

DUGWAY PERMIT

MODULE VII

ATTACHMENT 37

**SWMU 052
POST-CLOSURE PLAN**

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LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS

bgs	below ground surface
CFR	Code of Federal Regulations
CMI	Corrective Measures Implementation Plan
CWM	Chemical Warfare Materiel
DPG	Dugway Proving Ground
DSHW	Divisions of Solid and Hazardous Waste
DWQ	Division of Water Quality
EPO	Environmental Program Office
ft	feet
GCL	Geosynthetic Clay Liner
GMA	Groundwater Management Area
HWMU	Hazardous Waste Management Unit
µg/L	micrograms per liter
mg/L	milligrams per liter
msl	mean sea level
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
Shaw	Shaw Environmental, Inc.
SWMU	Solid Waste Management Unit
TDS	Total Dissolved Solids
UAC	Utah Administrative Code
UDEQ	Utah Department of Environmental Quality
USGS	U.S Geological Survey
UXO	Unexploded Ordnance

1.0 INTRODUCTION

The two objectives of this Post-Closure Plan are: 1) ensure that Dugway Proving Ground (DPG or Dugway) complies with the Post-Closure Permit issued by the State of Utah in accordance with Title 40 Code of Federal Regulations (CFR) §264.117, with respect to post-closure inspection requirements; 2) outline the requirements needed to prevent exposure or contact with waste left in place at this landfill site. To meet these objectives, this Post-Closure Plan provides detailed information regarding the location, regulatory criteria, and post-closure inspections at Solid Waste Management Unit (SWMU) 052, herein referred to as DPG-052. Post-closure requirements will continue for a minimum of 30 years after closure of DPG-052. The post-closure care period may be extended or shortened, as deemed necessary (40 CFR §264.117(a)(2)).

In accordance with 40 CFR §270.28 and Utah Administrative Code (UAC) R315-3-2.19, the Post-Closure Plan is required to include specific information for a closed facility. As applicable to DPG-052, the information requirements include:

- General description of the facility;
- Description of security procedures;
- General inspection schedule;
- Preparedness and Prevention Plan;
- Facility location information (including seismic and flood plain considerations);
- Closure Plan or Closure Proposal;
- Certificate of Closure;
- Topographic map, with specific scale;
- Summary of groundwater monitoring data; and
- Identification of uppermost aquifer and interconnected aquifers.

Table 1 provides the regulatory citations for the general information requirements and the specific locations in this Post-Closure Plan where the specific information is presented.

**Table 1: Summary of DPG-052 Post-Closure Information Requirements
 Under 40 CFR §270.14, and UAC R315-3-2.5**

Regulation Citation	Requirement Description	Location Requirement is Addressed
40 CFR §270.14(b)(1) UAC R315-3-2.5(b)(1)	General Description of the Facility	Section 2.0
40 CFR §270.14(b)(4) UAC R315-3-2.5(b)(4)	Description of Security Procedures	Section 3.0
40 CFR §270.14(b)(5) UAC R315-3-2.5(b)(5)	General Inspection Schedule	Section 4.2 and Module VII Form B
40 CFR §270.14(b)(6) UAC R315-3-2.5(b)(6)	Preparedness and Prevention	Section 3.0

Table 1 (Continued): Summary of DPG-052 Post-Closure Information Requirements Under 40 CFR §270.14, UAC R315-3-2.19, and UAC R315-3-2.5

Regulation Citation	Requirement Description	Location Requirement is Addressed
40 CFR §270.14(b)(11)(i-ii, v) UAC R315-3-2.5(b)(11) (i-ii, v)	Facility Location Information Applicable seismic standard	Section 4.3.1
40 CFR §270.14(b)(11) (iii-v) UAC R315-3-2.5(b)(11) (iii-v)	Facility Location Information 100-year floodplain	Section 4.3.2
40CFR §270.14(b)(13) UAC R315-3-2.5(b)(13)	Copy of the Closure Proposal	Phase II RCRA Facility Investigation (RFI) was approved on 09/20/2004. No public comments were received.
40 CFR §270.14(b)(14) UAC R315-3-2.5(b)(14)	Closure Certification and Notification	Section 2.7 and Appendix A.
40 CFR §270.14(b)(16) UAC R315-3-2.5(b)(16)	Post-Closure Cost Estimate	Federal Facilities are exempt from this requirement.
40 CFR §270.14(b)(18) UAC R315-3-2.5(b)(18)	Proof of Financial Coverage	Federal Facilities are exempt from this requirement.
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (i)	Topographic Map Map Scale and Date	Figure 2 (1 inch = 1000 feet (ft)).
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (ii)	Topographic Map 100-year floodplain area	Section 4.0; DPG-052 is not located within a verified 100-year floodplain area.
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (iii)	Topographic Map Surface waters including intermittent streams	Figure 2
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (iv)	Topographic Map Surrounding land uses	DPG-052 is within a military base. There are no nearby operations in the vicinity of DPG-052.
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (v)	Topographic Map A wind rose (i.e., prevailing windspeed and direction)	There are no residential populations abutting DPG-052. The closest residential area is English Village (approximately 10 miles away). A wind rose is not deemed necessary for DPG-052.
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (vi)	Topographic Map Orientation of Map, North Arrow	Figure 2
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (vii)	Topographic Map Legal boundaries of the hazardous waste management facility	Figure 2
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (viii)	Topographic Map Access control, fence, gates	Figure 2. The site is not enclosed by a fence.

Table 1 (Continued): Summary of DPG-052 Post-Closure Information Requirements Under 40 CFR §270.14, UAC R315-3-2.19, and UAC R315-3-2.5

Regulation Citation	Requirement Description	Location Requirement is Addressed
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (ix)	Topographic Map Injection and withdrawal wells	Figure 2
40 CFR §270.14(b)(19) UAC R315-3-2.5(b)(19) (xi)	Topographic Map Barriers for drainage or flood control	Figure 3. DPG-052 is graded to drain surface water away from the engineered covers. There are no barriers to drainage or flood control.
40 CFR §270.14(c) UAC R315-3-2.5(c)(1)	Groundwater Monitoring Information Summary of Groundwater Data	Final Phase II RFI Report, Section 2.2.4.2
40 CFR §270.14(c) UAC R315-3-2.5(c)(2)	Groundwater Monitoring Information Identification of uppermost aquifer	Final Phase II RFI Report, Section 2.2.1
40 CFR §270.14(c) UAC R315-3-2.5(c)(3)	Groundwater Monitoring Information Delineation of the Waste Management Area	Figure 2
40 CFR §270.14(c) UAC R315-3-2.5(c)(4)	Groundwater Monitoring Information Extent of Plume	Final Phase II RFI Report, Section 2.2.4.2 and Figure 2.5
40 CFR §270.14(c) UAC R315-3-2.5(c)(5)	Groundwater Monitoring Information Detailed Plans/Engineering Report for Proposed Groundwater Program	Post-closure groundwater monitoring at DPG-052 will be in accordance with the Carr Groundwater Management Area (GMA) Plan.
40 CFR §270.14(c) UAC R315-3-2.5(c)(6)(i)	Groundwater Monitoring Information Proposed List of Parameters	Post-closure groundwater monitoring at DPG-052 will be in accordance with the Carr GMA Plan.
40 CFR §270.14(c) UAC R315-3-2.5(c)(6)(ii)	Groundwater Monitoring Information Proposed Groundwater Monitoring System	Post-closure groundwater monitoring at DPG-052 will be in accordance with the Carr GMA Plan.
40 CFR §270.14(c) UAC R315-3-2.5(c)(6)(iii)	Groundwater Monitoring Information Background Values	Post-closure groundwater monitoring at DPG-052 will be in accordance with the Carr GMA Plan.
40 CFR §270.14(c) UAC R315-3-2.5(c)(6)(iv)	Groundwater Monitoring Information A description of the Proposed Sampling	Post-closure groundwater monitoring at DPG-052 will be in accordance with the Carr GMA Plan.

2.0 FACILITY DESCRIPTION

The following provides a general description of DPG-052, as required by UAC R315-3-2.5(b)(1) (Figures 1 and 2).

2.1 DPG-052 LOCATION AND HISTORY

SWMU-52 occupied approximately 5 acres and was located approximately 0.6 miles southeast of the entrance to the Carr Facility and 0.25 miles from the closest edge of the Carr Facility, along an unnamed dirt track. This site was the location of a landfill and a former munitions disposal and storage area based on surface wastes removed from the site and visible wastes formerly present in burial trenches. Site features covered an affected area (the portion of the SWMU where soil was potentially disturbed or otherwise affected by site activities) of approximately 4.5 acres.

DPG-052 is relatively flat with an average elevation of 4365 feet (ft) above mean sea level (AMSL). No historical information was available on the use of the site, but the types of munitions identified suggest that it was used during the 1940s and 1950s. Many of the disturbed site features (soil mounds and berms) are visible in aerial photographs of the Carr Facility that date back to November 1947.

The site was characterized during the RFI as consisting of the following features:

- 7 trenches (TR-1 through TR-7),
- 6 soil mounds (MD-1 through MD-6),
- 2 areas of stained soil associated with TR-1,
- 2 areas of stacked empty munitions (removed), and
- 3 detonation craters (DC-1 through DC-3).

The trenches were backfilled and varied in size from 50 ft to 400 ft in length and had an average width of 30 ft (Figure 3). Visible waste within the trenches and scattered on the surface consisted of munition remnants, metal debris, and decomposed drums. Field observations and geophysical survey results indicated that buried waste was present in the trenches (except for TR-2 through TR-4), and at a single mound (MD-6) at the site. No buried waste was evident in the other mounds. Buried debris was present in TR-1, TR-5, TR-6, and TR-7, with the highest concentration of buried debris present at TR-1 as evident from geophysical surveys. Highly corroded drums were evident in TR-7. Surface disposal of miscellaneous construction debris (mainly wood and scrap metal) was observed at TR-3 and TR-4; however, no evidence of buried waste was observed associated with these site features. TR-2 was a larger arc-shaped trench with an associated soil mound (MD-3) that extended around the south end of the main disposal area; no buried waste was evident within the trench or mound. MD-6 was a small mound at the location of a geophysical anomaly indicating the presence of buried metal.

2.2 PAST OPERATIONS

Partially buried drums and ordnance and explosive (OE) debris observed on the surface and in the subsurface of burial features indicate that disposal of waste and munitions associated with chemical warfare materiel (CWM) may have occurred. Additionally, the demilitarization of chemical munitions may also have occurred at this SMWU.

Surface debris was previously removed through a base contract, and consisted of empty WWII German bombs, empty 55-gallon fog-oil drums, unexploded ordnance (UXO) remnants, and miscellaneous debris.

Approximately 25 tons of munition/OE debris and empty bombs were disposed of at a State of Utah regulated hazardous waste landfill. Six and one-half tons of empty drums were disposed of at the DPG Defense Reutilization and Marketing Office (DRMO), and 4 tons of the remaining debris were taken to the DPG landfill. During the removal of the surface debris, a chemical-filled UXO item was identified at the site. An emergency permit was obtained, and the munition was destroyed at the site. Site soil screening for chemical agent was performed following the demolition of the UXO (Parsons, 1999).

2.3 PREVIOUS INVESTIGATIONS DOCUMENTATION

The detailed results of previous soil and groundwater sampling and closure information including the risk assessment are available for DPG-052 in the Division of Solid and Hazardous Waste (DSHW) public documents listed below in Table 2 (UAC R315-3-2.5(b)(13)).

Table 2: DSHW Library Documents Detailing DPG-052 Investigations

Document Title	Received Date	DSHW Library No.
Parsons, 1999. <i>Final Phase I RCRA Facility Investigation Report, Revision 1.</i> September	09/99	DPG00007
Parsons, 2005. <i>Final Phase II RCRA Facility Investigation Report, SWMU-052 Addendum.</i> January.	01/05	
Shaw Environmental, 2006a. <i>Corrective Measures Study Report, Firm Fixed-Price Remediation at Landfill Sites, Dugway Proving Ground, Dugway, Utah.</i> July.	07/06	DPG00528
Shaw Environmental, 2006b. <i>Corrective Measures Implementation Plan, Firm Fixed-Price Remediation at Landfill Sites, Dugway Proving Ground, Dugway, Utah.</i> November.	11/06	DPG00521
Shaw Environmental, Inc., 2008. <i>Final Corrective Measures Implementation Report For DPG-052.</i>	01/08	

2.4 CLOSURE ACTIVITIES

In accordance with UAC R315-7-21 and the Corrective Measures Implementation (CMI) Plan (Shaw, 2006b), closure at DPG-052 has been completed with the construction of an engineered cover system consisting of a geomembrane-supported geosynthetic clay liner (GCL) placed over the identified waste features. The closure activities are described in the CMI Report (Shaw, 2008). Appendix A includes a copy of the DPG-052 Closure Certification signed and stamped by a Utah-licensed Professional Engineer.

The final cover system as designed and constructed satisfies the requirements of UAC R315-7-14 and R315-7-21 (by reference 40 CFR §264, Subpart N, §264.310) for the closure and post-closure of DPG-052, namely:

- Provide long-term minimization of migration of liquids through the closed landfill;
- Function with minimum maintenance;
- Promote drainage and minimize erosion or abrasion of the cover;
- Accommodate settling and subsidence so that the integrity of the cover is maintained; and

- Achieve a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.

In meeting the above performance standards, the major closure activities completed at DPG-052 included:

- Installation of the final engineered cover system, and
- Final grading of the site, including enhancement of drainage features, to help control erosion and minimize long-term maintenance requirements.

These measures will prevent human contact with the waste and provide for protection of groundwater. A general inspection checklist for landfill sites designed to insure that these objectives are maintained is provided in Module VII as Form B.

2.5 HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT

In accordance with UAC R315-101, a risk assessment was conducted during the RFI (Parsons, 2005) to determine if the site-related chemicals detected in soil and groundwater at DPG-052 potentially pose unacceptable risks to human health and to identify site features requiring corrective action. In accordance with the risk assessment guidance presented in the DPG Risk Assumptions Document (Parsons, 2002), a quantitative HHRA was conducted to determine if the site would meet requirements for risk-based closure under UAC R315-101.

The estimated receptor-specific cancer risks are less than 1E-05 for potential carcinogens and the estimated noncancer hazards are less than 1.0. These risk levels apply to environmental media exclusive of buried waste and surface debris.

A DPG-052-specific Ecological Risk Assessment was conducted in two sequential assessment tiers. Based on the results, residual chemical concentrations in characterized soil would not pose a hazard to populations of small mammals or birds. However, corrective action was required due to the potential risk associated with buried waste.

2.6 SURFACE WATER AND GROUNDWATER

There are no defined surface water features within or near DPG-052. There is no surface water or temporary ponding of water at this relatively flat site. No ephemeral surface drainage patterns have been identified at SWMU-52.

Groundwater data from the vicinity of this SWMU indicate that the shallow water-bearing zone is present at approximately 39 ft bgs and is non-potable. Average water quality at SMWU-52 is calculated at 11,200 milligrams per liter (mg/L) and is Class IV (saline) per Utah Administrative Code (UAC) R317-6-3 (DWQ, 2002). The direction of regional groundwater flow is toward the south-southwest (Parsons 2004e). Potable water in the vicinity is obtained from WW-5 located approximately 0.5 mile northwest of SWMU-52, inside the Carr Facility. WW-5 is screened in the deep aquifer under confined conditions at a depth of 325-355 ft bgs. No contamination has been identified in groundwater sampled from WW-5. The shallow water-bearing zone does not appear to be hydraulically connected to the underlying deeper potable aquifer at this site, as indicated by lithology (i.e., the clay confining layer) and water quality data (Parsons, 2000a). WW-33 was recently drilled (May 2003) west of the Carr Facility, and is located approximately 0.8 mile west of SWMU-52. WW-33 is also screened in the deep confined aquifer from 290 ft to 390 ft bgs. No contamination has been identified in groundwater sampled from

WW-33 (Kleinfelder, 2003). Inactive well WW-29 is located approximately 1.3 miles southeast of the site and was drilled to a depth of 450 ft bgs. No information is available regarding the screen depth of this well or water quality of the aquifer at this location.

Groundwater monitoring will be in accordance with the Carr GMA.

2.7 CLOSURE NOTIFICATIONS

The Certification of Closure (Appendix A) was received and verified by the Executive Secretary of the Utah Solid and Hazardous Waste Control Board on August 8, 2008.

Federal facilities are exempt from submitting notifications to the local zoning authority as required by 40 CFR §264.116 and §264.119, which are incorporated by reference in UAC R315-8-7.

3.0 SECURITY REQUIREMENTS

The following security conditions are applicable to DPG-052:

1. DPG-052 is located within a federal, military installation (DPG). As such, the installation is restricted for the common population.
2. At DPG-052, signs are present warning against unauthorized entry.
3. Security facilities are to be maintained and inspected throughout the post-closure care period. The security facilities (i.e., posted signs) will be inspected and the frequency of inspection is stated in Section 4.2. Dugway shall report to the DSHW any decrease of Dugway's Base Security, which could affect the security conditions as applicable to DPG-052.
4. Damaged or missing security facilities shall be noted in the inspection checklist. Repairs shall be completed as soon as practicable after the problem is discovered, in compliance with R315-8-2.6(c).

4.0 POST-CLOSURE OPERATIONS AND INSPECTIONS

4.1 INTRODUCTION

DPG-052 has been closed under the DPG RCRA Part B Permit requirements and specifications of the CMI Plan for Landfill Sites (Shaw, 2006b). Disturbance of the waste will not be allowed. To ensure that the area is not reused or developed, periodic site inspections and a biennial post-closure report shall be required. Removal and reuse of soil from this site will not be allowed unless under an excavation permit approved by the Dugway Environmental Program Office (EPO). Soil excavation at this site must be coordinated through the Dugway EPO.

4.2 ROUTINE SITE INSPECTIONS

During its Post-Closure period general inspections of the former DPG-052 site shall be conducted annually by November 1st to ensure that the integrity of the engineered caps is maintained and to verify

the Dugway Dig Permit process has been followed. Any modifications to the frequency of inspections will be in accordance with amendments submitted in the form of proposed permit modifications.

Site inspections will consist of a complete walkthrough and visual inspection of the covered areas as well as surface water drainage features. A general site inspection checklist for landfill sites is included as Form B in Module VII. Completed inspection forms shall be filed with the DPG EPO.

At a minimum the site shall be visually inspected to ensure the following conditions are maintained at the site:

- No noticeable sliding (slope failure),
- No noticeable damage to the soil covering from burrowing animals,
- No noticeable depressions or ponding water are present,
- No excessive soil erosion is evident on the cap surface or at the cap edges,
- No weeds or trees (with deep tap roots) are present that may penetrate the caps,
- Signs are in good condition,
- Drainage patterns and roads are functioning as planned with no significant erosion or ponding, and
- The survey monument is undamaged and there is no significant subsidence of the landfill caps.

Table 3 summarizes the Post-Closure Inspection Schedule for DPG-052, and lists the items to be inspected. Inspection personnel shall note any problems found and shall inform appropriate Dugway representatives.

Table 3: DPG-052 Post-Closure Inspection Schedule

Inspection/ Monitoring Item	Method of Documentation	Frequency of Inspection
Landfill Caps	Inspection Checklist (Module VII Form B)	Annual, by November 1 st
Survey Monument	Inspection Checklist (Module VII Form B)	Annual, by November 1 st / 5 year intervals
Signs	Inspection Checklist (Module VII Form B)	Annual, by November 1 st
Drainage	Inspection Checklist (Module VII Form B)	Annual, by November 1 st

4.2.1 Protective Soil Layer Inspections

Maintenance of the protective soil layer is an essential step in ensuring that the integrity of the final cover system is preserved. During each site visit, observations will be made to ensure that the protective soil layer is functioning as designed (i.e., protecting the underlying GCL). Repairs to the protective soil layer may include removal of vegetation species having tap roots greater than 12 inches, placement of fill in areas where a potential for ponding water on the cover exists due to settlement, or repair and stabilization of areas that have been eroded.

If signs of soil erosion are excessive (for example, cracks or rills greater than 2 inches wide) or continual (recurring in the same area), corrective action may be necessary. Significant cracks or rills that have the potential to impact the functionality of the cover system will be documented on the inspection forms. Corrective action may include filling in the eroded or cracked area, regrading slopes, establishing vegetation (if soil salinity is favorable) or adding mulch to the soil surface.

For most routine repairs, corrective action should be initiated as soon as possible after identifying the problem or as directed by DPG. If the corrective action requires substantial effort and/or a technical plan, a brief plan will be prepared to summarize the problem, the potential impacts, and the time-frame in which corrective action will be implemented and the planning involved.

4.2.2 Survey Monument Inspections

During each visit, the survey monument installed during closure (Figure 4) will be inspected to determine if any damage has made its use questionable as a reference point. If missing or badly damaged, it will be replaced as soon as possible after discovery of the problem.

As part of the routine inspection, survey monument location and elevation will be surveyed at least once per year for the first two years after construction. Once a settlement of 0.1 ft or less has been measured for two consecutive years, surveys can be scaled back to once every five years. The baseline northing, easting, and elevation of the DPG-052 survey monument (SM052) have been summarized in Table 4. In addition, the survey coordinates for locations around the perimeter of the cover system, shown on Figure 4, are presented for future reference.

Table 4: DPG-052 Survey Coordinates

Description / Pt. Location	Northing (ft)	Easting (ft)	Elevation^a (ft above msl)
Survey Monument (SM052)	7,231,040.21	1,254,586.22	4,372.7
7000	7,231,038	1,254,483	4,370
7001	7,231,101	1,254,509	4,370
7002	7,231,030	1,254,714	4,370
7003	7,230,967	1,254,688	4,370
7008	7,231,103	1,254,284	4,368
7009	7,231,103	1,254,250	4,368
7010	7,231,137	1,254,251	4,368
7011	7,231,137	1,254,284	4,368
7013	7,230,990	1,254,312	4,369
7014	7,230,942	1,254,363	4,369
7015	7,230,919	1,254,340	4,369
7016	7,230,968	1,254,292	4,369
7020	7,230,828	1,254,242	4,368
7021	7,230,771	1,254,201	4,368
7022	7,230,790	1,254,147	4,368
7023	7,230,845	1,254,202	4,368
7027	7,230,750	1,254,235	4,367
7028	7,230,729	1,254,257	4,367
7029	7,230,685	1,254,216	4,367
7030	7,230,710	1,254,189	4,367

^{a.} *The initial coordinates of points 70-00 to 7030 were established with a Global Positioning System. The survey monument (SM052) was surveyed in February, 2008 and results are provided in the 2008 biennial report.*

4.3 CONTINGENCY INSPECTIONS

This section provides information about emergency response inspection procedures to be implemented in the event of any natural disaster in the DPG area that may affect the final soil cover at DPG-052. Module VII contains a general inspection checklist for landfill sites (Form B).

The Dugway Emergency Response and Contingency Plan (Part B Permit), where applicable to this site, shall be used to announce and respond to emergency conditions. At a minimum, the site inspector should have a radio or phone and a First Aid kit available during inspections.

4.3.1 Earthquakes

Dugway Proving Ground is located in Seismic Zone 2 with a maximum acceleration of 0.2 gravity force (Hunt, 1984). DPG-052 is not located within 200 ft of any active faults. Although Utah is tectonically active, most of the earthquake activity occurs about 65 miles to the east along the Wasatch Range Foothills.

A geologic map completed in a 1988 study by the U.S. Geological Survey (USGS) (Barnhard and Dodge, 1988), was used to determine the distribution, relative age, and amount and extent of surface rupture on Quaternary fault scarps, in the area of DPG-052.

The USGS study (Barnhard and Dodge, 1988) concluded that morphologic and geologic data collected along the fault scarps in the area indicate that all were formed during the later Pleistocene era and there is not any clear evidence of Holocene surface rupture. Several faults inferred on geophysical evidence are located at DPG; however, there is no evidence of displacement during Holocene time.

In the event of a 6.5 magnitude or higher earthquake centered within 50 miles of the site, qualified personnel will visually inspect the landfill caps for signs of damage as soon as it is safe and practical to do so. Any damage to a landfill cap will be repaired to ensure the integrity of the cap. If a landfill cap has sustained extensive damage, Dugway will implement corrective actions to ensure that contaminants are contained and human health is protected. Post-earthquake site inspection records will be submitted to the DPG EPO.

Following an earthquake, the landfill and landfill caps will also be inspected for lateral shifting of debris. The survey monument will be resurveyed to determine any horizontal or vertical movement of the caps.

4.3.2 Floods or Major Storms

DPG-052 is not located within a 100-year verified floodplain. The National Flood Insurance Rate Map, identifying the boundary of the 100-year flood, does not include DPG. There are no permanent streams or other surface water bodies on DPG.

During the capping of DPG-052, the site was graded so that surface water from precipitation flows away from the capped area and to the northwest in the direction of the natural drainage flow. Most of the surface water evaporates rather than percolating into the ground. Like other arid regions, DPG is subject to flash flooding following high-precipitation events. Flash floods have occurred only four times in the history of the installation, in 1944, 1952, 1973, and 1983. The major area affected during flash floods has been the Government Creek drainage channel, which has overflowed and caused minor inundation of roads at the Ditto Technical Center.

In the event of a flood or major storm, Dugway will inspect the landfill caps to ensure their integrity within 72 business hours of the event. A checklist is included in Module VII (Form B). A major storm is defined in this plan as a storm with 1 inch of precipitation or more over a 24-hour period. Any damage to the landfill caps will be repaired as soon as possible to ensure the integrity of the caps.

4.3.3 Fires

In the event of a surface fire near a landfill cap, the Dugway fire department will be notified and the Dugway integrated contingency plan will be implemented. In the event of a landfill fire, if a cap is observed to have been breached, firefighting methods such as using foam or smothering with soil will be considered and used, as appropriate. Following the incident, Dugway will perform a thorough inspection of the landfill caps using the checklist included in Module VII (Form B), to ensure that the integrity of the soil cover has not been compromised and waste has not been exposed. If there is fire damage, DPG will implement corrective actions to ensure that contaminants are contained and human health is protected.

4.4 INSPECTION FOLLOW-UP

Copies of completed site inspection checklists (Form B of Module VII) shall be forwarded to the Dugway Environmental Office. The Point-of-Contact for the Dugway Environmental Office is as follows:

Environmental Programs Compliance Representative
Dugway Proving Ground Environmental Program Office
Dugway Proving Ground, UT 84022
Telephone: (435) 831-3560

The Dugway Environmental Office shall notify the appropriate personnel to implement corrective action as needed.

Corrective action shall be initiated as soon as practical after identifying the problem, or as directed by Dugway. If the corrective action requires substantial effort, a technical plan shall be prepared to summarize the problem, the potential impacts, the proposed plan for action, and the time-frame in which corrective action will be implemented as required under this Permit. This plan shall be approved by the Executive Secretary prior to implementing corrective action.

5.0 SUBMITTALS/REPORTING

Based on the evaluation presented in the CMIR for DPG-052 (Shaw, 2007), post-closure inspection is required. Groundwater monitoring will be managed under the Carr GMA Plan.

5.1 NON-COMPLIANCE REPORTING

The conditions at DPG-052 are such that the impact to human health and the environment is very unlikely. Hazardous wastes are no longer managed at the site. Nonetheless, if there is any type of non-compliance with any condition of this Permit, notifications shall be submitted per permit condition VII.C.5.

5.2 BIENNIAL POST-CLOSURE REPORT

In accordance with UAC R315-3-3.1(1)(9), a Biennial Post-Closure Report shall be prepared for all Dugway closed Hazardous Waste Management Units (HWMUs) and SWMUs undergoing post-closure care by March 1, of the reporting year. The first Post-Closure report that included inspection results for DPG-052 was submitted on February 26, 2008. Specifically for DPG-052, the Biennial Post-Closure Report shall include, at a minimum, the following:

- General site description and conditions,

- Areas of cap repair, and
- Inspection records.

5.3 REQUIRED SUBMITTALS

Table 5 summarizes the requirements for the Biennial Post-Closure Report for DPG-052 and reporting for any non-compliance.

Table 5: Summary Table of Required Submittals

Required Submittals	Frequency and Submittal Date
<u>Biennial Post-Closure Report</u>	Post-Closure Reports shall be submitted to the Division of Solid and Hazardous Waste no later than March, of the year the report is due. Reporting years are even numbered years beginning with March 2008, for the duration of the Post-Closure Monitoring Period.
<u>Non-Compliance Reporting</u> Anticipated Non-Compliance 24-hour Notification for information concerning the non-compliance, which may endanger public drinking water supplies or human health or the environment.	30 days advance notice of any change which may result in noncompliance Orally within 24 hours of discovery
<u>Non-Compliance Reporting (Continued)</u> Five-day written notification for information concerning the non-compliance, which may endanger public drinking water supplies or human health or the environment including evidence of groundwater contamination, significant data quality issues, or a request for reduced monitoring frequency. The Executive Secretary may waive the 5-day notice, in favor of a 15-day notice. Written notification for information concerning the non-compliance, which does not endanger human health or the environment.	Within 5 days of discovery Submitted when the Biennial Post Closure Reports are submitted.

6.0 POST-CLOSURE CERTIFICATION

No later than 60 days after post-closure activities are completed and approved by the Executive Secretary, Dugway representatives shall submit a certification to the Board, signed by Dugway and an independent professional engineer registered in the State of Utah, stating why post-closure care is no longer needed.

7.0 REFERENCES

- Barnhard, T.P. and R.L. Dodge, 1988. *Map of Fault Scarps Formed on Unconsolidated Sediments, Tooele 1° x 2° quadrangle, Northwestern Utah*, United States Geological Survey.
- Division of Solid and Hazardous Waste (DSHW), 2001. *Administrative Rules for Cleanup Action and Risk-Based Closure Standards. Utah Department of Environmental Quality. R315-101, Utah Administrative Code.*
- Division of Water Quality (DWQ), 2002. *Administrative Rules for Ground Water Quality Protection. Utah Department of Environmental Quality. R317-6, Utah Administrative Code.*
- Hunt, Roy E, 1984. *Geotechnical Engineering Investigation Manual*. New York, McGraw-Hill.
- Kleinfelder, 2003. *Well Construction Report, Well 33 Dugway Carr Facility. Kleinfelder, Salt Lake City. July.*
- Parsons Engineering-Science, (Parsons), 1999. *Final Phase I RCRA Facility Investigation Report, Revision 1. September.*
- Parsons, 2002. *Final Phase II RCRA Facility Investigation Risk Assumptions Document, Dugway Proving Ground, Dugway, Utah, Revision 2, Parsons Engineering Science, Denver, Colorado. May.*
- Parsons, 2005. *Final Phase II RCRA Facility Investigation, SWMU 52 Addendum. January.*
- Shaw Environmental, Inc. (Shaw), 2006a. *Corrective Measures Study (CMS) Report, Firm Fixed-Price Remediation at Landfill Sites, Dugway Proving Ground, Dugway, Utah. July.*
- Shaw, 2006b. *Corrective Measures Implementation (CMI) Plan, Firm Fixed-Price Remediation, Landfill Sites, Dugway Proving Ground, Dugway, Utah. November.*
- Shaw, 2008. *Corrective Measures Implementation Report, DPG-052. January.*
- Utah Department of Environmental Quality (UDEQ), 1992. *RCRA Facility Assessment for Solid Waste Management Units at DPG.*

FIGURES

APPENDIX A
COPY OF
CERTIFICATION OF CLOSURE

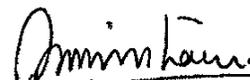
CERTIFICATION OF CLOSURE

The Corrective Measures Implementation Report for DPG-052 at Dugway Proving Ground, Utah has been prepared by Shaw Environmental in accordance with the closure requirements specified under the DPG Part B RCRA Permit and the CMI Plan. The requirements of UAC R315-101 form the basis for the risk-based criteria in the closure of DPG-052. The site has been managed in accordance with the specifications in the approved CMI Plan, except for re-vegetation (Section 2.4.6).

In accordance with the DPG Part B RCRA Permit, the signature and seal certify that a licensed professional has reviewed the Corrective Measures Implementation Report in accordance with the above referenced regulatory requirements.

Respectfully submitted,

Jeffrey S. Carter
Directorate of Environmental Programs
Dugway Proving Ground


Sunil Kishnani, P.E.
Utah Registered Civil Engineer No. 6027103

