

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER R5-2016-XXXX

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

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

1. The County of Sacramento, Municipal Services Agency, Department of Waste Management and Recycling (hereafter Discharger) owns and operates the Kiefer Landfill (facility). The facility is at the intersection of Grant Line Road and Kiefer Boulevard, in the eastern portion of Sacramento County, about 15 miles east of the City of Sacramento, one mile north of Sloughouse, and six miles northwest of the City of Rancho Murieta, in Sections 22, 26, 27, 34, and 35, T8N, R7E, MDB&M, as shown on Attachment A. The facility is a Class III municipal solid waste (MSW) landfill regulated under authority given in Water Code section 13000 et seq.; California Code of Regulations, title 27 (Title 27), section 20005 et seq.; and 40 Code of Federal Regulations section 258 (a.k.a, Subtitle D) in accordance with State Water Resources Control Board (State Water Board) Resolution 93-62.
2. The following documents are attached to this Order and hereby incorporated into and made a part of this Order by reference:
 - a. Attachment A – Site Location Map
 - b. Attachment B – Site Plan
 - c. Attachment C – Ancillary Facilities
 - d. Attachment D1 – Monitoring Network – Northeast Area
 - e. Attachment D2 – Monitoring Network – Southwest Area
 - f. Attachment E – Landfill Gas Collection System
 - g. Information Sheet
 - h. December 2015 Standard Provisions And Reporting Requirements
3. Kiefer Landfill's property boundary encompasses 1,084 acres at 12701 Kiefer Blvd, Sacramento County. The total permitted landfill footprint of 660 acres consists of 225-acre Landfill Unit 1 and 435-acre Landfill Unit 2, as shown on Attachment B. Landfill Unit 1 includes the 158.8-acre, unlined Module M-1 and the 65.7-acre, lined Module M-1L. Landfill Unit 2 includes lined Modules M-2 through M-11, of which Module M-2

and M-3 are constructed. The Assessor's Parcel Numbers are APNs 126-090-16, 17, 18, 19, 20, and 21; and APN 126-090-02 (Landfill Units 1 and 2).

4. On 22 September 2015, the Discharger submitted an amended Report of Waste Discharge (ROWD) as part of the Joint Technical Document (JTD) for the landfill. The information in the ROWD/JTD has been used in revising these waste discharge requirements (WDRs). The ROWD contains the applicable information required in Title 27. The ROWD/JTD and supporting documents contain information related to this revision of the WDRs including:
 - a. Discharge of effluent from Groundwater Extraction and Treatment Plant water to an infiltration basin.
 - b. Injection of limited quantities of Hydrogen Release Compound as a pilot project to assess the effectiveness of reducing Volatile Organic Compounds (VOCs) concentrations in groundwater.
 - c. Revisions to the Detection Monitoring Program.
5. On 2 August 2007, the Central Valley Water Board issued Order R5-2007-0107 in which the landfill waste management units at the facility were classified as Class III units for the discharge of non-hazardous waste, and municipal solid waste. This Order continues to classify the landfill units as Class III units in accordance with Title 27.
6. The existing and future landfill units authorized by this Order are described as follows:

<u>Unit</u>	<u>Module</u>	<u>Area</u>	<u>Liner/LCRS¹ Components²</u>	<u>Unit Classification & Status</u>
Landfill 1	M-1	158.5 acres	Unlined	Class III, active.
Landfill 1	M-1L	65.7 acres	Single liner system with compacted clay or GCL. LCRS consists of 12-inches pea gravel on floor, 6-inch collection pipe; 24 inches of screened sand on side slopes.	Class III, active
Landfill 2	M-2 M-3	30.3 acres 50.6 acres	Double liner system with GCL on base. Single liner system with GCL on side-slopes. LCRS consists of 12-inches pea gravel on floor, 6-inch collection pipe; 24 inches of screened sand on side slopes.	Class III, active

<u>Unit</u>	<u>Module</u>	<u>Area</u>	<u>Liner/LCRS¹ Components²</u>	<u>Unit Classification & Status</u>
Landfill 2	M-4 to M-11	354.1 acres	Double liner system with GCL on base. Single liner system with GCL on side-slopes. LCRS consists of 12-inches pea gravel on floor, 6-inch collection pipe; 24 inches of screened sand on side slopes.	Class III, future

¹ LCRS – Leachate collection and removal system

² All liner systems are composite liner systems unless otherwise noted

³ GCL – Geosynthetic clay liner

7. Support facilities include the office buildings, scalehouse, equipment maintenance building, access roads, materials recovery and storage areas (for wood, greenwaste, tires, construction materials, appliances, etc.), an inert waste processing area, public drop-off facility for antifreeze, batteries, motor oil, latex paint (ABOP) and universal wastes, sedimentation basins, a landfill gas flaring plant, landfill gas-to-energy plants, a groundwater extraction and treatment plant, and other facilities, see Attachments B and C.
8. On 9 October 1991, the United States Environmental Protection Agency (USEPA) promulgated federal MSW regulations under the Resource Conservation and Recovery Act (RCRA), Subtitle D. These regulations are under 40 Code of Federal Regulations section 258, and are hereafter referred to as either “Subtitle D” in reference to the RCRA federal law that required the regulations or “40 C.F.R. section 258.XX”. These regulations apply to all California Class II and Class III landfills that accept MSW. State Water Board Resolution 93-62 requires the Central Valley Water Board to implement in WDRs for MSW landfills the applicable provisions of the federal MSW regulations that are necessary to protect water quality, and in particular the containment provisions and the provisions that are either more stringent or that do not exist in Title 27.
9. This Order implements the applicable regulations for discharges of solid waste to land through Prohibitions, Specifications, Provisions, and monitoring and reporting requirements. Prohibitions, Specifications, and Provisions are listed in Sections A through H of these WDRs below, and in the Standard Provisions and Reporting Requirements (SPRRs) dated December 2015 which are part of this Order. Monitoring and reporting requirements are included in the Monitoring and Reporting Program (MRP) R5-2016-XXXX and in the SPRRs. In general, requirements that are either in regulation or otherwise apply to all MSW landfills are considered to be “standard” and are therefore in the SPRRs. Any site-specific changes to a requirement in the SPRRs are included in the applicable section (A through H) of these WDRs, and the requirement in the WDRs supersedes the requirement in the SPRRs.

10. Title 27 contains regulatory standards for discharges of solid waste promulgated by the State Water Board and the California Department of Resources Recovery and Recycling (CalRecycle). In certain instances, this Order cites CalRecycle regulatory sections. Title 27, section 20012 allows the Central Valley Water Board to cite CalRecycle regulations from Title 27 where necessary to protect water quality provided it does not duplicate or conflict with actions taken by the Local Enforcement Agency in charge of implementing CalRecycle's regulations.

WASTE CLASSIFICATION AND UNIT CLASSIFICATION

11. The Discharger proposes to continue to discharge nonhazardous solid waste, including municipal solid waste to lined and/or unlined Class III landfill units at the facility. These classified wastes may be discharged only in accordance with Title 27, Resolution 93-62, and Subtitle D as required by this Order.
12. Special wastes discharged at the landfill include treated infectious wastes, triple-rinsed empty pesticide containers, non-friable asbestos, and dead animal carcasses using special disposal and handling procedures. The landfill also accepts Publicly Owned Treatment Works (POTW) grit and screenings, and biosolids with a minimum 20 percent solids and no free moisture. Biosolids are only accepted from the Sacramento Regional Wastewater Treatment Plant on an infrequent, emergency basis. The landfill also accepts construction and demolition debris. These special wastes may be discharged to composite lined Class III landfill units at the facility in accordance with Title 27, Resolution 93-62, and Subtitle D as required by this Order.
13. Active unlined landfill units at the facility are "existing units" under Title 27 that were permitted before 27 November 1984 and may continue to accept waste in the "Existing Footprint" until ready for closure unless waste receipts do not meet the timeframes and amounts in Title 27, section 21110, or they are required to close sooner to address environmental impacts or other regulatory concerns. The "Existing Footprint" as defined in Title 27, section 20164 is the area that was covered by waste as of the date that the landfill unit became subject to Subtitle D. The Existing Footprint for Module M-1, the active unlined area of the landfill, is shown on Attachment B.
14. The Discharger proposes to continue to discharge treated wood waste in the composite-lined units at the landfill. Title 22 defines "treated wood" to mean wood that has been treated with a chemical preservative for purposes of protecting the wood against attacks from insects, microorganisms, fungi, and other environmental conditions that can lead to decay of the wood and the chemical preservative is registered pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Sec. 136 and following). This may include but is not limited to waste wood that has been treated with chromated copper arsenate (CCA), pentachlorophenol, creosote, acid copper chromate (ACC), ammoniacal copper arsenate (ACA), ammoniacal copper zinc arsenate (ACZA), or chromated zinc chloride (CZC).

15. Title 22, section 67386.11 allows treated wood waste to be discharged to a composite-lined portion of a MSW landfill that is regulated by WDRs issued pursuant to the Water Code provided that the landfill owner/operator:
 - a. Comply with the prohibitions in Title 22, section 67386.3, which are:
 - i. Treated wood waste shall not be burned, scavenged, commingled with other waste prior to disposal, stored in contact with the ground, recycled without treatment (except as in iii, below), treated except in compliance with Title 22, section 67386.10, or disposed to land except in compliance with Title 22, section 67386.11.
 - ii. Any label or mark that identifies the wood and treated wood waste shall not be removed, defaced, or destroyed.
 - iii. Treated wood waste may be recycled only by reuse when all of the following apply:
 - (1) Reuse is on-site.
 - (2) Reuse is consistent with FIFRA approved use of the preservative.
 - (3) Prior to reuse, treated wood waste is handled in compliance with Title 22, division 4.5, chapter 34.
 - b. Ensure treated wood waste is managed at the landfill according to Title 22, division 4.5, chapter 34 prior to disposal.
 - c. Monitor the landfill for a release and if a verified release is detected from the unit where treated wood is discharged, the disposal of treated wood will be terminated at the unit with the verified release until corrective action ceases the release.
 - d. Handle treated wood waste in a manner consistent with the applicable sections of the California Occupational Safety and Health Act of 1973.
16. Title 27, section 20690 allows the use of alternative daily cover (ADC) at MSW landfills upon approval by the Local Enforcement Agency (LEA) and concurrence from CalRecycle. Title 27, section 20705 provides the Water Board's regulations for all daily and intermediate cover including that it shall minimize the percolation of liquids through waste and that the cover shall consist of materials that meet the landfill unit classification (Class II or Class III). The regulations also require that for non-composite lined portions of the landfill, that any contaminants in the daily or intermediate cover are mobilized only at concentrations that would not adversely affect beneficial uses of waters of the state in the event of a release. For composite-lined portions of the landfill, the regulations require that constituents and breakdown products in the cover material are listed in the water quality protection standard.

17. The Discharger uses the following materials for ADC: temporary geosynthetic tarps, degradable geosynthetic covers, processed green materials, compost materials, processed construction and demolition wastes and materials, shredded tires (mixed with soil), and wood ash (non-hazardous, non-designated ash from wood-fired energy generation facilities). The Discharger has demonstrated that these materials will minimize percolation of liquids through waste, that they meet the unit classification where they will be discharged, and that the constituents and breakdown products are included in the water quality protection standard.
18. Landfills propose new ADC materials regularly in order to preserve landfill air space and to beneficially reuse waste materials. Title 27, section 20686 includes regulations for beneficial reuse, including use of ADC. Approval of ADC is primarily handled by the LEA and CalRecycle under Title 27, section 20690. This Order allows any ADC proposed for use at the facility after the adoption of this Order to be approved by Central Valley Water Board staff provided the Discharger has demonstrated it meets the requirements in Title 27, section 20705. The approved ADC materials should then be listed in the facility's WDRs during the next regular update or revision with information about the Discharger's demonstration. This Order also includes a requirement that ADC only be used in internal areas of the landfill unless the Discharger demonstrates that runoff from the particular ADC is not a threat to surface water quality. The demonstration can take sedimentation basins into account.
19. The Discharger proposes to return leachate and landfill gas condensate to the composite-lined landfill units from which they came. Title 27, section 20340(g) requires that leachate be returned to the unit from which it came or be discharged in a manner approved by the regional board. This section of Title 27 also references State Water Board Resolution 93-62 regarding liquids restrictions in 40 C.F.R. section 258.28 for MSW landfills. 40 C.F.R. section 258.28 states that liquid waste may not be placed in MSW landfill units unless the waste is leachate or gas condensate derived from the landfill unit and it is designed with a composite liner and an LCRS. Therefore, leachate and landfill gas condensate from composite lined units with an LCRS may be returned to the unit from which they came. This Order includes requirements for returning leachate and landfill gas condensate back to composite-lined units such that the liquid waste is not exposed to surface water runoff, will not cause instability of the landfill, and will not seep from the edges of the units.
20. The primary method of leachate management is recirculation in the lined portions of the landfill. Additionally, leachate may be used for dust control over composite lined areas of the landfill in compliance with Discharge Specification B.11. Leachate production is closely monitored to ensure that the moisture holding capacity of the refuse is not exceeded. Transportation to the local POTW is the alternative method of leachate disposal if the recirculation system is not operable.

SITE DESCRIPTION

21. The area surrounding the facility is low rolling Sierra Foothill terrain, with natural elevations varying between approximately 100 and 250 feet above mean sea level (MSL). No known springs are located within one mile of the facility. Several surface water bodies are located within 1 mile of facility. Blodgett Reservoir is located less than 0.5 mile northwest of the site, on Laguna Creek, and is used primarily for recreation. Additional small, seasonal reservoirs are present throughout the area and are used as stock tanks by local ranchers. Intermittent streams traverse the area and drain the site. Laguna Creek drains the area north of the facility and is a tributary of the Sacramento River. The confluence is located approximately 18 miles west of the site. Deer Creek drains the area south of the facility and is a tributary of the Cosumnes River. The confluence is located approximately 13 miles southwest of the site. Surface water drained from the facility ultimately flows into the San Pablo and San Francisco bays.
22. Land use within one mile of the facility is designated for agricultural use including pasture, livestock grazing, crop growing, and residential.
23. There are 59 water supply wells within one mile of the site, including 28 used for irrigation, 22 for domestic supply, one for livestock, two for on-site industrial supply, and 6 unknown wells.
24. Kiefer Landfill and surrounding areas are located on the geomorphic unit termed "dissected alluvial uplands" (United States Geological Survey (USGS), 1985). Geologic units observed at Kiefer Landfill include the Quaternary Alluvium, Laguna, Mehrten, Valley Springs, and lone Formations. Quaternary Alluvium and Laguna Formations that consists of sandy-gravel to sandy channel facies and sandy clay to clay floodplain deposits. The Mehrten Formation includes a sequence of variably cemented, interbedded clay, sand, and gravel that unconformably overlies the Valley Springs and lone Formations. Geologic stratigraphy was re-evaluated in 2015 and the Discharger reports that the strata now assigned to the Valley Springs Formation were originally included in the lone Formation as the "clay rock or tuff," the highest of three subdivisions of the lone (USGS, 1992). The lone Formation consists of variably cemented, fine to coarse sandstone, siltstone, lignite, and claystone with variegated colors including red, yellow, white, blue, gray, orange, and black.
25. Quaternary Alluvium, the Laguna Formation, the Mehrten Formation, the Valley Springs Formation and the lone Formation, in that order, underlie the site. These formations dip slightly to the west and are summarized as follows:
 - The Quaternary alluvium is confined to an area south of Landfill Unit 1.
 - The Laguna Formation is present as a thin gravel layer, which outcrops on the southern part of the site.

- The base of the landfill cuts the Mehrten Formation, which underlies the Laguna, in the southern part of the site. It varies from 300 to 350 feet in thickness and is subdivided into upper and lower units.
 - The upper Mehrten is subdivided into three sand sequences (the "shallow", "middle", and "deep" zones), which are composed of sandstone, siltstone, and claystone, and separated by mudstone. The beds have varying thickness and lateral continuity. Some of the thicker beds appear to be more laterally extensive, and split into several thinner, finer-grained beds. In the northern portion of the facility the shallow zone beds are thicker and coarser, whereas to the south they appear to split, thin, and pinch out.
 - The Lower Mehrten consists of thick sand and gravel beds with possibly some volcanic mudflow. The sand appears relatively uniform in thickness and widespread in extent.
 - The Lower Mehrten formation is underlain by Valley Springs Formation and Lone Formation. The Valley Springs Formation consists of volcanic sandstone (lava sand) and claystone. The Lone Formation consists of variably cemented, fine to coarse sandstone, siltstone, lignite, and claystone with variegated colors including red, yellow, white, blue, gray, orange, and black.
26. The measured hydraulic conductivity of the native soils underlying the Unit ranges between 1.8×10^{-6} and 1.8×10^{-4} centimeters per second (cm/sec) based on packer and infiltration testing conducted in the field in 1988. Saturated hydraulic conductivity testing conducted during 2006 during borrow-source investigation for final cover material ranged from 7.8×10^{-8} and 2.2×10^{-4} cm/sec. Areas with relatively clean sand soils with saturated hydraulic conductivity greater than 1×10^{-3} cm/sec also underlie the site.
27. The Bear Mountains and Melones fault zones, part of the Sierra Foothills fault system, are approximately 10 and 19 miles east of the facility, respectively. Neither of these fault zones is considered active. The closest Holocene faults are approximately 40 miles from the site with Maximum Probable Earthquake (MPE) magnitude of 5.7 to 6.4 that would result in Peak Ground Acceleration (PGA) of 0.02 to 0.05 g at the site. The San Andreas Fault, located approximately 90 miles to the southwest and an MPE of 8.0 would result in a PGA of 0.06 g at the facility.
28. The average annual precipitation at the Sacramento City National Weather Service Station is 17.87 inches. The facility receives an average of 19 inches of precipitation per year based on a 1996 Sacramento County isohyetal map. The mean pan evaporation is 66.2 inches per year as measured at the Folsom Dam Station (Western Regional Climate Center, 2005).
29. The 100-year, 24-hour precipitation event is estimated to be 4.39 inches at the Sacramento City National Weather Service Station (DWR 1976) and 5.09 inches at the facility (NOAA Point Precipitation Frequency Estimates 2015).

30. A revised Flood Insurance Rate Map published by the Federal Emergency Management Agency (FEMA) on 12 October 1999 indicates that approximately 4.5 acres of the southern portion of the proposed Sedimentation Basin will occupy the revised FEMA 100-year floodplain. This basin will be constructed adjacent to Module M-10 sometime during or after the filling of Module M-9 (refer to Attachment B). The current landfill does not occupy any of the temporary storage volume for a 100-year flood, nor restrict the 100-year flood. The creation of the proposed Sedimentation Basin will reduce the existing flood volume by approximately 14,500 cubic yards. This volume will be replaced by excavating an equal quantity of soil below the floodplain elevation of 108 feet MSL onsite or adjusting the configuration of the basin to avoid the floodplain altogether. This will satisfy the floodplain requirements of Subtitle D (40 CFR 258.11).
31. Storm water runoff from a majority of the landfill areas is captured via a network of drainage ditches called the on-site channel along the north and east perimeter of Landfill Unit 1. The on-site channel empties into Sedimentation Basin A at the southeast end of the landfill. Storm water runoff from the west facing slopes of Landfill Unit 2 M-2 and M-3 drains to Sedimentation Basin B that is adjacent to Landfill Unit 2 M-2. Refer to Attachment B for locations of these basins. Retained water within the basins evaporates, percolates into the ground, or is discharged to the off-site channel following primary sediment removal. Additionally, runoff from the undeveloped area of the facility is diverted around the landfill by a perimeter drainage channel (off-site channel) with in-line sedimentation basins. This off-site channel exits the facility at Kiefer Boulevard and ultimately discharges to Deer Creek.

SURFACE WATER AND GROUNDWATER CONDITIONS

32. The *Water Quality Control Plan for Sacramento and San Joaquin River Basins, Fourth Edition* (hereafter Basin Plan), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin.
33. The northern part of the facility is in the Franklin/Florin Hydrologic Sub-Areas (HSAs), Morrison Creek Hydrologic Area (HA) of the Valley-American Hydrologic Unit (HU) in the Sacramento Hydrologic Basin Planning Area (as depicted on the interagency hydrologic maps prepared by the Department of Water Resources in August 1986), and is naturally drained by Laguna Creek, a seasonal water tributary to the Sacramento River.
34. The southern portion of the facility is in the Lower Deer Creek HSA, Lower Cosumnes-Dry Creek HA of the North Valley Floor HU in the San Joaquin River Basin Planning Area, and is naturally drained by Deer Creek, tributary to the Cosumnes River, thence the Mokelumne River.
35. The designated beneficial uses of the Sacramento and Cosumnes Rivers, as specified in the Basin Plan, are municipal and domestic supply, agricultural supply, industrial service supply, industrial process supply, navigation, water contact recreation, non-contact water

recreation, warm freshwater habitat, cold freshwater habitat, wildlife habitat, migration of aquatic organisms, and spawning, reproduction, and/or early development.

36. The first encountered groundwater ranges from about 25 feet to 50 feet MSL. Groundwater is present in three zones. The shallow A-zone and deeper B-zone produce groundwater from discontinuous sand units in the upper Mehrten Formation. The A-zone lies between approximately 60 and -20 feet mean sea level (MSL), with first encountered groundwater at about 60 to 190 feet below ground surface. The B-zone lies between approximately -20 and -100 feet MSL. The deep C-zone is located within laterally extensive sands of the lower Mehrten and underlying Valley Springs Formation at approximately -150 to -250 feet MSL. Zones A and B are hydraulically connected and potentially represent the same aquifer, whereas Zone C is hydraulically disconnected from the A- and B-zones.
37. Monitoring data indicates background groundwater quality in the A-zone has an electrical conductivity (EC) typically ranging between 180 and 480 micromhos/cm, with total dissolved solids (TDS) typically ranging between 150 and 340 milligrams per liter (mg/L). The B-zone and C-zone background groundwater data are similar to the A-zone data.
38. The direction of groundwater flow at the facility is toward the west-southwest, with localized gradient flows more to the west in the vicinity of Deer Creek, as a result of groundwater infiltration of creek waters. The average groundwater gradient for A-, B-, and C-zones is approximately 0.0054, 0.0048, 0.00234 feet per foot, respectively. The average groundwater velocity for A-, B-, and C-zones is typically about 235, 211, 103 feet per year, respectively.
39. Most regional and on-site groundwater production is from the Lower Mehrten and Valley Springs Formations, which are part of the extensive groundwater aquifer system underlying the Sacramento Valley. The regional gradients are to the southwest, and are influenced by recharge from the American and Cosumnes Rivers, and heavy pumping near Elk Grove. West of the facility, the Laguna Formation is also a source of water supply.
40. The designated beneficial uses of the groundwater, as specified in the Basin Plan, are domestic and municipal water supply, agricultural supply, industrial service supply, and industrial process supply.

GROUNDWATER AND UNSATURATED ZONE MONITORING

41. The groundwater monitoring system at the landfill consists of detection monitoring wells within each of the three zones (A, B, and C-zones) and corrective action monitoring wells within the A and B-zones. There are currently 36 monitoring wells in the A-zone, 23 wells in the B-zone, and 6 wells in the C-zone. Additional monitoring wells will be installed as future modules are constructed. A current listing of monitoring wells and

their associated monitoring programs are listed (as of the date of this Order) in the Table below and in MRP R5-2016-XXXX, a part of this Order. The monitoring system is shown on Attachment D1 and D2, which is incorporated herein and made part of this Order by reference.

<u>Well</u>	<u>Status</u>	<u>Zone</u>
MW-1A	Corrective Action	A
MW-1B	Corrective Action	B
MW-2A	Corrective Action	A
MW-2B	Corrective Action	B
MW-2C	Detection	C
MW-2A1	Corrective Action	A
MW-3A	Corrective Action	A
MW-4A	Corrective Action	A
MW-4B	Corrective Action	B
MW-5A	Corrective Action	A
MW-5B	Detection	B
MW-6A	Corrective Action	A
MW-6A1	Detection	A
MW-6B	Detection	B
MW-7AR	Corrective Action	A
MW-7B	Corrective Action	B
MW-9A	Corrective Action	A
MW-9B	Corrective Action	B
MW-10A	Background	A
MW-10B	Background	B
MW-10C	Background	C
MW-11A	Corrective Action	A
MW-11B	Corrective Action	B
MW-12A	Detection	A
MW-12B	Detection	B
MW-12C	Detection	C
MW-15A	Corrective Action	A
MW-15B	Detection	B
MW-16A	Corrective Action	A
MW-16B	Corrective Action	A
MW-17A	Detection	A
MW-17B	Detection	B
MW-18A	Corrective Action	A
MW-19A	Corrective Action	B
MW-20A	Corrective Action	A
MW-20B	Corrective Action	B
MW-20C	Detection	C
MW-21A	Corrective Action	A

<u>Well</u>	<u>Status</u>	<u>Zone</u>
MW-21B	Corrective Action	B
MW-22A	Corrective Action	A
MW-22B	Detection	B
MW-23A	Corrective Action	A
MW-23B	Detection	B
MW-24A	Corrective Action	A
MW-27A	Detection	A
MW-28A	Corrective Action	A
MW-29A	Corrective Action	A
MW-30A	Corrective Action	A
MW-36A	Detection	A
MW-37A	Corrective Action	A
MW-37B	Corrective Action	B
MW-37C	Detection	C
MW-38A	Background	A
MW-38B	Background	B
MW-39A	Background	A
MW-39B	Background	B
MW-40A	Corrective Action	A
MW-40B	Detection	B
MW-41A1	Corrective Action	A
MW-41A2	Corrective Action	A
MW-41B	Corrective Action	B
MW-42A	Detection	A
MW-42B	Detection	B
MW-43A	Detection	A
Well E	Detection	C

42. At the time this Order was adopted, the Discharger's detection monitoring program for groundwater at the landfill satisfied the requirements contained in Title 27.
43. The unsaturated zone monitoring system at the landfill includes suction lysimeters and pan lysimeters, as well as numerous landfill gas monitoring probes. The unsaturated zone monitoring network currently consists of one background suction lysimeter (LYS-10U) and six downgradient suction lysimeters (LYS-1U, 2U, 7U, 13UN, 13US, and 14U). Six active suction lysimeters are located beneath Module M-1L (VZ-1, 2, 3, 4, 8, and 9). Pan lysimeters are and will be located beneath the sumps of each of the lined Modules M-2 through M-11 (LYS-M2 through LYS-M11). The unsaturated zone monitoring network is shown on Attachment D1 and D2. The detection monitoring program for the unsaturated zone at the landfill satisfies the requirements contained in Title 27.
44. Volatile organic compounds (VOCs) are often detected in a release from a MSW landfill and are often associated with releases of landfill gas rather than leachate. Since volatile

organic compounds are not naturally occurring and thus have no background value, they are not amenable to the statistical analysis procedures contained in Title 27 for the determination of a release of wastes from a landfill unit. Title 27, sections 20415(e)(8) and (9) allows the use of a non-statistical evaluation of monitoring data that will provide the best assurance of the earliest possible detection of a release from a landfill unit in accordance with Title 27, sections 20415(b)(1)(B)2.-4. However, Title 27 does not specify a specific method for non-statistical evaluation of monitoring data.

45. In order to provide the best assurance of the earliest possible detection of a release of non-naturally occurring waste constituents from a landfill unit, the SPRRs specify a non-statistical method for the evaluation of monitoring data for non-naturally occurring compounds. The specified non-statistical method for evaluation of monitoring data provides two criteria (or triggers) for making the determination that there has been a release of non-naturally occurring waste constituents from a landfill unit. The presence of two non-naturally occurring waste constituents above their respective method detection limit (MDL), or one non-naturally occurring waste constituent detected above its practical quantitation limit (PQL) [a.k.a, laboratory reporting limit (RL)], indicates that a release of waste from a Unit has occurred. Following an indication of a release, verification testing must be conducted to determine whether there has been a release from the landfill unit or the detection was a false detection. The detection of two non-naturally occurring waste constituents above the MDL as a trigger is appropriate due to the higher risk of false-positive analytical results and the corresponding increase in sampling and analytical expenses from the use of one non-naturally occurring waste constituent above its MDL as a trigger.
46. For a naturally occurring constituent of concern, the Title 27 requires concentration limits for each constituent of concern be determined as follows:
 - a. By calculation in accordance with a statistical method pursuant to Title 27, section 20415(e)(8); or
 - b. By an alternate statistical method meeting the requirements of Title 27, section 20415(e)(8)(E).
47. The Discharger submitted a 17 September 2015 Detection Monitoring Program report including a Water Quality Protection Standard (WQPS) proposing statistical data analysis methods to calculate concentration limits for each monitored constituent in accordance with Title 27. The WQPS report proposed to use Interwell data analysis to calculate tolerance limits for the monitored constituents. The WQPS and approved data evaluation methods are included in MRP R5-2016-XXXX.

GROUNDWATER CONDITIONS (OR DEGRADATION AND CORRECTIVE ACTION)

48. A release of waste constituents from the landfill to groundwater was discovered in 1989. Numerous detection and corrective action monitoring wells have since been installed in the A, B, and C-zones of the Mehrten formation, as identified on Attachment D1 and D2.
49. Monitoring of the A-zone shows the presence of various VOCs, including, but not limited to, tetrachloroethene, trichloroethene, 1,2-dichloroethene, and vinyl chloride. The A-zone VOC plume extends beyond the landfill footprint about 4,000 feet to the southwest to MW-41. The source area was identified as the unlined landfill Module M-1. The plume has also migrated down into the B-zone, where concentrations are lower and the plume is less extensive. VOCs have not been detected in the C-zone since 1999 when trace levels were reported in MW-2C. For the last 15 years, all C-zone wells have been part of the detection monitoring program.
50. In 1995, the Discharger installed a groundwater extraction system to remediate VOCs in groundwater, including several A-zone extraction wells and a pump and treat system. The current groundwater extraction system consists of 14 wells with 8 extraction wells in operation with a combined average rate of about 400 gallons per minute. The extraction wells are shown in Attachments D1 and D2. The system also includes two air stripper towers. Pump and treat remediation began in April 1995, with the objective of containing the spread of the plume and reducing VOC levels in the source area. According to the January 2015, 2014 Annual Report, submitted by the Discharger, groundwater extraction has removed over 800 pounds of VOCs from the groundwater since 1995, and resulted in an approximate 81 percent reduction in mass of VOCs in the groundwater. Treated groundwater is discharged to Deer Creek under NPDES Permit CA0083681 (Order R5-2013-0002).
51. The Discharger is proposing to discharge extracted groundwater to an infiltration basin to potentially reduce the carbon footprint of the groundwater treatment system and provide a beneficial re-use of groundwater through aquifer recharge. Prior to the discharge of extracted groundwater to the infiltration basin, the Discharger shall submit a Discharge Basin Pilot Study Work Plan for written Executive Officer approval, as detailed in Discharge Specification B.13.
52. The Discharger proposes to inject limited quantities of Hydrogen Release Compound as a pilot project to assess the effectiveness of reducing the remaining VOCs concentrations in groundwater. Prior to conducting the pilot test, the Discharger shall submit a Hydrogen Release Compound Injection Pilot Test Work Plan for written Executive Officer approval, per the General Order R5-2008-0149 requirements as detailed in Discharge Specification B.10.
53. In 1997, the Discharger installed a landfill gas control system to prevent further migration of landfill gas to groundwater. The current system includes a gas flaring facility and a landfill gas-to-energy plant with a combined extraction rate capability of 14,500 standard

cubic feet per minute. The system currently includes approximately 320 extraction devices including gas probes, vertical extraction wells, horizontal extraction wells, and leachate cleanouts. LFG is collected from these extraction devices using a network of collection piping. The collection piping is configured as a loop and services the entire landfill footprint. Future Modules M-4 through M-11 will also be connected to the landfill gas extraction system, and its extraction capability will be expanded as needed. Limited landfill gas extraction is also performed to remediate pockets of landfill gas that still exist in the subsurface outside of the landfill modules. The landfill gas collection system is shown on Attachment E.

LINER PERFORMANCE DEMONSTRATION

54. On 15 September 2000, the Central Valley Water Board adopted Resolution 5-00-213 *Request For The State Water Resources Control Board To Review The Adequacy Of The Prescriptive Design Requirements For Landfill Waste Containment Systems To Meet The Performance Standards Of Title 27*. The State Water Board responded, in part, that “a single composite liner system continues to be an adequate minimum standard” however, the Central Valley Water Board “should require a more stringent design in a case where it determines that the minimum design will not provide adequate protection to a given body of groundwater.”

In a letter dated 17 April 2001, the Executive Officer notified Owners and Operators of Solid Waste Landfills that “the Board will require a demonstration that any proposed landfill liner system to be constructed after 1 January 2002 will comply with Title 27 performance standards. A thorough evaluation of site-specific factors and cost/benefit analysis of single, double, and triple composite liners will likely be necessary.”

55. During 2002, the Discharger submitted liner performance demonstration reports that included computer modeling indicating that a single composite liner system with barrier layers consisting of 60-mil high density polyethylene (HDPE) and a geosynthetic clay liner (GCL) would meet the performance standards of Title 27. Based on Regional Water Board staff concerns about the proposed liner system, the Discharger proposed and installed a double composite liner system on the base of Module M-2 (single composite on the side slopes) and conducted extensive monitoring of the system as required by previous WDRs Order R5-2002-0187. The data from this monitoring was to be used to demonstrate whether the proposed single composite liner system meets the performance standard.
56. On 30 March 2007, the Discharger submitted a *Final Liner Performance Demonstration Update* report. The report included detailed analysis and assessment of the data collected from Module M-2 and compared the data with other data collected during historical liner system assessment projects conducted in cooperation with the United States Environmental Protection Agency (USEPA). The data from Module M-2 indicates that the upper single composite liner system performed favorably compared with other HDPE/GCL composite liner systems studied by USEPA, having captured approximately

99.7% of leachate generated by Module M-2. This is compared with an average 98.9% efficiency for the 28 landfills evaluated by USEPA. The Discharger's report concludes that either the single composite liner system, or the double composite liner system, meet the Title 27 performance standards. The report also notes that the secondary composite base liner system provides redundancy and additional protection and recommends that future landfill modules are constructed with the same double composite liner system on the base as Module M-2. This Order requires a double composite liner system on the base, and single composite liner system on the side slopes, for Module M-4 and all future landfill modules at the Kiefer Landfill. This Order also finds that the proposed liner system meets the Title 27 performance standards at the Kiefer Landfill.

CONSTRUCTION AND ENGINEERED ALTERNATIVE

57. On 17 June 1993, the State Water Board adopted Resolution 93-62 implementing a State Policy for the construction, monitoring, and operation of municipal solid waste landfills that is consistent with the federal municipal solid waste regulations promulgated under 40 Code of Federal Regulations section 258 (a.k.a, Subtitle D). Resolution 93-62 requires the construction of a specified composite liner system at new municipal solid waste landfills, or expansion areas of existing municipal solid waste landfills, that receive wastes after 9 October 1993. Resolution 93-62 also allows the Central Valley Water Board to consider the approval of engineered alternatives to the prescriptive standard. Section III.A.b. of Resolution 93-62 requires that the engineered alternative liner systems be of a composite design similar to the prescriptive standard.
58. Title 27, section 20080(b) allows the Central Valley Water Board to consider the approval of an engineered alternative to the prescriptive standard. In order to approve an engineered alternative in accordance with Title 27, sections 20080(c)(1) or (2), the Discharger must demonstrate that the prescriptive design is unreasonably and unnecessarily burdensome and will cost substantially more than an alternative which will meet the criteria contained in Title 27, section 20080(b), or would be impractical and would not promote attainment of applicable performance standards. The Discharger must also demonstrate that the proposed engineered alternative liner system is consistent with the performance goal addressed by the particular prescriptive standard, and provides protection against water quality impairment equivalent to the prescriptive standard in accordance with Title 27, section 20080(b)(2).
59. Water Code section 13360(a)(1) allows the Central Valley Water Board to specify the design, type of construction, and/or particular manner in which compliance must be met in waste discharge requirements or orders for the discharge of waste at solid waste disposal facilities.
60. Module M-1L of Landfill 1 was constructed in phases approved in previous WDRs Order 95-078 and Order 99-053 as an engineered alternative design (EAD) to the prescriptive Title 27 and Subtitle D designs. The formerly approved EAD allowed for substituting a GCL for one foot of clay in Phase II and two feet of clay for subsequent phases.

61. The Discharger justified the EAD based on the lack of available onsite clay and inadequate shear properties of local offsite clay, which made it unsuitable for WMU construction. The Discharger adequately demonstrated that construction of a Subtitle D prescriptive standard liner would be unreasonably and unnecessarily burdensome when compared to the proposed engineered alternative design. The Discharger demonstrated that the proposed engineered alternative is consistent with the performance goals of the prescriptive standard and affords at least equivalent protection against water quality impairment.
62. Following the liner demonstration analyses conducted in 2002 as detailed in Finding 55 and installation of a double composite liner system in Module M-2 (Finding 56), the Discharger proposed to install a double composite liner system in future modules. The Discharger proposes a double composite liner system using HDPE and GCL that was constructed at Modules M-2 and provides additional protection compared with the previously approved EAD. The proposed double composite liner system consists of the following:
- Primary Liner System: Base**
- minimum one-foot operations layer
 - nonwoven geotextile filter fabric (minimum eight oz. per square yard)
 - one-foot gravel drainage layer ($k \geq 0.1$ cm/sec)
 - 60-mil HDPE geomembrane (bottom side textured)
 - geosynthetic clay liner ($k \leq 5 \times 10^{-9}$ cm/sec)
 - a compositely lined sump
- Secondary Liner System: Base**
- one-foot gravel drainage layer ($k \geq 0.1$ cm/sec), or a geosynthetic drainage layer
 - 60-mil HDPE geomembrane (bottom side textured)
 - geosynthetic clay liner ($k \leq 5 \times 10^{-9}$ cm/sec)
 - a compositely lined sump
- Liner System: Side Slopes**
- a. Minimum two-foot sand operations layer/drainage layer ($k \geq 1 \times 10^{-3}$ cm/sec)
 - b. 60-mil HDPE geomembrane (bottom side textured)
 - c. geosynthetic clay liner ($k \leq 5 \times 10^{-9}$ cm/sec)
63. The proposed liner system includes a primary LCRS consisting of one foot of gravel ($k \geq 0.1$ cm/sec) on the base and two feet of sand ($k \geq 1 \times 10^{-3}$ cm/sec) on the side slopes. Calculations submitted by the Discharger indicate that this LCRS design, along with the leachate collection piping, is capable of transmitting twice the anticipated maximum volume of leachate that can be generated by the landfill under conditions when only 15 feet of waste has been placed. Leachate is collected and recirculated to the lined portions of the landfill.
64. The Discharger also proposes to construct a primary LCRS sump and a secondary LCRS sump, each equipped with dedicated pumps for removal of leachate. A pan

lysimeter will also be constructed beneath the sump area of each landfill module to comply with the unsaturated zone monitoring requirements of Title 27, as was done at Modules M-2 and M-3.

65. The Discharger proposes a liner system which will be designed, constructed, and operated in accordance with the criteria set forth in Title 27, and the provisions in State Water Board Resolution 93-62 for municipal solid wastes.
66. The 22 September 2015 ROWD includes a 1996 stability analysis for base grades, interim fill slopes, and final cover throughout the site, and a 2011 stability analysis for base grades and interim fill slopes for the most recently constructed Module M-3, Phase 3 pursuant to Title 27, section 21750(f)(5). The Discharger's stability analysis includes components to demonstrate the integrity of the landfill foundation, final slopes, and containment systems under both static and dynamic conditions throughout the landfill's life including the closure period and post-closure maintenance period. The stability analysis demonstrates that the structural components of Module M-3, Phase 3 will withstand the forces of the Maximum Probable Earthquake (MPE) without failure of the containment systems or environmental controls.
67. This Order approves the Discharger's proposed liner system for future modules as described in Finding 6 and requires that the Discharger submit design plans and construction quality assurance (CQA) plans for each new module or modules for review and approval at least 180 days prior to construction.

MODULE M-1 CLOSURE AND ENGINEERED ALTERNATIVE FINAL COVER

68. During 1990, a prescriptive final cover (one foot of 1×10^{-6} cm/sec clay and one foot vegetative soil) was installed on approximately 34 acres of unlined Module M-1. This portion of the landfill has received its final closure.
69. On 30 March 2007, the Discharger submitted an *Engineered Alternative Design Report* as part of the amended ROWD/JTD with information supporting an alternative final cover system for the unclosed portions of the unlined Module M-1. The proposed alternative final cover is an evapotranspirative cover, also known as a water balance cover. This type of cover functions by storing moisture between the soil particles during the rainy season, and releasing that moisture during the growing season and dry season through plant uptake and evaporation. As with the engineered alternative liner system, the Discharger must make the demonstrations required in Title 27, as listed in Finding 58 of this Order. The demonstration is described in the following Findings.
70. In preparation for the design of the proposal alternative final cover, the Discharger has completed several studies and design reports. The largest of these was a six year pilot study of two test sections conducted under the Alternative Covers Assessment Project (ACAP), a USEPA program conducted in coordination with Dr. Craig Benson of the University of Wisconsin, and Dr. Bill Albright of the Desert Research Institute. The Kiefer

Landfill project was one of many ACAP projects conducted in California and the United States. In summary, the project consisted of two large test sections (20 meters by 30 meters) of constructed final cover using onsite soils similar to those that are expected to be used in the eventual final cover for the landfill. The “thin” test section was 43 inches (3.6 feet) thick, and the “thick” test section was 96 inches (8 feet) thick. Each section was underlain by a large pan lysimeter (10 meters by 20 meters) designed to capture and record any moisture that drained through the soil cover. The results indicated that the thin test section allowed drainage averaging about 51 millimeters (mm) per year, and that the thick test section allowed drainage averaging about 2.5 mm/year. The report also concluded that the drainage seen from the thin test section was due to moisture not being adequately removed from the soil prior to the next rainy season, and the reason was that the proper vegetation to remove the moisture was not maintained. It should be noted that the thin test section performed well through the first and second rainy seasons, but began draining during the third rainy season because sufficient moisture was not removed after the second rainy season.

71. Other studies performed by the Discharger related to the alternative final cover include:
 - a. A soil borrow source study to assess the suitability and availability of onsite soils for the alternative cover, including nutrients for plants.
 - b. A study of the thickness and properties of the existing interim cover soils on Module M-1.
 - c. A design report for selection, monitoring, and maintenance of vegetation for the alternative final cover.
 - d. Hydrogeologic modeling of the alternative final cover to establish ranges of acceptable soil properties, and the total thickness of the alternative final cover.

Results of these studies and design details regarding the proposed alternative final cover are included in the Discharger’s *Engineered Alternative Design Report*.

72. The proposed engineered alternative final cover for the remainder of Module M-1 is a six-foot thick ET cover using onsite soils meeting design specifications and that are compacted to between 75 and 90 percent of standard proctor (ASTM D698). High compaction is not desirable since it reduces moisture storage capacity and root penetration. Onsite soil types potentially meeting design specifications were found to be select silty sand (with a high percentage of silt), sandy silt, and sandy clay. The proposed design also includes native or naturalized vegetation selected to be low maintenance, to maximize extraction of moisture at all depths during the growing season, and to persist after establishment without being subject to plant community shifts. Vegetation is also selected as a mixture of annuals and perennials, and to have varying rooting depths. Selected final cover vegetation included coyote bush, purple needle grass, blue wildrye, western yarrow, arroyo lupin, and gumplant. Final vegetation

design may be adjusted based on the performance of field vegetation test plots yet to be conducted.

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

An evapotranspirative final cover:

- a. Provides an equivalent or higher degree of groundwater protection since the prescriptive clay cover is often subject to desiccation cracking that can increase permeability several orders of magnitude.
 - b. Eliminates the need to import low permeability soils for admixing with onsite soils for the low permeability clay layer.
 - c. Can be constructed by operations personnel using onsite equipment.
 - d. Can be more easily repaired than a prescriptive clay cover or a cover containing a geomembrane layer.
 - e. Provides improved stability compared with multilayer covers that are susceptible to sliding along the interfaces.
 - f. Is more permeable to landfill gas, reducing the potential for landfill gas impacts to groundwater.
 - g. Provides a better long-term final cover compared with clay (desiccation) or geomembranes (previously required final cover for Module M-1) that will eventually degrade.
75. The Discharger has adequately demonstrated that the proposed engineered alternative liner final cover is consistent with the performance goal for final covers given in Title 27 because it will minimize percolation, and it will provide protection against water quality impairment equivalent to or better than the prescriptive standard. The Discharger has also adequately demonstrated that the prescriptive cover would be unreasonably and unnecessarily burdensome and would cost substantially more than the proposed

alternative. This Order approves the use of the proposed alternative final cover for the unlined Module M-1. This Order continues to approve the use of the previously approved composite final cover for Module M-1 in the event that the alternative cover does not perform as anticipated or cannot be constructed as envisioned.

76. Final grades necessary to begin closure of Module M-1 have been reached with the exception of some low areas that need fill to achieve the required 3% slope for drainage. The Discharger periodically places waste on the top-deck of the Module M-1 to fill in the low areas. The final grade upon closure will be 325 feet MSL at the crown down to 120 feet MSL at the toe.
77. The Discharger submitted an updated Partial Final Closure Plan for closure of the southern slopes of Module M-1 with an evapotranspirative cover in August 2013. Closure of these areas was planned in three phases. Currently, two phases of the final evapotranspirative cover system have been installed on the southern slopes. Monitoring devices are installed within the Phase 2 cover area to assess the performance of the evapotranspirative cover. This Order requires the last portion of the south slope final evapotranspirative cover to be installed on southern slopes of Module M-1 by 2018, as detailed in Closure and Post-Closure Maintenance Specification E.3. The eastern side-slopes of Module M-1 to be overlain with the base liner systems of future Modules M-8, M-9, and M-11 shall be maintained with a minimum of 12-inch thick of intermediate cover until the future modules are constructed, as detailed in Construction Specification D.3. This Order requires the Discharger to provide documentation that the eastern slopes of Module M-1 are a minimum of 12-inches thick, as detailed in Provision H.9.
78. Following completion of Phase 3, the remaining area of Module M-1 to be closed includes the approximately 54 acre top-deck. The Discharger reports that this area continues to settle 1 to 2 feet a year. Currently, the top-deck area is covered with a minimum 12-inch thick interim cover. The Discharger proposes to continue to place waste in Module M-1 to bring Module M-1 to final grades and then close Module M-1. This Order requires the Discharger to close Module M-1 by 2026, as detailed in Closure and Post-Closure Maintenance Specification E.3.
79. The Discharger is required to submit an updated Partial Final Closure and Post-Closure Maintenance Plan for review and approval that meets the requirements of Title 27 and this Order prior to closure of the top-deck of Module M-1.

LANDFILL CLOSURE

80. Title 27, section 21090 provides the minimum prescriptive final cover components for landfills consisting of, in descending order, the following layers:
 - a. One-foot soil erosion resistant/vegetative layer.
 - b. Geomembrane layer (this layer is required for composite-lined landfills for equivalency to bottom liner).

- c. One-foot soil low flow-hydraulic conductivity layer, less than 1×10^{-6} cm/s or equal to the hydraulic conductivity of any bottom liner system.
- d. Two-foot soil foundation layer.

81. Title 27 allows engineered alternative final covers provided the alternative design will provide a correspondingly low flow-through rate throughout the post-closure maintenance period.
82. The Discharger submitted an April 2013 *Preliminary Closure and Postclosure Maintenance Plan* (PCPCMP) for closure and post-closure maintenance of Landfill Units 1 and 2 at the facility. The composite final cover design proposed in the PCPCMP was approved in previous WDRs Order Nos. 99-053, R5-2002-0187, and R5-2007-0107. With the approval of an evapotranspirative cover for the remainder of unlined Module M-1, the composite final cover will not be used for Module M-1 unless the evapotranspirative cover does not function as anticipated or cannot be constructed as envisioned. The composite final cover design will be used for all composite-lined modules. The composite final cover design is as follows:

Side Slopes:

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

Top Deck:

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

83. The approved composite final cover system includes a GCL in place of a one-foot thick clay layer with ($k \leq 1 \times 10^{-6}$ cm/sec). This Engineered Alternative was approved because of the lack of on-site clay as detailed in Finding 61 for the base liner system. The Discharger has demonstrated that the engineered alternative final cover meets the performance goals of Title 27 and that it is equivalent to the prescriptive standard.
84. The top deck will be sloped at 3% for adequate drainage. Perimeter slopes in the existing landfill area will be no greater than 3:1 (horizontal-to-vertical) in M-1, 4:1 in M-1L, and the final slopes in the expansion area will range from 4:1 to 5:1 to provide visual relief. One 15-foot wide bench will be constructed at least every 50 vertical feet as required by Title 27.
85. Permanent excavation and landfill slopes have a minimum safety factor of 1.6 and 1.5, respectively. The landfill cover will have a safety factor of 1.3 under saturated

conditions and 1.7 under unsaturated conditions. Since the facility is not near any known active faults, the Discharger assumed low seismic activity for the purposes of landfill cover slope stability calculations, estimating a displacement from a maximum probable earthquake of less than one foot. The Discharger's static and dynamic stability analysis demonstrates that the side slopes of the final cover will be stable in accordance with the requirements of Title 27.

86. The Discharger estimates to begin closure of the western slopes of Modules M-1L and M-2 approximately 2 years following closure of Module M-1 (approximately 2028). Closure is dependent on a number of factors such as waste streams. The closure schedule for Modules M-1L and M-2 are only estimates that may change if the estimated waste streams are higher or lower than expected.
87. The Discharger is required to submit a Partial Final Closure and Post-Closure Maintenance Plan for review and approval that meets the requirements of Title 27 and this Order prior to each phase of closure of Module M-1L and Landfill Unit 2.
88. The Discharger is collecting monitoring data from the existing Module M-1 final evapotranspirative cover to evaluate whether a 6-foot thick evapotranspirative cover could be utilized over the composite lined areas of the landfill. The Discharger shall submit an *Engineered Alternative Design Report* detailing how the evapotranspirative cover meets Title 27 requirements with an updated ROWD for Board approval prior to implementation.
89. Pursuant to Title 27, section 21090(e)(1), this Order requires a survey of the final cover following closure activities for later comparison with iso-settlement surveys required to be conducted every five years.
90. This Order approves the proposed final cover(s) and requires that a final closure and post-closure maintenance plan, design documents, and CQA plan be submitted for review and approval at least 180 days prior to actual closure.

LANDFILL POST-CLOSURE MAINTENANCE

91. The Discharger submitted an April 2013 *Preliminary Closure and Postclosure Maintenance Plan* for closure and post-closure maintenance of Landfill Units 1 and 2. The plan includes inspection, maintenance, and monitoring of the landfill during the post-closure maintenance period, and includes a post-closure maintenance cost estimate for the entire facility. Inspection and maintenance will include the condition of the final cover, drainage features, LCRS, groundwater monitoring wells, unsaturated zone monitoring points, access roads, landfill gas system, groundwater corrective action system, and site security. The plan will be implemented for a minimum period of 30 years or until the waste no longer poses a threat to environmental quality, whichever is greater.

92. The Discharger submitted a December 2003 update of the JTD that included a Partial Final Closure and Post-Closure Maintenance Plan (PFCPMP) for portions of Module M-1 anticipated at that time to occur between 2006 and 2010. The PFCPMP includes, among other things, procedures and plans for inspection, monitoring, and maintenance of the closed landfill. Subsequently, in August 2013 the Discharger submitted a Partial Final Closure Plan for the Module M-1 southern side slope evapotranspirative cover design. This Order requires the Discharger to submit a PFCPMP for the Module M-1 evapotranspirative cover system for the areas that are not previously approved. This Order also requires the Discharger to inspect, monitor, and maintain the closed portions of the landfill in accordance with the applicable PFCPMP.
93. The Discharger's *Engineered Alternative Design Report* referred to in Finding 69 of this Order includes a Post-Construction Monitoring and Maintenance Program for monitoring and maintenance of the evapotranspirative final cover proposed for Module M-1. Briefly, the monitoring program will include inspection after extreme rainfall events, frequent vegetation monitoring during the first year and less frequent during the following two years. Monitoring will also include verification of the function of the cover using moisture sensors to support future regulatory approval of the use of the alternative cover in lined areas of the landfill. Maintenance will include control of invasive weeds, replanting of seeds or shrubs as needed, removal of dead shrubs as needed, repair of localized erosion, and corrective action for any areas of vegetation that are being affected by landfill gas. This Order requires the Discharger to monitor and maintain the vegetation for the evapotranspirative final cover in accordance with the proposed Post-Construction Monitoring and Maintenance Program, which will become part of the PFCPMP.
94. Once every five years during the post-closure maintenance period, aerial photographic maps of the closed landfill area will be made to identify and evaluate landfill settlement. Iso-settlement maps will be prepared to determine the amount of differential settlement occurring over the previous five years. Pursuant to Title 27, section 21090(e)(2), this Order requires iso-settlement maps to be prepared and submitted every five years.
95. The completed final cover will be periodically tested for damage or defects by monitoring surface emissions pursuant to California Code of Regulations, title 17, section 95471(c) and Title 27, section 21090(a)(4)(A). Defects will be repaired and tested for adequacy based on the closure CQA Plan.

FINANCIAL ASSURANCES

96. Title 27, sections 21820 and 22206 require a cost estimate for landfill closure. The cost estimate must be equal to the cost of closing the landfill at the point in its active life when the extent and manner of operation would make closure the most expensive. When closing units in phases, the estimate may account for closing only the maximum area or unit of a landfill open at any time. The Discharger's 22 September 2015 *JTD* includes a closure fund estimate. The lump sum estimate is for the cost to close largest future area needing closure at any one time. The total amount of the closure cost estimate in 2015

dollars is \$23,668,833 million. This Order requires that the Discharger maintain financial assurance with the California Department of Resources Recycling and Recovery (CalRecycle) in at least the amount of the closure cost estimate. As of 2015, the balance of the closure fund was \$17,242,104 million.

97. Title 27, sections 21840 and 22211 requires a cost estimate for landfill post-closure maintenance. The Discharger's April 2013 *Preliminary Closure and Post Closure Maintenance Plan* includes a cost estimate for landfill post-closure maintenance. The amount of the cost estimate for post-closure maintenance in 2015 dollars is \$27 million over 30 years. This Order requires that the Discharger maintain financial assurance with CalRecycle in at least the amount of the post-closure maintenance cost estimate adjusted annually for inflation. As of 2015, the Discharger has established a pledge of revenue for the post-closure maintenance fund to be utilized during the post-closure period.
98. Title 27, section 22221 requires a cost estimate for corrective action of all known or reasonably foreseeable releases. The Discharger submitted a September 2012 cost estimate of \$707,749 annually for corrective action of all known or reasonably foreseeable releases. This Order requires that the Discharger maintain financial assurance with the CalRecycle in at least the amount of the cost estimate adjusted annually for inflation. The inflated amount is \$782,981 in 2015 dollars. As of 2015, the Discharger has established a pledge of revenue for the annual cost of the corrective action costs.
99. Title 27 section 22100(b) requires owners and operators of disposal facilities that are required to be permitted as solid waste landfills to provide cost estimates for initiating and completing corrective action for known or reasonably foreseeable releases of waste. Title 27 section 22101 requires submittal of a *Water Release Corrective Action Estimate* and a *Non-Water Release Corrective Action Cost Estimate*. The *Water Release Corrective Action Estimate* is for scenarios where there is statistically significant evidence of a release of waste to ground or surface water when comparing point-of-compliance analyte concentrations to background concentrations. The *Non-Water Release Corrective Action Cost Estimate* is for complete replacement of the landfill final cover system, however a site-specific corrective action plan pursuant to Title 27 section 22101(b)(2) may be provided in lieu of the final cover replacement cost estimate. Title 27 section 22221 requires establishment of financial assurances in the amount of an approved *Water Release Corrective Action Estimate* or an approved *Non-Water Release Corrective Action Cost Estimate*, whichever is greater. The Discharger's *Water Release Corrective Action Estimate* is the greater cost estimate. As detailed in Finding 98, the Discharger has established a pledge of revenue for the annual cost of the water release corrective action costs.

CEQA AND OTHER CONSIDERATIONS

100. The action to revise waste discharge requirements for this existing facility is exempt from the provisions of the California Environmental Quality Act (CEQA), Public Resource Code section 21000, et seq., and the CEQA guidelines, in accordance with Title 14, section 15301.
101. The Discharger prepared a final environmental impact report (EIR) for the proposed expansion in December 1994. The EIR identified significant environmental impacts associated with the landfill expansion project and included a site mitigation plan for each significant impact. The County Board of Supervisors (Supervisors) did not certify the EIR at that time, however, because it did not include project alternatives. After public hearings, the Supervisors appointed an advisory committee to develop alternatives for the project. The alternatives were presented in an August 1998 Supplemental EIR. On 22 October 1998, the Supervisors certified the EIR and Supplemental EIR for the landfill expansion as adequate and complete, and on 10 November 1998, finalized approval of the project.
102. This Order implements:
- a. *The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition*;
 - b. The prescriptive standards and performance goals of California Code of Regulations, title 27, section 20005 et seq., effective 18 July 1997, and subsequent revisions;
 - c. State Water Board Resolution 93-62, *Policy for Regulation of Discharges of Municipal Solid Waste*, adopted 17 June 1993, and revised on 21 July 2005.
 - d. The applicable provisions of Title 40 C.F.R. section 258 "Subtitle D" federal regulations as required by State Water Board Resolution 93-62.
103. Based on the threat and complexity of the discharge, the facility is determined to be classified 1-A as defined below:
- a. Category 1 threat to water quality, defined as, "Those discharges of waste that could cause the long-term loss of a designated beneficial use of the receiving water. Examples of long-term loss of a beneficial use include the loss of drinking water supply, the closure of an area used for water contact recreation, or the posting of an area used for spawning or growth of aquatic resources, including shellfish and migratory fish."
 - b. Category A complexity, defined as, "Any discharge or toxic wastes; any small volume discharge containing toxic waste; any facility having numerous discharge points and groundwater monitoring; or any Class 1 waste management unit."

104. The *Statement of Policy With Respect to Maintaining High Quality of Waters in California*, SWRCB Order WQ 68-16 (hereinafter "Anti-Degradation Policy") was adopted by the State Water Board in October 1968. Anti-Degradation Policy limits the Board's discretion to authorize the degradation of "high-quality waters." This policy has been incorporated into the Board's Basin Plans. "High-quality waters" are defined as those waters where water quality is more than sufficient to support beneficial uses designated in the Board's Basin Plan. Whether or not a water is a high-quality water is established on a constituent-by-constituent basis, which means that an aquifer can be considered a high-quality water with respect to one constituent, but not for others. (SWRCB Order No. WQ 91-10.)
105. Anti-Degradation Policy applies when an activity discharges to high quality waters and will result in some degradation of such high quality waters. When it applies, the Policy requires that WDRs reflect best practicable treatment or control (BPTC) of wastes and that any degradation of high quality waters (a) will be consistent with the maximum benefit to the people of the State, and (b) will not result in an exceedance of water quality objectives. If the activity will not result in the degradation of high quality waters, Anti-Degradation Policy does not apply, and the Discharger need only demonstrate that it will use "best efforts" to control the discharge of waste.
106. Anti-Degradation Policy does not apply to the discharge of waste to Kiefer Landfill. The requirements of this Order are designed to ensure that any such wastes remain contained at the facility and will not reach waters of the State. The requirements of this Order reflect the Discharger's best efforts to control such wastes.
107. Anti-Degradation Policy applies to the discharge of extracted groundwater to an infiltration basin, and the requirements of this Order satisfy Anti-Degradation Policy. Under the requirements of this Order, the Discharger shall demonstrate that the extracted groundwater and proposed treatment methods, if any, shall not cause degradation to the groundwater prior to its discharge to the infiltration basin. Currently, air stripping treatment methods are utilized to treat extracted groundwater and the Discharger is required to demonstrate the effectiveness of future treatment methods prior to implementing a new treatment method. These measures reflect BPTC of wastes and are designed to ensure that operation of the facility will not result in an exceedance of water quality objectives. Further, although degradation is unlikely, any degradation of waters of the State that may occur is consistent with the maximum benefit to the people of the State. During the current state of drought, recharge of recycled water for later beneficial use is consistent with conservation of all available water supplies.
108. Water Code section 13267(b) provides that: "In conducting an investigation specified in subdivision (a), the Regional Board may require that any person who has discharged, discharges, or is suspected of having discharge 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 the waters of the state within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports.”

109. The technical reports required by this Order and the attached "Monitoring and Reporting Program R5-2016-XXXX" are necessary to assure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

PROCEDURAL REQUIREMENTS

110. All local agencies with jurisdiction to regulate land use, solid waste disposal, air pollution, and to protect public health have approved the use of this site for the discharges of waste to land stated herein.
111. The Central Valley Water Board notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
112. The Central Valley Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.
113. Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date that this Order becomes final, except that if the thirtieth day following the date that this Order becomes final falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at:

http://www.waterboards.ca.gov/public_notices/petitions/water_quality

or will be provided upon request.

IT IS HEREBY ORDERED, pursuant to California Water Code sections 13263 and 13267, that Order R5-2007-0107 is rescinded except for purposes of enforcement, and that the County of Sacramento, Municipal Services Agency, Department of Waste Management and Recycling, its agents, successors, and assigns, in order to meet the provisions of Division 7 of the California Water Code and the regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

1. The discharge of 'hazardous waste' or 'designated waste' is prohibited. For the purposes of this Order, the term 'hazardous waste' is as defined in California Code of Regulations, Title 23, section 2510 et seq., and 'designated waste' is as defined in Title 27.
2. The disposal of containerized liquids at this facility is prohibited.
3. The discharge of waste within 50 feet of surface waters is prohibited.
4. The disposal of wastes containing greater than one percent (>1%) friable asbestos is prohibited.
5. The Discharger shall comply with all Standard Prohibitions listed in Section C of the Standard Provisions and Reporting Requirements (SPRRs) dated December 2015 which are attached hereto and made part of this Order by reference.

B. DISCHARGE SPECIFICATIONS

1. The Discharger shall only discharge the following wastes:
 - Nonhazardous solid waste, including municipal solid waste.
 - Special wastes including treated infectious wastes, triple-rinsed empty pesticide containers, non-friable asbestos, and dead animal carcasses using special disposal and handling procedures.
 - Publicly Owned Treatment Works (POTW) grit and screenings, and biosolids with a minimum 20 percent solids and no free moisture. Biosolids are only accepted from the Sacramento Regional Wastewater Treatment Plant on an infrequent, emergency basis.
 - Construction and demolition debris.
 - Treated wood waste.
2. Nonhazardous wastes shall be discharged to either:

- a. To existing unlined Module M-1 (*existing MSWLF unit* as defined in 40 CFR 258.2) until Module M-1 is closed; or
 - b. To a Unit equipped with a composite liner containment system which meets the requirements for both liners and leachate collection and removal systems specified under D. Construction Specifications.
3. The Discharger shall discharge special wastes and POTW grit and screenings only to landfill units equipped with a composite liner system and a leachate collection and removal system (i.e., Modules M-1L, M-2, M-3, and future modules listed in Finding 6 of this Order).
 4. The Discharger shall discharge treated wood wastes only to landfill units equipped with a composite liner system and a leachate collection and removal system (i.e., Modules M-1L, M-2, M-3, and future modules listed in Finding 6 of this Order). If a verified release is detected from the waste management unit where treated wood is disposed, the disposal of treated wood shall be terminated at the unit with the verified release until corrective action ceases the release.
 5. The Discharger shall manage treated wood waste in accordance with California Health and Safety Code sections 25143.1.5 and 250150.7 and shall comply with all prohibitions listed in Title 22, section 67386.3.
 6. The Discharger shall use the following materials for ADC: temporary geosynthetic tarps, degradable geosynthetic covers, processed green materials, compost materials, processed construction and demolition wastes and materials, shredded tires (mixed with soil), and wood ash (non-hazardous, non-designated ash from wood-fired energy generation facilities).
 7. This Order allows any ADC proposed for use at the facility after the adoption of this Order to be approved by Central Valley Water Board staff provided the Discharger has demonstrated it meets the requirements in Title 27, section 20705. The approved ADC materials should then be listed in the facility's WDRs during the next regular update or revision with information about the Discharger's demonstration. This Order also includes a requirement that ADC only be used in internal areas of the landfill unless the Discharger demonstrates that runoff from the particular ADC is not a threat to surface water quality. The demonstration can take sedimentation basins into account.
 8. The Discharger shall use approved ADC only in internal areas of the landfill that do not drain outside of the limits of the contiguous landfill units unless the Discharger demonstrates that runoff from the particular ADC is not a threat to surface water quality and the demonstration has been approved. This demonstration may take removal of sediment or suspended solids into account for landfills where surface water drains to a sedimentation basin.

9. The Discharger shall, in a timely manner, remove and relocate any wastes discharged at this facility in violation of this Order. If the Discharger is unable to remove and relocate the waste, the Discharger shall submit a report to the Central Valley Water Board explaining how the discharge occurred, why the waste cannot be removed, and any updates to the waste acceptance program necessary to prevent re-occurrence. If the waste is a hazardous waste, the Discharger shall immediately notify the Department of Toxic Substances Control.
10. The Discharger may inject limited quantities of Hydrogen Release Compound as a pilot project to assess the effectiveness of reducing the remaining VOCs concentrations in groundwater following obtaining coverage under the General Order for In-Situ Groundwater Remediation R5-2008-0149.
11. Leachate and/or landfill gas condensate may be used as dust control or returned only to Modules M-1L, M-2, M-3, and future composite lined modules listed in Finding 6 of this Order in accordance with Standard Discharge Specifications D.2 through D.4 of the SPRRs. Leachate used as dust control shall be contained within composite lined modules in areas with no public access and shall not be allowed to commingle with storm water runoff or enter the storm water system. Leachate and gas condensate shall not be used as dust control on or returned to unlined Module M-1.
12. The Discharger shall comply with all Standard Discharge Specifications listed in Section D of the SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.

Infiltration Basins

13. The Discharger may discharge extracted groundwater to designated on-site infiltration basins to potentially reduce the carbon footprint of the groundwater treatment system and provide a beneficial re-use of groundwater through aquifer recharge following written Executive Officer approval. A minimum of 90-days prior to the discharge of groundwater to the infiltration basin, the Discharger shall submit a Discharge Basin Pilot Study Work Plan for written Executive Officer approval that includes the following:
 - a. Characterization of groundwater to be discharged to the infiltration basin including estimated volume and analysis of potential COCs, including, but not limited to VOCs, lead, selenium, chlorine, and manganese.
 - b. Evaluation showing that the discharge of treated groundwater will not impact groundwater or surface water.
 - c. Water Balance Model of the infiltration basin showing that the basin can contain the 25-year, 24-hour storm event including associated calculations.
 - d. Monitoring systems including, but not limited to:

- 1) Influent monitoring
- 2) Groundwater monitoring
- 3) Surface water monitoring
- 4) Freeboard monitoring

14. Only extracted groundwater with individual VOC concentrations less than 0.5 µg/L may be discharged into an infiltration basin.
15. Use of the infiltration basins shall not result in odor or vector nuisance conditions and shall not result in the degradation of underlying groundwater.

C. FACILITY SPECIFICATIONS

1. Surface drainage within the waste management facility shall either be contained on-site or be discharged in accordance with applicable storm water regulations.
2. The Discharger shall comply with all Standard Facility Specifications listed in Section E of the SPRRs dated December 2015 which are part of this Order.

Infiltration Basins

3. Infiltration basins shall have capacity for extracted groundwater flows to the infiltration basins, precipitation, and precipitation runoff from a 25-year, 24-hour storm event and shall maintain at least two (2.0) feet of freeboard at all times.
4. The Discharger shall **immediately** notify Central Valley Water Board staff by telephone and email and **immediately** take measures to regain infiltration basin capacity in the event that freeboard levels are equal to or less than 2.0 feet.
5. The infiltration basins shall be designed, constructed and maintained to prevent scouring and/or erosion of the containment features at points of discharge to the impoundments and by wave action at the water line.
6. Solids that accumulate in the infiltration basins shall be periodically removed to maintain minimum freeboard requirements and to maintain sufficient capacity for discharge of extracted groundwater. Prior to removal of these solids, samples shall be collected for their characterization and classification for disposal at an appropriate facility.

D. CONSTRUCTION SPECIFICATIONS

1. The Discharger shall construct the base liner and side slope liner of new Class III landfill units as described in Finding 6 of this Order in accordance with the following approved engineered alternative liner design:

a. An engineered alternative composite **base liner system** that is comprised, from bottom to top, of the following:

Secondary Liner System

- 1) a compositely lined sump
- 2) geosynthetic clay liner ($k \leq 5 \times 10^{-9}$ cm/sec)
- 3) 60-mil HDPE geomembrane (bottom side textured)
- 4) one-foot gravel drainage layer ($k \geq 0.1$ cm/sec), or a geosynthetic drainage layer

Primary Liner System

- 1) a compositely lined sump
- 2) geosynthetic clay liner ($k \leq 5 \times 10^{-9}$ cm/sec)
- 3) 60-mil HDPE geomembrane (bottom side textured)
- 4) one-foot gravel drainage layer ($k \geq 0.1$ cm/sec)
- 5) nonwoven geotextile filter fabric (minimum eight oz. per square yard)
- 6) minimum one-foot thick operations layer

b. An engineered alternative composite **side slope liner system** that is comprised, in ascending order, of the following:

- 1) geosynthetic clay liner ($k \leq 5 \times 10^{-9}$ cm/sec)
- 2) 60-mil HDPE geomembrane (bottom side textured)
- 3) minimum two-foot sand operations layer/drainage layer ($k \geq 1 \times 10^{-3}$ cm/sec)

2. The entire length of new Class III landfill unit slopes that connect to unlined Module M-1 shall be lined with the approved side-slope liner system detailed in Construction Specification D.1.

3. The eastern slopes of Module M-1 shall be maintained with a minimum 12-inch thick intermediate cover in accordance with Title 27 20700 until the base liner systems for adjacent Modules M-8, M-9, and M-11 are constructed on the eastern slope of Module M-1. As detailed in Provision H.9, the Discharger shall provide documentation that the intermediate cover on the eastern slope of Module M-1 meets these requirements.
4. The Discharger shall not proceed with liner construction (other than earth moving and grading in preparation for liner construction) until the construction plans, specifications, and all applicable construction quality assurance plans have been approved by Board staff.
5. The Discharger may propose changes to the liner system design prior to construction, provided that approved components are not eliminated, the engineering properties of the components are not substantially reduced, and the proposed liner system results in the protection of water quality equal to or greater than the design prescribed by Title 27 and this Order. The proposed changes may be made following written approval by the Executive Officer. Substantive changes to the design require reevaluation as an engineered alternative and approval by the Central Valley Water Board in revised WDRs.
6. The Discharger shall comply with all Standard Construction Specifications listed in Section F of the SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.
7. The Discharger shall comply with all Storm Water Provisions listed in Section L of the SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.

E. CLOSURE AND POST-CLOSURE MAINTENANCE SPECIFICATIONS

1. The Discharger shall submit a final or partial final closure and post-closure maintenance plan at least two years prior to proposed closure of any portion of the landfill in accordance with requirements in Section G of the Standard Closure and Post-Closure Specifications in the SPRRs.
2. At closure, the remaining unclosed portion of Module M-1 shall receive an evapotranspirative final cover generally meeting the proposed specifications in the Discharger's January 2007 Engineered Alternative Design Report and as described in Finding 69 through 75 of this Order. At a minimum, the final cover shall consist of at least six feet of soil and vegetation. The final design shall be submitted in a Partial Final Closure and Post-Closure Maintenance Plan at least 120 days prior to planned construction, and the cover shall meet the specifications of the approved final design. Final cover designs shall be supported by a slope stability analysis as required by Title 27. Module M-1 may receive the composite final cover described in Closure And Post-Closure Maintenance Specification E.4 in the event that the alternative cover

does not function as anticipated or cannot be constructed as envisioned. The Discharger shall not proceed with closure construction (other than earth moving and grading in preparation for liner construction) until the construction plans, specifications, and all applicable construction quality assurance plans have been approved by Board staff.

3. As detailed in Finding 76, the final grades for Module M-1 have been reached with the exception of some low areas on the top-deck. The Discharger shall close Module M-1 in accordance with the following schedule:

<u>Module M-1 Area</u>	<u>Closure Schedule</u>
Southern Side Slopes	Complete Closure by 2018
Top-Deck	Begin Closure no later than 2020 and Complete Closure by 2026

4. At closure, landfill Modules M-1L and M-2 through M-11 shall receive a composite final cover in accordance with the prescriptive standards of Subtitle D and Title 27, or the engineered alternative composite design described in Finding 82 of this Order and listed below:

Side Slopes:

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

Top Deck:

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

Final cover designs shall be supported by a slope stability analysis as required by Title 27.

5. The Discharger may not close the landfill Modules M-1L and M-2 with a minimum 6-foot thick evapotranspirative cover until the Discharger can show that the evapotranspirative cover meets the requirements of Title 27 and new WDRs are issued.
6. The Discharger shall obtain revised WDRs prior to closure with any other final cover design than the design or designs approved in this Order, except when modifications are necessary for problematic areas of the final cover needing repair so long as the

barrier layer (e.g., geomembrane, GCL, and/or compacted clay layer) remains intact, and the modifications are approved by Central Valley Water Board staff.

7. The Discharger shall close the landfill with side slopes at steepness of 3H:1V or less, and top deck areas shall be sloped at three percent or greater.
8. The Discharger shall install an active landfill gas extraction system for the closed landfill unit during landfill closure, and landfill gas shall be extracted from closed landfill units until such time that the landfill gas is no longer a threat to water quality as documented by the Discharger and approved by the Executive Officer.
9. For closure with a final cover that includes a geomembrane, the Discharger shall seal the edges of the final cover by connecting the cover geomembrane to the liner geomembrane.
10. The Discharger shall test the critical interfaces of the final cover in a laboratory to ensure minimum design shear strengths are achieved and include the results in the final documentation report.
11. The Discharger shall ensure that the vegetative/erosion resistant layer receives necessary seed, binder, and nutrients to establish the vegetation proposed in the final closure plan. The Discharger shall install necessary erosion and sedimentation controls to prevent erosion and sediment in runoff from the closed landfill during the period the vegetation is being established.
12. The Discharger shall inspect, monitor, and maintain closed landfill units in accordance with the applicable Partial Final Post-Closure Maintenance Plan or Final Post-Closure Maintenance Plan.
13. The Discharger shall monitor and maintain the vegetation for the evapotranspirative final cover in accordance with the Post-Construction Monitoring and Maintenance Program in the Discharger's January 2007 *Engineered Alternative Design Report* or an approved Partial Final Post-Closure Maintenance Plan.
14. The Discharger shall comply with all Standard Closure and Post-Closure Specifications listed in Section G and all Standard Construction Specifications that are applicable to closure in Section F of the SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.

Infiltration Basins

15. At closure of the infiltration basins, the Discharger shall clean-close the infiltration basins. All residual wastes, including liquids, sludges, precipitates, settled solids, liner materials and adjacent natural geological materials contaminated by wastes shall be completely removed and discharged to an appropriately permitted landfill facility. If after reasonable attempts to remove contaminated natural geologic materials, the

Discharger demonstrates that removal of all remaining contamination is infeasible, then the units shall be closed as a landfill. In this event, the Discharger shall backfill and grade the area and submit a revised Final Closure and Post-Closure Maintenance Plan proposing a final cover meeting the requirements of Title 27 section 21090 and shall perform all post-closure maintenance in the approved Post-Closure Maintenance Plan.

16. The Discharger shall submit a work plan for clean-closure of the infiltration basins a minimum of 90 days prior to the proposed work for written Executive Officer approval.

F. FINANCIAL ASSURANCE SPECIFICATIONS

1. The Discharger shall obtain and maintain assurances of financial responsibility with CalRecycle for closure and post-closure maintenance for the landfill in at least the amounts described in Findings 96 and 97, adjusted for inflation annually. A report regarding financial assurances for closure and post-closure maintenance shall be submitted to the Central Valley Water Board by **15 August of each year**. This may be the same report that is submitted to CalRecycle for this purpose. If CalRecycle 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 to CalRecycle and the Central Valley Water Board for at least the amount of the approved cost estimate.
2. The Discharger shall update the preliminary closure and post-closure maintenance plan (PCPCMP) any time there is a change that will increase the amount of the closure and/or post-closure maintenance cost estimate. The updated PCPCMP shall be submitted to the Central Valley Water Board, the Local Enforcement Agency, and CalRecycle. The PCPCMP shall meet the requirements of Title 27, section 21769(b), and include a lump sum estimate of the cost of carrying out all actions necessary to close each Unit, to prepare detailed design specifications, to develop the final closure and post-closure maintenance plan, and to carry out the first thirty years of post-closure maintenance. Reports regarding financial assurance required in F.1 above shall reflect the updated cost estimate.
3. The Discharger shall obtain and maintain assurances of financial responsibility with CalRecycle for initiating and completing corrective action for all known or reasonably foreseeable releases from the landfill in at least the amount of the annual inflation-adjusted cost estimate described in Finding 98. A report regarding financial assurances for corrective action shall be submitted to the Central Valley Water Board by **15 August of each year**. This may be the same report that is submitted to CalRecycle for this purpose. If CalRecycle 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 to CalRecycle and the Central Valley Water Board for at least the amount of the approved cost estimate.

4. The Discharger shall comply with all Standard Financial Assurance Specifications listed in Section H of the SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.

G. MONITORING SPECIFICATIONS

1. The Discharger shall comply with the detection monitoring program provisions of Title 27 for groundwater, surface water, and the unsaturated zone, and in accordance with Monitoring and Reporting Program (MRP) R5-2016-XXXX, and the Standard Monitoring Specifications listed in Section I of the SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.
2. The Discharger shall, for any landfill unit in a corrective action monitoring program, comply with the corrective action monitoring program provisions of Title 27, MRP R5-2016-XXXX, and the Standard Monitoring Specifications listed in Section I of SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.
3. The Discharger shall comply with the Water Quality Protection Standard as specified in this Order, MRP R5-2016-XXXX, and the SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.
4. The concentrations of the constituents of concern in waters passing the Point of Compliance (defined pursuant to Title 27, section 20164 as a vertical surface located at the hydraulically downgradient limit of the landfill unit that extends through the uppermost aquifer underlying the unit) shall not exceed the concentration limits established pursuant to MRP R5-2016-XXXX.
5. For each monitoring event, the Discharger shall determine whether the landfill is in compliance with the Water Quality Protection Standard using procedures specified in MRP R5-2016-XXXX and the Standard Monitoring Specifications in Section I of the SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.
6. As specified in MRP R5-2016-XXXX, the Discharger shall enter all monitoring data and monitoring reports into the online Geotracker database as required by Division 3 of Title 27 and Chapter 30, Division 3 of Title 23.
7. The Discharger shall monitor corrective action monitoring wells on a semi-annual basis, in accordance with MRP R5-2016-XXXX.
8. The Discharger shall comply with all Standard Monitoring Specifications and Response to a Release specifications listed in Sections I and J of the SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.

H. PROVISIONS

1. The Discharger shall maintain a copy of this Order at the facility, including the MRP R5-2016-XXXX and the SPRRs dated December 2015 which are part of this Order, and make it available at all times to facility operating personnel, who shall be familiar with its contents, and to regulatory agency personnel.
2. The Discharger shall comply with all applicable provisions of Title 27 and Subtitle D that are not specifically referred to in this Order.
3. The Discharger shall comply with MRP R5-2016-XXXX, which is incorporated into and made part of this Order by reference.
4. The Discharger shall continue to operate the corrective action groundwater extraction system until the Discharger demonstrates that the concentrations of all COCs are reduced to levels below their respective concentration limits throughout the entire zone affected by the release, per Title 27 Section 20430, and receives written authorization from the Executive Office to terminate corrective action.
5. The Discharger shall continue to operate the landfill gas extraction system until approval to discontinue operation is obtained by CalRecycle, LEA, and/or the Water Board.
6. The Discharger shall comply with the applicable portions of the Standard Provisions and Reporting Requirements for Waste Discharge Requirements for Nonhazardous Solid Waste Discharges Regulated by Subtitle D and/or Title 27, dated December 2015, which are attached hereto and made part of this Order by reference.
7. If there is any conflicting or contradictory language between the WDRs, the MRP, or the SPRRs, then language in the WDRs shall supersede either the MRP or the SPRRs, and language in the MRP shall supersede the SPRRs.
8. All reports required by this Order shall be submitted pursuant to Water Code section 13267.
9. The Discharger shall submit an *Intermediate Cover Thickness Verification Report* by **1 August 2016** documenting the Module M-1 intermediate cover thickness. The report shall include the following:
 - a. Methodology used to verify intermediate cover thickness (i.e. potholing). At a minimum, intermediate cover thickness shall be verified in a grid pattern on 300-foot centers over the eastern slopes of Module M-1. At locations, if any, where the cover is determined to be less than 12 inches, cover thickness will be re-verified using a grid pattern on 100-foot centers.”
 - b. Map showing sample locations.

- c. Table documenting sampling results.
 - d. Schedule and proposed methods to retrofit intermediate cover to maintain a minimum 12-inch thick cover, required only if the results show the intermediate cover is less than 12-inches thick.
10. By **1 June 2016**, the Discharger shall submit an updated *Sample Collection and Analysis Plan* detailing the facility sampling and analysis procedures including soil pore gas and quality assurance/quality control standards.
11. The Discharger shall complete the tasks contained in these waste discharge requirements in accordance with the following time schedule:

<u>Task</u>	<u>Compliance Date</u>
A. Construction Plans	
Submit construction and design plans for review and approval. (see all Construction Specifications in Section D, above and Section F of the SPRRs.)	90 days prior to proposed construction
B. Construction Report	
Submit a construction report for review and approval upon completion demonstrating construction was in accordance with approved construction plans (see Standard Construction Specification F.27 in the SPRRs).	60 days prior to proposed discharge
C. Final Closure Plans	
Submit a final or partial final closure and post-closure maintenance plan, design plans, and CQA plan for review and approval (see all Closure and Post-Closure Specifications in Section E, above and Section G of the SPRRs).	Two years prior to closure

12. The Discharger shall comply with all General Provisions listed in Section K of the SPRRs dated December 2015 which are part of this Order.

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

PAMELA C. CREEDON, Executive Officer

AAH/WMH