

**DUGWAY PERMIT**

**MODULE VII**

**ATTACHMENT 19**

**SOLID WASTE MANAGEMENT UNIT  
SWMU 207  
POST-CLOSURE PLAN**

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## 1.0 INTRODUCTION

There are four (4) objectives of this Post-Closure Plan: 1) ensure that Dugway Proving Ground (DPG or Dugway) complies with the Post-Closure Permit issued by the State of Utah in accordance with Utah Administrative Code (Utah Admin. Code) R315-265 - Title 40 Code of Federal Regulations (CFR) §264.117 incorporated by reference, with respect to post-closure inspection requirements; 2) prevent exposure of contact with the waste left in place at this landfill site; 3) prevent releases from the waste or soil contamination to the groundwater; and, 4) protection of potable groundwater in the confined aquifer by monitoring horizontal and vertical migration of contamination in groundwater. To meet this objective, this Post-Closure Plan provides detailed information regarding the location, regulatory criteria, and post-closure inspections at Solid Waste Management Unit (SWMU) 207, herein referred to as DPG-207. Post-closure requirements will continue for a minimum of 30 years after closure of DPG-207. The post-closure care period may be extended or shortened, as deemed necessary Utah Admin. Code R315-265 (40 CFR §264.117(a)(2) incorporated by reference).

In accordance with 40 CFR §270.28 and Utah Admin. Code R315-270-28, the Post-Closure Plan is required to include specific information for a closed facility. As applicable to DPG-207, 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-207 Post-Closure Information Requirements Under 40 CFR §270.1414 and Utah Admin. Code R315-270-28 and R315-270-14**

Regulation Citation	Requirement Description	Location Requirement is Addressed
40 CFR §270.14(b)(1) Utah Admin. Code R315-270-14(b)(1)	General Description of the Facility	Section 2.0
40 CFR §270.14(b)(4) Utah Admin. Code R315-270-14(b)(4)	Description of Security Procedures	Section 3.0
40 CFR §270.14(b)(5) Utah Admin, Code R315-270-14(b)(5)	General Inspection Schedule	Section 6.0, Module VII Table VII-3, and Module VII Form B
40 CFR §270.14(b)(6) Utah Admin. Code R315-270-14(b)(6)	Preparedness and Prevention	Section 3.0

**Table 1 (Continued): Summary of DPG-207 Post-Closure Information Requirements Under 40 CFR §270.14 and Utah Admin. Code R315-270-28 and R315-270-14**

<b>Regulation Citation</b>	<b>Requirement Description</b>	<b>Location Requirement is Addressed</b>
40 CFR §§270.14(b)(11)(i-ii, v) Utah Admin. Code R315-270-14(b)(11)(i-ii, v)	Facility Location Information Applicable seismic standard	Section 4.3.1
40 CFR §§270.14(b)(11)(iii-v) Utah Admin. Code R315-270-14(b)(11)(iii-v)	Facility Location Information 100-year floodplain	Section 4.3.2
40 CFR §270.14(b)(14) Utah Admin. Code R315-270-14(b)(14)	Copy of the Closure Proposal	Phase II Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI). No public comments were received.
40 CFR §270.14(b)(16) Utah Admin. Code R315-270-14(b)(16)	Closure Certification and Notification	Section 2.7 and Appendix A.
40 CFR §270.14(b)(18) Utah Admin. Code R315-270-14(b)(18)	Post-Closure Cost Estimate	Federal Facilities are exempt from this requirement.
40 CFR §270.14(b)(19) Utah Admin. Code R315-270-14(b)(19)(i)	Proof of Financial Coverage	Federal Facilities are exempt from this requirement.
40 CFR §270.14(b)(19) Utah Admin. Code R315-270-14(b)(19)(ii)	Topographic Map Map Scale and Date	Figure 2 (1 inch = 1000 feet).
40 CFR §270.14(b)(19) Utah Admin. Code R315-270-14(b)(19)(iii)	Topographic Map 100-year floodplain area	Section 4.3.2; DPG-207 is not located within a verified 100-year floodplain area.
40 CFR §270.14(b)(19) Utah Admin. Code R315-270-14(b)(19)(iv)	Topographic Map Surface waters including intermittent streams	Figure 2
40 CFR §270.14(b)(19) Utah Admin. Code R315-270-14(b)(19)(v)	Topographic Map Surrounding land uses	DPG-207 is within a military base. There are no nearby operations in the vicinity of DPG-207.
40 CFR §§270.14(b)(11)(i-ii, v) Utah Admin. Code R315-270-14(b)(11)(i-ii, v)	Topographic Map A wind rose (i.e., prevailing windspeed and direction)	There are no residential populations abutting DPG-207. The closest residential area is English Village (approximately 13 miles away). A wind rose is not deemed necessary for DPG-207.
40 CFR §270.14(b)(19) Utah Admin. Code R315-270-14(b)(19)(vi)	Topographic Map Orientation of Map, North Arrow	Figure 2
40 CFR §270.14(b)(19) Utah Admin. Code R315-270-14(b)(19)(vii)	Topographic Map Legal boundaries of the hazardous waste management facility	Figure 2
40 CFR §270.14(b)(19) Utah Admin. Code R315-270-14(b)(19)(viii)	Topographic Map Access control, fence, gates	Figure 2. The site is not enclosed by a fence.
40 CFR §270.14(b)(19) Utah Admin. Code R315-270-14(b)(19)(ix)	Topographic Map Injection and withdrawal wells	Figure 2

**Table 1 (Continued): Summary of DPG-207 Post-Closure Information Requirements Under 40 CFR §270.14 and Utah Admin. Code R315-270-28 and R315-270-14**

<b>Regulation Citation</b>	<b>Requirement Description</b>	<b>Location Requirement is Addressed</b>
40 CFR §270.14(b)(19) Utah Admin. Code R315-270-14(b)(19) (xi)	Topographic Map Barriers for drainage or flood control	Figure 3. DPG-207 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) Utah Admin. Code R315-270-14(c)(1)	Groundwater Monitoring Information Summary of Groundwater Data	Final Phase II RFI Report, Section 2.2.4
40 CFR §270.14(c) Utah Admin Code R315-270-14(c)(2)	Groundwater Monitoring Information Identification of uppermost aquifer	Final Phase II RFI Report, Section 2.2.1
40 CFR §270.14(c) Utah Admin. Code R315-270-14(c)(3)	Groundwater Monitoring Information Delineation of the Waste Management Area	Figure 2
40 CFR §270.14(c) Utah Admin. Code R315-270-14(c)(4)	Groundwater Monitoring Information Extent of Plume	Final Phase II RFI Report, Section 2.2.4
40 CFR §270.14(c) Utah Admin. Code R315-270-14(c)(5)	Groundwater Monitoring Information Detailed Plans/Engineering Report for Proposed Groundwater Program	Post-closure groundwater monitoring at DPG-207 is not required.
40 CFR §270.14(c) Utah Admin. Code R315-270-14(c)(6)(i)	Groundwater Monitoring Information Proposed List of Parameters	Post-closure groundwater monitoring at DPG-207 is not required.
40 CFR §270.14(c) Utah Admin. Code R315-270-14(c)(6)(ii)	Groundwater Monitoring Information Proposed Groundwater Monitoring System	Post-closure groundwater monitoring at DPG-207 is not required.
40 CFR §270.14(c) Utah Admin. Code R315-270-14(c)(6)(iii)	Groundwater Monitoring Information Background Values	Post-closure groundwater monitoring at DPG-207 is not required.
40 CFR §270.14(c) Utah Admin. Code R315-270-14(c)(6)(iv)	Groundwater Monitoring Information A description of the Proposed Sampling	Post-closure groundwater monitoring at DPG-207 is not required.

## 2.0 FACILITY DESCRIPTION

The following provides a general description of DPG-207, as required by Utah Admin. Code R315-270-14(b)(1) (Figures 1 and 2).

## 2.1 DPG-207 LOCATION AND HISTORY

DPG-207 was a landfill site that occupied approximately 3.4 acres located 500 feet (ft) east of the Carr Facility (Figure 2). The site was relatively flat with an average elevation of approximately 4,364 ft mean sea level (msl). Features at the site included seven mounds, two depressed areas, and two piles of rubble.

## 2.2 PAST OPERATIONS

Based on field observations and limited available aerial photography and documentation the site was used for the disposal of laboratory, construction, and military testing waste/debris. Many of the disturbed site features were visible in aerial photographs of the Carr Facility, dating at least as far back as November 1947. In these images, a distinct soil berm surrounded most of the disturbed ground, suggestive of a firebreak. Burned debris and ordnance and explosives (OE) debris observed on the surface and in the subsurface of burial features indicated that burning/disposal of waste, possibly related to demilitarization of chemical munitions, occurred at this site. A buried effluent line crossing the site along its northern perimeter formerly carried liquid waste from Building 3445 to an evaporation pond (DPG-058) located 200 ft east of DPG-207. Facility design drawings describing the construction of the effluent line and evaporation pond identify contaminated soils in the area of DPG-207, but give no details relating to the nature of waste on the site (Parsons, 1999). The effluent line is not part of DPG-207 and is being investigated under the site designation of DPG-150. Because of the close proximity of these site features to one another, the entire 3.4 acres of DPG-207 was designated as the affected area.

## 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-207 in the Utah Division of Waste Management and Radiation Control (UDWMRC), formerly the Division of Solid and Hazardous Waste (DSHW), public documents listed below in Table 2 (Utah Admin. Code R315-270-14(b)(13)).

**Table 2: UDWMRC Library Documents Detailing DPG-207 Investigations**

Document Title	Received Date	UDWMRC Library No.
Parsons, 1999. <i>Final Phase I RCRA Facility Investigation Report, Revision 1</i> . September.	09/99	
Parsons, 2004. <i>Final Phase II RCRA Facility Investigation Report, SWMU-207 Addendum</i> . June.	06/04	
Shaw , 2006a. <i>Corrective Measures Study Report, Firm Fixed-Price Remediation at Landfill Sites, Dugway Proving Ground, Dugway, Utah</i> . July.	07/06	
Shaw , 2006b. <i>Corrective Measures Implementation (CMI) Plan, Firm Fixed-Price Remediation at Landfill Sites, Dugway Proving Ground, Dugway, Utah</i> . November.	11/06	
Shaw, 2006c. <i>Decision Document for Closure Activities at DPG-207, Dugway Proving Ground, Dugway, Utah</i> . April.	04/06	
Shaw., 2007. <i>Final Corrective Measures Implementation Report for DPG-207. Dugway Proving Ground, Dugway, Utah</i> .	02/07	

## 2.4 CLOSURE ACTIVITIES

In accordance with Utah Admin. Code R315-265; 40 CFR §265.111 incorporated by reference and the Corrective Measures Implementation (CMI) Plan (Shaw, 2006b), closure at DPG-207 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 trenches. The closure activities are described in the Corrective Measures Implementation Report (CMIR) (Shaw, 2007). Appendix A includes a copy of the DPG-207 Closure Certification.

The final cover systems as designed and constructed satisfy the requirements of Utah Admin. Code R315-265 (by reference 40 CFR §265, Subpart N, 265.310) for the closure and post-closure of DPG-207, 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-207 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 post-closure site inspection checklist for landfill sites (Form B) designed to insure that these objectives are maintained is presented in Module VII.

## 2.5 HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT

Human health and ecological risk assessments were conducted and indicated that no subsurface contamination was detected in soil (outside of the trenches). Groundwater at DPG-207 is impacted and does pose an unacceptable risk as defined in Utah Admin. Code R315-101. The groundwater monitoring requirements for this site are included in the post closure permit in condition VII.Q. The risk assessment focused on areas outside the constructed cover, but did take into consideration airborne particulates emanating from the landfill surface prior to remediation. Direct sampling of trench contents could not be conducted due to the potential presence of unexploded ordnance (UXO), chemical warfare materiel (CWM), and/or other OE debris. Despite the absence of direct sampling results, risks to intrusive site workers and burrowing ecological receptors associated with uncharacterized buried wastes are assumed to be unacceptable based on the types of materials potentially present. The industrial cancer risk is less than 1E-06 and the Hazard Index is less than 1.0. Ecological risks are expected to be minimal. Due to the risks associated with direct exposure to the waste, intrusive activities into the buried wastes must be avoided. The human and ecological risk assessments, as presented in the Final Phase II RFI, DPG-207 Addendum (Parsons, 2004), are included in Appendix B of this DPG-207 CMIR (Shaw, 2007).



## **2.6 SURFACE WATER AND GROUNDWATER**

There are no defined surface water features within or near DPG-207. The general direction of surface water drainage in the area surrounding this unit is to the southwest.

Groundwater monitoring is required for the site as described in 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.

Federal facilities are exempt from submitting notifications to the local zoning authority as required by Utah Admin. Code R315-264-116 and R315-264-119.

## **3.0 SECURITY REQUIREMENTS**

The following security conditions are applicable to DPG-207:

1. DPG-207 is located within a federal, military installation (DPG). As such, the installation is restricted for the common population.
2. At DPG-207, 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 frequencies of inspections are listed on the Post-Closure Inspection Schedule. Dugway shall report to the UDWMRC any decrease of Dugway's Base Security, which could affect the security conditions as applicable to DPG-207.
4. Damaged or missing security facilities shall be noted in the general post-closure site inspection checklist for landfill sites which is included as Form B of Module VII. Repairs shall be completed as soon as practicable after the problem is discovered, in compliance with Utah Admin. Code R315-264-15(c).

## **4.0 POST-CLOSURE OPERATIONS AND INSPECTIONS**

### **4.1 INTRODUCTION**

DPG-207 has been closed under the DPG RCRA part B Permit requirements and specifications of the CMI Plan (Shaw, 2006b). Disturbance of the waste will not be allowed. To ensure that the area is not reused or developed, semi-annual site inspections and a biennial Post-Closure Report shall be required..

### **4.2 ROUTINE SITE INSPECTIONS**

During its post-closure period general inspections of the former DPG-207 site shall be conducted annually by November 1<sup>st</sup> to ensure that the integrity of the engineered cap is maintained and to verify the Dugway Dig Permit process as described in Module VII.I 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. Module VII includes a general post-closure site inspection checklist for landfill sites (Form B). Completed inspection forms shall be filed with the Dugway Environmental Office.

#### **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, regrading through the 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 two 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. Soil samples will be collected during each inspection in accordance with Field Work Variance 119350-02-006 (August 7, 2007) and analyzed for salinity as outline in form B of Module VII.

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 monuments installed during closure (Figure 3) will be inspected to determine if any damage has made their use questionable as reference points. If missing or badly damaged, they will be replaced as soon as possible after discovery of a problem.

As part of the routine inspection, the survey monument locations and elevations 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-207 survey monuments (SM-207\_1 and SM-207\_2) have been summarized in Table 3. In addition, the survey coordinates for locations around the perimeter of the cover system, shown on Figure 3, are presented for future reference.

**Table 3: DPG-207 Survey Coordinates**

<b>Description / Pt. Location</b>	<b>Northing (ft)</b>	<b>Easting (ft)</b>	<b>Elevation<sup>a</sup> (ft above msl)</b>
Survey Monument (SM-207_1)	7233250	1254046	4,369.3
Survey Monument (SM-207_2)	7233218	1254196	4,370.0
7001	7,233,485	1,254,144	4,367.4
7002	7,233,498	1,254,167	4,367.4
7003	7,233,416	1,254,187	4,367.4
7008	7,233,363	1,254,116	4,367.8
7009	7,233,348	1,254,124	4,367.9
7010	7,233,319	1,254,068	4,368.5
7011	7233,335	1,254,059	4,368.0
7015	7,233,287	1,254,038	4,368.7
7016	7,233,256	1,254,080	4,368.1
7017	7,233,192	1,254,047	4,367.7
7018	7,233,209	1,254,015	4,367.3
7022	7,233,192	1,253,998	4,366.5
7023	7,233,122	1,253,955	4,366.7
7024	7,233,136	1,253,930	4,366.3
7025	7,233,206	1,253,971	4,366.5
7029	7,233,122	1,254,007	4,367.3
7030	7,233,133	1,254,043	4,367.6
7031	7,233,108	1,254,059	4,368.0
7032	7,233,131	1,254,100	4,367.8
7033	7,233,104	1,254,108	4,367.5
7034	7,233,067	1,254,053	4,367.5
7038	7,233,327	1,253,962	4,366.9
7039	7,233,368	1,253,969	4,366.6
7040	7,233,365	1,253,938	4,366.4
7041	7,233,299	1,253,914	4,367.1
7042	7,233,284	1,253,927	4,366.6
7046	7,233,106	1,254,209	4,368.4
7047	7,233,106	1,254,176	4,368.7
7048	7,233,202	1,254,175	4,369.3
7049	7,233,217	1,254,128	4,368.6
7050	7,233,236	1,254,128	4,368.3
7051	7,233,236	1,254,220	4,369.1
7052	7,233,202	1,254,220	4,368.8
7053	7,233,202	1,254,209	4,369.4
7060	7233,272	1,254,178	4,368.0
7061	7,233,309	1,254,178	4,367.7
7062	7,233,326	1,254,207	4,367.5
7063	7,233,286	1,254,205	4,368.3

<b>Description / Pt. Location</b>	<b>Northing (ft)</b>	<b>Easting (ft)</b>	<b>Elevation<sup>a</sup> (ft above msl)</b>
Survey Monument (SM-207_1)	7233250	1254046	4,369.3
Survey Monument (SM-207_2)	7233218	1254196	4,370.0
7001	7,233,485	1,254,144	4,367.4
7002	7,233,498	1,254,167	4,367.4
7003	7,233,416	1,254,187	4,367.4
7008	7,233,363	1,254,116	4,367.8
7009	7,233,348	1,254,124	4,367.9
7010	7,233,319	1,254,068	4,368.5
7011	7233,335	1,254,059	4,368.0
7015	7,233,287	1,254,038	4,368.7
7016	7,233,256	1,254,080	4,368.1
7017	7,233,192	1,254,047	4,367.7
7018	7,233,209	1,254,015	4,367.3
7022	7,233,192	1,253,998	4,366.5
7023	7,233,122	1,253,955	4,366.7
7024	7,233,136	1,253,930	4,366.3
7025	7,233,206	1,253,971	4,366.5
7029	7,233,122	1,254,007	4,367.3
7030	7,233,133	1,254,043	4,367.6
7031	7,233,108	1,254,059	4,368.0
7032	7,233,131	1,254,100	4,367.8
7033	7,233,104	1,254,108	4,367.5
7034	7,233,067	1,254,053	4,367.5
7038	7,233,327	1,253,962	4,366.9
7039	7,233,368	1,253,969	4,366.6
7040	7,233,365	1,253,938	4,366.4
7041	7,233,299	1,253,914	4,367.1
7042	7,233,284	1,253,927	4,366.6
7046	7,233,106	1,254,209	4,368.4
7047	7,233,106	1,254,176	4,368.7
7048	7,233,202	1,254,175	4,369.3
7049	7,233,217	1,254,128	4,368.6
7050	7,233,236	1,254,128	4,368.3
7051	7,233,236	1,254,220	4,369.1
7052	7,233,202	1,254,220	4,368.8
7053	7,233,202	1,254,209	4,369.4
7066	7,233,121	1,253,924	4,366.3
7067	7,233,085	1,253,925	4,366.9
7068	7,232,993	1,253,865	4,366.3
7069	7,232,982	1,253,830	4,366.1
7070	7,233,020	1,253,828	4,366.4
7071	7,233,108	1,253,886	4,365.9

<sup>a</sup> *The locations and elevations represent design coordinates. The final elevations are provided in the 2008 Biennial report.*

*ft = feet*

*msl = mean seal level*

Table 4 summarizes the Post-Closure Inspection Schedule for DPG-207, and lists the items to be inspected. Inspection personnel shall note any problems found and shall inform appropriate Dugway representatives.

**Table 4: DPG-207 Post-Closure Inspection Schedule**

<b>Inspection/ Monitoring Item</b>	<b>Method of Documentation</b>	<b>Frequency of Inspection</b>
Landfill Caps	General Post-Closure Site Inspection Checklist for Landfill Sites (Module VII, Form B)	Annual
Salinity Testing	General Post-Closure Site Inspection Checklist for Landfill Sites (Module VII, Form B)	In accordance with Field Work Variance 119350-02-006
Survey Monuments	General Post-Closure Site Inspection Checklist for Landfill Sites (Module VII, Form B)	Annual/five year intervals
Signs	General Post-Closure Site Inspection Checklist for Landfill Sites (Module VII, Form B)	Annual
Drainage	General Post-Closure Site Inspection Checklist for Landfill Sites (Module VII, Form B)	Annual

### **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 engineered cover at DPG-207. Module VII provides a general post-closure site 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**

DPG is located in Seismic Zone 2 with a maximum acceleration of 0.2 gravity force (Hunt, 1984). DPG-207 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 United States 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-207.

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 cap for signs of damage as soon as it is safe and practical to do so. Any damage to the landfill cap will be repaired to ensure the integrity of the cap. If the 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 Dugway Environmental Department.

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

#### **4.3.2 Floods or Major Storms**

DPG-207 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-207, 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 percolates 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 cap to ensure its integrity within 72 business hours of the event. A general post-closure site checklist for landfill sites (Form B) is included in Module VII. A major storm is defined in this plan as a storm with one inch of precipitation or more over a 24-hour period. Any damage to the landfill cap will be repaired as soon as possible to ensure the integrity of the cap.

#### **4.3.3 Fires**

In the event of a surface fire near the 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 the 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 cap using the general post-closure site checklist for landfill sites (Form B) included in Module VII, to ensure that the integrity of the soil cover has not been compromised and waste has not been exposed. If there is fire damage, Dugway will implement corrective actions to ensure that contaminants are contained and human health is protected.

#### **4.4 INSPECTION FOLLOW-UP**

Copies of completed general post-closure site inspection checklists for landfill sites (Module VII, Form B) 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 but no longer than 30 days of discovery. If the corrective action will require more than 30 days, a schedule of the correction will be provided to the Director for approval. If the corrective action requires substantial effort, a technical plan shall be prepared to summarize the problem, illustrate potential impacts, and clarify the proposed plan for action. Routine corrective actions will be recorded on the site inspection form in the comments with the date of the correction. This will ensure proper tracking of the resolution.

#### **5.0 SUBMITTALS/REPORTING**

Based on the evaluation presented in the CMIR for DPG-207 (Shaw, 2007), post-closure inspection is required. Groundwater monitoring is not required for DPG-207.

##### **5.1 NON-COMPLIANCE REPORTING**

The conditions at DPG-207 are such that 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 Utah Admin. Code R315-270-30(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 for DPG-207 shall be due no later than March 1, 2008. Specifically for DPG-207, 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-207 and reporting for any non-compliance.

**Table 5: Summary Table of Required Submittals**

<b>Required Submittals</b>	<b>Frequency and Submittal Date</b>
<u>Biennial Post-Closure Report</u>	Post-Closure Reports shall be submitted to the UDWMRC 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
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 Director 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 Director, 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 Water Quality (DWQ), 2002. *Division of Water Quality Administrative Rules for Groundwater Quality Protection 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, Salt Lake City*. July.
- Parsons Environmental Science, Inc. (Parsons), 2006. *Hydrogeological Assessment and Regional Groundwater Management Plan, Volume II, Carr Groundwater Management Area, Dugway Proving Ground, Dugway, Utah*.
- Parsons, 2004. *Final Phase II RCRA Facility Investigation Report, SWMU-207 Addendum*. June.
- Parsons, 1999. *Final Phase I RCRA Facility Investigation, Revision 1*. September.
- Shaw Environmental, Inc. (Shaw), 2007. *Final Corrective Measures Implementation Report, for DPG-207, Dugway Proving Ground, Utah*.
- 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 Plan, Firm Fixed-Price Remediation at Landfill Sites, Dugway Proving Ground, Dugway, Utah*. November.
- Shaw, 2006c. *Decision Document for Closure Activities at DPG-207, Dugway Proving Ground, Dugway, Utah*. April.

**APPENDIX A**

**COPY OF**

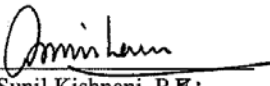
**CERTIFICATION OF CLOSURE**

### CERTIFICATION OF CLOSURE

The Corrective Measures Implementation Report for DPG-207 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-207. The site has been managed in accordance with the specifications in the approved CMI Plan, except for re-vegetation (Section 2.4.5).

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,

\_\_\_\_\_  
Scott Reed  
Directorate of Environmental Programs  
Dugway Proving Ground

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

