

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2006-0122

WASTE DISCHARGE REQUIREMENTS
FOR
CHEMICAL WASTE MANAGEMENT, INC.
CLASS II/III LANDFILL B-19, BIOREACTOR AND CONTROL UNIT
CLASS II/III LANDFILL B-17
KETTLEMAN HILLS FACILITY
KINGS COUNTY

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

1. The Chemical Waste Management, Inc. Kettleman Hills Facility (KHF) is one of five Hazardous Waste Landfill Facilities and one of nearly 300 Municipal Solid Waste Landfill sites that Waste Management, Inc. operates in North America. Waste Management, Inc., the largest waste management corporation in the world, also currently has ten bioreactor projects in operation (one in Canada). The KHF currently accepts for disposal approximately 1,400 tons per day of municipal solid waste (MSW) and approximately 4,000 tons per day of hazardous and designated wastes, mostly from sources within the State of California.
2. The McKay Trucking Company began disposal operations at the KHF in March 1975. In 1979, Chemical Waste Management, Inc. (hereafter Discharger), a wholly-owned subsidiary of Waste Management, Inc. of Texas, purchased the facility and is the current owner and operator.
3. The Discharger submitted a Joint Technical Document (JTD) dated 29 September 2005 for the operation of a bioreactor project and a control unit within the Class II/III Landfill B-19, and a JTD for new Class II/III Landfill B-17 dated 10 July 2006. The JTDs fulfill the requirement for submission of a Report of Waste Discharge. Other technical reports regarding site characteristics, facility design, monitoring, operations, and closure have also been submitted.
4. On 27 February 1998, the Regional Water Board adopted Waste Discharge Requirements (WDRs) Order No. 98-058 that currently regulates the disposal of liquid and solid hazardous wastes, and the disposal of non-hazardous liquid and municipal solid wastes and designated wastes at the facility. The new WDRs will regulate the disposal of designated solid waste and MSW to proposed Landfill B-17 and the Landfill B-19 Control Unit in accordance with Title 27, California Code of Regulations (CCR), Section 20005, et seq. (Title 27). The new WDRs will also regulate the disposal of designated solid waste, MSW, and the addition of supplemental liquids to the Landfill B-19 Bioreactor in accordance with Title 27 and State Water Resources Control Board (State Water Board) Resolution No. 93-62, once the pending amendments to the resolution are approved by the U.S. EPA. The Discharger has been accepting MSW and non-hazardous designated solid waste into Landfill B-19 since 1998. The closure of Landfill B-17, the Landfill B-19 Bioreactor, and the Landfill B-19 Control Unit will also be regulated by these WDRs.

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5. On 22 March 2004, the U.S. EPA added Section 258.4 to the federal MSW regulation requirements, for the purpose of developing and demonstrating advanced landfill operation methods, such as bioreactors, as long as specific conditions are met. The section allows states to issue research, development, and demonstration (RD&D) permits, which in this case would be in the form of these WDRs allowing the addition of supplemental liquids to the Landfill B-19 Bioreactor. Liquids cannot be added to the Landfill B-19 Bioreactor until the U.S. EPA grants formal approval of the 21 July 2005 revisions made to amended State Water Board Resolution No. 93-62.
6. When amended Resolution No. 93-62 is formally approved by U.S. EPA, the portions of the WDRs relative to the RD&D bioreactor project for liquid additions to the Landfill B-19 Bioreactor are to remain in force for a period not to exceed three years. The WDRs can be renewed for liquid additions to the bioreactor unit every three years for a total period not to exceed 12 years.
7. This Order implements Title 27 for the construction, operation, and closure of the Class II/III Landfill B-19 Bioreactor and Control Unit, and Class II/III Landfill B-17.

LOCATION AND DESCRIPTION

8. The site is approximately one mile north of State Route 41 and about 2.5 miles west of the intersection of Interstate 5 and Route 41, as shown in Attachment 1, which is attached to and made part of this Order. Attachment 2 is also attached to and made part of this Order. The nearest occupied residence to the KHF is approximately 3.5 air miles to the northeast near Kettleman City.
9. The presently authorized waste management area includes 499 acres of the 1,600-acre parcel and extends generally in a northwest to southeast direction across Section 34, T22S, R18E, and across Section 3, T23S, R18E, MDB&M, as shown in Attachment 2, (Assessor Parcel Nos. 038-330-001, 038-330-019, 038-330-020, 038-320-015, 038-320-020, 038-320-021, and 038-310-005).
10. Land in the vicinity of the Discharger's property is used for oil and gas production and a limited amount of cattle grazing.
11. Site topography is characterized by rolling hills and incised drainages, with elevations varying from 700 to 1015 feet mean sea level.
12. The facility is not in a 100-year flood plain based on the Federal Emergency Management Agency's Flood Insurance Rate Map, Community Panel Number 060086 0275B.

13. As required by the General Permit for Discharges of Storm Water Associated with Industrial Activities, the Discharger filed a Notice of Intent on 16 February 1996 and is to submit annual reports as required by the General Permit.
14. The average annual precipitation is 6.61 inches and the average annual pan evaporation is 102.1 inches. The probable maximum precipitation in a 24-hour period is 7.4 inches. The 1,000-year, 24-hour precipitation event is 3.3 inches.
15. The nearest surface water, the California Aqueduct, is about 3.5 miles east of the site at its closest point.

GEOLOGY & HYDROGEOLOGY

16. The KHF lies on the west side of the North Kettleman Dome where the Tulare, San Joaquin, and Etchegoin formations trend approximately 50 degrees west of north and are tilted to the southwest at 25 to 35 degrees. Landfill B-19 and proposed Landfill B-17 lie on the San Joaquin formation and the lower Tulare formation (southwest corner of Landfill B-17 only), where the surface exposures of the formations consist of interbeds of marine sandstone, siltstone, claystone, and minor amounts of limestone. Detailed geologic studies conducted at the site have shown that the San Joaquin and lower Tulare formation interbeds are laterally and vertically continuous.
17. Sandstones that can transmit landfill gas (LFG) and groundwater within the San Joaquin formation are targeted for methane gas monitoring and groundwater detection monitoring.
18. No known Holocene faults exist within 200 feet of waste management units (WMUs) or the facility. In accordance with the most current geotechnical and seismic engineering practices, the Discharger determined a mean peak horizontal ground acceleration of 0.57g. This acceleration was based on an assumed maximum credible earthquake (MCE) of M_s 6.6 on a ramp thrust fault rupturing at 10 km depth beneath the site.
19. Landfill B-19 is, and proposed Landfill B-17 will be, designed to withstand the MCE without significant damage to their respective containment and cover systems.
20. The WMUs are not known to be in areas subject to rapid geologic change.
21. Over 20 years of analytical data from existing groundwater monitoring wells in both the San Joaquin and lower Tulare formations indicate that the groundwater is of poor quality. Total dissolved solids (TDS) range from 1,550 to greater than 10,000 mg/l. The depth to groundwater ranges from approximately 300 feet to greater than 500 feet below the ground surface. The well yields are low, ranging from 0.25 gpm to 5.5 gpm.

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22. Groundwater flows predominantly to the southeast at less than 10 ft/year. The average drop in groundwater elevation is 2 ft. per 1,000 ft. or .002 ft./ft.
23. Approximately 1.5 miles west of the KHF, wells in the Kettleman Plain area are used for stock watering, irrigation, and domestic water supply. These relatively shallow wells produce good quality groundwater from Alluvium and upper Tulare formation aquifers from depths of 200 to 1,000 feet. WMUs at the KHF are/will be constructed on top of the San Joaquin formation and beds of the lower Tulare formation. The San Joaquin formation and beds of the lower Tulare formation are tilted 25-30 degrees to the southwest and plunge several thousand feet below the Kettleman Plain. These formations contain poor quality groundwater as stated in Finding No. 21. Several hundred feet of impermeable claystone and siltstone interbeds separate the deeper San Joaquin formation and lower Tulare formation from the shallower Alluvium and upper Tulare formation aquifers, isolating and preventing any groundwater flow between the formations.
24. Approximately 3.0 miles east of the KHF and east of the North Kettleman Dome, groundwater wells in the Kettleman City area are used for irrigation, industrial supply, and domestic and municipal water supply for Kettleman City. These relatively shallow wells produce good quality groundwater from Alluvium and upper Tulare formation aquifers from depths of 300 to 1,000 feet. As stated in Finding No. 23, WMUs at the KHF are/will be constructed on top of the San Joaquin formation and lower Tulare formation that tilt to the west away from the Kettleman City area. Erosion of the upper and lower Tulare and San Joaquin formations in the central portion of the dome lying between the KHF and Kettleman City has completely removed these formations between the two areas, thus preventing any possibility for groundwater flow from the KHF towards Kettleman City. Therefore, disposal and treatment operations at the KHF cannot affect groundwater wells in the Kettleman City area.
25. There are no known groundwater supply wells being used within one mile of the facility property boundary line. The closest well on record is a domestic well located approximately 1.9 miles due west of the KHF property boundary line (Meredith/Boli & Associates, 1985). Regional Water Board Resolution No. 89-155, adopted by the Regional Water Board on 11 August 1989, resolved that groundwater contained in the San Joaquin, Etchegoin, and Jacalitos formations within approximately one-half mile of the area permitted for waste disposal is not a municipal or domestic supply (MUN). The groundwater has no demonstrated beneficial uses other than for minor stock watering and industrial usage if sufficient quantities could be obtained.

HISTORY OF LANDFILL B-19

26. Landfill B-19 was originally permitted as a 40-acre Class I hazardous waste landfill with a total capacity of approximately seven million cubic yards. Constructed in four phases (IA, IB, II, and III as shown in Attachment 3) between 1986 and 1989, it began receiving Class I waste in 1987. Attachment 3 is attached to and made part of this Order. The

- containment system for each phase was constructed in accordance with the Article 4 Construction Standards for Class I Units contained in CCR, Title 23. In March 1988, after placement of approximately one million cubic yards of Class I waste in Phase IA, a portion of the liner system failed, sliding with a horizontal and vertical displacement of the waste. No waste escaped the unit.
27. After notification of federal, state, and local agencies, all of the approximately one million cubic yards of Class I hazardous waste was transferred from Phase IA to Phases IB, II, and III of Landfill B-19. A temporary synthetic cover was placed over the slope and floor of the damaged Phase IA to prevent precipitation/stormwater runoff from entering.
 28. Through 1992, approximately three million cubic yards of Class I hazardous waste was discharged into Phases IB, II, and III of Landfill B-19. The landfill was then deactivated and a 40-mil geomembrane was constructed over the waste as interim closure.
 29. In 1998, a portion of Landfill B-19 was converted to a Class II designated waste and Class III MSW disposal unit. Damaged and weathered portions of the Phase IA secondary composite base and sideslope liner systems were removed and repaired, and a new Phase IA primary composite base liner system and primary leachate collection and removal system (LCRS) were constructed as indicated in Finding No. 34. MSW was first received in Landfill B-19 Phase IA on 2 November 1998.
 30. A separation liner, covering approximately 16 acres, was constructed over the Class I hazardous waste in Phase IB and a portion of Phases II and III up to the southern limits of the proposed Bioreactor Control Unit shown in Attachment 2. A review of separation liner Construction Quality Assurance (CQA) reports, by both Regional Water Board and Department of Toxic Substances Control staff, indicated that the liner was constructed in accordance with the approved closure plan. Both MSW and designated waste have been placed over the separation liner. The liner is the final cover for the Class I hazardous waste in that area, and has been designed to preclude leachate and landfill gas migration from the overlying Class II/III non-hazardous waste to the underlying hazardous waste. The separation liner design, as described in Finding No. 35, was approved through the adoption of WDRs Order No. 98-058.

WASTE MANAGEMENT UNIT OPERATION & DESIGN **Landfill B-19**

31. This Order will, upon U.S. EPA approval of amended State Water Board Resolution No. 93-62, permit the addition of supplemental non-hazardous liquids to the Landfill B-19 Bioreactor that consists of the 18.23-acres of Class II/III non-hazardous waste lying within Landfill B-19 Phase IA. No liquids will be added to the 11.73-acres of Class II/III non-hazardous waste within the proposed Control Unit. No Class II designated waste or Class III municipal solid waste will be placed over the Class I hazardous waste south of

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the Control Unit (see Attachment 2). This 11.1-acre area has been capped with a closure cover that was approved by the Regional Water Board and the Department of Toxic Substances Control. The closed portions of Landfill B-19 containing Class I hazardous waste will continue to be regulated by WDRs Order No. 98-058.

32. An engineered, earthen stability berm has been constructed around the eastern and southern perimeter of Landfill B-19 with a portion of the berm constructed over the closure cover system in the 11.1-acre area described above. The berm is designed to provide stability of the landfill during the maximum credible earthquake.
33. Landfill B-19 is designed with a total volume of approximately 3.99 million cubic yards (including the final cover). Assuming the final cover consists of a 4-foot thick soil cover (evapotranspirative cover), Landfill B-19 will contain approximately 3.82 million cubic yards of Class II/III non-hazardous waste.
34. Table 1 shows the Landfill B-19 Bioreactor and Control Unit as-built containment systems (from top to bottom):

TABLE 1

WMU	Base Liner	Sideslope Liner
Landfill B-19 Bioreactor Phase IA (18.23 acres)	<ul style="list-style-type: none"> ▶ 2-foot soil operations layer ▶ 12 oz. non-woven geotextile filter fabric ▶ Primary LCRS - 12 inch granular drainage layer ▶ 16 oz. non-woven geotextile fabric ▶ Primary 60-mil textured HDPE geomembrane ▶ Primary 2-foot clay liner compacted to hydraulic conductivity of 1×10^{-7} cm/sec or less ▶ 16 oz. non-woven geotextile filter fabric ▶ Secondary LCRS - 12 inch granular drainage layer ▶ 16 oz. non-woven geotextile fabric ▶ Secondary 60-mil smooth HDPE geomembrane ▶ Secondary 3.5-foot clay liner compacted to a hydraulic conductivity of 1×10^{-7} cm/sec or less 	<ul style="list-style-type: none"> ▶ 2-foot soil operations layer ▶ Geocomposite drainage layer ▶ 80-mil HDPE geomembrane, textured on the bottom and smooth on top ▶ 3.5-foot existing clay liner compacted to hydraulic conductivity of 1×10^{-7} cm/sec or less
Landfill B-19 Control Unit (11.73 acre)	<ul style="list-style-type: none"> ▶ 2-foot soil operations layer ▶ 16 oz. non-woven geotextile filter fabric ▶ Primary LCRS - 12 inch granular drainage layer ▶ 16 oz. non-woven geotextile fabric ▶ Primary 60-mil smooth HDPE geomembrane ▶ Primary 1.5-foot clay liner compacted to a hydraulic conductivity of 1×10^{-7} cm/sec or less ▶ 16 oz. non-woven geotextile filter fabric ▶ Secondary LCRS - 12 inch granular drainage layer ▶ 16 oz. non-woven geotextile fabric ▶ Secondary 60-mil smooth HDPE geomembrane ▶ Secondary 3.5-foot clay liner compacted to a 	<ul style="list-style-type: none"> ▶ 2-foot soil operations layer ▶ 16 oz. non-woven geotextile fabric ▶ A geonet ▶ 60-mil HDPE smooth geomembrane ▶ A geonet ▶ 60-mil HDPE smooth geomembrane ▶ 3.5-foot clay liner compacted to a hydraulic conductivity of 1×10^{-7} cm/sec or less

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	hydraulic conductivity of 1×10^{-7} cm/sec or less	
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35. The containment system described in Table 1 for the Landfill B-19 11.73-acre Control Unit has Class I hazardous waste lying immediately above it. The separation liner located above the hazardous waste is designed for closure of the Class I hazardous waste in the landfill and the disposal of Class II/III designated and MSW over it. The separation liner consists of (from top to bottom): 2-foot soil operations layer; geocomposite drainage layer; 60-mil textured HDPE geomembrane liner; and a 2-foot low-permeability foundation layer with a hydraulic conductivity of less than or equal to 1×10^{-5} cm/sec.
36. The waste containment system for Landfill B-19 as described in Finding No. 34 exceeds the Title 27 prescriptive standards for Class II & III containment and the Section III containment system requirements of amended State Water Resolution No. 93-62.

Landfill B-17

37. Class II/III Landfill B-17 is proposed for construction southwest of Landfill B-19 (see Attachment 2). The 62.1-acre landfill will be constructed in three phases (A, B, and C) and will have a total gross capacity of approximately 18.4 million cubic yards, including liner and final cover systems.
38. Landfill B-17 will be operated by the “dry tomb” method (no liquid additions).
39. The proposed containment system for Phases A, B, and C for Class II/III Landfill B-17 is provided in Table 2 as shown below:

TABLE 2

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WMU	Base Liner	Sideslope Liner
Landfill B-17 (62.1-acres)	<ul style="list-style-type: none"> ▶ 2-foot soil operations layer ▶ Non-woven geotextile filter fabric ▶ Primary LCRS - 12 inch granular drainage layer ▶ Geotextile cushion fabric ▶ Primary 60-mil textured HDPE geomembrane ▶ Geosynthetic Clay Liner ▶ geotextile cushion fabric ▶ Secondary LDS - 12 inch granular drainage layer ▶ Geotextile cushion fabric ▶ Secondary 60-mil textured HDPE geomembrane ▶ Geosynthetic Clay Liner 	<ul style="list-style-type: none"> ▶ 2-foot soil operations layer ▶ Geocomposite drainage layer ▶ 60-mil HDPE geomembrane, textured on the bottom and smooth on top ▶ Geosynthetic Clay Liner

40. The waste containment system for Landfill B-17 as described in Finding No. 39 meets or exceeds the Title 27 prescriptive standards for Class II and Class III containment. The JTD submitted for Landfill B-17 contains a demonstration indicating that the proposed geosynthetic clay liners (GCLs) are an engineered alternative that exceed the prescriptive clay liner requirements of Title 27. GCLs have previously been demonstrated to be an engineered alternative equivalent to the prescriptive clay liner requirements of Title 27.

WASTE CLASSIFICATION

41. This Order will regulate the discharge of non-hazardous Class III MSW, and Class II designated solid waste, to Landfill B-17 and the Landfill B-19 Bioreactor and Control Unit, as defined in Title 27 CCR Section 20164. Non-hazardous solid waste includes MSW, as referred to in the Code of Federal Regulations, Title 40, (40 CFR), Part 258.2. This Order will also regulate the proposed addition of non-hazardous liquids into the bioreactor portion of Landfill B-19. These classified wastes may be discharged only in accordance with Title 27, CCR; Resolution No. 93-62 (as amended 21 July 2005); and 40 CFR, Part 258 as required by this Order.

42. The Discharger proposes to dispose of treated wood waste into the landfills. "Treated wood" means wood that has been treated with chemical preservatives registered pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Sec. 136 and following). Treated wood waste is exempt from hazardous waste regulation under the amended federal Resource Conservation and Recovery Act (RCRA) of 1976, if it is disposed of in a municipal landfill that meets the disposal site classification requirements contained in the Porter-Cologne Water Quality Control Act, and the landfill also meets the requirements specified in Sections 25143.1.5 and 25150.7 of the Health and Safety Code. Section 25150.8 of the Health and Safety Code indicates that if the treated wood

waste is managed and disposed of in a solid waste landfill in the manner specified, it is considered to be non-hazardous waste.

BIOREACTOR OPERATION

43. The bioreactor will be operated within 18.23-acres of Landfill B-19 Phase IA extending into a small wedge-shaped area within the northern portion of Phase IB of the landfill. It will be permitted as an RD&D project allowing the introduction of supplemental non-hazardous liquids in accordance with Section II.C. of State Water Board Resolution No. 93-62 (as amended 21 July 2005). The bioreactor liner exceeds the prescriptive containment system requirements stated in Section III. of the Resolution. The bioreactor has requirements in the Monitoring and Reporting Program of this Order specific to monitoring its operation.
44. The benefits of operating a bioreactor include applying liquids to the landfill, that would have to otherwise be disposed of in surface impoundments, to accelerate the waste decomposition process; more rapid decomposition, resulting in more rapid waste settlement, thereby increasing the disposal capacity of the landfill and ultimately resulting in the need for less landfills; also, more rapid decomposition causes more rapid gas generation, where the gas can be collected and used beneficially as an energy source. Environmental risks and potential impacts are reduced at closure since the waste mass of a landfill that has been operated as a bioreactor is stabilized and gas emissions are greatly reduced.
45. The bioreactor will be operated as an anaerobic bioreactor, with the addition of liquids at a rate of approximately 50 to 75 gallons per cubic yard of waste to bring the waste up to near the moisture-holding capacity (field capacity). It is anticipated that up to 170,000 gallons per day will be added to the waste, with trucks delivering liquid waste for direct application at the working face, to infiltration galleries, and to liquid storage tanks that are plumbed to a series of vertical injection wells. At the maximum rate of liquid addition, it is estimated that it will take approximately 3 ½ years to bring the waste mass to field capacity.
46. The leachate collection and removal system (LCRS) will minimize head buildup on the primary liner system. An automated pumping system will be installed consisting of a float activated primary LCRS sump pump. Fluid levels in the sump will be continuously monitored and recorded with an electronic digital readout system. The sump pump will be sized to remove the maximum expected leachate generation rate without excessive fluid head buildup on the primary liner. Leachate would be reintroduced into the unit or removed to the Class I surface impoundments, as needed. Design calculations indicate that the head buildup on the primary liner would be less than seven inches should the waste reach field capacity.

47. LFG and volatile organic compound (VOC) emissions typically increase as liquids are added to MSW. Since the calculated VOC emission rate exceeds 50 Mg/yr for the “dry tomb” operation of Landfill B-19, the landfill is subject to the New Source Performance Standards gas collection and control requirements contained in the 40 CFR, Part 60, Subpart WWW.

LFG CONTROL

48. Before operating the bioreactor, the Discharger will install a LFG collection and removal system for both the Landfill B-19 Bioreactor and Landfill B-19 Control Unit meeting both the Title 27 and federal standards. Installation will require the Discharger to obtain an Authority to Construct and a Permit to Operate from the San Joaquin Valley Unified Air Pollution Control District. The system has been designed to remove and flare 2,225 scfm (assuming 90% gas recovery efficiency at the peak gas generation rate) that is predicted to occur approximately three years after initiating liquid additions to the bioreactor.
49. In accordance with 40 CFR, Part 60, Subpart WWW, a LFG collection and removal system will be installed for Landfill B-17. Installation will require the Discharger to obtain an Authority to Construct and a Permit to Operate from the San Joaquin Valley Unified Air Pollution Control District. The system will be constructed to meet the Title 27 and federal standards.

LANDFILL MONITORING **LFG Monitoring**

50. The Discharger has installed eleven gas probes (GP-1A, GP-2A, GP-3A, GP-3BC, GP-4A, GP-4BC, GP-5A, GP-5BC, GP-6A, GP-7A, and GP-8A) around the perimeter of Landfill B-19. Two gas probes (GP-4D & GP-5D) have been installed at the facility property boundary in accordance with Title 27, Sections 20923 and 20925. The probes and five on-site structures are monitored for methane gas in accordance with Title 27.
51. Eight gas probes will be installed at the property boundary for Landfill B-17 and monitored for methane gas in accordance with Title 27.
52. The Discharger will collect gas samples from the Landfill B-19 secondary LCRS riser pipe to monitor the performance of the LFG collection and removal system in accordance with the monitoring and reporting program.

Unsaturated Zone Monitoring

53. The Discharger has conducted a field test demonstrating that the collection of soil-pore liquid samples with suction lysimeters or similar suction-based technology as a component of an active unsaturated zone monitoring system at the facility is not feasible

since soil suction values greatly exceed the pressure limits of these devices for collecting liquid samples. Therefore, the Discharger will use pan lysimeter collection systems installed below the low points of the landfill containment systems to collect liquids by gravity drainage. The pan lysimeters will serve as passive unsaturated zone monitoring systems for the landfills.

54. Landfill B-19 is equipped with 15-foot wide, 1-foot deep pan lysimeters installed below the axial low points of the WMU containment system that serve as an extended pan lysimeter. The trenches are lined with 80-mil HDPE geomembrane, packed with high transmissivity granular material, and terminate at unsaturated zone pan lysimeter collection sumps located below the secondary leachate collection sumps in each phase of the landfill. The Landfill B-19 Phase IA unsaturated zone pan lysimeter collection sump will serve as the unsaturated zone monitoring system for both the landfill bioreactor and the control unit. Fluids will be collected and analyzed from the sump in accordance with the Monitoring and Reporting Program.
55. Below the low point of each phase of Landfill B-17 (below each secondary LCRS sump), the Discharger will install gravel-filled pan lysimeter collection sumps that will serve as the unsaturated zone monitoring systems for the unit. Fluids will be collected and analyzed from the sumps in accordance with the Monitoring and Reporting Program.

Groundwater Monitoring

56. VOCs are often the primary constituents detected in releases to groundwater from MSW landfills. Since VOC's are not naturally occurring and thus have no background value, they are not amenable to the statistical procedures contained in Title 27 for determining the evidence of a release.
57. Sections 20415(e)(8) and (9) of Title 27 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 Section 20415(b)(1)(B) 2. through 4. of Title 27. However, Title 27 does not specify a specific method for non-statistical evaluation of monitoring data.
58. The Regional Water Board may specify a non-statistical data analysis method pursuant to Section 20080(a)(1) of Title 27. Section 13360(a)(1) of the California Water Code (Water Code) allows the Regional Water Board to specify requirements to protect groundwater or surface waters from leakage from a solid waste site, including a method that provides the best assurance of determining the earliest possible detection of a release.
59. Due to significant geochemical spatial variability in the poor quality groundwater across the facility and the lack of contrast between the concentrations of inorganics in the leachate and the same naturally occurring inorganics in the groundwater, the statistical procedures specified in Section 20415(e) of Title 27 for detection monitoring have

proved to be ineffective in providing any assurance of detecting a release from any waste management unit. Therefore, in order to provide the best assurance of the earliest possible detection of a release of non-naturally occurring waste constituents from the landfills, this Order specifies a non-statistical method for evaluating the monitoring data using intrawell comparison as indicated in Section D.1. of the Monitoring and Reporting Program.

60. Groundwater monitoring wells K-69 and K-70 will provide detection monitoring for the Landfill B-19 Bioreactor and Control Units.
61. Groundwater monitoring well K-73 will provide detection monitoring for Landfill B-17 Phase A. Well K-72 will serve as a “gradient” well for measuring groundwater depths. The wells are shown on Attachment 2. Additional detection monitoring wells will be installed for the other proposed phases of Landfill B-17 prior to their construction.
62. Groundwater detection monitoring Wells K-69, K-70, K-73, and any other detection monitoring wells installed for the future phases of Landfill B-17 will be monitored for the VOC detection monitoring parameters at the frequency specified in the Monitoring and Reporting Program.
63. In accordance with Section 20420(g) of Title 27, groundwater detection monitoring Wells K-69, K-70, K-73, and any other detection monitoring wells installed for the future phases of Landfill B-17 will also be monitored for the Constituents of Concern (COCs) at 5-year intervals using intrawell statistical and non-statistical procedures as specified in the most recent edition of the Site-Specific Groundwater Monitoring Plan for the Landfill B-19 Bioreactor and Control Unit, and Landfill B-17. The plan is included by reference in the Monitoring and Reporting Program.

LANDFILL CLOSURE

64. Closure and post-closure maintenance requirements for landfills are contained in Section 21090 of Title 27. The prescriptive standard for the final cover is contained in Section 21090(a) of Title 27.
65. Section 20080(b) of Title 27 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 Section 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 criterion contained in 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 cover system is consistent with the performance goals addressed by the particular prescriptive standard, and provides protection against

water quality impairment equivalent to the prescriptive standard in accordance with Section 20080(b)(2) of Title 27.

66. Section 13360(a)(1) of the 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 WDRs or orders for the discharge of waste at solid waste disposal facilities.
67. Information was submitted in the JTDs proposing the construction of an engineered alternative in lieu of the prescriptive cover design specified in Section 21090(a) of Title 27. The proposed engineered alternative is a 4-foot thick evapotranspirative (ET) cover consisting of fine sand with some clay or sandy clay having a low plasticity index. An ET cover design is engineered and constructed to absorb moisture during precipitation events and subsequently expel moisture by evaporation and transpiration. Preliminary water balance modeling using the UNSAT-H computer program indicate that the proposed ET cover is not likely to transmit moisture to the underlying waste. The performance of the ET cover system will be monitored in accordance with Closure Construction Specification G.4.
68. The Discharger has demonstrated that construction of a Title 27 prescriptive standard cover system would be unreasonably and unnecessarily burdensome when compared to the proposed engineered alternative design. Previous field studies conducted at the KHF during the early 1990s have shown that low permeability Title 27 prescriptive clay cover systems perform very poorly in the semi-arid climate at the facility. The systems developed extensive desiccation cracking within a 3-year period.
69. The proposed ET cover is less prone to desiccation cracking, is less susceptible to damage from differential settlement, and should result in lower post-closure maintenance costs when compared to the prescriptive low permeability clay cover system. The ET cover system is designed to meet the performance goals of Title 27 by isolating the waste from moisture, and by resulting in minimum maintenance during the post-closure period.
70. In order to monitor the performance of the ET cover systems, the Discharger is required to install gravel-filled pan lysimeter(s) beneath the final cover in the top deck area of the Landfill B-19 Bioreactor/Control Unit.

POST-EARTHQUAKE INSPECTION AND RESPONSE PLAN

71. The Discharger will implement a Post-Earthquake Inspection and Response Plan as specified in the Monitoring and Reporting Program. An inspection will be conducted following an earthquake of Magnitude (M_w) 5.0 or greater within 25 miles of the facility or a Magnitude (M_w) 6.0 or greater earthquake within 50 miles of the facility.

CEQA AND OTHER CONSIDERATIONS

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72. An Environmental Impact Report (EIR) for the construction and operation of Class I waste management units at the Kettleman Hills Facility was prepared and approved by the Kings County Planning Department in January 1986. Kings County adopted a Subsequent EIR (SEIR) for the proposed construction and operation of a Class II/III landfill within Landfill B-19 at the facility and filed a Notice of Determination on 16 December 1997. Kings County adopted an SEIR on 6 June 2005 for operation of the Landfill B-19 Bioreactor and filed a Notice of Determination on 7 June 2005. Kings County adopted an SEIR on 30 May 2006 for the construction and operation of new Class II/III Landfill B-17 and filed a Notice of Determination on 31 May 2006. The SEIRs were adopted and noticed in accordance with the California Environmental Quality Act (CEQA) (Public Resources Code, Section 21000 et seq.) and CEQA guidelines (14 CCR, Section 15000 et seq.).
73. The Regional Water Board has considered the SEIRs and has reached its own conclusions regarding the operation of the Landfill B-19 Bioreactor and the construction and operation of new Class II/III Landfill B-17 at the facility. Compliance with these WDRs will prevent and mitigate any significant adverse impacts to water quality from facility operations.
74. This order implements:
- a. *The Water Quality Control Plan for the Tulare Lake Basin, 2nd Edition (1995)*;
 - 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, Part 258; and
 - d. State Water Board Resolution No. 93-62, *Policy for Regulation of Discharges of Municipal Solid Waste*, adopted 17 June 1993 and amended 21 July 2005.
75. Section 13267(b)(1) of the 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 proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the*

need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.” The reports required in the Monitoring and Reporting Program, that is part of this Order, are necessary to ensure compliance with the WDRs.

76. A Solid Waste Facility Permit (SWFP) will be issued by the Kings County Department of Public Health (the LEA) after concurrence from the California Integrated Waste Management Board. The SWFP will among other things, allow a portion of Landfill B-19 to be operated as a bioreactor, allow an increase in the daily tonnage of Class II/III wastes received at the facility landfills from 1,400 tpd to 2,000 tpd, and allow an increase in daily hours of operation to include Saturday's from 8:00 a.m. to 6:00 p.m. A second SWFP will be issued to allow the operation of new Landfill B-17.
77. Since the operation of proposed Landfill B-17 will require an additional 8.5 acres of land beyond the current Conditional Use Permit (CUP) boundary, the Kings County Planning Commission approved a new CUP (No. 04-01) on 30 May 2006, to increase the existing operations area at the facility and to allow the increase in daily tonnage and operating hours.

PROCEDURAL REQUIREMENTS

78. 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 as stated herein.
79. The Regional Water Board notified the Discharger and interested agencies and persons of its intent to prescribe WDRs for this discharge, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
80. The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.
81. Any person affected by this action of this Regional Water Board may petition the State Water 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 Water Code, that the specifications and provisions contained in Order No. 98-058 that apply to Landfill B-19 Class II/III designated/municipal solid waste operations, monitoring, and closure/post-closure are

superseded by this Order and that Chemical Waste Management, Inc., its agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the Water Code and the regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

The following discharges are prohibited:

1. The discharge of solid or liquid waste or leachate to surface waters, surface water drainage courses, groundwater, and natural geologic materials adjacent to the WMUs.
2. The discharge of hazardous waste to non-hazardous WMUs, except for hazardous waste that has been granted a variance from hazardous waste management requirements pursuant to Section 13173 of the California Water Code. Hazardous waste is defined in Section 2601 (Technical Definitions) of Title 23, California Code of Regulations.
3. The discharge of waste to closed WMUs.
4. Free liquids, except for leachate from a landfill LCRS or liquids from lab-packs, waste containing free liquids or containerized free liquids, to the Landfill B-19 Control Unit and to Landfill B-17.
5. The addition of liquids to the Landfill B-19 Bioreactor without U.S. EPA approval of amended State Water Board Resolution No. 93-62.
6. The discharge of non-hazardous liquids to the Landfill B-19 Bioreactor Unit three years beyond the date of U.S. EPA approval of amended Resolution No. 93-62, unless this Order is revised at the end of this three year period allowing for the continued addition of liquids to the bioreactor for another three year period. The WDRs can be revised at the end of each three year period, up to but not to exceed a total of 12 years [this Order (3 years) plus three revisions (9 years)]. The start date of the Bioreactor will be the date of the first liquid addition, which can only occur after all necessary permits have been obtained. The Discharger shall provide written notification of that start date to the Regional Water Board.
7. Radioactive materials that require special placards because they exceed 2,000 picocuries/gram of activity as referenced in 49 CFR 173.403(y).
8. The continued addition of free liquids and/or high moisture content waste in excess of the field capacity of the waste contained in the Landfill B-19 Bioreactor.

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9. Wastes that have the potential to reduce or impair the integrity of containment structures or which, if commingled with other wastes in the WMU, 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 WMU;
 - b. are 'restricted hazardous wastes'; or
 - b. impair the integrity of containment structures.

B. FACILITY DISCHARGE SPECIFICATIONS

1. Non-hazardous wastes shall be discharged only into the landfills specifically designed for their containment, as described in this Order and Title 27.
2. The Discharger shall remove to an appropriate WMU any wastes that are discharged at this site in violation of this Order, or shall otherwise respond to such discharges in accordance with an approved contingency or remedial plan.
3. The treatment, storage, biodegradation, or disposal of wastes shall not cause pollution or a nuisance as defined in Section 13050 of the California Water Code.
4. "Treated wood" wastes may be discharged to a WMU equipped with a composite liner and a leachate collection and removal system and shall be handled in accordance with Sections 25143.1.5 and 25150.7 of the California Health and Safety Code. "Treated wood" means wood that has been treated with chemical preservatives registered pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Sec. 136 and following). The preservatives protect the wood from damage and decay caused by insects, microorganisms, fungi, and other environmental conditions. This may include, but may not be 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).
5. 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 of, the disposal of treated wood shall be terminated at the unit with the verified release until corrective action ceases the release.

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6. Discharge Specification B.4 and B.5 apply only to treated wood waste that is hazardous due solely to the presence of preservatives in the wood, and is not subject to hazardous waste regulations under the federal act.
7. When triggered by the requirements of 40 CFR, Part 60, Subpart WWW, methane and other landfill gases, including VOCs, generated at Landfill B-17 and at Landfill B-19 shall be collected and flared, or converted to energy via a cogeneration facility, or utilized via other viable options, to prevent any potential danger to human health, nuisance conditions, impairment of the beneficial uses of surface water or groundwater due to migration through the vadose (unsaturated) zone, or migration into on or off-site structures.
8. Landfill gas collection and control systems shall be designed, constructed, operated, and monitored in conformance with 40 CFR, Part 60, Subpart WWW.
9. Gas condensate that is not flared can be recirculated back into the Landfill B-19 bioreactor and Landfill B-17 provided it is non-hazardous and provided it will not have an adverse impact on the waste biodegradation process.
10. Any liquid supplement can be added to the Landfill B-19 Bioreactor provided it is non-hazardous and provided it will enhance biodegradation of the waste.
11. Pursuant to Title 27, Sections 20200(d) and 20340(g), the amount of leachate and/or supplemental liquids injected and infiltrated into the Landfill B-19 Bioreactor shall not exceed the “moisture holding capacity” of the waste mass, as defined in Title 27. The generation of leachate in the LCRS during the liquid additions shall not be construed as violating this specification, provided that leachate continues to be absorbed into the waste mass in significant quantities and that the rate of liquid addition is adjusted as practicable to minimize excessive leachate production. The moisture holding capacity, or “field capacity” of the bioreactor, shall be construed as the point where, under steady-state conditions, leachate is no longer being absorbed into the waste mass in significant quantities, as evidenced by the rate of leachate production being approximately equal to the liquid addition rate. Prohibition A.8 in this Order shall apply should this condition develop.
12. If a build up of hydraulic head greater than one foot occurs on the primary liner system as indicated by measurement of the fluid level in the magnehelic line (or other suitable device) in any landfill primary LCRS sump regulated by this Order, the Discharger shall **immediately** notify the Regional Water Board and provide a written notification **within seven days**. The written notification shall include a timetable for implementing corrective action measures necessary to reduce leachate production.

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13. 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 that could impair the integrity of waste or leachate containment facilities or precipitation and drainage control structures. Discharges to WMUs shall cease in the event of any containment system failure.
14. The facility shall be fenced and maintained to prevent unauthorized access.
15. The Discharger shall maintain in good working order any WMU, control system, visual observation and/or recording mechanism, or monitoring device installed to achieve compliance with this Order.
16. The discharge shall not cause degradation of any water supply.
17. The site shall be graded so that storm runoff from access roads adjacent to the WMUs is diverted away from the landfills.
18. Diversion and drainage facilities for Landfill B-19 shall be designed and constructed to accommodate the anticipated volume of precipitation and peak flows resulting from the 24-hour probable maximum precipitation event (7.4 inches) since portions of the landfill contain hazardous waste.
19. Diversion and drainage facilities for proposed Landfill B-17 shall be designed and constructed to accommodate the anticipated volume of precipitation and peak flows resulting from the 24-hour, 1000-year storm event (3.3 inches) since portions of the landfill will contain designated waste.
20. Storm water runoff originating within the facility shall either be contained on-site or be discharged in accordance with applicable storm water regulations.
21. The Discharger shall maintain a *Storm Water Pollution Prevention Plan* in accordance with the General Plan mentioned in Finding No. 13, as required by State Water Board Order No. 97-03-DWQ, or retain all storm water on-site.
22. The Discharger shall submit a revised post earthquake inspection plan for review and approval **within 90 days** following adoption of this Order. The revised plan shall include inspecting WMU liners and covers; LCRS riser pipes, sump pump operation, and storage tanks; all components of the bioreactor, including the flare station; drainage control facilities; and detection monitoring facilities for damage following an earthquake of Magnitude (M) 5.0 or greater within 25 miles of the facility or a M6.0 or greater earthquake within 50 miles of the facility.

23. An earthquake inspection shall be conducted in a timely manner following earthquakes of the magnitude as specified in Facility Discharge Specification B. 22. A report of the inspection shall be submitted **within 30 days** after the inspection assessing any damage and shall contain proposals to repair or replace any damaged structures or facilities.
24. All compatible wastes not prohibited by state or federal regulations, or these requirements, may be placed in appropriate WMUs as specified in Title 27, provided that each waste is verified to be:
 - a. compatible with containment systems; and
 - b. compatible with wastes residing within the WMU.
25. Conditions may be added to the facility's design, operating plan, or post closure plans as necessary to protect water quality, human health or the environment.

C. LINER CONSTRUCTION SPECIFICATIONS

1. New Landfill B-17 shall have a composite liner designed and constructed as described in Table 2 of Finding No. 39.
2. Prior to beginning construction on any phase of a new landfill containment system, a Final Design Report shall be submitted for review. The report shall include, but not be limited to, the engineered design plans and construction drawings for the WMU and a construction quality assurance (CQA) plan to verify that construction specifications will be met. The CQA plan monitoring and testing shall be performed by an independent third party and shall be supervised by a registered civil engineer or certified engineering geologist who is designated as the CQA officer. The Final Design Report shall be prepared by a registered civil engineer or certified engineering geologist and shall be submitted for review and approval prior to commencing construction.
3. Visual observations and detailed geologic mapping of foundation conditions underlying the excavations for each WMU shall be made during construction by a California Professional Geologist. A geologic report and map of the excavation shall be submitted with the construction certification report for the unit.
4. LCRSs shall be designed, constructed, and maintained to prevent the buildup of hydraulic head on the underlying liner. Each landfill unit shall have a blanket-type 1-foot thick granular drainage layer covering the base of the unit and a geocomposite drainage layer covering the landfill side slopes. The LCRS shall be

sized to convey twice the anticipated daily volume of leachate generated in the landfill. LCRS sump pumps shall be installed in the sump at or above the minimum level necessary for proper operation.

5. The Discharger shall submit a Final Liner Construction Certification Report for each WMU containment system constructed. The following information shall be included as appendices in the certification report: 1) a map of the excavated foundation and a geologic report describing the geology and general condition of the foundation prior to WMU containment system construction as indicated in Liner Construction Specification C.3.; 2) as-built plans and final construction drawings; and 3) the CQA testing results. The CQA testing shall include a written summary of the CQA testing program, all test results, analyses, and copies of the inspector's original field notes.

The certification report shall contain sufficient information and test results to certify that construction was completed in accordance with the Final Design Report as specified in Liner Construction Specification C.2. The certification report shall be prepared by a registered civil engineer or certified engineering geologist and shall be submitted for review and approval prior to discharging any waste to the new WMU.

6. Proposed changes to WMU containment system components can be made so long as it is demonstrated that the changes will provide equal or greater protection of water quality and are approved.
7. The Discharger shall provide notification, either written or oral, to Regional Water Board staff at least **10 days prior to** construction of the subgrade, installation of the unsaturated monitoring zone system components (pan lysimeters and/or gas probes), the installation of synthetic and clay liners, and the construction of the LCRSs.

D. CONSTRUCTION SPECIFICATIONS FOR LANDFILL B-19 BIOREACTOR

1. Infiltration galleries shall be constructed to allow liquids to flow freely into the waste mass without the galleries being overtopped and to prevent liquid seepage through the berms. Solids that accumulate in the galleries shall be removed as necessary to maintain gallery capacity.
2. Temporary liquid or leachate storage tanks, piping, manifolds, and gauges located within or over the waste mass shall be designed to withstand any forces exerted by settlement without compromising their integrity to store, distribute, or monitor liquids.

3. Vertical injection wells shall be constructed to withstand the maximum settlement forces without compromising their integrity to inject liquids into the waste mass. The wells shall not penetrate any closer than 15 feet of the top of the liner and shall be constructed of materials that will minimize plugging.
4. Vertical injection wells shall be operated by gravity drainage and shall be properly sealed to prevent liquids from migrating uncontrolled up the well annulus.
5. All gas collection and removal system components, including vertical extraction wells, piping, manifolds, and gauges, shall be designed to withstand the maximum settlement forces without compromising their integrity to collect and control landfill gas emissions. Gas collection and control system components shall contain materials that are corrosion and heat resistant. Any vertical gas extraction wells installed shall not penetrate any closer than 15 feet of the top of the liner and shall be constructed of materials that will enhance gas collection.
6. Gas extraction wells installed shall be properly sealed to prevent oxygen from migrating into the subsurface waste mass down the annulus of the well and to prevent gas and VOCs from escaping through the annulus.
7. Any bioreactor components left in place after completion of bioreactor operations, including vertical injection and inactive gas extraction wells, shall be properly decommissioned and shall not have the ability to damage either the landfill containment system or closure cover by settlement of the waste mass during the post-closure monitoring period.

E. OPERATION SPECIFICATIONS GAS COLLECTION & REMOVAL SYSTEMS

1. Gas collection and control systems shall be operated to minimize and control air intrusion and to prevent direct venting of the gas to the atmosphere.
2. Gas collection and control systems shall be operated so that the methane concentration is less than 500 parts per million above background at the surface of the landfill.
3. There shall be a sufficient number and spacing of horizontal collectors or vertical gas collection wells to control landfill gas migration and emissions.
4. Gas shall be extracted from the landfill primary LCRS as necessary to control gas migration at the base of the units.

5. Gas collection and control systems shall be monitored in accordance with the Monitoring and Reporting Program.

F. DETECTION MONITORING SPECIFICATIONS

1. The unsaturated zone detection monitoring system for the Landfill B-19 Bioreactor and Control Unit shall include the Landfill B-19 Phase IA vadose zone collection sump (pan lysimeter) for the collection of liquid samples.
2. The unsaturated zone detection monitoring system for the Landfill B-17 shall include the pan lysimeters installed under the secondary LCRS collection sumps for the collection of liquid samples.
3. The Discharger shall provide notification at least **10 days prior to** installing any groundwater monitoring wells, gas probes, and pan lysimeters.
4. The groundwater detection monitoring system shall consist of detection monitoring Wells K-69 and K-70 for the Landfill B-19 Bioreactor and Control Units, and detection monitoring Well K-73 and gradient Well K-72 for Landfill B-17 Phase A as shown in Attachment 2 of this Order.
5. Additional groundwater detection monitoring wells shall be installed for the other two phases of proposed Landfill B-17 (Phases B & C). Four quarters of groundwater analytical data shall be obtained from each of these wells prior to waste being discharged to the associated/new phase of the landfill in accordance with Title 27, Section 20415(e)(6).
6. Both unsaturated zone and groundwater detection monitoring shall be conducted in accordance with the Monitoring and Reporting Program.
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 the Monitoring and Reporting Program.
8. The concentrations of the constituents of concern in groundwater passing the Point of Compliance shall not exceed the concentration limits established pursuant to the Monitoring and Reporting Program.
9. Groundwater samples shall be collected from the monitoring points leaving a sufficient amount of time to satisfy the data analysis requirements for the reporting period. The pre-sample purging method and field parameter measurements shall ensure that representative groundwater samples are collected for each sampling event. Specific methods of collection and analysis must be

identified. Sample collection, storage, and analysis shall be performed according to the most recent version of U.S. EPA Methods, such as the latest editions, as applicable, of: (1) Methods for the Analysis of Organics in Water and Wastewater (U.S. EPA 600 Series), (2) Test Methods for Evaluating Solid Waste (SW-846, latest edition), and (3) Methods for Chemical Analysis of Water and Waters (U.S. EPA 600/4-79-020), and in accordance with the most recently approved edition of the Site-Specific Groundwater Monitoring Plan.

10. 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 the data, the analytical method having the lowest method detection limit (MDL) shall be selected from among those methods which would provide valid results considering potential matrix effects or interferences.
11. **“Trace” results** are analytical results that fall between the MDL and practical quantitation limit (PQL) and shall be “J” flagged as such, including the estimated MDL and PQL values for that analytical run.
12. **MDLs and PQLs** shall be derived by the laboratory for each analytical procedure, according to the 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 for U.S. EPA analytical method manuals. In relatively interference-free water, laboratory-derived MDLs and PQLs are expected to closely agree with published U.S. EPA MDLs and PQLs.
13. If the laboratory suspects that, due to a change in matrix or other effects, the true detection limit or quantitation limit for a particular 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.
14. All **Quality Assurance/Quality Control (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 samples results shall be appropriately flagged.

15. During 5-year constituent of concern sampling events, unknown chromatographic peaks shall be reported, flagged, and tracked for potential comparison to subsequent peaks that may be observed in future sampling events. When unknown peaks are encountered, second column or second method confirmation procedures may be performed in an attempt to identify and more accurately quantify the unknown analyte.
16. For groundwater detection monitoring at the facility, the Discharger shall use the non-statistical data analysis procedure as specified in the Monitoring and Reporting Program.
17. The statistical method shall account for data below the PQL with a statistical procedure that is protective of water quality. Any PQL concentration used in statistical calculations pursuant to Title 27 CCR Section 20415(e)(7) shall be derived as specified in Detection Monitoring Specification F.13 of this Order. Any laboratory used by the Discharger shall consider the PQL concentrations listed in Appendix IX to Chapter 14 of Division 4.5 of Title 22, CCR, as a reference for comparing their PQL concentrations in accordance with Detection Monitoring Specification No. F.12 of this Order. For any given COC monitored, trace results shall be identified and used in an appropriate statistical method. For a statistical method that is compatible with the proportion of trace and non-detect values 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."

G. CLOSURE CONSTRUCTION SPECIFICATIONS & POST-CLOSURE

1. Prior to beginning construction on any landfill cover system, a Closure/Post-Closure Maintenance Plan shall be submitted for review. The plan shall include, but not be limited to, the engineered design plans and construction drawings for the WMU cap and a construction quality assurance (CQA) plan to verify that construction specifications will be met. The CQA plan monitoring and testing shall be performed by an independent third party and shall be supervised by a registered civil engineer or certified engineering geologist who is designated as the CQA officer. The Closure Plan shall be prepared by a registered civil engineer

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or certified engineering geologist and shall be submitted for review and approval prior to commencing construction.

2. The final cover systems for the Landfill B-19 Bioreactor/Control Unit and Landfill B-17 shall be constructed with an engineered alternative design known as an evapotranspirative (ET) or monolithic soil cover design. The cover shall, at a minimum, consist of a three-foot thick vegetated soil layer placed over an existing interim cover soil of one-foot thickness, having the same consistency and characteristics as the three foot layer (combined minimum thickness equal to 4 feet). The soil material used shall be a low plasticity index fine sand with some clay or sandy clay that is not susceptible to desiccation cracking and excessive soil erosion. The soil layer shall be placed in a manner ensuring its structural integrity and ability to promote vegetative growth.
3. A Final Closure Construction Certification Report shall be submitted for each WMU cover system constructed. As-built plans and final closure cover drawings and the CQA testing results shall be included in the closure certification report. The CQA testing shall include a written summary of the CQA program, all test results, analyses, and copies of the inspector's original field notes.

The closure certification report shall contain sufficient information and test results to certify that construction was completed in accordance with the approved Closure/Post-Closure Maintenance Plan. The report shall be prepared by a registered civil engineer or certified engineering geologist and shall be submitted for review and approval.

4. Since Landfill B-19 will be closed several years before Landfill B-17, as part of the construction of the ET cover system for the Landfill B-19 Bioreactor and Control Unit, one or more pan lysimeters shall be constructed on the upper deck of the landfill beneath the ET cover to monitor its performance. The final ET cover system for Landfill B-17 shall be based upon the performance of the Landfill B-19 final ET cover system and any final adjustments made to the system to improve its ability to preclude moisture flow-through to the underlying waste. No pan lysimeters shall be required for the Landfill B-17 ET cover system provided a Landfill B-19 ET cover system **performance report** is submitted demonstrating that the system performs satisfactorily.
5. Proposed changes to ET cover system design can be made so long as it is demonstrated that the changes will provide an equal or greater ability to isolate moisture from the waste and provided the design change is submitted and approved.

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6. The Discharger shall provide notification, either written or oral, to Regional Water Board staff at least **10 days prior** to the construction of the closure cover system or closure cover pan lysimeter for any WMU.
7. The Discharger shall monitor closed landfills in accordance with the Post-Closure Maintenance Plan and the Monitoring and Reporting Program, that shall include the following elements:
 - a. Final cover monitoring and maintenance;
 - b. Settlement monitoring;
 - c. Maintenance of permanent monuments;
 - d. LCRS monitoring;
 - f. Maintenance of surface water drainage systems;
 - g. LFG monitoring and control; and
 - h. Groundwater and unsaturated zone monitoring.
8. The Discharger shall install and maintain at least two surveyed permanent monuments from which the location and elevation of wastes, containment structures, and monitoring facilities can be determined throughout the post-closure maintenance period in accordance with Title 27, Section 20950(d).
9. The Discharger shall perform visual inspections of the final cover of any closed landfill unit regulated by this Order at least **annually** to check for evidence of settlement, erosion, ponded water, odor, exposed waste, cracks, slope failure, leachate seeps, or damage to the vegetated cover in accordance with the Monitoring and Reporting Program. Areas of the final cover showing evidence of any of the problems described above shall be repaired in a timely manner, and the cause shall be investigated to prevent recurrences of the problem(s).
10. Monitoring of the final cover for the Landfill B-19 Bioreactor and Control Unit shall also include recording the volume of moisture collected by the pan lysimeters.
11. As part of the Closure/Post-Closure Maintenance, the Discharger shall submit an appendix to the plan proposing a moisture accumulation volume in the pan lysimeter that indicates significant infiltration through the ET cover system.
12. In the event the final cover pan lysimeter(s) detects significant moisture infiltration, **within 120 days** the Discharger shall submit a revised ET cover design that will reduce moisture infiltration below a significant level. The plan shall be implemented in a timely manner upon approval.

13. The post-closure maintenance and monitoring period shall continue for as long as wastes contained within closed WMUs pose a threat to water quality.

H. PROVISIONS

1. The Discharger is required to submit technical reports as directed.
2. The Discharger shall comply with the attached Monitoring and Reporting Program No. R5-2006-122 which is incorporated into and made part of this Order.
3. The Discharger shall comply with the applicable portions of the April 2000 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.), that is included as part of this Order.
4. The Discharger shall comply with all applicable provisions of Title 27, 40 Code of Federal Regulations Part 258 (Subtitle D), and 40 CFR Part 60 Subpart WWW that are not specifically referred to in this Order.
5. This Order does not authorize violation of any federal, state, or local laws or regulations.
6. All reports and transmittal letters required by this Order 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 Order 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.”

7. The Discharger shall establish 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.
8. The Discharger shall obtain and 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.
9. The Discharger shall obtain and 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.
10. The Discharger shall update the preliminary closure and post-closure maintenance plan any time there is a change that will significantly affect the amount of the closure and post-closure maintenance cost estimate. The updated plan shall be submitted to the Regional Water Board, the Local Enforcement Agency, and the CIWMB. The plan

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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 landfill, 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 closure and post-closure maintenance plan shall be submitted and approved prior to closure.

11. The Discharger shall submit final construction and closure certification reports in accordance with Liner Construction Specification No. C.5 and Closure Construction Specification G.3. The certification reports shall be submitted **within 60 days** following completion of construction or closure of a WMU.
12. 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.
13. The Discharger 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 post-closure maintenance period of the landfills.
14. 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 H.6. 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 Water Code. Transfer of this Order shall be approved by the Regional Water Board.
15. The Discharger or persons employed by the Discharger shall, at a minimum, comply with all notice and reporting requirements of the State Department of Water Resources with regard to the drilling, installation, or decommissioning of any monitoring well, gradient well, piezometer, or gas probe used for compliance with this Order, as required by Sections 13750 through 13755 of the Water Code.
16. Monitoring locations may be modified if it is determined that they provide equal or greater protection of water quality.

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17. The Discharger shall maintain the landfills and their associated LCRS and storm water drainage systems, storm water retention basins, unsaturated zone and groundwater monitoring systems, gas collection and removal systems, flare station(s), interim covers, and final covers during the operation, closure, and post-closure maintenance periods as specified in this Order and in the Monitoring and Reporting Program. Regional Water Board staff shall be immediately notified of any flooding, equipment failure, slope failure, fire, explosion, earthquake damage, accident, leachate seepage, or gas release that could cause the failure of any portion of the landfill and its related facilities, potentially threatening water quality.
18. The Landfill B-19 Bioreactor shall be operated in a manner to prevent the seepage of leachate outside the unit, to maintain slope stability of the waste mass during liquid application and waste settlement, to prevent excessive leachate generation, to prevent the buildup of hydraulic head on the waste containment system, to control LFG, to prevent liquids from entering the Control Unit, and to maintain the stability berm structural integrity.
19. **Annually**, the Discharger shall submit a topographic map and aerial photograph of the facility during active operations (prior to closure). After closure of a WMU, the map and photograph shall be submitted **every five years**. The map and photograph shall be at a scale where Landfill B-17 and Landfill B-19 are readily discernible and changes in topography from waste filling operations can be tracked.
20. The Discharger shall maintain a copy of these WDRs at the facility and provide copies to the appropriate facility employees, who shall comply with the prohibitions, specifications, and provisions contained in the Order. This Order shall be made available to regulatory agency personnel upon request.
21. This Order will be reviewed periodically and revisions made when necessary.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 27 October 2006.

PAMELA C. CREEDON, Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2006-0122
FOR
CHEMICAL WASTE MANAGEMENT, INC.
CLASS II/III LANDFILL B-19 BIOREACTOR AND CONTROL UNIT
CLASS II/III LANDFILL B-17
KETTLEMAN HILLS FACILITY
KINGS COUNTY

Compliance with this Monitoring and Reporting Program, with Title 27, California Code of Regulations, Section 20005, et seq. (hereafter Title 27), and with the Standard Provisions and Reporting Requirements for Waste Discharge Requirements for Nonhazardous Solid Waste Discharges Regulated by Title 27 and/or Subtitle D (27 CCR §20005 et seq. and 40 CFR 258), dated April 2000 is ordered by Waste Discharge Requirements Order No. R5-2006-_____.

A. REQUIRED REPORTS

<u>Report</u>	<u>Due</u>
1. Annual Monitoring Summary Report (Section E.5.)	Due Annually on 1 May
2. Groundwater Detection Monitoring (Section D.1)	Semi-Annual
3. Groundwater Constituents of Concern (Section D.1)	Every 5 years¹
4. Unsaturated Zone Constituents of Concern (Section D.2)	Due Annually on 1 May
5. Incoming Waste Monitoring (Section D.3)	Monthly
6. Leachate Collection and Removal System Monitoring (Section D.4)	Monthly
a. Supplemental Parameters (Section D.4)	Due Annually on 1 May
b. Constituents of Concern (Section D.4)	Due Annually on 1 May
7. Landfill B-19 Bioreactor Operation & Performance Monitoring (Section D.5)	Due Annually on 1 May
8. Facility Monitoring (Section D.6)	
a. Facility Inspection & Report (Section D.6.a)	Annually
b. Storm Event Inspection (Section D.6.b.)	When required
c. Seismic Event Inspection (Section D.6.c)	When required

¹Every 5 years, the sampling shall alternate between the 1st Semi-Annual and 2nd Semi-Annual event.

B. 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 that do not comply with the required format will be **REJECTED** and the Discharger shall be deemed to be in noncompliance with the Waste Discharge 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. Data shall be submitted in a digital database format, such as Microsoft Access or Excel, that is acceptable to Regional Water Board staff. The data shall be annotated in a manner so that it can be clearly determined whether or not the Discharger is in compliance with the Waste Discharge Requirements.

Each monitoring report shall include a compliance evaluation summary as specified in the **Section E.3. REPORTING REQUIREMENTS** of this Monitoring and Reporting Program.

Field measurements and laboratory tests shall be reported in each monitoring report. Monthly, semi-annual, and annual monitoring reports shall be submitted to the Board in accordance with the following schedule for the calendar period in which samples were taken or observations made.

<u>Sampling Frequency</u>	<u>Reporting Frequency</u>	<u>Reporting Periods End</u>	<u>Report Date Due</u>
Monthly	Monthly	Last Day of Month	30 th day of following month
Semi-Annual	1 st Semi-Annual	30 June	28 September
	2 nd Semi-Annual	31 December	31 March
Annual	Annual	31 December ¹	1 May ¹
		30 September ²	15 November ²
5-Year	5-Year	30 June ³	28 September ³
		31 December ⁴	31 March ⁴

¹Annual Monitoring Summary Report

²Annual Facility Inspection & Report

³For 1st Semi-Annual Event

⁴For 2nd Semi-Annual Event

The results of any monitoring conducted more frequently at the locations specified herein or by the waste discharge requirements shall be reported to the Regional Water Board.

C. WATER QUALITY PROTECTION STANDARD

1. Water Quality Protection Standards

For each landfill, the water quality protection standard shall include: 1) the list of constituents of concern, 2) the concentration limits for each constituent of concern, and 3) the Point of Compliance and groundwater *monitoring points* specified in this program.

2. Constituents of Concern

Constituents of concern (COCs) are the waste constituents, reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the landfills. The COCs listed in Table 1 are analyzed **every five years** for groundwater and **annually** for liquids, if present, in the unsaturated zone and LCRS sumps. The concentration limits for COCs apply only to groundwater samples and are not applied to other liquid samples, such as liquids collected from the pan lysimeters and LCRS sumps. The concentration limits in groundwater for COCs shall be established as follows:

- a. For any COCs with detection frequencies below 10 percent during background sampling, the concentration limit shall be the Practical Quantitation Limit (PQL) as calculated periodically by the California State Certified analytical laboratory contracted by the Discharger and consistent with the most recent edition of Manual SW-846 published by the U.S. EPA. Concentrations that lie between the PQL and the Method Detection Limit (MDL) shall be reported as traces and “J” flagged accordingly. Exceedances shall be determined using either the statistical and/or non-statistical procedures specified in this program (for VOCs) and Detection Monitoring Specification F.17. (for non-detected inorganics) of the WDRs.
- b. The concentration limits for any *detected inorganic* COCs listed in Table 1 shall be established in accordance with the statistical procedure described in the most recently approved version of the *Site-Specific Groundwater Monitoring Plan (SSGWMP)* for monitoring the Landfill B-19 Bioreactor and Control Unit and Landfill B-17.

3. Monitoring Parameters

Monitoring parameters are the waste constituents, reaction products, hazardous constituents, and physical parameters that provide a reliable indication of a release from a landfill. The groundwater detection monitoring parameters for the landfills are the VOCs listed in Table 2.

4. Monitoring Points

The groundwater detection monitoring wells specified in **Section D. MONITORING** of this Monitoring and Reporting Program, including any new detection monitoring wells installed for Landfill B-17, shall constitute the Points of Compliance for the groundwater quality

protection standard. The unsaturated zone pan lysimeter sumps shall be the unsaturated zone monitoring points for the landfills.

D. MONITORING

1. **Groundwater Detection Monitoring**--Wells K-69 and K-70 shall serve as the Point of Compliance wells for groundwater detection monitoring for the Landfill B-19 Bioreactor and Control Unit. Well K-73 shall serve as the Point of Compliance well for groundwater detection monitoring for Landfill B-17, Phase A. The well locations are shown on Attachment 2 of the WDRs. Any new detection monitoring wells installed for Phases B and C of Landfill B-17 shall serve as the Point of Compliance wells for groundwater detection monitoring for these phases.

The Discharger shall collect, preserve, and transport groundwater samples from wells in accordance with the procedures described in the most recently approved version of the *SSGWMP*. The wells shall be analyzed **semi-annually** for the VOCs contained in Table 2 by U.S. EPA Method 8260B. The wells shall also be analyzed for the supplemental hydrochemical and field parameters contained in Table 3 and reported **semi-annually**, using the analytical methods specified. The supplemental hydrochemical parameters are not subject to statistical evaluation during the semi-annual monitoring events.

The following non-statistical procedure shall be used for data evaluation and reported **semi-annually**: The presence of two VOC's above their respective method detection limit (MDL), or one VOC detected above its PQL, indicates that a release of waste from the unit may have occurred. Following an indication of a possible release from the unit, two verification retests will be conducted **within 30 days** to confirm whether a release has occurred. If the analytical results from either one of the retests or both retests indicate the presence of any of the initially detected VOC(s) and a source other than the WMU is not evident, then a release has been confirmed and the Discharger shall make the necessary notifications and submit an Amended Report of Waste Discharge for an Evaluation Monitoring Program as specified in Section 20420(j) and (k) of Title 27. If both retests come back non-detect, then the well shall remain in the groundwater detection monitoring program.

The Discharger shall determine groundwater flow rate and direction semi-annually in the water-bearing zones being monitored pursuant to this Monitoring and Reporting Program, and report the results **semi-annually**. Groundwater depths measured in Gradient Well K-72 and Detection Monitoring Well K-73 shall be used to determine the groundwater flow direction and velocity for the Lower Acila C sand for Landfill B-17 Phase A. The groundwater depths in groundwater detection monitoring wells monitoring Class I WMUs at the facility in conjunction with Detection Monitoring Wells K-69 and K-70 shall be used to determine the groundwater flow direction and velocity for Landfill B-19. The location of the wells used in making these determinations shall be provided in a map contained in the **semi-annual** Groundwater Monitoring Reports.

Groundwater monitoring data shall be submitted in the **semi-annual** Groundwater

Monitoring Reports due **as specified in Section B Reporting**. Each report shall contain, in addition to reporting requirements specified in this program, a summary of the groundwater analytical data including an electronic copy of the certified analytical reports, a summary of the laboratory quality assurance/quality control standards, field information and chain-of-custody forms, groundwater elevations, groundwater gradient and velocity calculations, gradient maps, and shall indicate that they meet the standards specified in the most recently approved version of the *SSGWMP*, especially regarding well purging, field parameter measurement and stabilization, and sampling procedures. The certified analytical results shall contain the MDL, PQL, and result, and shall appropriately flag any result lying between the PQL and the MDL.

Every five years, a report shall be submitted for all groundwater detection monitoring wells analyzed for the COCs contained in Table 1, utilizing the statistical and/or non-statistical data evaluation procedures cited in the most recently approved version of the *SSGWMP*. This report shall contain the same detailed information as is required in the semi-annual reports as indicated above.

The Discharger may use groundwater analytical methods other than those contained in this program provided the method has an equal or lower MDL and can detect all the required COCs and monitoring parameters.

The Discharger shall submit revisions, changes, and/or additions to the *SSGWMP*, when necessary, to reflect the current groundwater and unsaturated zone monitoring systems and sampling procedures.

2. **Unsaturated Zone Monitoring**

- a. Pan lysimeters -- The Landfill B-19 Phase IA pan lysimeter sump and Landfill B-17 pan lysimeter sumps shall serve for unsaturated zone monitoring for these units.

The Discharger shall collect, preserve, and transport unsaturated zone liquid samples from the pan lysimeter sumps in accordance with the applicable procedures contained in the most recently approved version of the *SSGWMP*. Liquids collected shall be analyzed **annually** for the COCs contained in Table 1. The analytical data shall be submitted in the **Annual Monitoring Summary Report** due on **1 May** and shall contain a summary of the analytical data including the certified analytical results, a summary of the laboratory quality assurance/quality control standards, chain-of-custody forms, and a discussion of the analytical results and any noticeable increasing or decreasing trends.

The Discharger may use analytical methods other than those contained in this program provided the method has an equal or lower MDL and can detect all the required COCs and monitoring parameters.

The Discharger shall submit revisions, changes, and/or additions to the *SSGWMP*, when

necessary, to reflect the current unsaturated zone monitoring system and sampling procedures.

3. **Incoming Waste**

The Discharger shall report in a **Monthly** Waste Monitoring Report, the quantity of designated and MSW discharged to the Landfill B-19 Bioreactor and Control Unit, and to Landfill B-17.

- a. For the discharge of designated waste to the landfills, the generator shall submit documentation and the Discharger shall verify that the waste is designated waste as defined by Water Code Section 13173. Chemical analyses, if used for verification, shall be performed as required by Water Code Section 13176 and Health and Safety Code Section 100825. Source and type of waste shall be considered in determining what analyses to run. Records shall be maintained and be adequate so that an independent auditor can verify that the waste is non-hazardous.

4. **Leachate Collection and Removal Systems**

- a. Landfill B-19 Bioreactor and Control Unit -- The primary leachate collection and removal system (LCRS) fluid level in the Phase IA cell of Landfill B-19 shall be continuously monitored and recorded with an electronic digital readout system or similar device when bioreactor operations begin. The volume of leachate generated shall be measured. For the secondary LCRS in the Phase IA cell, the fluid level shall be inspected each operating day and the volume of fluid removed shall be measured, calculated in gallons per acre per day. The systems shall be operated as indicated in the WDRs. Liquid additions to the bioreactor unit shall not cause excessive leachate generation as specified in Facility Discharge Specification B.11. of the WDRs.
- b. Landfill B-17 -- The LCRS fluid levels shall be recorded each operating day. For primary LCRSs, the average daily volume of liquid removed shall be measured. For the secondary LCRSs, the average daily volume of liquid removed shall be measured, calculated in gallons per acre per day.

The results of all LCRS monitoring shall be reported in the **Monthly** Waste Monitoring Reports, except for the annual COC event. Liquids removed from the primary bioreactor LCRS shall be analyzed **annually** for the parameters listed in Table 5. Liquids removed from any landfill LCRS (primary & secondary) shall be analyzed **annually** for the COCs listed in Table 1 of this program. The analytical results shall be submitted with the **Annual Monitoring Summary Report** due on **1 May**. All analytical results submitted shall include a summary of the analytical data including an electronic copy of the certified analytical results, a summary of the laboratory quality assurance/quality control standards, chain-of-custody forms, and a discussion of the analytical results and any increasing or decreasing trends.

5. Landfill B-19 Bioreactor/Control Unit Operations & Performance Monitoring

The B-19 Bioreactor and Control Unit operation and performance shall be monitored for the parameters and at the frequencies indicated in Tables 4 and 5 of this program. Appropriate mitigation measures as indicated in Table 6 of this program shall be implemented when warranted. The Discharger shall: 1) **semi-annually** collect a gas sample from the Landfill B-19 Phase 1A Bioreactor and Control Unit secondary LCRS riser pipe and analyze the sample for the constituents contained in Table 7; and 2) **semi-annually** measure the methane concentration in the Landfill B-19 Phase 1A Bioreactor and Control Unit secondary LCRS riser pipe with a CES- LANDTEC GEM-500 meter or by an approved equivalent method.

The results of the bioreactor/control unit operation, monitoring, and any mitigation measures implemented shall be documented and submitted in an **annual report** as part of the **Annual Monitoring Summary Report**. The report shall contain a summary of the analytical data including an electronic copy of the certified analytical reports, a summary of the laboratory quality assurance/quality control standards, volumes of fluid added to the bioreactor at each infiltration gallery and each vertical injection well, temperature and pressure data at each vertical injection well, leachate volume generated and liquid levels in the primary LCRS sump, leachate temperature, volume of gas extracted from each extraction well, temperature and pressure data at each vertical gas extraction well, surveyed elevations of the waste mass in both the bioreactor and control unit, and a comparison of the bioreactor process with the “dry tomb” control unit. The data shall be submitted in the annual report and shall be presented in a tabular and graphical format that makes reviewing of the bioreactor and control unit operation and performance readily discernible.

6. Facility Monitoring

a. Facility Inspection

Annually, prior to 30 September, the Discharger shall conduct an inspection of the landfill drainage control systems, landfill slope conditions, groundwater and unsaturated zone monitoring systems, gas collection systems, LCRS and unsaturated zone riser pipes and leachate collection tanks, bioreactor unit liquid distribution system, landfill covers, and Landfill B-19 stability berm. Any necessary repairs shall be completed by **31 October**. By **15 November** of each year, the Discharger shall submit an **annual report** describing the results of the inspection, including photographs of the problem areas before and after repairs have been made.

b. Storm Events

The Discharger shall inspect all landfill precipitation, diversion, and drainage facilities for damage during the rainy season or **within 7 days** following a precipitation event of 1.0 or more inches in a 24-hour period measured at the facility. Necessary repairs shall be implemented as soon as practicable. The Discharger shall report any damage and subsequent repairs **within 45 days** of completion of the repairs, including photographs of

the problem areas before and after repairs have been made.

c. **Seismic Events**

The Discharger shall perform a full-scale facility inspection **within 24 hours** following an earthquake of Magnitude (M_w) 5.0 or greater within 25 miles of the facility or a (M_w) 6.0 or greater earthquake within 50 miles of the facility. The inspection shall be performed in accordance with the facility Post-Earthquake Inspection and Response Plan and a report of the inspection shall be submitted **within 30 days** as indicated in Facility Discharge Specification B.23. of the WDRs. The Discharger shall report any repairs to damaged structures or facilities **within 45 days** of completion, including photographs of the damage before and after repairs have been made.

E. REPORTING REQUIREMENTS

1. The Discharger shall retain records of all monitoring information, including all calibration and maintenance records for equipment used in field parameter measurements, all original strip chart recordings from in-line 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 post-closure period.

Sampling and analytical data 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 the name of the personnel and laboratory performing each analysis;
 - d. Laboratory procedure used, including method of preserving the sample, and the reagents used;
 - e. Results of analyses, and the MDL and PQL for each analysis.
2. A transmittal letter shall accompany each monitoring report summarizing the analytical results, field observations, and any field measurements made. The letter shall indicate whether the facility is in compliance with the WDRs. As applicable to the monitoring being performed, the following items shall be discussed in the letter: (1) Either there was no detections or shall include a discussion of any indications of a release and any retesting results; (2) Anomalous analytical results and measures taken to correct the problem; (3) Damage observed to monitoring equipment, monitoring wells and piezometers, gas probes, bioreactor liquid injection and landfill gas extraction facilities, landfill containment systems

and covers, storm water drainage and storage facilities, and report any repairs made; and, (4) Any discrepancies in field measurements (i.e., groundwater depths, field parameter values, measured leachate levels in the LCRSs, etc.) and what measures were taken to correct the problem.

3. Each monitoring report shall include a compliance evaluation summary containing:
 - a. For each monitoring point and background monitoring point addressed in 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 filter packed interval;
 - 3) The method of purging, including the pumping rate, the equipment and methods used to monitor field parameters during purging, results of field parameter testing, and the method of disposing of the purge water.
 - 4) The type of pump – or other device – used for sampling, if different than the pump or device for purging; and,
 - 5) A statement that the sampling procedure was conducted in accordance with the approved *SSGWMP*.
 - b. A map or aerial photograph showing the locations of the landfills, observation stations, and the monitoring points.
 - c. For each water bearing zone, a description and graphical presentation of the gradient and direction of groundwater flow and groundwater flow rate based upon groundwater elevations obtained during the semi-annual monitoring event.
 - d. Laboratory statements of results of all analyses evaluating compliance with the WDRs.
 - e. An evaluation of the effectiveness of the leachate monitoring and control systems, and of the run-off/run-on control systems.
 - f. A summary and certification of completion of all **Standard Observations** for the landfills and for the perimeter of the landfills. Standard observations for operating landfills shall be conducted **weekly** during the rainy season (1 October to 30 April) and **monthly** during the dry season (1 May to 30 September). Standard observations for closed landfills shall be conducted **monthly** during the rainy season (1 October to 30 April) and **quarterly** during the dry season (1 May to 30 September). The standard observations shall include:

- (1) For the landfill and along the perimeter of the landfill:
 - a) The observation of ponded water anywhere within the landfill and estimated volume and size of affected area; and, liquid entering or leaving the landfill and estimated flow rate (show the affected areas on map);
 - b) Any odor complaints received by the facility; and,
 - c) The observation of erosion and/or day-lighted refuse.
- g. The quantity and types of wastes discharged as provided in the Monthly Waste Monitoring Reports (Reporting Section B & Monitoring Section D.3. of this program) and, keeping facility records (grid sheets) at the locations in the landfill where waste has been placed since submittal of the last report.
4. The Discharger shall report by telephone any seepage from the landfill footprint **immediately** after it is discovered. A written report shall be filed with the Regional Board **within 7 days**, containing at least the following information:
 - d. A map showing the location(s) of seepage;
 - e. An estimated flow rate;
 - f. A description of the nature of the discharge (e.g., all pertinent observations and analyses);
 - g. Verification that samples have been collected and submitted for analyzing the COCs, and an estimated date that the results will be submitted to the Regional Water Board; and,
 - h. Corrective measures for containing, and proposed measures for eliminating, the seepage.
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:
 - i. Time-Series graphs of all monitoring parameters and COCs 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 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 groundwater 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.
 - j. All historical monitoring data, including data for the previous year, shall be submitted in

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CHEMICAL WASTE MANAGEMENT, INC.
KETTLEMAN HILLS FACILITY, KINGS COUNTY

- a digital format (Microsoft Access). The current format submitted by the Discharger includes the entire groundwater and leachate monitoring database, updated following each monitoring event.
- k. A comprehensive discussion of the compliance record, and the result of any corrective action taken or planned which may be needed to bring the Discharger into full compliance with the WDRs.
 - l. 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.
 - m. A written summary of the monitoring results, indicating any changes made or observed since the previous annual report.
 - n. An evaluation of the effectiveness of the leachate monitoring/control systems 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 and Reporting Program on the effective date appearing on this program.

Ordered by: _____
PAMELA C. CREEDON, Executive Officer

27 October 2006

(Date)

jkd/kes:10/27/06

TABLE 1
CONSTITUENTS OF CONCERN (COCs)

<u>Inorganic parameter</u>	<u>Method</u>	<u>Inorganic parameter</u>	<u>Method</u>
1 Aluminum	6010B	18 Magnesium	6010B
2 Antimony	6010B	19 Manganese	6010B
3 Arsenic	6010B	20 Mercury	7470A
4 Barium	6010B	21 Molybdenum	6010B
5 Beryllium	6010B	22 Nickel	6010B
6 Boron	6010B	23 Nitrogen, Nitrate	353.1
7 Cadmium	6010B	24 Potassium	6010B
8 Calcium	6010B	25 Selenium	6010B
9 Chloride	300	26 Silicon	6010B
10 Chromium	6010B	27 Silver	6010B
11 Chromium VI	218.5	28 Sodium	6010B
12 Cobalt	6010B	29 Sulfate	300
13 Copper	6010B	30 Thallium	6010B
14 Cyanide	9012	31 Tin	6010B
15 Fluoride	340.2	32 Vanadium	6010B
16 Iron	6010B	33 Zinc	6010B
17 Lead	6010B		

**TABLE 1 (Cont.)
CONSTITUENTS OF CONCERN (COCs)**

Organic Parameters (Method 8260B)

34	Acetone	54	p-Dichlorobenzene
35	Acetonitrile	55	Ethylbenzene
36	Acrolein	56	Ethyl methacrylate
37	Acrylonitrile	57	Hexachlorobutadiene
38	Allyl chloride	58	2-Hexanone
39	Benzene	59	Isobutyl alcohol
40	Bromochloromethane	60	Methacrylonitrile
41	Bromodichloromethane	61	Methyl bromide
42	Bromoform	62	Methyl chloride
43	Carbon disulfide	63	Methylene bromide
44	Carbon tetrachloride	64	trans-1,4-Dichloro-2-butene
45	Chlorobenzene	65	Dichlorodifluoromethane
46	Chloroethane	66	1,1-Dichloroethane
47	Chloroform	67	1,2-Dichloroethane
48	Chloroprene	68	1,1-Dichloroethylene
49	Dibromochloromethane	69	cis-1,2-Dichloroethylene
50	1,2-Dibromo-3-chloropropane	70	trans-1,2-Dichloroethylene
51	1,2-Dibromoethane	71	1,2-Dichloropropane
52	o-Dichlorobenzene	72	1,1-Dichloropropene
53	m-Dichlorobenzene	73	1,3-Dichloropropane

**TABLE 1 (Cont.)
CONSTITUENTS OF CONCERN (COCs)**

Organic Parameters (Method 8260B)

74	2,2-Dichloropropane	86	1,1,2,2-Tetrachloroethane
75	cis-1,3-Dichloropropane	87	Tetrachloroethylene
76	trans-1,3-Dichloropropene	88	Toluene
77	1,4-Dioxane	89	1,2,4-Trichlorobenzene
78	Methylene chloride	90	1,1,1-Trichloroethane
79	Methyl ethyl ketone	91	1,1,2-Trichloroethane
80	Methyl iodide	92	Trichloroethylene
81	Methyl methacrylate	93	Trichlorofluoromethane
82	4-Methyl-2-pentanone	94	1,2,3-Trichloropropane
83	Propionitrile	95	Vinyl acetate
84	Styrene	96	Vinyl chloride
85	1,1,1,2-Tetrachloroethane	97	Xylene (total)

Organic Parameters (Method 8270C)

98	Acenaphthene	103	Aniline
99	Acenaphthylene	104	Anthracene
100	Acetophenone	105	Aramite
101	2-Acetylaminofluorene	106	Benzo(a)anthracene
102	4-Aminobiphenyl	107	Benzo(b)fluoranthene

**TABLE 1 (Cont.)
 CONSTITUENTS OF CONCERN (COCS)**

Organic Parameters (Method 8270C)

108	Benzo(k)fluoranthene	129	Dibenz(a,h)anthracene
109	Benzo(g,h,i)perylene	130	Dibenzofuran
110	Benzo(a)pyrene	131	Di-n-butyl phthalate
111	Benzyl alcohol	132	Ethyl methanesulfonate
112	Bis(2-chloroethoxy)methane	133	Famphur
113	Bis(2-chloroethyl)ether	134	Fluoranthene
114	Bis(2-chloro-1-methylethyl)ether	135	Fluorene
115	Bis(2-ethylhexyl)phthalate	136	Hexachlorobenzene
116	4-Bromophenyl phenyl ether	137	Hexachlorocyclopentadiene
117	Butyl benzyl phthalate	138	Hexachloroethane
118	p-Chloroaniline	139	Hexachlorophene
119	Chlorobenzilate	140	Hexachloropropene
120	p-Chloro-m-cresol	141	Indeno(1,2,3-cd)pyrene
121	2-Chloroaphthalene	142	Isodrine
122	2-Chlorophenol	143	Isophorone
123	4-Chlorophenyl phenyl ether	144	Isosafrole
124	Chrysene	145	Kepone
125	m-Cresol	146	Methapyrilene
126	o-Cresol	147	3-Methylcholanthrene
127	p-Cresol	148	3,3'-Dichlorobenzidine
128	Diallate	149	2,4-Dichlorophenol

**TABLE 1 (Cont.)
 CONSTITUENTS OF CONCERN (COCS)**

Organic Parameters (Method 8270C)

150	2,6-Dichlorophenol	171	1-Naphthylamine
151	Diethyl phthalate	172	2-Naphthylamine
152	Dimethoate	173	o-Nitroaniline
153	p-(Dimethylamino)azobenzene	174	m-Nitroaniline
154	7-12-Dimethylbenz(a)anthracene	175	p-Nitroaniline
155	3,3'-Dimethylbenzidine	176	Nitrobenzene
156	alpha-Dimethylphenethylamine	177	o-Nitrophenol
157	2,4-Dimethylphenol	178	p-Nitrophenol
158	Dimethyl phthalate	179	4-Nitroquinoline 1-oxide
159	m-Dinitrobenzene	180	N-Nitrosodi-n-butylamine
160	4,6-Dinitro-o-cresol	181	N-Nitrosodiethylamine
161	2,4-Dinitrophenol	182	N-Nitrosodimethylamine
162	2,4-Dinitrotoluene	183	N-Nitrosodiphenylamine
163	2,6-Dinitrotoluene	184	N-Nitrosodipropylamine
164	Di-n-octyl phthalate	185	N-Nitrosomethylethylamine
165	Diphenylamine	186	N-Nitrosomopholine
166	Disulfoton	187	N-Nitrosopiperidine
167	Methyl methanesulfonate	188	N-Nitrosopyrrolidine
168	2-Methylnaphthalene	189	5-Nitro-o-toluidine
169	Naphthalene	190	0,0-Diethyl 0-2-pyrazinyl phosphorothioate
170	1,4-Naphthoquinone	191	Pentachlorobenzene

**TABLE 1 (Cont.)
 CONSTITUENTS OF CONCERN (COCS)**

<u>Organic Parameters (Method 8270C)</u>			
192	Pentachloroethane	202	Pyridine
193	Pentachloronitrobenzene	203	Safrole
194	Pentachlorophenol	204	1,2,4,5-Tetrachlorobenzene
195	Phenacetin	205	2,3,4,6-Tetrachlorophenol
196	Phenanthrene	206	Tetraethyl dithiopyrophosphate
197	Phenol	207	o-Toluidine
198	p-Phenylenediamine	208	2,4,5-Trichlorophenol
199	2-Picoline	209	2,4,6-Trichlorophenol
200	Pronamide	210	0,0,0-Triethyl phosphorothioate
201	Pyrene	211	sym-Trinitrobenzene
<hr/>			
<u>Pesticides (Method 8081A)</u>			
		221	Dieldrin
212	Aldrin	222	Endosulfan I
213	alpha-BHC	223	Endosulfan II
214	beta-BHC	224	Endosulfan sulfate
215	delta-BHC	225	Endrin
216	gamma-BHC (Lindane)	226	Endrin aldehyde
217	Chlordane	227	Heptachlor
218	4,4'-DDD	228	Heptachlor epoxide
219	4,4'-DDE	229	Methoxychlor
220	4,4'-DDT	230	Toxaphene

**TABLE 1 (Cont.)
 CONSTITUENTS OF CONCERN (COCs)**

	<u>Polychlorinated biphenyls</u> (Method 8082)	235	Aroclor 1248
231	Aroclor 1016	236	Aroclor 1254
232	Aroclor 1221	237	Aroclor 1260
233	Aroclor 1232	238	Aroclor 1262
234	Aroclor 1242	239	Aroclor 1268
<hr/>			
	<u>Organophosphorus Compounds</u> (Method 8141A)		
240	Methyl parathion	242	Phorate
241	Parathion	243	Dichlorvos
<hr/>			
	<u>Chlorinate Herbicides</u> (Method 8151A)		
244	2,4-D (2,4-Dichlorophenoxyacetic acid)	246	Dinoseb (DNBP; 2-sec-Butyl-4,6-dinitrophenol)
245	Silvex (2,4,5-Trichlorophenoxypropionic acid; 2,4,5-TP)	247	2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)
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	<u>Carbamate & Urea Pesticides</u> (Method 632)	256	Methiocarb
248	Barban	257	Methomyl
249	Carbaryl	258	Monuron
250	Carbofuran	259	Neburon
251	Chlorpropham	260	Oxamyl
252	Diuron	261	Propham
253	Fenuron	262	Propoxur
254	Fluometuron	263	Siduron
255	Linuron	264	Swep

TABLE 2
GROUNDWATER DETECTION MONITORING PARAMETERS

<u>VOCs</u> (Method 8260B)	24	cis-1,3-Dichloropropene
1 Acetone	25	trans-1,3-Dichloropropene
2 Acrylonitrile	26	Ethylbenzene
3 Benzene	27	2-Hexanone
4 Bromochloromethane	28	Methyl bromide
5 Bromodichloromethane	29	Methyl chloride
6 Bromoform	30	Methylene bromide
7 Carbon disulfide	31	Methylene chloride
8 Carbon tetrachloride	32	Methyl ethyl ketone
9 Chlorobenzene	33	Methyl iodide
10 Chloroethane	34	4-Methyl-2-pentanone
11 Chloroform	35	Styrene
12 Dibromochloromethane	36	1,1,1,2-Tetrachloroethane
13 1,2-Dibromo-3-chloropropane (DBCP)	37	1,1,2,2-Tetrachloroethane
14 1,2-Dibromoethane	38	Tetrachloroethylene
15 o-Dichlorobenzene	39	Toluene
16 p-Dichlorobenzene	40	1,1,1-Trichloroethane
17 trans-1,4-Dichloro-2-butene	41	1,1,2-Trichloroethane
18 1,1-Dichloroethane	42	Trichloroethylene
19 1,2-Dichloroethane	43	Trichlorofluoromethane
20 1,1-Dichloroethylene	44	1,2,3-Trichloropropane
21 cis-1,2-Dichloroethylene	45	Vinyl acetate
22 trans-1,2-Dichloroethylene	46	Vinyl chloride
23 1,2-Dichloropropane	47	Xylenes

TABLE 3
SUPPLEMENTAL HYDROCHEMICAL PARAMETERS
AND
FIELD PARAMETERS

<u>Hydrochemical Parameters</u>	<u>Method</u>
1 Calcium	6010B
2 Potassium	258.1
3 Magnesium	6010B
4 Sodium	6010B
5 Chloride	300
6 Bicarbonate	350.1
7 Carbonate	350.1
8 Sulfate	310.1
9 Silica	6010B
10 Total Dissolved Solids	160.1
11 Total Organic Carbon	415.1

<u>Field Parameters*</u>	<u>Method</u>
1 pH	150.1
2 Specific Conductance	120.1
3 Temperature	---
4 Turbidity	---
5 Dissolved Oxygen	---

* To be measured in the field prior to sampling groundwater monitoring wells.

**TABLE 4.
 B-19 BIOREACTOR & CONTROL UNIT MONITORING**

Monitoring Parameter	Frequency of Testing
Monitoring of Liquid Additions	
Leachate Seeps	Daily ³ in conjunction with Bioreactor leachate injection operations
Head on liner	Daily ¹ check fluid level in primary LCRS sump so that there is no hydraulic head on the liner system
Flow equilibrium	Daily evaluate liquid levels and alarms in all tanks, infiltration galleries, injection wells, and sumps to ensure that flow equilibrium exists in order to minimize the potential for overflow and/or head buildup
Liquid flow rate (at each injection wellhead)	Daily ³
Temperature (at each injection wellhead)	Daily ³
Pressure (at each injection wellhead)	Daily ³
Landfill Surface/Settlement	
Topographic mapping	Annually per Provision I. 19 of the WDRs
Settlement Plates	Annually (Bioreactor & Control Unit)
Leachate	
Evaluation of Leachate Quality	Quarterly, per Table 6 of this program
VOCs & Metals + Table 6	Annually, per Section D.4. of this program
Gas Monitoring	
Flow rate (at the flare)	Continuous
Flow rate (at each wellhead)	Monthly
Methane/Carbon dioxide (at each well head)	Monthly
Oxygen or Nitrogen (at each wellhead)	Monthly
Pressure (at each wellhead)	Monthly
Temperature (at each wellhead)	Monthly
Methane/Carbon dioxide (at flare station)	Monthly
Aggregate Flow (Bioreactor vs. Control Unit)	Monthly
Surface Emissions Monitoring (SEM)	Quarterly ²
VOCs (composite feed gas to the flare)	Annual
Hydrogen Sulfide (composite feed gas to flare)	Annual
Waste	
Waste Appearance	Whenever drilling or excavating into the waste mass, look for a dark, sludgy color. Results to be recorded as part of well drilling logs. (Bioreactor)

¹The fluid level in the primary sump shall be continuously monitored and checked at regularly scheduled times each operating day by CWMI staff to ensure that there is no hydraulic head buildup on the primary liner system.

²SEM shall comply with Operations Specification E.2. of the WDRs.

³Each operating day.

TABLE 5.
B-19 BIOREACTOR ANNUAL LEACHATE MONITORING

	<u>Parameters</u>	<u>Method</u>
1	Chloride	300
2	Ammonia as N	350.1
3	Total Kjeldahl Nitrogen	351.3
4	Nitrate Nitrogen	353.2
5	Sulfate	300
6	Chemical Oxygen Demand	--- ¹
7	BOD 5-day	--- ¹
8	Total Organic Carbon	--- ¹

¹ Discharger to provide a method

**TABLE 6.
B-19 BIOREACTOR CONTINGENCY & MITIGATION MEASURES**

Parameter	Event	Measure
Daily Operations Monitoring		
Leachate Seeps	Visual observation of leachate seepage	Install injection trenches and pipe perforations at least 50 feet from landfill sideslope. If seepage occurs, relocate injection points further from the sideslope and/or reduce injection rate in the area to remove seepage problem. Excavate in the area of the seep to determine if vertical infiltration is blocked by impermeable item. Remove item and replace with material to promote vertical drainage.
Landfill Surface/Settlement		
Severe Localized Settlement	Excessive settlement which might cause a safety hazard	In the event localized settlement causes a safety hazard, either place additional refuse and cover with soil or place additional soil to alleviate the hazard.
Leachate and Liquid Management		
Head on Liner	Hydraulic head buildup is detected on primary liner	Stop liquid additions and leachate recirculation. Pump and remove leachate from the primary sump until there is no hydraulic head on the primary liner system.
Pumping Systems	Pump failure (LCRS sump, leachate tank)	Have backup pump available on-site for installation.
Injection System Flow Rate	Daily application or injection rate shows signs of system overloading (i.e., excessive seeps, backed up injection wells, etc.)	Reduce liquids in bioreactor system. First reduce leachate recirculation by removing leachate to surface impoundments for evaporation. Second, reduce external liquid additions. Closely control and monitor daily volume of liquids applied to the system until signs of overloading are removed.
Leachate pH	Leachate pH drop approaches 5.5	If pH trend approaches 5.5, control addition of liquid and high moisture content solids known to cause rapid fermentation until pH rebounds toward a neutral level (near pH \pm 7.0)
Gas		
Methane/Carbon dioxide	Levels of Methane/Carbon dioxide drop with a corresponding increase in Oxygen or Nitrogen	Inspect landfill gas well field for excessive vacuum or leaks in the system and adjust accordingly
Oxygen/Nitrogen	Exceeds levels approved by SJVAPCD at the wellhead	Inspect landfill gas well field for excessive vacuum or leaks in the system and adjust accordingly
Temperature	Exceeds 131 degrees F at a wellhead	Investigate for possibility of a landfill fire
Pressure	Loss of negative pressure on wellhead	Inspect landfill gas well field for excessive vacuum or leaks in the system and adjust accordingly
Flow Rate	Rapid change in flow rate from one monthly evaluation	Inspect landfill gas well field for excessive vacuum or leaks in the system and adjust accordingly
Air		
Odor	Unusually strong odors generated from direct liquid placement at working face or in injection galleries	Adjust operations to adjust severe or objectionable odors, such as: reducing liquid additions, selectively screening out particular liquids, applying soil cover to an offending gallery or trench, and possibly abandoning an injection gallery or trench in the short term or permanently.
Surface Emissions Monitoring	Surface emissions above permit requirements	Take combination of actions, such as LFG control system adjustment and cover repairs.

KETTLEMAN HILLS FACILITY, KINGS COUNTY

TABLE 7

<u>VOCs</u> (U.S. EPA Method TO-14A)	26	Chlorobenzene
1 Freon 12 (dichlorodifluoromethane)	27	Ethylbenzene
2 Freon 114 (1,2-dichloro-1,1,2,2-tetrafluoroethane)	28	m,p-Xylene
3 Chloromethane	29	o-Xylene
4 Vinyl Chloride	30	Styrene
5 Bromomethane	31	1,1,2,2-Tetrachloroethane
6 Chloroethane	32	1,3,5-Trimethylbenzene
7 Freon 11 (trichlorofluoromethane)	33	1,2,4-Trimethylbenzene
8 1,1-Dichloroethene	34	1,3-Dichlorobenzene
9 Freon 113 (1,1,2-trichloro-1,2,-trifluoroethane)	35	1,4-Dichlorobenzene
10 Methylene Chloride	36	alpha-Chlorotoluene
11 1,1-Dichloroethane	37	1,2-Dichlorobenzene
12 cis-1,2-Dichloroethene	38	1,2,4-Trichlorobenzene
13 Chloroform	39	Hexachlorobutadiene
14 1,1,1-Trichloroethane	*40	trans-1,2-Dichloroethene
15 Carbon Tetrachloride	*41	n-Hexane
16 Benzene	*42	Cyclohexane
17 1,2-Dichloroethane	*43	Bromodichloromethane
18 Trichloroethene	*44	Dibromochloromethane
19 1,2-Dichloropropane	*45	Bromoform
20 cis-1,3-Dichloropropene	*46	4-Ethyltoluene
21 Toluene	*47	n-Heptane
22 trans-1,3-Dichloropropene	*48	Acetone
23 1,1,2-Trichloroethane	*49	Isopropanol
24 Tetrachloroethene	*50	Carbon Disulfide
25 Ethylene Dibromide		

* Asterisk denotes supplemental constituents

INFORMATION SHEET

ORDER NO. R5-2006-0122
CHEMICAL WASTE MANAGEMENT, INC.
CLASS II/III B-19 BIOREACTOR AND CONTROL UNIT
CLASS II/III LANDFILL B-17
KETTLEMAN HILLS FACILITY
KINGS COUNTY

Chemical Waste Management, Inc. (CWMI) owns and operates the 1,600-acre Kettleman Hills Facility, of which 499 acres has a Conditional Use Permit as well as various other permits, including a Hazardous Waste Facility Permit, Waste Discharge Requirements (WDRs), and a Solid Waste Facility Permit, for accepting Class I liquid and solid hazardous wastes, Class II/III designated liquid and solid wastes, and municipal solid waste. The facility has been used as a land disposal site for liquid and solid hazardous wastes since at least 1975, and for designated/municipal solid wastes since 1998. It is located approximately 1 mile north of State Highway 41 and 3.5 miles southwest of Kettleman City.

WDRs Order No. 98-058 currently implements Title 22, Title 23, and Title 27 of the California Code of Regulations, regulating the disposal of hazardous waste and the disposal of designated/municipal solid waste at the facility. The new WDRs would supersede implementation of the Title 22 and Title 23 hazardous waste regulations, and will implement only the Title 27 non-hazardous waste regulations for permitting the addition of supplemental liquids to a portion of Class II/III Landfill B-19 (the 18.23-acre Bioreactor Unit) as an RD&D project in accordance with amended State Water Resources Control Board Resolution No. 93-62, the operation of a portion of Class II/III Landfill B-19 as a Control Unit (11.73-acres), the construction and operation of new Class II/III designated and municipal solid waste Landfill B-17 (62.1-acres), and the closure of these units.

CWMI is a wholly owned subsidiary of Waste Management, Inc. of Texas, a company that has considerable experience in operating bioreactor units. Waste Management, Inc. is currently operating ten bioreactor projects in both the United States and Canada. The benefits from operating a landfill as a bioreactor, rather than the current “dry tomb” practice, are:

- 1) Liquids, such as leachate and wastewater, are added to the bioreactor waste to speed up the waste decomposition process. This is considered to be a beneficial use of these liquids, which would have to be otherwise disposed of in surface impoundments.
- 2) More rapid waste decomposition resulting in more rapid waste settlement and more rapid gas generation. The waste settlement increases the landfill air space by 15-40%, providing an increase in the waste disposal capacity of the unit. More rapid gas generation from a bioreactor unit reduces the potential environmental impacts vs. the long-term impacts from gas emissions from a “dry tomb” landfill. Gas can potentially be recovered and used as an energy source to generate electricity or to power a fleet of trucks or buses designed to run on methane.
- 3) The more rapid waste settlement provides an increase in disposal capacity with a bioreactor, resulting in the need for less landfills.
- 4) A stabilized waste mass with lower gas emissions at closure results in lower post-closure maintenance costs and less environmental risks/impacts.

ORDER NO. R5-2006-0122
CHEMICAL WASTE MANAGEMENT, INC.
CLASS II/III B-19 BIOREACTOR AND CONTROL UNIT
CLASS II/III LANDFILL B-17
KETTLEMAN HILLS FACILITY
KINGS COUNTY

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Landfill B-19 is well suited for conversion to a bioreactor, having a double composite bottom liner system that exceeds the Title 27 prescriptive standards for Class III containment. The Kettleman Hills Facility is situated in an environmentally conducive area for operating a bioreactor unit and constructing new Class II/III landfills since there are no surface water bodies near the facility (nearest surface water is the California Aqueduct, 3.5 miles to the east), groundwater is relatively deep and of poor quality and is isolated from useable groundwater in both the Kettleman Plain and the San Joaquin Valley, and the facility is physically separated from any populated areas by several rolling hills and intervening gullies. The groundwater under the facility is not a municipal or domestic supply (MUN) and has very limited beneficial uses. On-site groundwater detection monitoring wells have very low yields (< 5 gpm) and are typically pumped dry in less than 30 minutes. The nearest off-site water supply wells with relatively good quality groundwater lie about 1.5 miles west of the facility, in the Kettleman Plain.

The climate around the facility is semi-arid, with annual average precipitation at 6.61 inches per year. The facility is not located within a 100-year flood plain and the landfills are not located in areas subject to rapid geologic change.

A portion of Landfill B-19 will be operated as a conventional “dry tomb” Control Unit, where no liquid waste will be added. The Landfill B-19 Bioreactor Unit will be operated immediately adjacent to the Landfill B-19 Control Unit, where the operation and performance of the two units can be compared in the same environmental setting.

The new unit, Landfill B-17, will be constructed in three phases and will be operated as a conventional “dry tomb” unit. The landfill will have a double composite base liner system that meets or exceeds the required Title 27 prescriptive standards for Class III containment. The unit will have an 18.4 million cubic yard capacity (including final cover and liner materials).

Both the Landfill B-19 Bioreactor and Control Unit have, and Landfill B-17 has or will have, groundwater detection monitoring systems to detect for the earliest possible evidence of a release from the units. The monitoring will be conducted semi-annually, utilizing monitoring parameters that will provide reliable evidence of the detection of a release.

CWMI is proposing to close the landfills with evapotranspirative (ET) cover material as an engineered alternative to the Title 27 prescriptive standard. Field tests conducted at the facility by CWMI have shown that the low permeability Title 27 prescriptive clay cover systems perform very poorly in semi-arid climates such as exist at the Kettleman Hills Facility. The ET cover system would consist of a 4-foot thick layer of fine sandy material with some clay and a low plasticity index, with a vegetative cover. An ET cover is designed to absorb moisture during precipitation events and to evaporate and transpire moisture between precipitation events and after the rainy season before it permeates the entire cover thickness. Preliminary results indicate that the proposed ET cover will prevent stormwater from percolating through the bottom of the cover system.

ORDER NO. R5-2006-0122

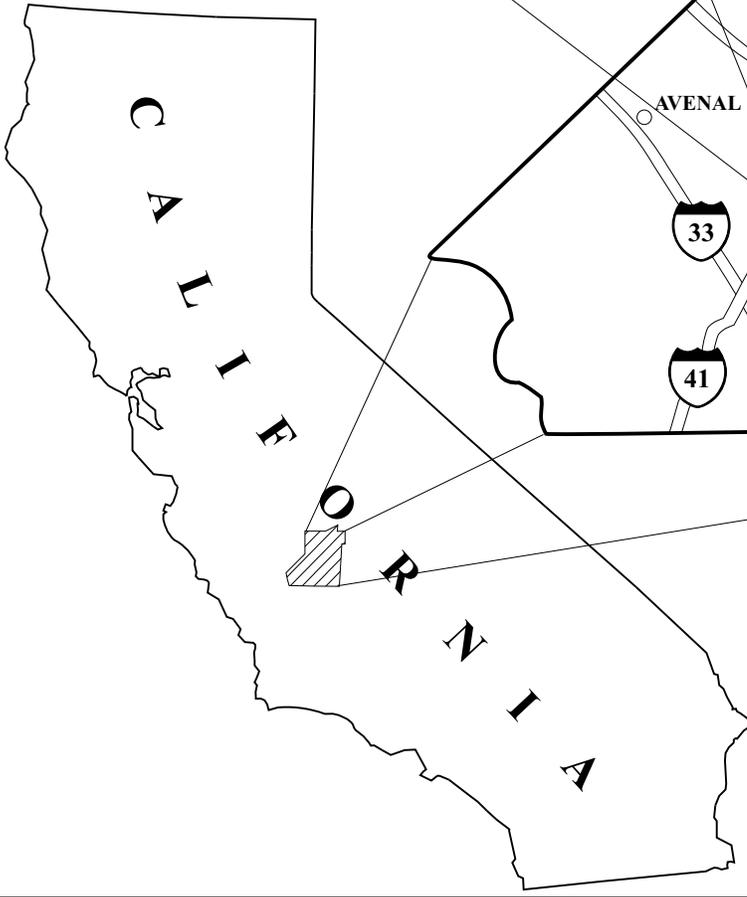
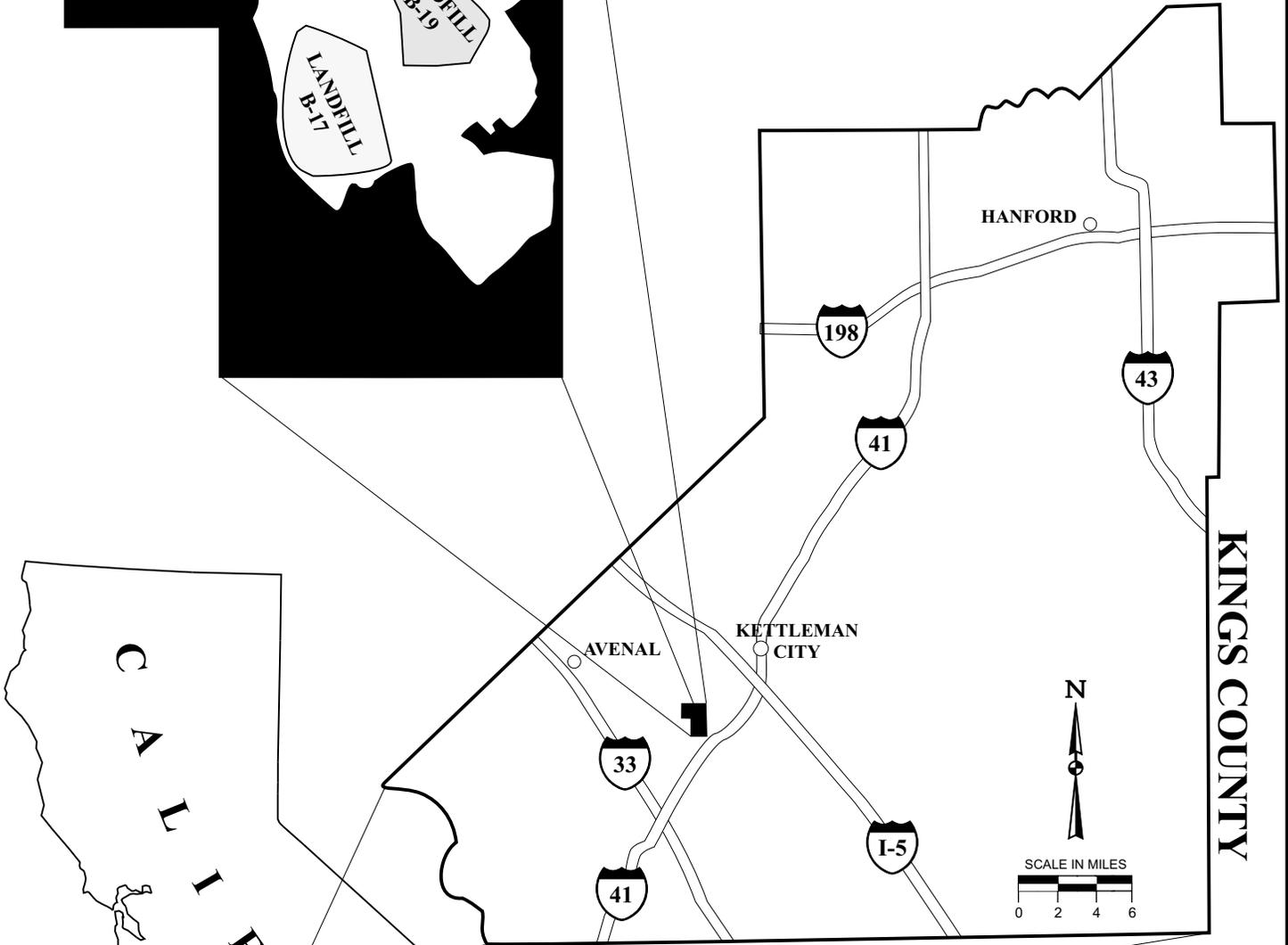
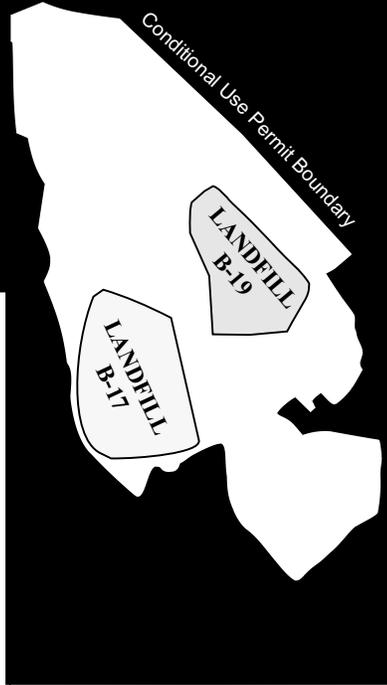
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CHEMICAL WASTE MANAGEMENT, INC.
CLASS II/III B-19 BIOREACTOR AND CONTROL UNIT
CLASS II/III LANDFILL B-17
KETTLEMAN HILLS FACILITY
KINGS COUNTY

Regional Water Board staff reviewed and commented on the draft Subsequent Environmental Impact Reports (SEIRs) for both the Landfill B-19 Bioreactor and new Class II/III Landfill B-17, and comments were incorporated into the final SEIRs. Kings County, acting as the lead agency, adopted the final SEIRs and filed Notices of Determination on 6 June 2005 and 30 May 2006, respectively. The SEIRs were adopted and noticed in accordance with the California Environmental Quality Act (CEQA) (Public Resources Code, Section 21000 et seq.) and CEQA guidelines (14 CCR, Section 15000 et seq.).

JKD:10/27/06

**CHEMICAL WASTE MANAGEMENT, INC.
KETTLEMAN HILLS FACILITY**



**WASTE DISCHARGE REQUIREMENTS FOR
CHEMICAL WASTE MANAGEMENT, INC.
KETTLEMAN HILLS FACILITY
KINGS COUNTY**

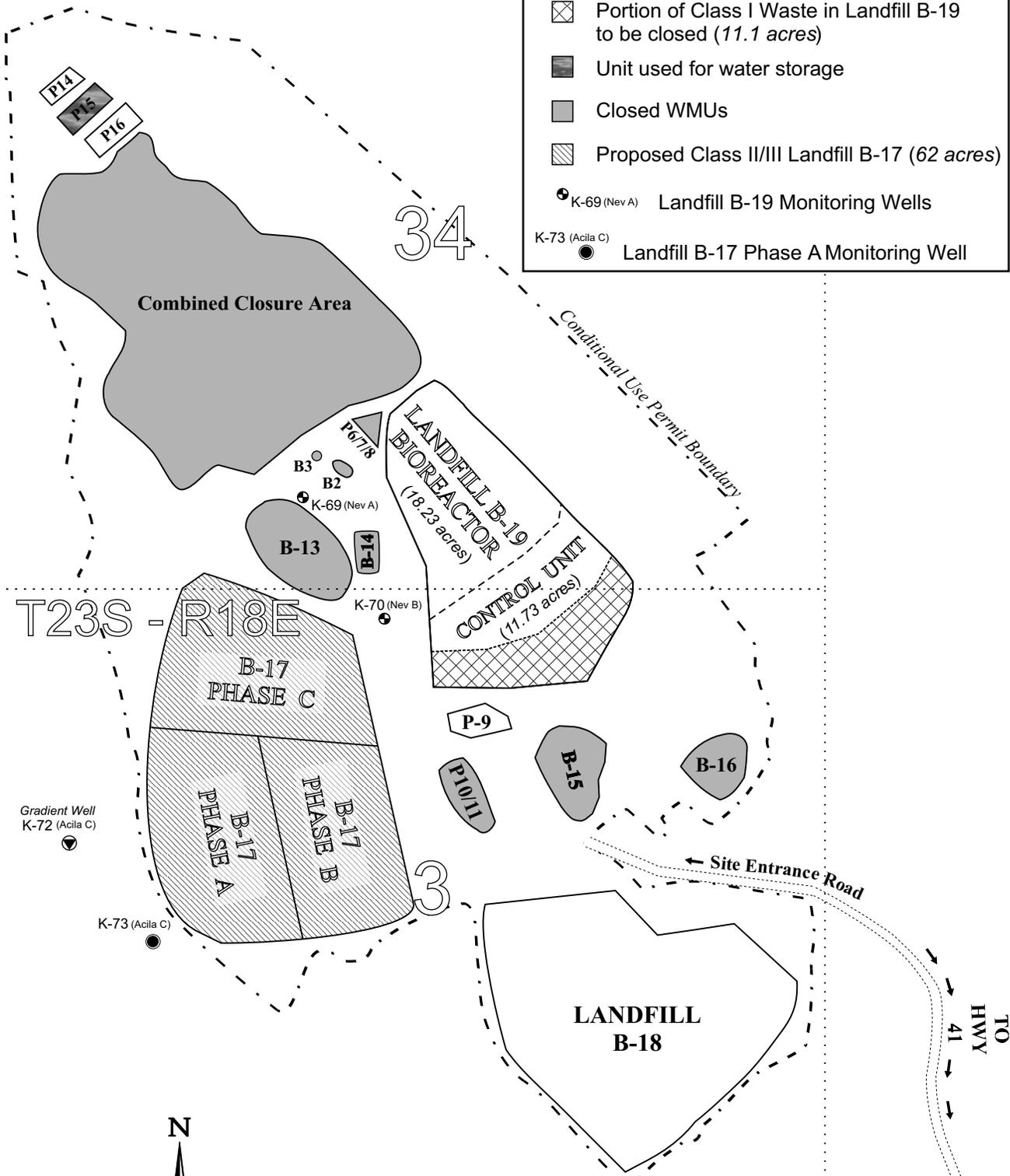
ORDER NO. R5-2006-0122

ATTACHMENT 1

T22S - R18E

LEGEND

-  Indicates WMUs that are active
-  Portion of Class I Waste in Landfill B-19 to be closed (11.1 acres)
-  Unit used for water storage
-  Closed WMUs
-  Proposed Class II/III Landfill B-17 (62 acres)
-  K-69 (Nev A) Landfill B-19 Monitoring Wells
-  K-73 (Acila C) Landfill B-17 Phase A Monitoring Well



Combined Closure Area

34

3

T23S - R18E

**WASTE DISCHARGE REQUIREMENTS FOR
 CHEMICAL WASTE MANAGEMENT, INC.
 KETTLEMAN HILLS FACILITY
 KINGS COUNTY**

ORDER NO. R5-2006-0122

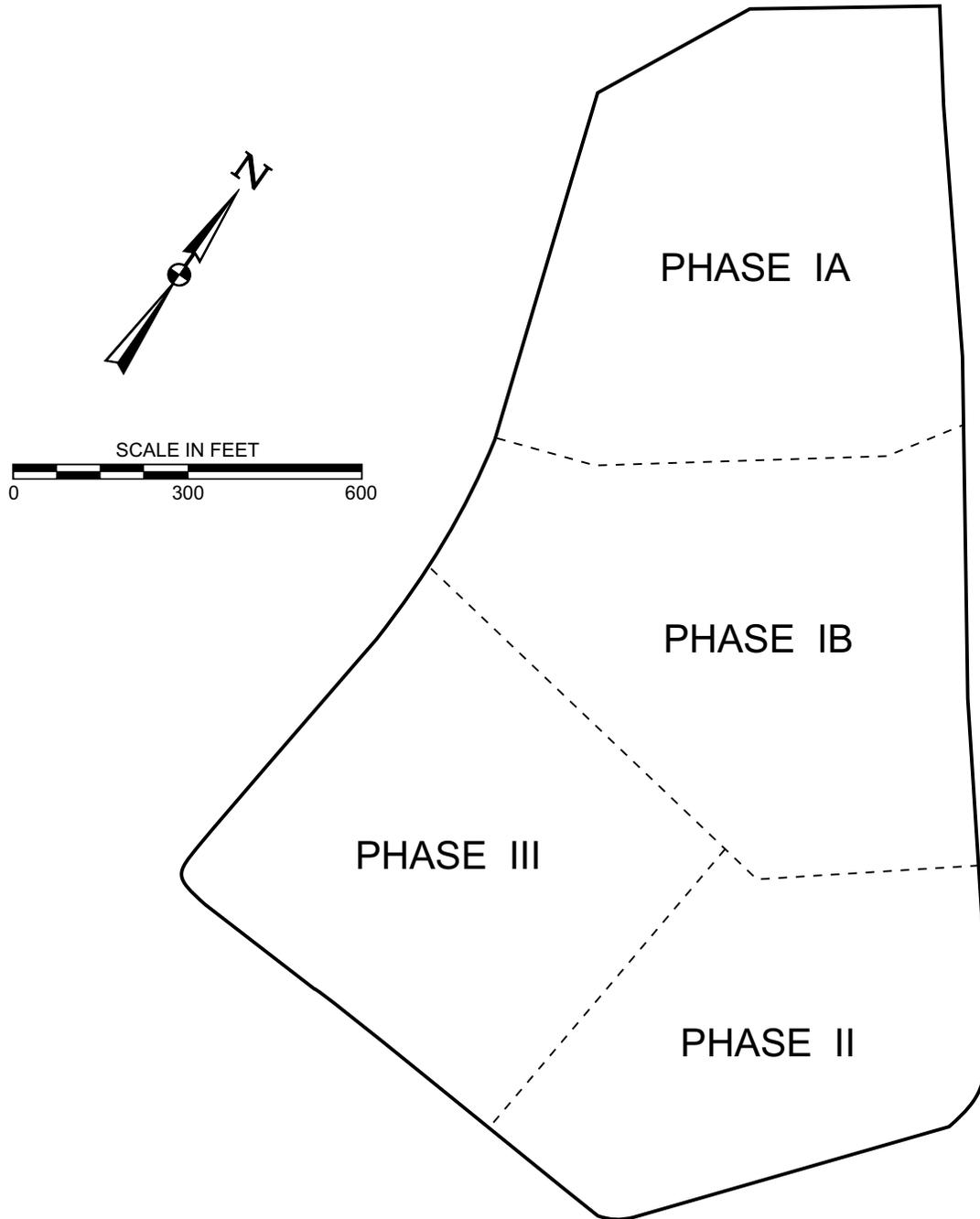
ATTACHMENT 2

Gradient Well
K-72 (Acila C)

K-73 (Acila C)



LANDFILL B-19



**WASTE DISCHARGE REQUIREMENTS FOR
CHEMICAL WASTE MANAGEMENT, INC.
KETTLEMAN HILLS FACILITY
KINGS COUNTY**

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ATTACHMENT 3