

DUGWAY PERMIT

MODULE VII

ATTACHMENT 41

**SWMU 060
POST-CLOSURE PLAN**

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LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS

bgs	Below Ground Surface
CFR	Code of Federal Regulations
COPC	Chemical of Potential Concern
COPEC	Chemical of Potential Ecological Concern
CWA	Chemical Warfare Agent
DPG	Dugway Proving Ground
Dugway	Dugway Proving Ground
DSHW	Divisions of Solid and Hazardous Waste
ft	Feet
GMA	Groundwater Management Area
HWMU	Hazardous Waste Management Unit
MCL	Maximum Contaminant Level
NFA	No Further Action
PCE	Tetrachloroethylene
PCP	Post Closure Plan
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SWMU	Solid Waste Management Unit
TCE	Trichloroethylene
UAC	Utah Administrative Code
VOC	Volatile Organic Compound

1.0 INTRODUCTION

The objectives of this Post-Closure Plan (PCP) are 1) to 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) §265.117, with respect to post-closure inspection requirements; 2) to document tracking and inspections; 3) to ensure industrial site use; and 4) to track Building 3445 closure requirements. To meet these objectives, this PCP provides detailed information regarding the location, regulatory criteria, and post-closure inspections at Solid Waste Management Unit (SWMU) 60. Post-closure requirements will continue for a minimum of 30 years after closure of SWMU 60. The post-closure care period may be extended or shortened, as deemed necessary (40 CFR §265.117(a)(2)).

Based on the approved Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) there are no uncontrolled sources of contamination (R315-101-2 and 3) present at DPG-060. The nature and extent of potential contamination has been characterized in soil in accordance with R315-101-4 and the site risks have been assessed in accordance with R315-101-5. Surface and subsurface soil do not qualify for no further action (NFA) based on hypothetical residential use; however, potential exposures to soil are below R315-101-6 industrial screening levels. Soil-to-groundwater analysis indicates that potential future impacts to groundwater from soil are not expected at DPG-060. Corrective measures for soil are not required. In the event of the closure of Building 3445 or decommissioning of the air system at Building 3445, additional sampling will be conducted around the building and any closure/decommissioning waste will be managed accordingly. Future site management is based on the characterization in the approved RFI.

In accordance with Title 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-060, the information requirements include:

- General description of the facility,
- Description of security procedure,
- 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 locations in this Post-Closure Plan where the specific information is presented.

**Table 1: Summary of DPG-060 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 4.0 and Module VII, Form A
40 CFR §270.14(b)(6) UAC R315-3-2.5(b)(6)	Preparedness and Prevention	Section 3.0
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	There are no active faults in the vicinity of DPG-060.
40 CFR §270.14(b)(11) (iii-v) UAC R315-3-2.5(b)(11) (iii-v)	Facility Location Information 100-year floodplain	DPG-060 is not located within a verified 100-year floodplain area.
40CFR §270.14(b)(13) UAC R315-3-2.5(b)(13)	Copy of the Closure Proposal	Final Phase II RFI was issued on December 2008 and approved on 08/25/09.
40 CFR §270.14(b)(14) UAC R315-3-2.5(b)(14)	Closure Certification and Notification	Section 2.7.
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	DPG-060 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) (v)	Topographic Map A wind rose (i.e., prevailing windspeed and direction)	There are no residential populations abutting DPG-060. The closest residential area approximately 8.0 miles away. A wind rose is not deemed necessary for DPG-060.
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

**Table 1: Summary of DPG-060 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)(19) UAC R315-3-2.5(b)(19) (viii)	Topographic Map Access control, fence, gates	Figure 2.
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 2. There are no barriers to drainage or flood control in the vicinity of DPG-060.
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
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
40 CFR §270.14(c) UAC R315-3-2.5(c)(3)	Groundwater Monitoring Information Delineation of the Waste Management Area	Figure 3
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
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 will be managed under the Carr Regional 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 will be managed under the Carr Regional 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 will be managed under the Carr Regional GMA Plan.
40 CFR §270.14(c) UAC R315-3-2.5(c)(6)(iii)	Groundwater Monitoring Information Background Values	Post-closure groundwater monitoring will be managed under the Carr Regional GMA Plan.
40 CFR §270.14(c) UAC R315-3-2.5(c)(6)(iv)	Groundwater Monitoring Information Description of the Proposed Sampling	Post-closure groundwater monitoring will be managed under the Carr Regional GMA Plan.

Table 1: Summary of DPG-060 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)(19) UAC R315-3-2.5(b)(19) (iv)	Topographic Map Surrounding land uses	DPG-060 is within a military base. There are no nearby operations in the vicinity of DPG-060.

2.0 FACILITY DESCRIPTION

The following provides a general description of DPG-060, as required by UAC R315-3-2.5(b)(1) (Figures 1 and 2).

2.1 DPG-060 LOCATION AND HISTORY

DPG-060 is located in the fenced area of the Carr facility and is comprised of a six former chemical container storage areas located along the northeastern and southeastern fence lines and the sewer lines within Carr. Storage Area 1 in the southern portion of DPG-060 was used to store on-ton chemical agent containers until about 1965. Storage Area 2 in the northeast portion of the site was also used to store on-ton chemical agent containers until about 1965. Storage Areas 3 was located northeast of Storage Areas 2 and consisted of the former Building 300, which was removed in the early 1960s. The pas outside the former building was used to store a variety of chemicals. Storage Area 4 in the east-northeast corner of the Carr facility consisted of two main concrete pads (Pads 2 and 3) and several minor pads. Pad 3 was known to be where munitions were filled with chemical agents and on-ton agent containers were stored. Storage Area 5 is northwest of Storage Area 4. Former Buildings 3002 and 3004, which were used for agent-related activities, were located in Storage Area 5. In the 1950s and 1960s, Storage Area 6, located west of Storage Area 5, was used to store chemical agent munitions stacked on rails. During the Phase II investigation (Parsons, 2008), DPG-060 was expanded to include the sewer lines and any other possible storage locations within the fenced area of the Carr facility.

The site features included in the DPG-060 investigation included:

- Storage Area 1 concrete pad, which was removed during the investigation of Hazardous Waste Management Unit (HWMU) 168,
- Asphalt pas in Storage Area 3,
- Former location of Building 3000 in Storage Area 3,
- Concrete Pads 2 and 3 in Storage Area 4,
- Backfilled drainage pit associated with Pad 3 in Storage Area 4,
- Stained soil areas along the northeast Carr fence line in Storage Areas 4 and 5,
- Former locations for Buildings 3002 and 3004 in Storage Area 5,
- Minor concrete pads in various storage areas, and
- Sewer lines inside the fenced Carr facility.

Concentrations of trichloroethylene (TCE), 1,1,2-trichloroethane, and tetrachloroethylene (PCE) were

detected in groundwater at DPG-060 at concentrations greater than the Maximum Contaminant Level (MCL). Groundwater monitoring volatile organic compounds (VOCs) will be management under the Carr Regional GMA Plan.

Potential releases from Building 3445 have not been completely characterized due to its active status and nature of its construction. These factors prevented sampling of some of the drain lines close to the building. Potential releases from Building 3445 will be investigated upon closure of the Building. A special requirement addressing this issue has been added to Table VII-2 of Module VII of the part B permit.

2.2 PAST OPERATIONS

Information collected from the Phase II investigation indicates that there were five chemical storage areas in addition to the concrete storage pad. The former storage areas were used to store a variety of materials from about 1955 to 1980. Prior to 1969, the area was also a transfer point for all chemical warfare agents (CWAs) used in open air testing at Dugway. This area within Carr was historical referred to in documents and on maps at the “Toxic Gas Yard”.

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-060 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-060 Investigations

Document Title	Received Date	DSHW Library No.
Parsons, 1999. <i>Final Phase I RCRA Facility Investigation, Investigation Report, Revision 1</i> . September.	09/99	DPG0007
Parsons, 2008. <i>Final Phase II RCRA Facility Investigation Report, SWMU-60 Addendum</i> . December.	12/08	

2.4 CLOSURE ACTIVITIES

Documentation in the approved RFI Report indicates that conditions at DPG-060 meet the closure performance standards under UAC R315-7-14 (by reference 40 CFR Part 265, Subpart G, §265.111). Risks and hazards associated with potential exposure to soil and indoor air at DPG-060, while not qualifying for NFA, are less than industrial screening levels. Land use controls are required to prevent residential use of the site.

The major closure activities completed at DPG-060 included:

- Demonstrating that degradation of groundwater was unlikely based on the soil-to-groundwater screening analysis and current concentrations of contaminants in groundwater;

- Prevention of human contact with the waste and groundwater protection will be achieved through land use restrictions. An inspection checklist designed to insure that these objectives are maintained is presented in Module VII, Form A; and
- Investigation controls for Building 3445 (active status) upon closure. DPG-060 has been included in the “special requirements” section of Table VII-2 in Module VI.

2.5 HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT

Results of the HRA and ERA performed per UAC R315-101 (DSHW, 2001) indicate: 1) that adverse health effects to industrial workers associated with potential exposures to constituents of potential concern (COPCs) in the soil and indoor air at DPG-060 are not expected; and 2) constituents of potential ecological concern (COPECs) are not expected to pose unacceptable hazards to ecological receptors. Therefore, corrective measures are not required for soils under continued industrial land use. The appropriate closure method for DPG-060 is to restrict future property use to industrial use only.

Potential releases from Building 3445 have not been completely characterized due to the active status and nature of its construction, which prevented sampling of some of the drain lines close to the building. Risks associated with potential releases from Building 3445 will be investigated upon closure of the building.

2.6 SURFACE WATER AND GROUNDWATER

There are no defined surface water features within or near DPG-060.

The flow of groundwater in Carr is dominantly to the south-southwest. An aquitard is present from about 85 to 115 ft below ground surface (bgs). The confining clay layer is horizontally extensive, occurring throughout the Ditto and Carr regions, and separates the groundwater into two distinct zones: a non-potable, shallow water-bearing zone and a deeper, potable water aquifer. Groundwater contamination at DPG-060 is limited to the shallow water-bearing zone, and no contamination has been detected in the deeper potable aquifer.

A plume of dissolved TCE in groundwater, approximately 700 ft long by 375 ft wide, was delineated emanating from Building 3445. 1,1,2-Trichloroethane and PCE also exceeded MCLs and resulted in discernable plumes within the larger TCE plume. The lateral and vertical extent of the plumes will be monitored under the Carr GMA.

2.7 CLOSURE NOTIFICATIONS

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 condition is applicable to DPG-060:

DPG-060 is located within a federal, military installation (DPG). As such, the installation is restricted for the common population.

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 cell phone and a First Aid kit available during inspections.

4.0 POST-CLOSURE OPERATIONS AND INSPECTIONS

4.1 INTRODUCTION

DPG-060 has been closed under a continued industrial use scenario, which prohibits residential use in the area formerly occupied by the site. The site has been closed under the DPG RCRA Part B Permit requirements. To ensure that the area is not reused or developed and to ensure the Dugway Dig Permit Process (Module VII.I) has been followed, 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-060 site shall be conducted annually by November 1st to ensure that the former site remains under industrial use and that the Dig Permit Process (Module VII.F.4) has been followed. The frequency of inspections can be modified in accordance with amendments submitted in the form of proposed permit modifications.

Site inspections will consist of a complete walk through and visual inspection of the site. A general site inspection checklist for industrial use sites is included in Module VII, Form A. Completed inspection forms shall be filed with the Dugway Environmental Office.

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

1. There is no evidence of land use other than for industrial purposes within the former site boundary;
2. There is no evidence of soil disturbance; and
3. Building 3445 is still active and closure of the Building is not underway and/or decommissioning of the air ventilation system is not being conducted.

Table 3 summarizes the Post-Closure Inspection Schedule for DPG-060, and lists the items to be inspected. Inspection personnel shall note any problems found and shall inform appropriate Dugway representatives.

Table 3: DPG-060 Post-Closure Inspection Schedule

Inspection/ Monitoring Item	Method of Documentation	Frequency of Inspection
Land Use	Industrial Use Inspection Checklist (Module VII, Form A)	Annual, by November 1 st
Soil Disturbance	Industrial Use Inspection Checklist (Module VII, Form A)	Annual, by November 1 st

4.3 INSPECTION FOLLOW-UP

Copies of completed site inspection checklists (Module VII, Form A) 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 RFI for DPG-060 (Parsons, 2008), post-closure inspection is required. Groundwater monitoring will be managed under the Carr Regional GMA.

5.1 NON-COMPLIANCE REPORTING

The conditions at DPG-060 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 HWMUs and SWMUs undergoing post-closure care by March 1, of the reporting year. The first Post-Closure report for DPG-060 shall be due no later than March 1, 2010. Specifically for DPG-060, the Biennial Post-Closure Report shall include, at a minimum, the following:

- General site description and conditions; and

- Inspection records.

5.3 REQUIRED SUBMITTALS

Table 4 summarizes the requirements for the Biennial Post-Closure Report for DPG-060 and reporting of any non-compliance.

Table 4: 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 2010, 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 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

Division of Water Quality (DWQ), 2002. *Division of Water Quality Administrative Rules for Groundwater Quality Protection R317-6 Utah Administrative Code.*

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.

Parsons Environmental Science, Inc. (Parsons), 2008. *Final Phase II RCRA Facility Investigation Report, SWMU-060 Addendum.* December.

Parsons, 1999. *Final Phase I RCRA Facility Investigation, Investigation Report, Revision 1.* September.

Utah Department of Environmental Quality (UDEQ), 1992. *RCRA Facility Assessment of Solid Waste Management Units at Dugway.*