PERMIT PART 3: POST-CLOSURE CARE REQUIREMENTS FOR THE CHEMICAL WASTE LANDFILL

3.0 GENERAL

The CWL Closure Plan, which contained mandatory closure requirements for the CWL, was approved by the NMED in February 1993. A few years earlier, in 1990, trichloroethene (TCE) was detected in groundwater at a concentration exceeding the U.S. Environmental Protection Agency (EPA) Maximum Contaminant Level (MCL) of 0.005 mg/L. This finding led to the development and incorporation of a corrective action program into the approved Closure Plan (as Appendix S). Groundwater and subsurface soil and soil-gas investigations, as well as two Voluntary Corrective Measures (VCMs) were subsequently conducted according to Closure Plan requirements and related documents.

The CWL was excavated from September 1998 through February 2002 to remove the contents of the landfill and contaminated soil (the Landfill Excavation VCM). Soil-vapor extraction was conducted prior to the Landfill Excavation VCM and removed a portion of the VOC soil-gas plume in the vadose zone (the Vapor Extraction VCM). Numerous intact containers of waste were removed as a result of excavation of the landfill; the wastes within these containers were treated and disposed of off-site. Soil having the highest levels of contaminants was treated as necessary and placed permanently into the containment cell at the nearby Corrective Action Management Unit. After excavation was completed, the CWL was backfilled with soil to a uniform depth of four feet below ground surface. Some of the soil used as backfill was originally excavated from the landfill (this soil is referred to as replaceable soil). Concentrations of contaminants in the replaceable soil meet industrial risk levels, consistent with the projected future land use for the CWL site. Since completing the Landfill Excavation and Vapor Extraction VCMs, levels of contaminants in the groundwater have dropped to concentrations below applicable EPA MCLs and New Mexico Water Quality Control Commission water quality standards. Construction of the at-grade cover for the CWL was completed in September 2005, originally as an interim measure.

This Permit Part includes information on the requirements for the length of post-closure care, planned monitoring and maintenance activities, and other requirements for post-closure care. More detailed post-closure care requirements for the CWL are presented in the Attachments to this Permit.

In addition to the post-closure care requirements of 40 C.F.R. §§ 264.117 through 264.120, the Permittees must comply with the groundwater protection standard at 40 C.F.R. § 264.92. Trichloroethene (TCE), chromium, and nickel have been detected in groundwater in the uppermost aquifer underlying the CWL. Therefore, in accordance with 40 C.F.R. § 264.91(a)(1), the Permittees must institute a compliance groundwater monitoring program meeting the requirements of 40 C.F.R. § 264.99. In accordance with 40 C.F.R. § 264.96(a), the compliance period shall last for 47 years, and shall begin when the Permittees initiate the required compliance monitoring program in accordance with 40 C.F.R. § 264.99. In accordance with 40 C.F.R. § 264.96(c), if the Permittees are engaged in a corrective action program at the end of the compliance period, the compliance period shall be extended until the Permittees can demonstrate that the groundwater protection standard of 40 C.F.R. § 264.92 has not been exceeded for a period of three consecutive years.

3.1. RESIDUAL SOIL CONTAMINATION AT RISK-BASED LEVELS

Residual soil contamination that remains at the landfill currently meets risk-based levels for industrial land use. Table 3-1 summarizes the maximum concentrations of contaminants detected in replaceable soil and unexcavated soil. As noted above, replaceable soils are soils placed back into the landfill following completion of the Landfill Excavation VCM. Unexcavated soils are soils that were not removed during the LE VCM, but may contain low levels of hazardous constituents meeting risk-based criteria.

Table 3-1

Residual Soil Concentrations in the Chemical Waste Landfill - Replaceable Soil and Unexcavated Soil

COC	SNL/NM Background Concentration (mg/kg)[a]	Maximum Concentration (mg/kg)	Concentration Range in Replaceable Soils above Background (mg/kg)	Number of Detections in Replaceable Soils above Background	Concentration Range in Unexcavated Soils (mg/kg)	Number of Detections in Unexcavated Soils
Inorganic						
Arsenic	4.4	86.3	4.52-86.3	30	4.51-73.1	40
Barium	214	563 J	350-563	4	215-519	8
Beryllium	0.65	1.14	0.668-1.14	3	0.741-0.846	4
Cadmium	0.9	15.6	0.931-15.6	7	1.79	1
Chromium	15.9	1800	16-181	31	17.7-1800	23
Chromium VI	1	24.6	1.02-5.52	10	1.02-24.6	29
Copper	18.2	545 J	18.4-545	25	18.6-261	9
Lead	11.8	338	11.9-338	48	11.9-162	42
Mercury	<0.1	236	0.122-236	49	0.104-2.35	42
Nickel	11.5	26.1	11.6-26.1	7	12.4-23.4	4
Selenium	<1	9.61	1.01-1.58	2	1.07-9.61	3
Silver	<1	1.5	1.02-1.5	2	All results < bkgd	0
Organic						
Acenaphthene	NA	0.406	0.0081-0.153	10	0.00484-0.406	6
Acenaphthylene	NA	0.01835[b]	ND	0	0.0101	1
Acetone	NA	0.617[b] J	0.00383-0.0803	35	0.00152-0.617	68
Aniline	NA	0.312 J	0.312	1	0.23-0.293	2
Anthracene	NA	0.347	0.00586-0.347	14	0.00522-0.209	9
Benzo(a)anthracene	NA	0.531	0.0136-0.15	6	0.0174-0.531	7
Benzo(a)pyrene	NA	0.181	0.0338-0.181	4	0.0374-0.0859	4
Benzo(b)fluoranthene	NA	0.787	0.0335-0.787	9	0.021-0.343	6
Benzo(ghi)perylene	NA	0.408 J	0.0275	1	0.0293-0.408	2

COC	SNL/NM Background Concentration (mg/kg)[a]	Maximum Concentration (mg/kg)	Concentration Range in Replaceable Soils above Background (mg/kg)	Number of Detections in Replaceable Soils above Background	Concentration Range in Unexcavated Soils (mg/kg)	Number of Detections in Unexcavated Soils
Benzo(k)fluoranthene	NA	0.218	0.0399-0.218	3	0.00515-0.121	5
Bromodichloromethane	NA	0.0175[b]	0.00076	1	ND	0
Bromoform	NA	0.018[b]	0.000554-0.006	21	0.00182	1
4-Bromophenyl phenyl ether	NA	0.02335[b]	ND	0	0.00843	1
2-Butanone	NA	0.187 J	0.00388-0.00739	9	0.00104-0.187	11
Butylbenzene, tert-	NA	0.015[b]	ND	0	0.00161	1
Butylbenzyl phthalate	NA	0.0728 J	ND	0	0.0131-0.0728	2
Carbazole	NA	0.0572 J	0.0266-0.0572	4	0.0111	1
Carbon disulfide	NA	0.031[b]	ND	0	0.00519	1
bis(2-Chloroethyl)ether	NA	0.248 J	0.248	1	ND	0
Chloroform	NA	0.0235[b]	0.000545-0.00119	14	ND	0
Chloromethane	NA	0.00175[b]	0.00034	1	ND	0
2-Chloronaphthalene	NA	0.01835[b]	ND	0	0.0123-0.0125	2
2-Chlorophenol	NA	0.025b	0.00622-0.0059	2	0.00525	1
4-Chlorophenyl phenyl ether	NA	0.01665b	ND	0	0.00826	1
Chrysene	NA	0.559	0.0198-0.559	31	0.0133-0.228	10
Di-n-butyl phthalate	NA	9.3	0.0256-9.3	8	0.0211-0.114	9
Di-n-octyl phthalate	NA	0.347c	ND	0	0.012	1
Dibenzofuran	NA	0.118 J	0.0028-0.118	8	0.00271-0.0951	7
Dibromochloromethane	NA	0.0205b	0.000608-0.00206	9	ND	0
1,2-Dibromoethane	NA	0.016b	ND	0	0.00144	1
1,2-Dichlorobenzene	NA	0.214	0.0142-0.214	5	0.00116-0.114	18
1,3-Dichlorobenzene	NA	0.021b J	0.0037-0.00383	2	0.000447-0.0123	8
1,4-Dichlorobenzene	NA	0.194	0.0129	1	0.00041-0.194	60
2,4-Dichlorophenol	NA	0.04b	0.0128	1	ND	0

COC	SNL/NM Background Concentration (mg/kg)[a]	Maximum Concentration (mg/kg)	Concentration Range in Replaceable Soils above Background (mg/kg)	Number of Detections in Replaceable Soils above Background	Concentration Range in Unexcavated Soils (mg/kg)	Number of Detections in Unexcavated Soils
Diethylphthalate	NA	0.0985b	0.025	1	0.026-0.0544	18
2,4-Dimethylphenol	NA	0.36b	ND	0	0.0883	1
Dimethylphthalate	NA	0.0585b	ND	0	0.0124	1
2,4-Dinitrophenol	NA	0.699	0.699	1	ND	0
Diphenyl amine	NA	0.035b	0.0258	1	ND	0
Ethyl benzene	NA	0.035b	0.00143	1	0.000822-0.00124	3
bis(2-Ethylhexyl) phthalate	NA	57.1	0.0315-5.13	51	0.00911-57.1	125
Fluoranthene	NA	2.03	0.00687-2.03	43	0.00352-0.955	35
Fluorene	NA	0.183	0.00308-0.0947	15	0.00352-0.183	6
Heptachlorodibenzo-p-dioxin	NA	0.000063	ND	0	0.000063	1
1,2,3,4,6,7,8-Heptachlorodibenzodioxin	NA	0.000063	ND	0	0.000063	1
Heptachlorodibenzofuran	NA	0.000047	ND	0	0.000025-0.000047	4
1,2,3,4,6,7,8-Heptachlorodibenzofuran	NA	0.000047	ND	0	0.000025-0.000047	4
Hexachlorobenzene	NA	0.02335b	0.00998-0.0203	3	0.011-0.0167	3
Hexachlorobutadiene	NA	0.02335b	ND	0	0.0147	1
Hexachlorodibenzo-p-dioxin	NA	0.00003	ND	0	0.00003	1
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	NA	0.00003	ND	0	0.00003	1
Hexachlorodibenzofuran	NA	0.00002	ND	0	0.00002	1
1,2,3,6,7,8-Hexachlorodibenzofuran	NA	0.00002	ND	0	0.00002	1
Indeno(1,2,3-c,d)pyrene	NA	0.267 J	ND	0	0.0408-0.267	3
4-Isopropyltoluene	NA	0.0401 J	ND	0	0.00154-0.0401	2
Methyl methacrylate	NA	0.102b	ND	0	0.00194-0.006	10
Methylene chloride	NA	0.864	0.000955-0.016	14	0.000448-0.864	70
2-Methylnaphthalene	NA	0.0683	0.00414-0.0295	5	0.00432-0.0683	6
4-Methylphenol (same as p-Cresol)	NA	0.0767 J	0.0119-0.0767	2	0.0195-0.0427	3

COC	SNL/NM Background Concentration (mg/kg)[a]	Maximum Concentration (mg/kg)	Concentration Range in Replaceable Soils above Background (mg/kg)	Number of Detections in Replaceable Soils above Background	Concentration Range in Unexcavated Soils (mg/kg)	Number of Detections in Unexcavated Soils
Naphthalene	NA	0.1b	0.00446-0.0217	3	0.000307-0.0535	27
Octachlorodibenzo[b,e][1,4]dioxin	NA	0.000305	ND	0	0.000085-0.000305	5
Octachlorodibenzofuran	NA	0.000329	ND	0	0.000087-0.000329	6
PCBs, total	NA	24.69	0.00165-24.69	56	0.0016-11.45	118
Pentachlorophenol	NA	1.16	0.218-1.16	5	0.103-0.897	3
4-methyl-2-Pentanone	NA	0.067b	ND	0	0.00136-0.00328	15
Phenanthrene	NA	0.916	0.0134-0.916	24	0.00601-0.2	13
Phenol	NA	0.578	0.00898	1	0.0295-0.578	6
n-Propylbenzene	NA	0.0175b	ND	0	0.00181	1
Pyrene	NA	1.51 J	0.0114-1.46	46	0.00951-1.51	33
Styrene	NA	0.016b	ND	0	ND	0
1,1,1,2-Tetrachloroethane	NA	0.02b	ND	0	0.000946	1
1,1,2,2-Tetrachloroethane	NA	0.0445	ND	0	0.000333-0.0445	3
Tetrachloroethene	NA	0.11	0.0021-0.11	4	0.00158-.0108	6
Tetrahydrofuran	NA	0.119b	ND	0	0.00459-0.089	2
Toluene	NA	0.894	0.000369-0.0183	12	0.0005123-0.894	161
o-Toluidine	NA	0.4065b	ND	0	0.131-0.151	2
1,2,3-Trichlorobenzene	NA	0.0235b	ND	0	0.000453-0.000776	2
1,2,4-Trichlorobenzene	NA	0.043 J	0.00509-0.00618	2	0.000674-0.043	11
Trichloroethene	NA	0.36b	0.00048-0.0021	2	0.000831-0.00206	3
2,4,5-Trichlorophenol	NA	0.22	0.0254-0.22	4	ND	0
1,2,3-Trichloropropane	NA	0.0928	ND	0	0.000404-0.0928	3
1,3,5-Trimethylbenzene	NA	0.021b	ND	0	0.000245-0.0108	4
Xylene	NA	0.00387	0.000804-0.00365	3	0.00387	1
m-,p-Xylene	NA	0.0174	0.0174	1	ND	0
o-Xylene	NA	0.00393	0.00393	1	0.000313-0.000919	2

Radiological Constituents						
COC	**SNL/NM Background Concentration (pCi/g)[a]**	**Maximum Concentration (pCi/g)**	**Activity Range in Replaceable Soils Above Background (pCi/g)**	**Number of Detections in Replaceable Soils Above Background**	**Activity Range in Unexcavated Soils Above Background (pCi/g)**	**Number of Detections in Unexcavated Soils Above Background**
Co-60	NA	0.46	ND	0	0.46	1
Cs-137	0.079	0.534	0.0811-0.163	7	0.534	1
H-3	0.021[e]	9.9	0.0237-9.9	5	0.0216-2.28	14
Th-232	1.01	2.3	1.02-2.3	5	1.08	1
U-235	0.16	0.454[b]	0.179-0.219	2	0.161-0.227	6
U-238	1.4	3.26	1.47-2.05	11	1.43-3.26	25

Note: Data qualifiers (i.e., "J") are not included in this table except in the Maximum Concentration column.

[a] Dinwiddie, September 1997.

[b] Maximum value reported is ½ the maximum detection limit, which was greater than the maximum detected value.

[c] Maximum value from a clean fill soil sample – only one detection of this constituent.

[d] All total PCB concentrations greater than 1 part per million represent soil at depths greater than 5 feet below ground surface.

[e] Tharp, February 1999.

COC = Constituent of concern.
J = Estimated concentration.
mg/kg = Milligram(s) per kilogram.
NA = Not applicable.
PCB = Polychlorinated biphenyl.
pCi/g =Picocurie(s) per gram.

3.2. POST-CLOSURE CARE PROCEDURES AND USE OF PROPERTY

3.2.1. Duration of Post-Closure Care

The Permittees shall conduct post-closure care for the CWL to begin upon the Department's written approval of the Permittees' certification of closure of the unit and continue for 30 years after that date, except that the 30-year post-closure care period may be shortened or extended, as follows:

1. In accordance with 40 C.F.R. § 264.117(a)(2)(i), the Department may, in accordance with the permit modification procedures in 40 C.F.R. Part 270 and 20.4.1.901 NMAC, shorten the post-closure care period if it finds that human health and the environment will be protected sufficiently (e.g., groundwater and soil-gas monitoring results indicate that the CWL is secure).
2. In accordance with 40 C.F.R. § 264.117(a)(2)(ii), the Department may, in accordance with the permit modification procedures in 40 C.F.R. Part 270 and 20.4.1.901 NMAC, extend the post-closure care period if it finds that this is necessary to protect human health or the environment (e.g., groundwater or soil-gas monitoring results indicate a potential for migration of hazardous wastes at levels which may be harmful to human health and the environment).

3.2.2. Groundwater Monitoring System

The Permittees shall operate and maintain the groundwater monitoring system and shall comply with all applicable requirements of 40 C.F.R. Part 264, Subpart F during the post-closure care and compliance periods, in accordance with 40 C.F.R. § 264.117(a)(1), and as specified in this Permit.

3.2.3. Special Post-Closure Requirements for Landfills

The Permittees shall comply with the requirements for landfills at 40 C.F.R. § 264.310(b), except for the requirements for a leachate collection and removal system, and as described in Attachment 1 of this Permit, as follows.

1. Maintain the integrity and effectiveness of the final cover, including making repairs to the cover, as necessary, to correct the effects of settling, subsidence, erosion, or other events;
2. Operate and maintain the groundwater monitoring system described in Section 1.4 of Attachment 1 of this Permit, and comply with all other applicable requirements of 40 C.F.R. Part 264 Subpart F;
3. Prevent run-on and run-off from eroding or otherwise damaging the final cover; and,
4. Protect and maintain surveyed benchmarks used in complying with the surveying and recordkeeping requirements of 40 C.F.R. § 264.309.

3.2.4. Security Requirements

In accordance with 40 C.F.R. § 264.117(b), the Permittees shall comply with all security requirements, as specified in Attachment 1 of this Permit, and as required by 40 C.F.R. § 264.14.

3.2.5. Future Land Use Requirements

The Permittees shall not allow any use of the CWL that will disturb the integrity of the final cover or the function of the unit's monitoring systems during the post-closure care period, as required by 40 C.F.R. § 264.117(c).

3.3. INSPECTION

The Permittees shall inspect the components, structures, and equipment at the CWL in accordance with the Inspection and Maintenance/Repair Schedule described in Section 1.9 of Attachment 1 of this Permit and shall record the results of each inspection as described in Section 1.10 of Permit Attachment 1, and in accordance with the inspection requirements of 40 C.F.R. § 264.15.

3.4. GROUNDWATER SAMPLING AND ANALYSIS PLAN

The Permittees shall conduct groundwater sampling and analysis following the procedures and requirements described in Attachments 1 and 2 of this Permit.

3.5. SOIL GAS SAMPLING AND ANALYSIS

The Permittees shall conduct soil-gas sampling and analysis following the procedures and requirements described in Attachments 1 and 3 of this Permit.

3.6. PERSONNEL TRAINING FOR POST-CLOSURE CARE PERIOD

The Permittees shall implement the CWL-specific personnel training program for the post-closure care period specified in Attachment 5 of this Permit, and as required by 40 C.F.R. § 264.16.

3.7. POST-CLOSURE PERMIT MODIFICATIONS

In accordance with 40 C.F.R. § 264.118(d), the Permittees must request a permit modification to authorize a change in this Permit. This request must be in accordance with applicable requirements of 40 C.F.R. Part 270 and 20.4.1.901 NMAC, and must include a copy of the proposed amended portions of this Permit for approval by the Department. The Permittees shall request a permit modification whenever changes in operating plans or facility design affect any part of this Permit, there is a change in the expected year of final closure, or other events occur during the post-closure care period of the CWL that affect this Permit. The Permittees must submit a written request for a permit modification to the Department at least sixty (60) days prior to the proposed change in CWL design or operation, or no later than 60 days after an unexpected event has occurred which has affected the post-closure care requirements contained in this Permit.

3.8. REFERENCES

Dinwiddie, R.S, September 24, 1997. Letter to M.J. Zamorski (U.S. Department of Energy), "Request for Supplemental Information: Background Concentrations Report, SNL/KAFB." New Mexico Environment Department.

Tharp, T.L, February 25, 1999. Memorandum to F.B. Nimick (Sandia National Laboratories/New Mexico), "Tritium Background Data Statistical Analysis for Site-Wide Surface Soils." Sandia National Laboratories/New Mexico.