

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM R5-2014-XXX
FOR
CHEMICAL WASTE MANAGEMENT, INC.
CLASS I/II WASTE MANAGEMENT UNITS
KETTLEMAN HILLS FACILITY
KINGS COUNTY

Compliance with this Monitoring and Reporting Program (MRP), with Chapter 15, and with the Standard Provisions and Reporting Requirements dated September 1993 for Class I Waste Management Units (WMUs) is ordered by Waste Discharge Requirements (WDRs) Order No. R5-2014-_____.

Failure to comply with this MRP, or with the Standard Provisions and Reporting Requirements, constitutes noncompliance with the WDRs and the Water Code, which can result in the imposition of civil monetary liability.

A. REQUIRED REPORTS

<u>Report</u>	<u>Due</u>
1. Annual Monitoring Summary Report (Section B.)	Annually
2. Constituents of Concern (Section C.1)	Every 5 years¹
3. Groundwater Monitoring (Section D.1)	Semi-Annually
4. Incoming Waste Monitoring (Section D.2)	Monthly
5. Leachate Collection and Removal System Monitoring (Section D.3)	
a. LCRS Fluid Levels (Section D.3)	Monthly
b. Constituents of Concern (Section D.3)	Quarterly²/Annually
c. Integrity Testing (Section D.3.a)	Annually
6. Unsaturated Zone Monitoring (Section D.4)	Semi-Annually
7. Class I Surface Impoundment Monitoring (Section D.5)	Monthly
8. Facility Monitoring (Section D.6)	
a. Facility Inspection Certification (Section D.6.a.)	Annually
b. Post-Closure Inspection Report (Section D.6.b.)	Annually
c. Storm Event Inspection (Section D.6.c.)	When required
d. Seismic Event Inspection (Section D.6.d.)	When required

¹Sampling shall alternate between the 1st Semi-annual and 2nd Semi-annual sampling events.

²Quarterly the first four quarters after waste placement in the B-18 Phase III Expansion WMU begins.

B. REPORTING

The Discharger shall report monitoring data and information as required in this MRP, in the approved *Site-Specific Groundwater Monitoring Plan* (SSGWMP), and in the Standard Provisions and Reporting Requirements. Reports that do not comply with the required format will be **REJECTED** and the Discharger shall be deemed to be in noncompliance with the WDRs. In reporting the monitoring data required by this MRP, the Discharger shall arrange the data in tabular form so that the date, constituents, concentrations, and units are readily discernible. Data shall be submitted in a digital database format, such as Microsoft Access or Excel that is acceptable to Central Valley Water Board staff. The data shall be summarized in such a manner as to illustrate clearly compliance with the WDRs or the lack thereof. A short discussion of the monitoring results, including notations of any water quality violations, shall precede the tabular summaries.

Each monitoring report shall include a compliance evaluation summary as specified in Item 2, 'Reports to be Filed with the Board,' of the 'Reporting Requirements,' of the Standard Provisions and Reporting Requirements.

The Discharger shall submit an **Annual Monitoring Summary Report** covering the previous monitoring year. The annual report shall contain the information specified in Item 4, 'Reports to be Filed with the Board,' of the 'Reporting Requirements,' of the Standard Provisions and Reporting Requirements, and a discussion of compliance with the WDRs and the water quality protection standards (WQPS).

The results of any WDR/MRP monitoring conducted more frequently at the locations specified herein or by the WDRs shall be reported. Field measurements and laboratory tests shall be reported in each monitoring report. Monthly, quarterly, semi-annual, and annual monitoring reports, unless as otherwise indicated, shall be submitted to the Board in accordance with the following schedule for the calendar period in which samples were taken or observations made.

<u>Sampling Frequency</u>	<u>Reporting Frequency</u>	<u>Reporting Periods End</u>	<u>Report Date Due</u>
Monthly	Monthly	Last Day of Month	30 th day of following month
Quarterly	Quarterly	Last Day of each Calendar Quarter	45 th day of the the next quarter
Semi-annual	1 st Semi-annual 2 nd Semi-annual	30 June 31 December	30 September 31 March

Annual	Annual	31 December ¹ 30 September ²	1 March ¹ 15 November ²
5-Year	5-Year	30 June ³ 31 December ⁴	30 September ³ 31 March ⁴

¹Annual Monitoring Summary Report

²Annual Facility Inspection & Report

³For 1st Semi-Annual Event

⁴For 2nd Semi-Annual Event

C. WATER QUALITY PROTECTION STANDARD AND COMPLIANCE PERIOD

For each WMU, the WQPS consists of a list of: 1) constituents of concern (COC), 2) monitoring parameters, 3) concentration limits for each COC and each monitoring parameter, and 4) all monitoring points.

The WQPS shall apply during the active life of the WMU, closure period, post-closure maintenance period, and any compliance period under Title 23 CCR Section 2550.6.

1. Constituents of Concern

COCs are the waste constituents, reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the WMUs. Analysis for the COCs is due **every 5 years** and includes all the constituents listed in Table 1.

2. Monitoring Parameters

Monitoring parameters are the waste constituents, reaction products, hazardous constituents, and physical parameters that provide a reliable indication of a release from a WMU. The monitoring parameters for all Class I WMUs are those listed in Table 2. The supplemental hydrochemical parameters and field parameters are those listed in Table 3. Supplemental hydrochemical parameters are only analyzed to track changes in groundwater chemistry over time and are not used for comparison with concentration limits or to determine compliance with the WQPS.

3. Concentration Limits

The concentration limits for COCs and monitoring parameters shall be established as follows:

- a. For any anthropogenic COC or monitoring parameters, the concentration limit shall be the Practical Quantitation Limit (PQL) as described in the most recent edition of Manual SW-846 published by United States Environmental Protection Agency (US EPA). Concentrations that lie between the PQL and the Method Detection Limit (MDL) shall be reported as traces. Exceedences shall be determined using the non-statistical procedure specified in the most recent approved version of the SSGWMP.

- b. The concentration limits for the naturally occurring COCs listed in Table 1 were revised in the September 2002 Revised Groundwater Concentration Limits report. The concentration limits shall be updated, as appropriate, following each COC monitoring event in accordance with the statistical procedure described in the most recent approved version of the SSGWMP.

4. Monitoring Points

All wells established for groundwater detection monitoring shall constitute the monitoring points for the WQPS. All approved monitoring wells shall be sampled and analyzed for the monitoring parameters and COCs as indicated and listed herein. All approved piezometers and gradient wells shall be sounded as appropriate. The currently approved groundwater monitoring well network includes the detection monitoring wells, corrective action wells, and gradient wells listed in Table 4. Their locations are shown in Attachment 5 of the WDRs.

5. Revisions to Site-Specific Groundwater Monitoring Plan

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

D. MONITORING

1. Groundwater

The Discharger shall submit a revised SSGWMP as required by Provision H.13 in the WDRs. The Discharger shall collect, preserve, and transport groundwater samples semi-annually from wells in the approved groundwater monitoring system. Groundwater sampling, analysis, and statistical and non-statistical data evaluations shall be performed in accordance with the procedures described in the revised SSGWMP.

Groundwater monitoring data shall be submitted in the semi-annual Groundwater Monitoring Reports due as specified above in the schedule contained in **B. Reporting**. The reports shall contain, in addition to reporting requirements specified in this MRP, a summary of the laboratory quality assurance/quality control standards and shall indicate that they meet the standards specified in the revised SSGWMP.

The Discharger shall determine groundwater flow rate and direction in the uppermost aquifer and in any zones of perched water and in any additional zone of saturation monitored pursuant to this MRP **quarterly** and shall report the results in the semi-annual report.

The Discharger may use analytical methods other than those contained in this MRP provided the method has equal or lower reporting limits, can detect all the required COCs and monitoring parameters, and is an approved US EPA method.

2. Incoming Waste

The Discharger shall report on a **monthly** basis, the type and quantity of hazardous waste and designated waste accepted for disposal to the Class I WMUs at the facility.

3. Leachate Collection and Removal Systems

The leachate collection and removal system (LCRS) fluid levels shall be inspected **daily**. For primary LCRSs, the volume of liquid removed shall be measured and reported. For the secondary LCRSs, the volume of liquid removed shall be measured, calculated in gallons per acre per day, and reported. The results of LCRS monitoring shall be reported **monthly**.

Liquids removed from the LCRSs shall be analyzed **quarterly** for four consecutive calendar quarters commencing in the quarter following initial placement of waste within the B-18 Phase III Expansion WMU and **annually** thereafter for the COCs listed in Table 1 of this MRP.

The Discharger shall follow the actions specified in LCRS Specification D.1 contained in the WDRs should any hydraulic head occur on any liner outside of the LCRS sump.

a. Integrity Testing

In accordance with Title 23 CCR Section 2543(d), LCRSs shall be tested **annually** to demonstrate proper operation. The results of the tests shall be compared with earlier tests under comparable conditions.

4. Unsaturated Zone

The Discharger shall submit a revised *Site-Specific Unsaturated Zone Monitoring Plan* with a revised semi-annual sampling schedule for the soil-moisture monitoring wells and the soil-gas monitoring wells, and other appropriate changes as necessary.

Liquids removed from vadose zone collection sumps shall be analyzed **annually** for the COCs listed in Table 1 of this MRP.

5. Class I Surface Impoundments

The Discharger shall measure the fluid levels in all Class I surface impoundments. The calibrated freeboard gauges shall be inspected **daily** and the fluid levels recorded and reported **monthly**.

6. Facility Monitoring

a. Facility Inspection

Annually, **prior to 30 September**, the Discharger shall submit written certification that the drainage control system; slope conditions; groundwater, and unsaturated zone monitoring equipment; fencing; and visible portions of waste management unit liners and covers have been inspected and any necessary repairs have been completed.

b. Post-Closure Inspection

Submit an **annual** inspection report of the closed WMUs indicating compliance with Closure and Post-Closure Specifications G.7. and G.9. contained in the WDRs.

c. Storm Events

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

d. Seismic Events

The Discharger shall perform a full-scale facility inspection **within 24 hours** following an earthquake of magnitude (M_w) 5.0 or greater within 25 miles of the facility or M_w 6.0 or greater earthquake within 50 miles of the facility. The inspection shall be performed in accordance with the facility Post-Earthquake Inspection and Response Plan cited in Discharge Specification B.15 in the WDRs. The Discharger shall report any damage and subsequent repairs **within 45 days** of completion.

Ordered by: _____
PAMELA C. CREEDON, Executive Officer

(Date)

**TABLE 1
CONSTITUENTS OF CONCERN**

<u>Inorganic parameter</u>	<u>Method</u>	<u>Inorganic parameter</u>	<u>Method</u>
1 Aluminum	6010B	14 Iron	6010B
2 Antimony	6010B	15 Lead	6010B
3 Arsenic	6010B	16 Manganese	6010B
4 Barium	6010B	17 Mercury	7470A
5 Beryllium	6010B	18 Molybdenum	6010B
6 Boron	6010B	19 Nickel	6010B
7 Cadmium	6010B	20 Nitrogen, Nitrate	300.0A
8 Chromium	6010B	21 Selenium	6010B
9 Chromium VI	7196A	22 Silver	6010B
10 Cobalt	6010B	23 Thallium	6010B
11 Copper	218.5	24 Tin	6010B
12 Cyanide	9012A	25 Vanadium	6010B
13 Fluoride	300.0A	26 Zinc	6010B

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

Organic Parameters (Method 8260B)

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

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

<u>Organic Parameters (Method 8260B)</u>			
67	2,2-Dichloropropane	79	1,1,2,2-Tetrachloroethane
68	cis-1,3-Dichloropropene	80	Tetrachloroethylene
69	trans-1,3-Dichloropropene	81	Toluene
70	1,4-Dioxane	82	1,2,4-Trichlorobenzene
71	Methylene chloride	83	1,1,1-Trichloroethane
72	Methyl ethyl ketone	84	1,1,2-Trichloroethane
73	Methyl iodide	85	Trichloroethylene
74	Methyl methacrylate	86	Trichlorofluoromethane
75	4-Methyl-2-pentanone	87	1,2,3-Trichloropropane
76	Propionitrile	88	Vinyl acetate
77	Styrene	89	Vinyl chloride
78	1,1,1,2-Tetrachloroethane	90	Xylene (total)

<u>Organic Parameters (Method 8270C)</u>			
91	Acenaphthene	96	Aniline
92	Acenaphthylene	97	Anthracene
93	Acetophenone	98	Aramite
94	2-Acetylaminofluorene	99	Benzo(a)anthracene
95	4-Aminobiphenyl	100	Benzo(b)fluoranthene

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

Organic Parameters (Method 8270C)

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

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

<u>Organic Parameters</u> (Method 8270C)			
143	2,6-Dichlorophenol	164	1-Naphthylamine
144	Diethyl phthalate	165	2-Naphthylamine
145	Dimethoate	166	o-Nitroaniline
146	p-(Dimethylamino)azobenzene	167	m-Nitroaniline
147	7-12-Dimethylbenz(a)anthracene	168	p-Nitroaniline
148	3,3'-Dimethylbenzidine	169	Nitrobenzene
149	alpha-Dimethylphenethylamine	170	o-Nitrophenol
150	2,4-Dimethylphenol	171	p-Nitrophenol
151	Dimethyl phthalate	172	4-Nitroquinoline 1-oxide
152	m-Dinitrobenzene	173	N-Nitrosodi-n-butylamine
153	4,6-Dinitro-o-cresol	174	N-Nitrosodiethylamine
154	2,4-Dinitrophenol	175	N-Nitrosodimethylamine
155	2,4-Dinitrotoluene	176	N-Nitrosodiphenylamine
156	2,6-Dinitrotoluene	177	N-Nitrosodipropylamine
157	Di-n-octyl phthalate	178	N-Nitrosomethylethylamine
158	Diphenylamine	179	N-Nitrosomorpholine
159	Disulfoton	180	N-Nitrosopiperidine
160	Methyl methanesulfonate	181	N-Nitrosopyrrolidine
161	2-Methylnaphthalene	182	5-Nitro-o-toluidine
162	Naphthalene	183	Pentachlorobenzene
163	1,4-Naphthoquinone	184	Pentachloroethane

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

Organic Parameters (Method 8270C)

185	Pentachloronitrobenzene	194	Pyridine
186	Pentachlorophenol	195	Safrole
187	Phenacetin	196	1,2,4,5-Tetrachlorobenzene
188	Phenanthrene	197	2,3,4,6-Tetrachlorophenol
189	Phenol	198	Tetraethyl dithiopyrophosphate
190	p-Phenylenediamine	199	o-Toluidine
191	2-Picoline	200	2,4,5-Trichlorophenol
192	Pronamide	201	2,4,6-Trichlorophenol
193	Pyrene	202	0,0,0-Triethyl phosphorothioate
		203	sym-Trinitrobenzene

Pesticides (Method 8081A)

204	Aldrin	213	Dieldrin
205	alpha-BHC	214	Endosulfan I
206	beta-BHC	215	Endosulfan II
207	delta-BHC	216	Endosulfan sulfate
208	gamma-BHC (Lindane)	217	Endrin
209	Chlordane	218	Endrin aldehyde
210	4,4'-DDD	219	Heptachlor
211	4,4'-DDE	220	Heptachlor epoxide
212	4,4'-DDT	221	Methoxychlor
		222	Toxaphene

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

Polychlorinated biphenyls (Method 8082)

223	Aroclor 1016	227	Aroclor 1248
224	Aroclor 1221	228	Aroclor 1254
225	Aroclor 1232	229	Aroclor 1260
226	Aroclor 1242	230	Aroclor 1262
		231	Aroclor 1268

Organophosphorus Compounds (Method 8141A)

232	Methyl parathion	235	Phorate
233	Parathion	236	Dichlorvos
234	0,0-Diethyl 0-2-pyrazinyl phosphorothioate		

Chlorinated Herbicides (Method 8151A)

237	2,4-D (2,4-Dichlorophenoxyacetic acid)	239	Dinoseb (DNBP; 2-sec-Butyl-4,6-dinitrophenol)
238	Silvex (2,4,5-Trichlorophenoxypropionic acid; 2,4,5-TP)	240	2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)

Carbamate & Urea Pesticides (Method 632)

241	Barban	249	Methiocarb
242	Carbaryl	250	Methomyl
243	Carbofuran	251	Monuron
244	Chlorpropham	252	Neburon
245	Diuron	253	Oxamyl
246	Fenuron	254	Propham
247	Fluometuron	255	Propoxur
248	Linuron	256	Siduron
		257	Swep

TABLE 2
DETECTION MONITORING PARAMETERS - CLASS I WMUs

Organic Parameters (Method 8260B)

1	Benzene	17	1,1-Dichloroethane
2	Bromodichloromethane	18	1,2-Dichloroethane
3	Bromoform	19	1,1-Dichloroethene
4	Bromomethane	20	Ethylbenzene
5	Carbon Tetrachloride	21	trans-1,2-Dichloroethene
6	Chlorobenzene	22	1,2-Dichloropropane
7	Chloroethane	23	trans-1,3-Dichloropropene
8	Chloroform	24	Methylene chloride
9	2-Chloroethylvinyl ether	25	1,1,2,2-Tetrachloroethane
10	Chloromethane	26	Tetrachloroethene
11	cis-1,3-Dichloropropene	27	Toluene
12	Dibromochloromethane	28	1,1,1-Trichloroethane
13	1,2-Dichlorobenzene	29	1,1,2-Trichloroethane
14	1,3-Dichlorobenzene	30	Trichloroethene
15	1,4-Dichlorobenzene	31	Trichlorofluoromethane
16	Dichlorodifluoromethane	32	Vinyl chloride
		33.	Xylenes, total

TABLE 3
SUPPLEMENTAL HYDROCHEMICAL PARAMETERS
AND
FIELD PARAMETERS

<u>Hydrochemical Parameters</u> ¹		<u>Method</u>
1	Calcium	6010B
2	Potassium	6010B
3	Magnesium	6010B
4	Sodium	6010B
5	Chloride	300.0A
6	Alkalinity	2320B
7	Sulfate	300.0A
8	Silica	6010B
9	Total Dissolved Solids	2540C
10	Total Organic Carbon	5310B

<u>Field Parameters</u> ²	
1	pH
2	Specific Conductance
3	Temperature
4	Turbidity
5	Dissolved Oxygen

¹Parameters to be analyzed as part of semi-annual groundwater monitoring program.

²Measured in the field prior to sampling groundwater monitoring wells.

**TABLE 4
 GROUNDWATER MONITORING WELL NETWORK**

<u>DETECTION MONITORING WELLS</u>	<u>WMU¹</u>	<u>CORRECTIVE ACTION WELLS</u>	<u>WMU²</u>	<u>GRADIENT WELLS³</u>
K5 (Tuffaceous B) ⁴	B19,P20,S6	A2 (Neverita B)	P12/12A	K12 (Neverita A)
K7 (Tuffaceous A)	P1,P4,P13,S1,S3,B9 exp	A7 (Neverita B)	P12/12A	K34 (Cascajo A)
K17 (Neverita A)	B19,S5	E1 (Neverita B)	P12/12A	K36 (Tuffaceous A)
K18 (Sand No. 10)	B18	K4R (Neverita B)	P12/12A	K39 (Mya A)
K32R (Mya A)	B18	K6 (Neverita B)	P12/12A	K69 (Neverita A)
K35 (Cascajo A)	P14,P15,P16,S4	A5 (Mya C/D)	P9	K70 (Neverita B)
K37 (Mya C/D)	B9 ext, B11	E2 (Mya C/D)	P9	
K38 (Mya A)	B15	K30R (Mya A)	P9	
K41 (Neverita B)	P6,P8,B9 exp,S1,S2	K44 (Neverita A)	B7	
K42 (Tuffaceous B)	P1,P2,P3,P4,P4.5,B9 exp	K45 (Cascajo A)	B7	
K43 (Mya A)	B8,B9,B10	K63 (Tuffaceous A)	B15	
K46 (Mya A)	B12,B13	K65 (Neverita B)	P18	
K47 (Neverita A)	P7,B1,B4,B5,B6,B9 exp			
K48 (Neverita B)	B19,P18,S6			
K49 (Neverita B)	B16			
K50 (Tuffaceous B)	B14			
K51 (Mya C/D)	B18			
K60 (Pecten A)	P10,P11			
K62 (Tuffaceous B)	B15			
K64 (Tuffaceous A)	B19,P20,S6			
K66 (Neverita A)	B19			
K67 (Sand No. 10)	B18			
K68 (Pecten B)	B18			
K71R (Pecten B)	B18			

¹Indicates the WMUs monitored by detection monitoring wells. WMUs not shown on Attachment B of the revised WDRs include B2, B3, and S4; P1, P2, P3, P4, P4.5, P13, S1, S2, S3, B1, B4, B5, B6, B8, B9, B9 ext, B9 exp, B-10, and B11 which are all located in the Combined Closure Area; P18, P19, P20, S5, and S6, which are former WMUs within the footprint of Landfill B-19; B12, which is within the footprint of closed Landfill B-13 which is shown on Attachment E of the revised WDRs.

²Indicates WMUs monitored by corrective action wells.

³Groundwater elevations only

⁴Water bearing zone being monitored is in parenthesis.