and PQLs** shall be derived by the laboratory for each analytical procedure, according to State of California laboratory accreditation procedures. These MDLs and PQLs shall reflect the detection and quantitation capabilities of the specific analytical procedure and equipment used by the lab, rather than simply being quoted from USEPA analytical method manuals. In relatively interference-free water, laboratory-derived MDLs and PQLs are expected to closely agree with published USEPA MDLs and PQLs.
14. If the laboratory suspects that, due to a change in matrix or other effects, the true detection limit or quantitation limit for a particular analytical run differs significantly from the laboratory-derived MDL/PQL values, the results shall be flagged accordingly, along with estimates of the detection limit and quantitation limit actually achieved. The **MDL shall always be calculated such that it represents the lowest achievable concentration associated with a 99% reliability of a nonzero result.** The PQL shall always be calculated such that it represents the lowest constituent concentration at which a numerical value can be assigned with reasonable certainty that it represents the constituent's actual concentration in the sample. Normally, PQLs should be set equal to the concentration of the lowest standard used to calibrate the analytical procedure.
15. All **QA/QC data** shall be reported, along with the sample results to which they apply, including the method, equipment, analytical detection and quantitation limits, the percent recovery, an explanation for any recovery that falls outside the QC limits, the results of equipment and method blanks, the results of spiked and surrogate samples, the frequency of quality control analysis, and the name and qualifications of the

person(s) performing the analyses. Sample results shall be reported unadjusted for blank results or spike recoveries. In cases where contaminants are detected in QA/QC samples (i.e., field, trip, or lab blanks), the accompanying sample results shall be appropriately flagged.

16. Unknown chromatographic peaks shall be reported, flagged, and tracked for potential comparison to subsequent unknown peaks that may be observed in future sampling events. Identification of unknown chromatographic peaks that recur in subsequent sampling events may be required.
17. The statistical method shall account for data below the practical quantitation limit (PQL) with one or more statistical procedures that are protective of human health and the environment. Any PQL validated pursuant to Title 27 CCR Section 20415(e)(7) that is used in the statistical method shall be **the lowest concentration (or value) that can be reliably achieved** within limits of precision and accuracy specified in the WDRs for routine laboratory operating conditions that are available to the facility. The Discharger's technical report, pursuant to Title 27 CCR Section 20415(e)(7), shall consider the PQLs listed in Appendix IX to Chapter 14 of Division 4.5 of Title 22, CCR, for guidance when specifying limits of precision and accuracy. For any given constituent monitored at a background or downgradient monitoring point, an indication that falls between the MDL and the PQL for that constituent (hereinafter called a "trace" detection) shall be identified and used in appropriate statistical or nonstatistical tests. Nevertheless, for a statistical method that is compatible with the proportion of censored data (trace and ND indications) in the data set, the Discharger can use the laboratory's concentration estimates in the trace range (if available) for statistical analysis, in order to increase the statistical power by decreasing the number of "ties".
18. Background for water samples or soil-pore gas samples shall be represented by the data from all samples taken from applicable background monitoring points during that reporting period (at least one sample from each background monitoring point). The Discharger may propose an alternate statistical method [to the methods listed under Title 27 CCR Section 20415(e)(8)(A-D)] in accordance with Title 27 CCR Section 20415(e)(8)(E), for review and approval.
19. The Discharger may propose an alternate statistical method [to the methods listed under Title 27 CCR Section 20415(e)(8)(A-D)] in accordance with Title 27 CCR Section 20415(e)(8)(E), for review and approval. Upon receiving written approval, alternate statistical procedures may be used for determining the significance of analytical results for common laboratory contaminants (i.e., methylene chloride, acetone, diethylhexyl phthalate, and di-n-octyl phthalate). Nevertheless, analytical results involving detection of these analytes in any background or downgradient sample shall be reported and flagged for easy reference by Regional Water Board staff.

20. The Discharger shall use the following non-statistical method for all analytes that are detected in less than 10% of the background samples. The non-statistical method shall be implemented as follows:

- a. From the constituent of concern or monitoring parameter list, identify each analyte in the **current** sample that exceeds either its respective MDL or PQL. The Discharger shall conclude that the exceedance provides a preliminary indication of a release or a change in the nature or extent of the release, at that monitoring point, if **either**:
 - 1) The data contains two or more analytes that are detected in less than 10% of background samples that equal or exceed their respective MDLs; or
 - 2) The data contains one or more analyte that equals or exceeds its PQL.
- b. **Discrete Retest** [Title 27 CCR Section 20415(e)(8)(E)]:
 - 1) In the event that the Discharger concludes (pursuant to paragraph 20.a., above) that there is a preliminary indication of a release, then the Discharger shall immediately notify Regional Water Board staff by phone or e-mail and, within 30 days of such indication, shall collect two new (retest) samples from the monitoring point where the release is preliminarily indicated.
 - 2) For any given retest sample, the Discharger shall include, in the retest analysis, **only the laboratory analytical results for those analytes detected in the original sample**. As soon as the retest data are available, the Discharger shall conclude that there is measurably significant evidence of a release if two or more analytes equal or exceed their respective MDLs or if one or more analyte equals or exceeds its PQL and shall:
 - a) **Immediately** notify the Regional Water Board about any constituent or constituents verified to be present at the monitoring point, and follow up with written notification submitted by certified mail **within seven days** of validation; and
 - b) Comply with ¶21, below if any constituent or constituents were verified to be present.
 - 3) Any analyte that is confirmed per this method shall be added to the monitoring parameter list such that it is monitored during each regular monitoring event.

21. If the Discharger determines that there is measurably significant evidence of a release from the Unit at any monitoring point, the Discharger shall **immediately** implement the

requirements of **XI. Response To A Release, C. Release Has Been Verified**, contained in the Standard Provisions and Reporting Requirements.

H. PROVISIONS

1. The Discharger shall maintain a copy of this Order at the facility and make it available at all times to facility operating personnel, who shall be familiar with its contents, and to regulatory agency personnel.
2. The Discharger shall comply with all applicable provisions of Title 27 and 40 Code of Federal Regulations Part 258 (Subtitle D) that are not specifically referred to in this Order.
3. The Discharger shall comply with Monitoring and Reporting Program No. R5-2007-0107, which is incorporated into and made part of this Order.
4. The Discharger shall comply with the applicable portions of the Standard Provisions and Reporting Requirements for Waste Discharge Requirements for Nonhazardous Solid Waste Discharges Regulated by Title 27 and/or Subtitle D (Title 27 CCR Section 20005 et seq. and 40 CFR 258 et seq.), dated April 2000, which are hereby incorporated into this Order.
5. Prior to module construction, the Discharger shall obtain approval from the United States Fish and Wildlife Service, and shall obtain any and all permits required under federal, state, or local laws for the protection of endangered and/or threatened species and their habitats. A copy of the USFWS permit shall be submitted to the Board prior to module construction. Prior to and concurrent with module construction, and as necessary during the operational life of the landfill, the Discharger shall further implement the Wetlands Mitigation and Monitoring Program, and submit annual monitoring reports as described in MRP No. R5-2007-0107, a part of this Order. The Discharger shall further conduct long term monitoring of wetlands created on-site pursuant to this plan and to MRP No. R5-2007-0107.
6. In the event the Discharger does not comply or will be unable to comply with any prohibition or limitation of this Order for any reason, the Discharger shall notify the appropriate Regional Water Board office by telephone **as soon as** it or its agents have knowledge of such noncompliance or potential for noncompliance, and shall confirm this notification in writing **within two weeks**. The written notification shall state the nature, time, and cause of noncompliance, and shall describe the measures being taken to prevent recurrences and shall include a timetable for corrective actions.
7. All reports and transmittal letters shall be signed by persons identified below:

- a. For a corporation: by a principal executive officer of at least the level of senior vice-president.
 - b. For a partnership or sole proprietorship: by a general partner or the proprietor.
 - c. For a municipality, state, federal or other public agency: by either a principal executive officer or ranking elected or appointed official.
 - d. A duly authorized representative of a person designated in a, b or c above if;
 - 1) The authorization is made in writing by a person described in a, b, or c of this provision;
 - 2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a Unit, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
 - 3) The written authorization is submitted to the Regional Water Board.
 - e. Any person signing a document under this Section shall make the following certification:

“I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.”
8. The Discharger shall take all reasonable steps to minimize any adverse impact to the waters of the State resulting from noncompliance with this Order. Such steps shall include accelerated or additional monitoring as necessary to determine the nature, extent, and impact of the noncompliance.
 9. The owner of the waste management facility shall have the continuing responsibility to assure protection of waters of the state from discharged wastes and from gases and leachate generated by discharged waste during the active life, closure, and postclosure maintenance period of the Unit(s) and during subsequent use of the property for other purposes.

10. The fact that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with this Order shall not be regarded as a defense for the Discharger's violations of the Order.
11. To assume ownership or operation under this Order, the succeeding owner or operator must apply in writing to the Regional Water Board requesting transfer of the Order within 14 days of assuming ownership or operation of this facility. The request must contain the requesting entity's full legal name, the State of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Regional Water Board, and a statement. The statement shall comply with the signatory requirements contained in Provision F.5. and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code. Transfer of this Order shall be approved or disapproved by the Regional Water Board.
12. The Discharger shall maintain cost estimates for initiating and completing corrective action for all known or reasonably foreseeable releases from the landfill, and submit these estimates for review and approval.
13. The Discharger shall maintain assurances of financial responsibility for initiating and completing corrective action for all known or reasonably foreseeable releases from the landfill in the amount of the approved cost estimate. The Discharger shall submit the approved cost estimate and proposed financial assurance mechanism meeting the requirements of Chapter 6, Title 27 to the Financial Assurances Section of the California Integrated Waste Management Board (CIWMB). If the CIWMB determines that either the amount of coverage or the mechanism is inadequate, then within 90 days of notification, the Discharger shall submit an acceptable mechanism for at least the amount of the approved cost estimate.
14. The Discharger shall update the preliminary closure and post-closure maintenance plan (PCPCMP) any time there is a change that will increase the amount of the closure and post-closure maintenance cost estimate. The updated PCPCMP shall be submitted to the Regional Water Board, the Local Enforcement Agency, and the CIWMB. The PCPCMP shall meet the requirements of Title 27 CCR Section 21769(b), and include a lump sum estimate of the cost of carrying out all actions necessary to close each Unit, to prepare detailed design specifications, to develop the final closure and post-closure maintenance plan, and to carry out the first thirty years of post-closure maintenance. A final (or partial final) closure and post-closure maintenance plan shall be submitted prior to closure and closure shall not be conducted in the absence of closure WDRs.

15. The Discharger shall maintain assurances of financial responsibility for closure and post-closure maintenance costs in the amount of the cost estimates in the approved preliminary or final closure and post-closure maintenance plan, as applicable. The Discharger shall submit a proposed financial assurance mechanism for closure and post-closure maintenance meeting the requirements of Chapter 6, Title 27 to the Financial Assurances Section of the CIWMB. If the CIWMB determines that either the amount of coverage or the mechanism is inadequate, then within 90 days of notification, the Discharger shall submit an acceptable mechanism for at least the amount of the approved cost estimate.
16. The Discharger shall complete the tasks contained in these waste discharge requirements in accordance with the following time schedule:

| <u>Task</u> | <u>Compliance Date</u> |
|--|------------------------------|
| A. Construction Plans | |
| Submit construction and design plans for review and approval. (see Construction Specification D.1) | Prior to construction |
| B. Construction Report | |
| Submit a construction report for review and approval upon completion demonstrating construction was in accordance with approved construction plans. (see Construction Specification D.8) | Prior to discharge |

I, PAMELA C. CREEDON, Executive Officer, do hereby certify that 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 2 August 2007.

PAMELA C. CREEDON, Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2007-0107
FOR
COUNTY OF SACRAMENTO
DEPARTMENT OF WASTE MANAGEMENT AND RECYCLING
KIEFER LANDFILL, CLASS III LANDFILLS
CONSTRUCTION, OPERATION, 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 Subchapter 3, Chapter 3, Subdivision 1, Division 2, Title 27, CCR, and any other applicable provisions therein.

Compliance with this Monitoring and Reporting Program, and with the companion Standard Provisions and Reporting Requirements dated April 2000, is ordered by Waste Discharge Requirements (WDRs) Order No. R5-2007-0107. Failure to comply with this MRP, or with the Standard Provisions and Reporting Requirements, constitutes non-compliance with the WDRs and with Division 7 of the Water Code, which can result in the imposition of civil monetary liability.

This MRP contains the following sections:

- I. MONITORING PROGRAMS
- II. DETECTION MONITORING
- III. CORRECTIVE ACTION MONITORING
- IV. WATER QUALITY PROTECTION STANDARD
- V. REPORTING

I. MONITORING PROGRAMS

A. SOLID WASTE MONITORING

The Discharger shall monitor and report all wastes discharged to each Module in Landfills 1 and 2 as follows:

| <u>Parameter</u> | <u>Units</u> | <u>Reporting Frequency</u> |
|---------------------------------------|---------------------|----------------------------|
| Quantity discharged | cubic yards or tons | Semi-annually |
| Type of material discharged | --- | Semi-annually |
| Capacity of landfill/module remaining | percent | Annually |

B. FIVE YEAR CONSTITUENTS OF CONCERN

Except as otherwise indicated in this Order, the Discharger shall monitor each media of each new and existing landfill module for applicable Constituents of Concern (per federal Subtitle D and State Water Resources Control Board Resolution 93-62). The monitoring locations, analytical methods, and frequency of analysis are as follows:

1. Monitoring Locations

- a. Leachate - Sump L-1 in Landfill 1 and one LCRS sump for each module at Landfill Unit 2.
- b. Unsaturated zone
 - i) Pore fluid - lysimeters in (or near) the unlined module M1, and underlying each Landfill Unit 2 module containing waste.
 - ii) Landfill gas - a representative gas probe for each module of Landfills Units 1 and 2.
- c. Groundwater - a least one monitoring well screened in each location as follows:
 - i) Each aquifer zone in the source area near M1 (i.e., MWs 2a, 2b, and 2c).
 - ii) In upgradient background wells.

2. Monitoring Schedule

Each media shall be monitored for the following:

| <u>Constituents of Concern</u> | <u>Units</u> | <u>Frequency</u> |
|---|--------------|----------------------|
| Carbonate | mg/L | Every 5 years |
| Bicarbonate Alkalinity | mg/L | Every 5 years |
| Volatile Organic Compounds (EPA Method 8260) | ug/L | Every 5 years |
| Semi-Volatile Organic Compounds (EPA Method 8270) | ug/L | Every 5 years |
| Organochlorine Pesticide, PCBs (EPA Method 8080) | ug/L | Every 5 years |
| Chlorophenoxy Herbicides (EPA Method 8150) | ug/L | Every 5 years |
| Organophosphorus Compounds (EPA Method 8141) | ug/L | Every 5 years |
| Inorganics (dissolved) | mg/L | Every 5 years |

The constituent-by-constituent listings for each of the above groups are included in Attachment E, a part of this Order.

C. LEACHATE MONITORING

The Discharger shall monitor leachate as required below. Upon detection of leachate in a previously dry LCRS sump, the leachate shall be sampled in accordance with the above schedule and the results included in the monitoring report. If COC constituents are detected that are not already Monitoring Parameters, then the leachate must be re-sampled for those constituents. If confirmed by re-test, then these constituents must be added to the Monitoring Parameter list and analyzed on a quarterly basis.

All visible portions of synthetic liners shall be inspected on a monthly basis. Each LCRS shall be hydraulically tested annually to demonstrate that it is still operating in conformance with the WDRs. The results shall be reported to the Board in the annual report and include comparison with earlier tests made under comparable conditions.

1. Monitoring Locations

The leachate monitoring locations shall be as follows:

| <u>Landfill</u> | <u>Landfill Module</u> | <u>Monitoring Location</u> |
|-----------------|------------------------|----------------------------|
| 1 | M1 | unlined |
| 1 | M1-L | Sump L-1 |
| 2 | M2 | Sump L-2 |
| 2 | M3 | Sump L-3 |
| 2 | M4 | Sump L-4 |
| 2 | M5 | Sump L-5 |
| 2 | M6 | Sump L-6 |
| 2 | M7 | Sump L-7 |
| 2 | M8 | Sump L-8 |
| 2 | M9 | Sump L-9 |
| 2 | M10 | Sump L-10 |
| 2 | M11 | Sump L-11 |

2. Monitoring Schedule

Leachate monitoring shall be conducted as specified:

| <u>Parameter</u> | <u>Units</u> | <u>Frequency</u> |
|------------------------------|--------------|------------------|
| <i>Field Parameters</i> | | |
| Flow Rate | gallons/day | Monthly |
| Volume | gallons | Monthly |
| Specific Conductance | mhos/cm | Monthly |
| pH | pH units | Monthly |
| <i>Monitoring Parameters</i> | | |
| Total Dissolved Solids (TDS) | mg/L | Quarterly |
| Chlorides | mg/L | Quarterly |

| <u>Parameter</u> | <u>Units</u> | <u>Frequency</u> |
|---|--------------|------------------|
| Sulfates | mg/L | Quarterly |
| Volatile Organic Compounds | ug/L | Quarterly |
| <i>Constituents of Concern</i> | | |
| Five Year COCs (Listed in Section I.B.2) | ug/L | Annually |

D. WETLANDS MITIGATION AND MONITORING

The Discharger shall monitor wetlands in accordance with the Wetlands Mitigation and Monitoring Plan (WMMP), as approved by Regional Water Board staff and included in Volume II of the Final Supplemental Environmental Impact Report. Monitoring shall be conducted for a sufficient number of years to ensure that all wetlands created on-site survive for the long term, and shall be discontinued only upon revision of this MRP. The results of monitoring shall be submitted annually, by **31 August** of each year.

II. DETECTION MONITORING

A. GENERAL

The Discharger shall perform Detection Monitoring on all media potentially affected by a release, including surface water, groundwater, and the unsaturated zone. For any given monitored medium, a sufficient number of samples shall be taken from all Monitoring Points and Background Monitoring Points to satisfy the data analysis requirements for a given Reporting Period, and shall be taken in a manner that ensures sample independence to the greatest extent feasible.

The Discharger shall use a Board-approved statistical (or non-statistical) procedure to determine whether there has been a measurably significant increase in a constituent over the water quality protection standard, as set forth in Section 20415(e)(5) of Title 27.

B. UNSATURATED ZONE

Unsaturated zone monitoring devices shall be checked monthly for fluid and monitoring shall include the volume of fluid recovered. The monitoring locations, analytical methods, and frequency of analysis shall be as follows:

1. Monitoring Locations

The unsaturated zone monitoring locations, shown in Attachment D, shall be as listed:

UNSATURATED ZONE MONITORING LOCATIONS - LANDFILL 1

| <u>Module</u> | <u>Upgradient Suction Lysimeter</u> | <u>Downgradient Suction Lysimeter</u> | <u>Gas Probe</u> |
|---------------|---|---|----------------------|
| M1-L | LYS-10U | 1U, 2U, 7U, 13UN, 13 US, 14U | --- |
| M1-L (1) | LYS-10U | VZ-1, 2, 3, 4 | GP-40 |
| M1-L (3) | LYS-10U | VZ-8, 9, 10 | --- |

UNSATURATED ZONE MONITORING LOCATIONS - LANDFILL 2

| <u>Module</u> | <u>Pan Lysimeter</u> |
|---------------|----------------------|
| M2 | LYS-M2 |
| M3 | LYS-M3 |
| M4 | LYS-M4 |
| M5 | LYS-M5 |
| M6 | LYS-M6 |
| M7 | LYS-M7 |
| M8 | LYS-M8 |
| M9 | LYS-M9 |
| M10 | LYS-M10 |
| M11 | LYS-M11 |

Pan Lysimeters for Modules M2 through M11 shall be placed under the leachate collection sump.

2. Monitoring Schedule

The analytes and frequency of unsaturated zone monitoring shall be conducted as specified:

| <u>Parameter</u> | <u>Units</u> | <u>Frequency</u> | |
|---|--------------|------------------|---------------|
| <i>Field Parameters</i> | | | |
| Specific Conductance | mhos/cm | Semi-annually | --- |
| pH | pH units | Semi-annually | --- |
| <i>Monitoring Parameters</i> | | | |
| Total Dissolved Solids (TDS) | mg/L | Quarterly | --- |
| Chlorides | mg/L | Quarterly | --- |
| Sulfates | mg/L | Quarterly | --- |
| Nitrate - Nitrogen | mg/L | Quarterly | --- |
| Volatile Organic Compounds ¹ | ug/L | Quarterly | Semi-annually |

| <u>Parameter</u> | <u>Units</u> | <u>Frequency</u> |
|---|--------------|--------------------------------|
| <i>Constituents of Concern</i> | | |
| Five Year COCs (Listed in Section I.B.2) | ug/L | Every 5 years Every 5 years |

¹ If methane or any other VOC carrier gas is detected in the soil gas at this location during the monitoring period.

C. GROUNDWATER

The groundwater surface elevation (in feet and hundredths, M.S.L.) in all wells shall be measured on a quarterly basis and used to determine the velocity and direction of groundwater flow. This information shall be displayed on a water table contour map and/or groundwater flow net for the site and included in the semi-annual monitoring reports. Groundwater elevations taken prior to purging the well and sampling for Monitoring Parameters shall be used to fulfill the groundwater gradient/direction analyses required. For each monitored groundwater body, the Discharger shall measure the water level in each well and determine groundwater gradient and direction at least quarterly, including the times of expected highest and lowest elevations of the water level for the respective groundwater body. Groundwater elevations for all upgradient and downgradient wells for a given groundwater body shall be measured within a period of time short enough to avoid temporal variations in groundwater flow which could preclude accurate determination of groundwater gradient and direction. This information shall be included in the semi-annual monitoring reports.

1. Monitoring Locations

The groundwater detection monitoring points for Landfill Unit 1 and Landfill Unit 2, shown in Attachment C, are as follows:

LANDFILL 1

| <u>Module</u> | <u>Aquifer</u> | <u>Monitoring Method¹</u> | <u>Background</u> | <u>Detection</u> |
|---------------|----------------|--------------------------------------|----------------------|---|
| M1, M1-L | Zone A | Interwell Intrawell ² | 10A 12A, 17A, 27A | 6A1, 27A, 41A1, 42A 12A, 17A, 27A |
| | Zone B | Interwell | 10B | 5B, 6B, 15B, 21B, 22B, 23B, 40B, 42B |
| | | Intrawell ² | 12B, 17B | 12B, 17B |
| | Zone C | Interwell Intrawell ² | 10C 12C | 2C, 20C, Well E 12C |

¹ Refers to statistical approach used for Detection Monitoring.

² Each well functions as its own background well using historical monitoring data.

LANDFILL 2

| <u>Module</u> | <u>Aquifer</u> | <u>Monitoring Method</u> ¹ | <u>Background Wells</u> | | <u>Detection Wells</u> | |
|---------------|----------------|---------------------------------------|-------------------------|--------------------------|------------------------|------------------|
| | | | <u>Existing</u> | <u>Proposed</u> | <u>Existing</u> | <u>Proposed</u> |
| M2 | Zone A | Interwell | 10A | | 37A | 37C ³ |
| | Zone B | Interwell | 10B | | 37B | |
| | Zone C | Interwell | 10C | | | |
| M3 | Zone A | Interwell | 10A | | 15A, 15B Well E | |
| | Zone B | Interwell | 10B | | | |
| | Zone C | Interwell | 10C | | | |
| M4 thru M7 | Zone A | Interwell | 10A | 34A, 35A ² | 15A | 36A |
| | Zone B | Interwell | 10B | 34B, 35B ² | 15B | 36B |
| | Zone C | Interwell | 10C | 34C, 35C ² | | 36C |
| M10, M11 | Zone A | Interwell | | 38A, 39A | 17A | |
| | Zone B | Interwell | | 38B, 39B | 17B | |

¹ Refers to statistical approach used for Detection Monitoring.

² Background data from these wells to be pooled for Detection Monitoring purposes.

³ This well will be constructed only if MW-37B is determined to be impacted.

2. Monitoring Schedule

The analytes and frequency of groundwater monitoring is as follows:

| <u>Parameter</u> | <u>Units</u> | <u>Frequency</u> |
|---|-----------------|------------------|
| <i>Field Parameters</i> | | |
| pH | pH units | Semi-annually |
| Specific Conductance | mhos/cm | Semi-annually |
| Temperature | Degrees F | Semi-annually |
| Turbidity | Turbidity units | Semi-annually |
| <i>Monitoring Parameters</i> | | |
| Total Dissolved Solids (TDS) | mg/L | Semi-annually |
| Chlorides | mg/L | Semi-annually |
| Sulfates | mg/L | Semi-annually |
| Nitrate - Nitrogen | mg/L | Semi-annually |
| Volatile Organic Compounds | ug/L | Semi-annually |
| <i>Constituents of Concern</i> | | |
| Five Year COCs (Listed in Section I.B.2) | ug/L | Every 5 years |

D. SURFACE WATER MONITORING

1. Monitoring Locations

Surface water samples shall be collected from Deer Creek at upstream location RSW-001 (background), and downstream location RSW-003 (point of compliance), as shown on Attachment B.

2. Monitoring Schedule

Surface water monitoring shall be conducted as specified below. Sampling shall begin with the first surface runoff in the fall of each year and continue quarterly until surface runoff ceases in the dry season. Sampling shall also be conducted after any major storm events that cause the main sedimentation basin to discharge to Deer Creek.

| <u>Parameter</u> | <u>Units</u> | <u>Frequency</u> |
|--|-----------------|------------------|
| <i>Field Parameters</i> | | |
| Dissolved Oxygen | mg/L | Quarterly |
| Hardness (as CaCO ₃) | mg/L | Quarterly |
| pH | pH units | Quarterly |
| Specific Conductance | mhos/cm | Quarterly |
| Turbidity | Turbidity Units | Quarterly |
| <i>Monitoring Parameters</i> | | |
| Total Dissolved Solids (TDS) | mg/L | Quarterly |
| Bicarbonate | mg/L | Quarterly |
| Chlorides | mg/L | Quarterly |
| Sulfates | mg/L | Quarterly |
| Nitrate - Nitrogen | mg/L | Quarterly |
| <i>Constituents of Concern</i> | | |
| Carbonate | mg/L | Annually |
| Chemical Oxygen Demand (COD) | mg/L | Annually |
| Total Organic Carbon (TOC) | mg/L | Annually |
| Five Year COCs (Listed in Section I.B.2) | ug/L | Every 5 years |

The Discharger shall determine at each sampling whether there is a statistically significant increase over water quality protection standards for each parameter and constituent analyzed. If a release is detected at the downstream sampling point, the Discharger shall proceed with an Evaluation Monitoring Program to determine the source(s) and extent of the release.

III. CORRECTIVE ACTION MONITORING

A. GROUNDWATER EXTRACTION

The groundwater extraction well network, shown in Attachment C, is as follows:

| <u>Module</u> | <u>Aquifer</u> | <u>Extraction Wells</u> |
|---------------|----------------|-------------------------|
| M1, M1-L | Zone A | EW-1 through EW-14 |
| | Zone B | none |
| | Zone C | none |

The following information shall be gathered annually as to the progress of groundwater remediation and reported in the format below:

| <u>Aquifer Zone</u> | <u>Original Amount In Place</u> | Mass of Total VOCs (lbs) | | <u>Amount Left In Place</u> |
|---------------------|---------------------------------|-----------------------------------|----------------------------------|-----------------------------|
| | | <u>Amount Removed During Year</u> | <u>Cumulative Amount Removed</u> | |
| A | | | | |
| B | | | | |
| C | | | | |

The information shall be included in the Annual Monitoring Report and/or the monitoring report for the second half of each year per the monitoring program.

B. CORRECTIVE ACTION MONITORING

1. Monitoring Locations

The corrective action monitoring points for Landfill Unit 1 (including M1 and M1-L), shown in Attachment C, are as follows:

| <u>Aquifer</u> | <u>Source Area</u> | <u>Downgradient Wells</u> |
|---------------------|--------------------|--|
| Zone A ¹ | Landfill 1, M1 | 1A, 2A, 2A1, 3A, 4A, 5A, 6A, 7AR, 9A, 11A, 15A, 16A, 18A, 19A, 20A, 21A, 22A, 23A, 24A, 28A, 29A, 30A, 40A, 41A2 |
| Zone B ¹ | Landfill 1, M1 | 1B, 2B, 4B, 7B, 9B, 11B, 16B, 20B, 41B |

¹ List includes former detection monitoring wells impacted by the spread of contaminants.

2. Monitoring Schedule

The monitoring schedule for the corrective action wells is as follows:

| <u>Parameter</u> | <u>Units</u> | <u>Frequency</u> |
|---|-----------------|------------------|
| <i>Field Parameters</i> | | |
| pH | pH units | Semi-annually |
| Specific Conductance | mhos/cm | Semi-annually |
| Temperature | Degrees F | Semi-annually |
| Turbidity | Turbidity units | Semi-annually |
| <i>Monitoring Parameters</i> | | |
| Total Dissolved Solids (TDS) | mg/L | Semi-annually |
| Chlorides | mg/L | Semi-annually |
| Sulfates | mg/L | Semi-annually |
| Nitrate - Nitrogen | mg/L | Semi-annually |
| Volatile Organic Compounds | ug/L | Semi-annually |
| <i>Constituents of Concern</i> | | |
| Five Year COCs (Listed in Section I.B.2) | ug/L | Annually |

IV. WATER QUALITY PROTECTION STANDARD

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

- A. Constituents of Concern;
- B. Concentration Limits;
- C. Monitoring Points;
- D. Points of Compliance; and
- E. Compliance Period.

Each of these is described as follows:

A. Constituents of Concern

The Constituents of Concern (COCs) required under Section 20395 of Title 27 shall include all constituent groups identified in Section I.B.2 and specifically listed in Attachment E, a part of this Order. The Discharger shall monitor all COCs every five years or more frequently as required under the corrective action monitoring program.

B. Concentration Limits

1. General

The Concentration Limit for any given Constituent of Concern or Monitoring Parameter in a given monitored medium (i.e., the uppermost aquifer) at a landfill

shall be as follows, and shall be used as the basis of comparison with data from the Monitoring Points in that monitored medium:

- a. The background value established in the WDRs by the Board for that constituent and medium;
 - b. The constituent's background value, established anew during each Reporting Period using only data from all samples collected during that Reporting Period from the Background Monitoring Points for that monitored medium. Either:
 - (1) The mean (or median, as appropriate) and standard deviation (or other measure of central tendency, as appropriate) of the constituent's background data; or
 - (2) The constituent's MDL, in cases where less than 10 percent of the background samples exceed the constituent's MDL; or
 - c. A concentration limit greater than background, as approved by the Board for use during or after corrective action.
2. **Unsaturated Zone** - background values established by monitoring
 3. **Groundwater** - background values established by monitoring
 4. **Surface Water** - Concentration limits for RSW-001 shall be the upper tolerance limits calculated for this background monitoring point.

These values, and the statistical methods upon which they are based, are subject to ongoing review and approval by Board staff. In addition, they shall be updated as necessary to provide ongoing definition of background water quality.

C. Monitoring Points

1. **Unsaturated Zone** - As listed in Section II. B.1 for Landfill Units 1 and 2, respectively.
2. **Groundwater** - As listed in Section II.C.1 for Landfill Units 1 and 2, respectively.
3. **Surface Water** - As described in Section II.D.

Upon confirmation of an exceedance from an existing release, the Discharger shall transfer the impacted monitoring point(s) from the Detection Monitoring Program (DMP) to the Corrective Action Monitoring Program (CAMP). Upon confirmation that levels in a previously impacted monitoring point has been reduced below concentration limits, the Discharger may, with Board staff approval, transfer that monitoring point from the CAMP to the DMP.

D. Points of Compliance

The point(s) of compliance at each groundwater monitoring point is the vertical surface located at the downgradient limit of the WMU that extends through the uppermost aquifer underlying the WMU. These points correspond to the corrective action wells on the southern and southwestern periphery of the landfill along Kiefer Road. The point of compliance for surface water monitoring shall be RSW-003.

E. Compliance Period

The Compliance Period is the number of years equal to the active life of the landfill plus the closure period. Each time the Standard is exceeded (i.e., a release is discovered), the landfill 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 has not achieved compliance with the Standard by the scheduled end of the Compliance Period, the Compliance Period is automatically extended until the landfill has been in continuous compliance for at least three consecutive years.

V. 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 noncompliance with the WDRs.

A narrative discussion of the monitoring results, including notations of any water quality violations shall precede tabular summaries of the water quality data. Further, each monitoring report shall include a summary and certification of completion of all Standard Observations for the waste management unit (WMU), for the perimeter of the WMU, and for the receiving waters. The standard observations shall be performed on a weekly basis and shall include those elements as defined in the Standard Provisions and Reporting Requirements.

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 data shall be summarized in such a manner so as to illustrate clearly the compliance with waste discharge requirements or the lack thereof. Historical and current monitoring data shall be graphed at least once annually. Graphs for the same constituent shall be plotted at the same scale to facilitate visual comparison of monitoring data.

The results of any monitoring done more frequently than required at the locations specified herein shall be reported to the Board in the monitoring report(s) for that period.

A. REQUIRED REPORTS

1. Detection Monitoring Report

Detection Monitoring Reports (DMRs) shall be prepared and submitted to the Board semi-annually by **31 July** and **31 January** following the end of each calendar semester. The semi-annual report due by 31 January may be included as part of the Annual Report specified in I.A.2, below. The reports shall include the results of all monitoring programs listed herein.

2. Annual Report

An Annual Report which summarizes the monitoring results for the prior four quarters shall be submitted to the Board by **31 January** each year. The Discharger shall submit the Annual Report as specified in the Standard Provisions and Reporting Requirements. The report shall contain both tabular and graphical summaries of the detection and corrective action monitoring data and a discussion of the progress toward re-establishment of compliance with WDRs and the Water Quality Protection Standard (WQPS). In reporting the progress of corrective action, the report shall include contaminant contour maps for representative volatile organic compounds and inorganic constituents and compare the current plumes with those prior to the start of corrective action. The report shall also include calculations of the amounts of contaminant removed, as listed in Section III.A. In lieu of submitting a separate report, the Annual Report information may instead be included with the second semester Detection Monitoring Report. The Annual Report shall also include the results of the soil gas monitoring program.

3. Wetlands Mitigation and Monitoring

The results of monitoring conducted pursuant to the Wetlands Mitigation and Monitoring Plan (WMMP), as approved by Board staff, shall be submitted **annually by 31 August** of each year. In addition to reporting the monitoring results, the report shall include maps showing impacted areas, narrative descriptions, and summaries of mitigation and preservation activities.

4. Water Quality Protection Standard Report

As noted above, any changes to the water quality protection standard are to be included in the Annual Report.

5. Constituents-of-Concern (COC)

The results of COC monitoring shall be submitted with, or reported in, the Annual Report for that year.

6. Notification of Release and Re-test

For any WMU, if the results of a detection monitoring program shows that there is a measurably significant increase in an indicator parameter or waste constituents over

the WQPS at or beyond the points of compliance (i.e., measurably significant evidence of an exceedance or release), the Discharger shall:

- a. immediately notify the Regional Water Board by telephone or fax of the exceedance,
- b. within seven days of the initial findings, follow up with written notification (or acknowledgment of the Board's finding),
- c. within 30 days of the initial finding, re-sample for the constituent(s) or parameter(s) at the point where the standard was exceeded, and
- d. within 60 days of the initial finding, submit the results of the re-sampling and statistical analysis, indicating whether or not an exceedance or release was confirmed by the re-test.

7. Existing Release - Amended Programs

Within 30 days upon confirmation of an exceedance from an existing release, the Discharger shall submit for Board staff approval an amendment to the Corrective Action Program, describing measures planned or taken to mitigate the exceedance. The Discharger shall also note any necessary changes to the DMP and Corrective Action Monitoring Program monitoring locations as a result of the exceedance (see Section IV.C, above).

8. Responding to a Release Discovery

Upon verifying a measurably significant evidence of a release from a WMU according to Section 20420(j) of Title 27 and Section V.A.6 of this MRP, above, shall **immediately** implement the requirements of **XI. Response To A Release, C. Release Has Been Verified**, contained in the Standard Provisions and Reporting Requirements.

B. REPORTING REQUIREMENTS

1. The Discharger shall retain records of all monitoring information, including all calibration and maintenance records, all original strip chart recordings of continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order. Records shall be maintained throughout the life of the facility including the postclosure period.

Such legible records shall show the following for each sample:

- a. Sample identification and the monitoring point or background monitoring point from which it was taken, along with the identity of the individual who obtained the sample;
- b. Date, time, and manner of sampling;

- c. Date and time that analyses were started and completed, and the name of the personnel and laboratory performing each analysis;
 - d. Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used;
 - e. Calculation of results; and
 - f. Results of analyses, and the MDL and PQL for each analysis.
2. A transmittal letter explaining the essential points shall accompany each report. At a minimum, the transmittal letter shall identify any violations found since the last report was submitted, and if the violations were corrected. If no violations have occurred since the last submittal, this shall be stated in the transmittal letter. The transmittal letter shall also state that a discussion of any violations found since the last report was submitted, and a description of the actions taken or planned for correcting those violations, including any references to previously submitted time schedules, is contained in the accompanying report.
 3. Each monitoring report shall include a compliance evaluation summary. The summary shall contain at least:
 - a. For each monitoring point and background monitoring point addressed by the report, a description of:
 - 1) The time of water level measurement;
 - 2) The type of pump - or other device - used for purging and the elevation of the pump intake relative to the elevation of the screened interval;
 - 3) The method of purging (the pumping rate; the equipment and methods used to monitor field pH, temperature, and conductivity during purging; the calibration of the field equipment; results of the pH, temperature, conductivity, and turbidity testing; and the method of disposing of the purge water) to remove all portions of the water that was in the well bore while the sample was being taken;
 - 4) The type of pump - or other device - used for sampling, if different than the pump or device used for purging; and
 - 5) A statement that the sampling procedure was conducted in accordance with the approved Sampling and Analysis Plan.
 - b. A map or aerial photograph showing the locations of observation stations, monitoring points, and background monitoring points.

- c. For each groundwater body, a description and graphical presentation of the gradient and direction of groundwater flow under/around the Unit, and the groundwater flow rate, based upon water level elevations taken prior to the collection of the water quality data submitted in the report.
- d. Laboratory statements of results of all analyses evaluating compliance with requirements.
- e. An evaluation of the effectiveness of the leachate monitoring and control facilities, and of the run-off/run-on control facilities.
- f. A summary and certification of completion of all **Standard Observations** for the Unit(s), for the perimeter of the Unit, and for the receiving waters. Standard observations for ACTIVE landfill units shall be conducted **weekly** during the wet season (1 October to 30 April) and **monthly** during the dry season (1 May to 30 September). Standard observations for INACTIVE or CLOSED landfill units shall be conducted **monthly** during the wet season (1 October to 30 April) and **quarterly** during the dry season (1 May to 30 September). Standard The Standard Observations shall include:
 - 1) For the Unit:
 - a) Evidence of ponded water at any point on the facility (show affected area on map);
 - b) Evidence of odors - presence or absence, characterization, source, and distance of travel from source; and
 - c) Evidence of erosion and/or of day-lighted refuse.
 - 2) Along the perimeter of the Unit:
 - a) Evidence of liquid leaving or entering the Unit, estimated size of affected area, and flow rate (show affected area on map);
 - b) Evidence of odors - presence or absence, characterization, source, and distance of travel from source; and
 - c) Evidence of erosion and/or of day-lighted refuse.
 - 3) For receiving waters:
 - a) Floating and suspended materials of waste origin - presence or absence, source, and size of affected area;

- b) Discoloration and turbidity - description of color, source, and size of affected area;
 - c) Evidence of odors - presence or absence, characterization, source, and distance of travel from source;
 - d) Evidence of water uses - presence of water-associated wildlife;
 - e) Flow rate; and
 - f) Weather conditions - wind direction and estimated velocity, total precipitation during recent days and on the day of observation.
- g. The quantity and types of wastes discharged and the locations in the Unit where waste has been placed since submittal of the last such report.
4. The Discharger shall report by telephone any seepage from the disposal area **immediately** after it is discovered. A written report shall be filed with the Regional Water Board **within seven days**, containing at least the following information:
- a. A map showing the location(s) of seepage;
 - b. An estimate of the flow rate;
 - c. A description of the nature of the discharge (e.g., all pertinent observations and analyses);
 - d. Verification that samples have been submitted for analyses of the Monitoring Parameters and Constituents of Concern listed in Section I.C.2, and an estimated date that the results will be submitted to the Regional Water Board; and
 - e. Corrective measures underway or proposed, and corresponding time schedule.
5. The Discharger shall submit an **Annual Monitoring Summary Report** to the Regional Water Board covering the reporting period of the previous monitoring year. This report shall contain:
- a. All monitoring parameters and constituents of concern shall be graphed so as to show historical trends at each monitoring point and background monitoring point, for all samples taken within at least the previous five calendar years. Each such graph shall plot the concentration of one or more constituents for the period of record for a given monitoring point or background monitoring point, at a scale appropriate to show trends or variations in water quality. The graphs shall plot each datum, rather than plotting mean values. For any given constituent or parameter, the scale for background plots shall be the same as that used to plot

downgradient data. Graphical analysis of monitoring data may be used to provide significant evidence of a release.

- b. All historical monitoring data, including data for the previous year, shall be submitted in tabular form as well as in a digital file format. The Regional Water Board regards the submittal of data in hard copy and in digital format as "...the form necessary for..." statistical analysis [Title 27 CCR Section 20420(h)], in that this facilitates periodic review by the Regional Water Board.
- c. A comprehensive discussion of the compliance record, and the result of any corrective actions taken or planned which may be needed to bring the Discharger into full compliance with the waste discharge requirements.
- d. A map showing the area and elevations in which filling has been completed during the previous calendar year and a comparison to final closure design contours.
- e. A written summary of the monitoring results, indicating any changes made or observed since the previous annual report.
- f. An evaluation of the effectiveness of the leachate monitoring/control facilities including the results of the annual testing of leachate collection and removal systems required under VIII.P of the Standard Provisions and Reporting Requirements.

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

Ordered by: _____
PAMELA C. CREEDON, Executive Officer

2 August 2007
(Date)

WLB: 8/2/2007

INFORMATION SHEET

ORDER NO. R5-2007-0107
COUNTY OF SACRAMENTO
DEPARTMENT OF WASTE MANAGEMENT AND RECYCLING
KIEFER LANDFILL, CLASS III LANDFILLS
CONSTRUCTION, OPERATION, CLOSURE,
POST-CLOSURE MAINTENANCE, AND CORRECTIVE ACTION
SACRAMENTO COUNTY

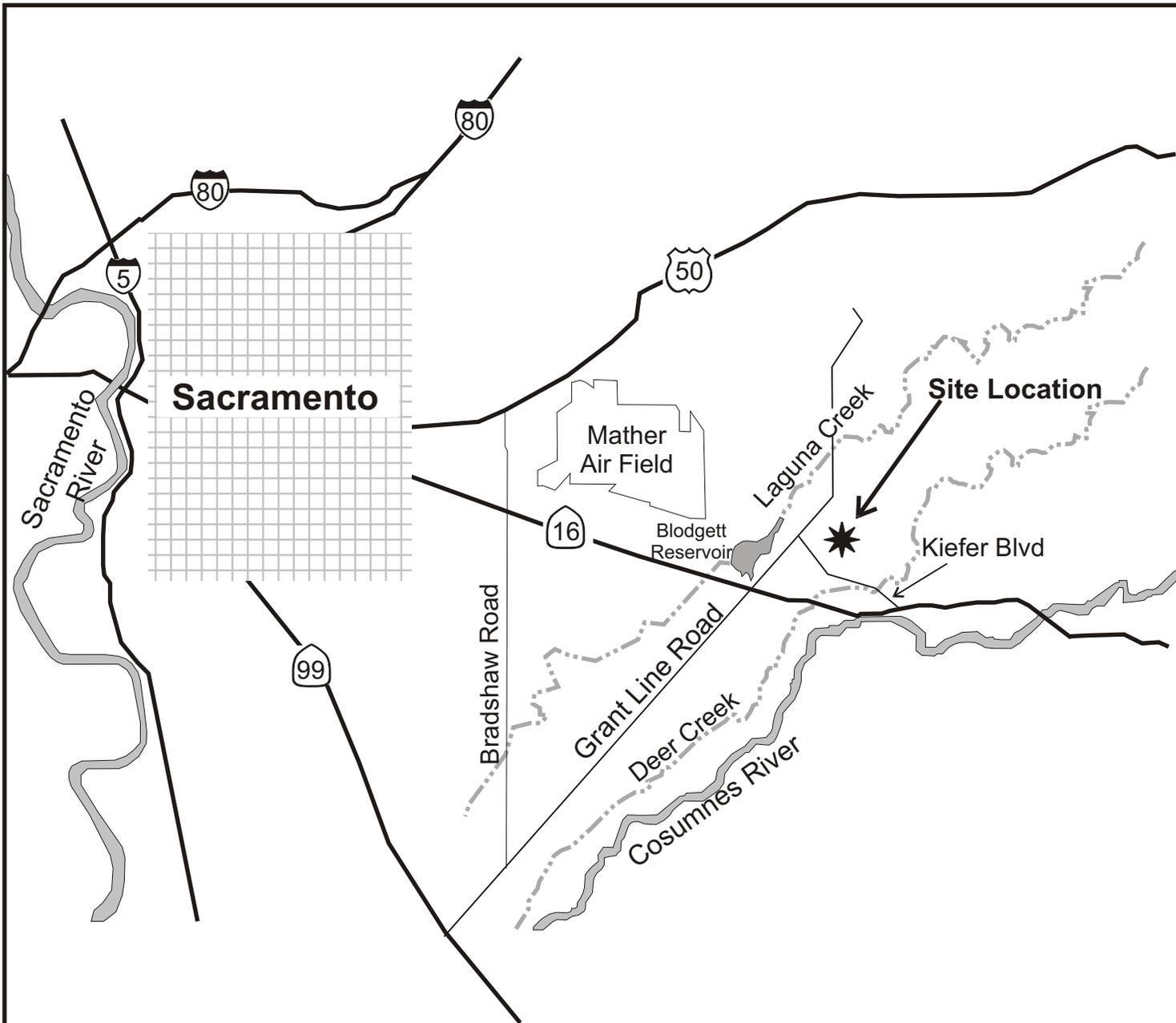
The Kiefer Landfill is a Class III municipal solid waste (MSW) disposal facility operated by the County of Sacramento, Municipal Services Agency (Discharger) since its start-up 1967. It is at the intersection of Grant Line Road and Kiefer Boulevard, in the eastern portion of Sacramento County, about 15 miles east of the City of Sacramento, one mile north of Sloughhouse. The landfill accepts approximately 750,000 tons per year of MSW from areas within Sacramento County. The total permitted landfill footprint of 660 acres is comprised of 232-acre Landfill Unit 1 containing Modules M1 and M1-L, and 428-acre Landfill Unit 2 containing Modules M2 through M11. Module M1 is unlined, Module M1-L has a single composite liner system, and Module M2 is single composite on the side slopes, and double composite on the base. Modules M3 through M11 have yet to be constructed.

Waste discharge requirements for the Kiefer Landfill have been revised to approve an alternative final (evapotranspirative) cover for Module M1, to approve a liner performance demonstration for Module M3 and future modules, to approve the acceptance of treated wood waste, to approve changes to the detection monitoring program for surface water, and to clarify leachate management alternatives. Details regarding the approval of these items are provided in the Findings. Refer to Finding No. 3 for a list of the applicable Findings.

Several aquifers of drinking water quality underlie the site, including the Laguna, Upper Mehrten, Lower Mehrten, and Valley Springs Formations, which are part of the extensive ground water aquifer underlying the Sacramento Valley. In 1989, a significant release of volatile organic compounds (VOC) and inorganic constituents from the landfill was detected in the upper zones of the Upper Mehrten during a Solid Waste Assessment Test (SWAT). In 1991, the Board issued Cleanup and Abatement Order No. 91-725 (CAO), requiring the Discharger to develop a Corrective Action Plan, and in April 1995 the Discharger initiated ground water extraction and treatment of VOCs. The treatment system includes two air stripper towers, a carbon absorption filter, and several extraction wells, and discharges to Deer Creek under NPDES permit. The Discharger has also initiated landfill gas extraction. Monitoring results indicate that the extent and levels of VOCs in the ground water have been significantly reduced.

Natural surface water drainage is to Laguna Creek to the north, thence to the Sacramento River, and to Deer Creek to the South, tributary to the Cosumnes River, thence the Mokelumne River. On-site diversionary structures direct storm water to the southern part of the site, however, where it is contained and periodically discharged to Deer Creek.

WLB: 8/2/2007



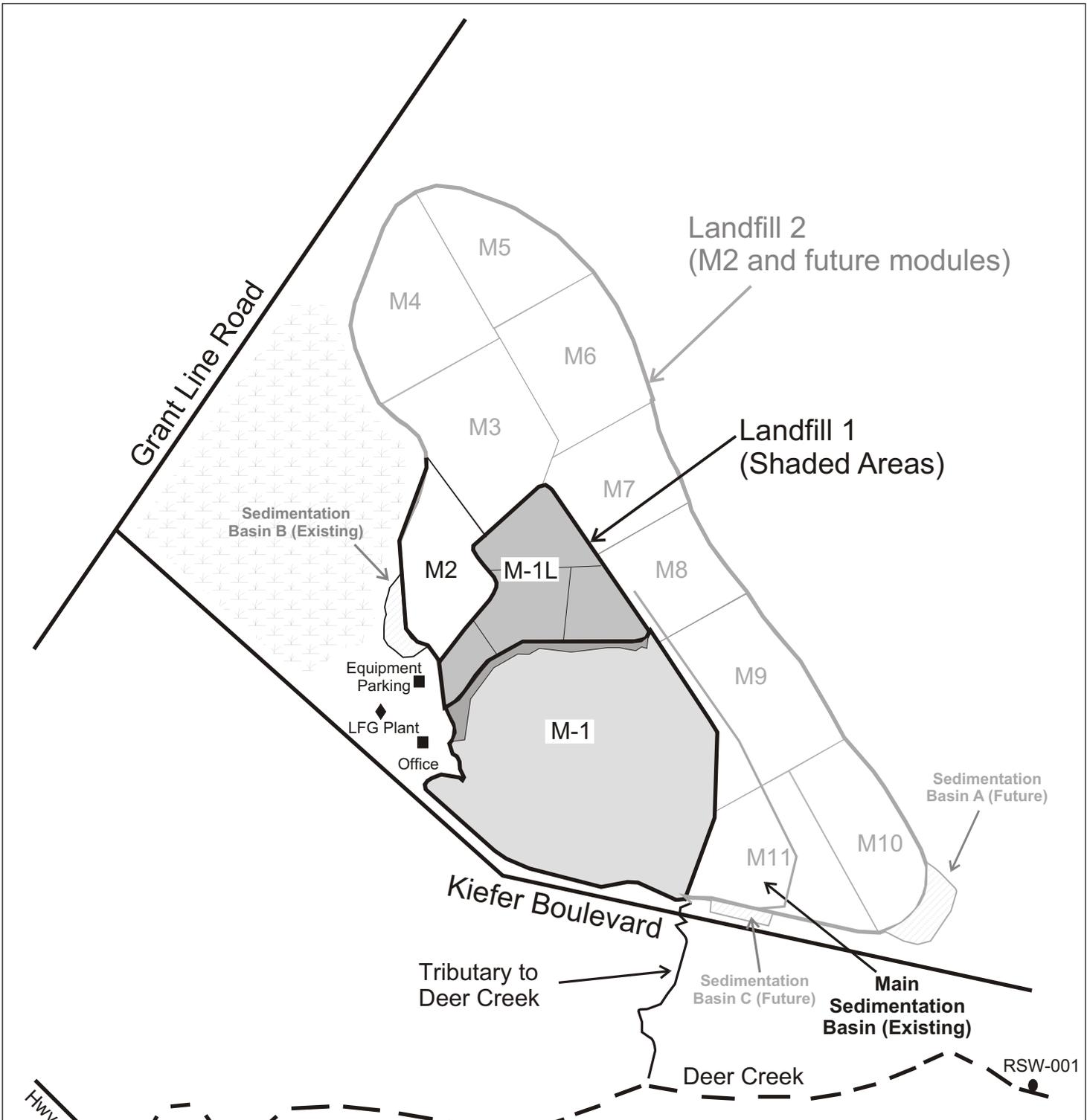
0 1 2 3
Scale in Miles

ATTACHMENT A

LOCATION MAP

KIEFER LANDFILL
CLASS III LANDFILL

SACRAMENTO COUNTY

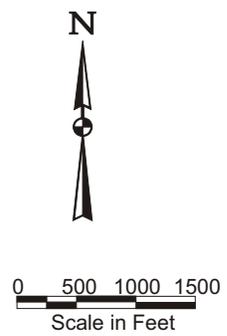


Hwy 16 (Jackson Hwy)

LEGEND

 Wetland Preservation Area

● RSW-003 Surface Water Monitoring Location

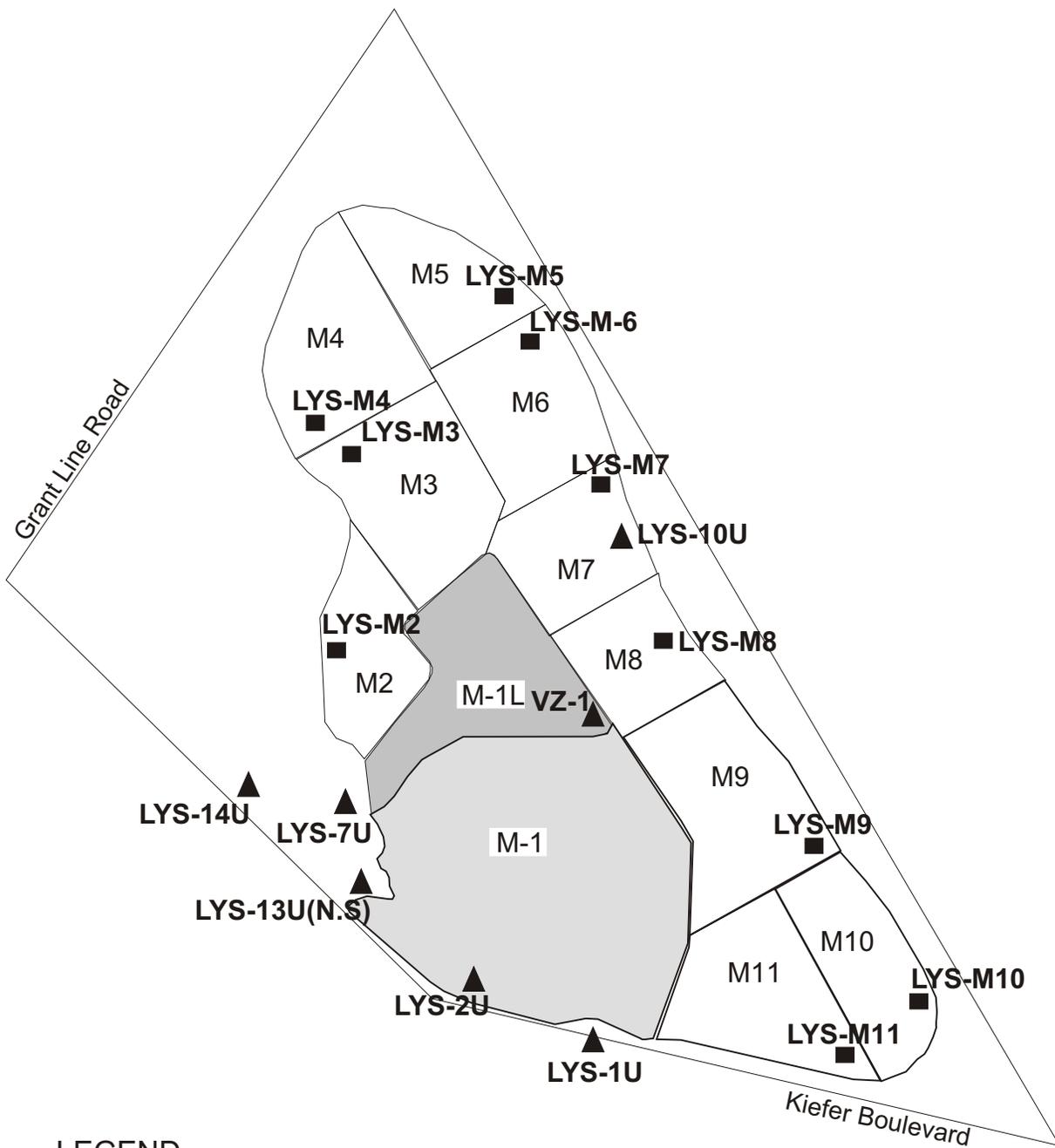


ATTACHMENT B

SITE MAP

KIEFER LANDFILL
CLASS III LANDFILL

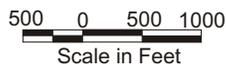
SACRAMENTO COUNTY



LEGEND

- ▲ Suction Lysimeter
- Pan Lysimeter

Notes: 1) Landfill gas probe locations are not shown.
 2) Locations of all suction lysimeters in Module M1-L are not shown.
 3) Pan lysimeters underlie (or will underlie) each leachate sump in Modules M2 through M11.



ATTACHMENT D

**UNSATURATED ZONE
MONITORING NETWORK**

**KIEFER LANDFILL
CLASS III LANDFILL**

SACRAMENTO COUNTY

Attachment E

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

Inorganics (by USEPA Method):

| | |
|--------------------------|------|
| Aluminum | 6010 |
| Antimony | 6010 |
| Barium | 6010 |
| Beryllium | 6010 |
| Cadmium | 6010 |
| Chromium | 6010 |
| Chromium VI ⁺ | 7197 |
| Cobalt | 6010 |
| Copper | 6010 |
| Iron | 6010 |
| Manganese | 6010 |
| Silver | 6010 |
| Tin | 6010 |
| Vanadium | 6010 |
| Zinc | 6010 |
| Arsenic | 7061 |
| Lead | 7421 |
| Mercury | 7470 |
| Nickel | 7520 |
| Selenium | 7741 |
| Thallium | 7841 |
| Cyanide | 9010 |
| Sulfide | 9030 |

Volatile Organics (USEPA Method 8260):

Acetone
Acetonitrile (Methyl cyanide) Acrolein
Acrylonitrile
Allyl chloride (3-Chloropropene) Benzene
Bis(2-ethylhexyl) phthalate
Bromochloromethane (Chlorobromomethane)

Attachment E (continued)

Bromodichloromethane (Dibromochloromethane)
Bromoform (Tribromomethane)
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane (Ethyl chloride)
Chloroform (Trichloromethane)
Chloroprene
Dibromochloromethane (Chlorodibromomethane)
1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane (Ethylene dibromide; EDB)
o-Dichlorobenzene (1,2-Dichlorobenzene)
m-Dichlorobenzene (1,3-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
trans- 1,4-Dichloro-2-butene
Dichlorodifluoromethane (CFC 12)
1,1-Dichloroethane (Ethylidene chloride)
1,2-Dichloroethane (Ethylene dichloride)
1,1-Dichloroethylene (1,1-Dichloroethene; Vinylidene chloride)
cis- 1,2-Dichloroethylene (cis- 1,2-Dichloroethene)
trans- 1,2-Dichloroethylene (trans- 1,2-Dichloroethene)
1,2-Dichloropropane (Propylene dichloride)
1,3-Dichloropropane (Trimethylene dichloride)
2,2-Dichloropropane (Isopropylidene chloride)
1,1 -Dichloropropene
cis- 1,3-Dichloropropene
trans- 1,3-Dichloropropene
Ethylbenzene
Hexachlorobutadiene
2-Hexanone (Methyl butyl ketone)
Isobutyl alcohol
Isodrin
Methacrylonitrile
Methyl bromide (Bromomethane)
Methyl chloride (Chloromethane)
Methyl ethyl ketone (MEK; 2-Butanone)
Methyl iodide (Iodomethane)
Methyl methacrylate
Methyl tert-butyl ether (MTBE)
4-Methyl-2-pentanone (Methyl isobutyl ketone)
Methylene bromide (Dibromomethane)

Attachment E (continued)

Methylene chloride (Dichloromethane)
Naphthalene
Propionitrile (Ethyl cyanide)
Styrene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene; PCE)
Toluene
1,2,4-Trichlorobenzene
1,1,1-Trichloroethane, Methylchloroform
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene; TCE)
Trichlorofluoromethane (CFC- 11)
1,2,3-Trichloropropane
Vinyl acetate
Vinyl chloride (Chloroethene)
Xylene (total)

Semivolatile Organics (USEPA Method 8270 - base, neutral, & acid extractables):

Acenaphthene
Acenaphthylene
Acetophenone
2-Acetylaminofluorene (2-AAF)
Aldrin
4-Aminobiphenyl
Anthracene
Benzo[a]anthracene (Benzanthracene)
Benzo[b]fluoranthene
Benzo[k]fluoranthene
Benzo[g,h,i]perylene
Benzo[a]pyrene
Benzyl alcohol
alpha-BHC
beta-BHC
delta-BHC
gamma-BHC (Lindane)
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl) ether (Dichloroethyl ether)
Bis(2-chloro-1-methylethyl) ether (Bis(2-chloroisopropyl) ether; DCIP)
4-Bromophenyl phenyl ether

Attachment E (continued)

Butyl benzyl phthalate (Benzyl butyl phthalate)
Chlordane
p-Chloroaniline
Chlorobenzilate
p-Chloro-m-cresol (4-Chloro-3-methylphenol)
2-Chloronaphthalene
2-Chlorophenol
4-Chlorophenyl phenyl ether
Chrysene o-Cresol (2-methylphenol)
m-Cresol (3-methylphenol)
p-Cresol (4-methylphenol)
4,4'-DDD
4,4'-DDE
4,4'-DDT
Diallate
Dibenz[a,h]anthracene
Dibenzofuran
Di-n-butyl phthalate
o-Dichlorobenzene (1,2-Dichlorobenzene)
m-Dichlorobenzene (1,3-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
3,3'-Dichlorobenzidine
2,4-Dichlorophenol
2,6-Dichlorophenol
Dieldrin
Diethyl phthalate
p-(Dimethylamino)azobenzene
7,12-Dimethylbenz[a]anthracene
3,3'-Dimethylbenzidine
2,4-Dimethylphenol (m-Xylenol)
Dimethyl phthalate
m-Dinitrobenzene
4,6-Dinitro-o-cresol (4,6-Dinitro-2-methylphenol)
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-n-octyl phthalate
Diphenylamine
Endosulfan I
Endosulfan II

Attachment E (continued)

Endosulfan sulfate
Endrin
Endrin aldehyde
Ethyl methacrylate
Ethyl methanesulfonate
Famphur
Fluoranthene
Fluorene
Heptachlor
Heptachlor epoxide
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Hexachloropropene
Indeno(1,2,3-c,d)pyrene
Isophorone
Isosafrole
Kepone
Methapyrilene
Methoxychlor
3-Methylcholanthrene
Methyl methanesulfonate
2-Methylnaphthalene
Naphthalene
1,4-Naphthoquinone
1-Naphthylamine
2-Naphthylamine
o-Nitroaniline (2-Nitroaniline)
m-Nitroaniline (3-Nitroaniline)
p-Nitroaniline (4-Nitroaniline)
Nitrobenzene
o-Nitrophenol (2-Nitrophenol)
p-Nitrophenol (4-Nitrophenol)
N-Nitrosodi-n-butylamine (Di-n-butylnitrosamine)
N-Nitrosodiethylamine (Diethylnitrosamine)
N-Nitrosodimethylamine (Dimethylnitrosamine)
N-Nitrosodiphenylamine (Diphenylnitrosamine)
N-Nitrosodipropylamine (N-Nitroso-N-dipropylamine; Di-n-propylnitrosamine)
N-Nitrosomethylethylamine (Methylethylnitrosamine)

Attachment E (continued)

N-Nitrosopiperidine
N-Nitrosopyrrolidine
5-Nitro-o-toluidine
Pentachlorobenzene
Pentachloronitrobenzene (PCNB)
Pentachlorophenol
Phenacetin
Phenanthrene
Phenol
p-Phenylenediamine
Polychlorinated biphenyls (PCBs; Aroclors)
Pronamide
Pyrene
Safrole
1,2,4,5-Tetrachlorobenzene
2,3,4,6-Tetrachlorophenol
o-Toluidine
Toxaphene
1,2,4-Trichlorobenzene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
0,0,0-Triethyl phosphorothioate
sym-Trinitrobenzene

Organophosphorus Compounds (USEPA Method 8140):

0,0-Diethyl 0-2-pyrazinyl phosphorothioate (Thionazin)
Dimethoate
Disulfoton
Methyl parathion (Parathion methyl)
Parathion
Phorate

Chlorinated Herbicides (USEPA Method 8150):

2,4-D (2,4-Dichlorophenoxyacetic acid)
Dinoseb (DNBP; 2-sec-Butyl-4,6-dinitrophenol)
Silvex (2,4,5-Trichlorophenoxypropionic acid; 2,4,5-TP)
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)