

ATTACHMENT 1-1 CHWSF WASTE ANALYSIS PLAN

1.0 INTRODUCTION

1.0.1 The waste analysis plan (WAP) details the hazardous waste characterization and management process at Dugway Proving Ground (DPG). It also identifies waste streams generated at the installation. The WAP has been prepared to provide specific guidance for day-to-day operations associated with characterizing hazardous waste, and to facilitate compliance with DPG's Central Hazardous Waste Storage Facility (CHWSF) Storage Permit.

1.1 OBJECTIVE

1.1.1 The objective of this WAP is to provide specific procedures to the CHWSF operator to facilitate compliance with federal and State of Utah (State) hazardous waste regulations and to ensure that each waste stream is properly characterized for storage at the CHWSF. The waste analysis requirements, as documented in this WAP, are designed to ensure that sufficient information is known about each waste stream so the wastes may be properly stored on-site and transported off-site for treatment and disposal.

1.2 REGULATORY REQUIREMENTS

1.2.1 The CHWSF WAP must follow the applicable State and Federal environmental regulations listed in Utah Administrative Code (Utah Admin. Code), R315-262-11 and R315-264-13, which incorporates 40 Code of Federal Regulation (CFR) §264.13 by reference. These regulations require the WAP to specify:

- The parameters for which each hazardous waste will be analyzed and the rationale for the selection of these parameters (i.e., how analysis of these parameters will provide sufficient information on the waste's properties to properly treat, store, and dispose of these wastes);
- The approved analytical methods, which will be used to test for these parameters;
- The sampling method, which will be used to obtain a representative sample of the waste. (These methods must be one of those listed in Utah Admin. Code R315-261 Appendix I, which incorporates 40 CFR §261 Appendix I by reference or an equivalent sampling method.);
- The frequency at which the initial characterization will be reviewed or repeated to ensure that the characterization is accurate and up to date; and
- If applicable, the methods that will be used to meet the additional waste analytical requirements for ignitable, reactive, or incompatible wastes as specified in Utah Admin. Code R315-264-17 (b).

1.3 PLAN ORGANIZATION

1.3.1 The WAP is divided into two sections representing two categories of hazardous wastes: chemical agent-related hazardous waste and non-chemical agent-related hazardous waste. Waste analysis procedures for non-chemical agent-related hazardous waste, hereafter referred to simply as "hazardous waste," are presented in Section 2.0. The WAP procedures for chemical agent-related hazardous waste are included in Section 3.0.

2.0 WASTE ANALYSIS PLAN FOR HAZARDOUS WASTE

- 2.01 DPG personnel, contractors, and tenants generate hazardous waste as a result of the installation's mission and support activities. DPG's mission includes the following:
- Plan, conduct, analyze and report the results of exploratory, developmental, and production tests of chemical and biological defense systems, smoke and obscurant materiel and delivery systems, and incendiary devices.
 - Operate the proving ground and a Department of Defense Major Range and Test Facility Base.
 - Operate the Environmental Characterization and Remediation Technology Test Center.
 - Operate and manage the installation facilities and administrative, technical and logistic services in support of the mission and tenants' training, testing and research activities.
- 2.02 The hazardous wastes generated from these activities, with the exception of chemical agent-related wastes (See Section 3.0), are discussed in Sections 2.1 and 2.2.
- 2.03 In addition to the hazardous waste generated at DPG, a number of non-hazardous wastes are generated. These wastes result from routine and emergency vehicle repair operations (e.g., used oil, oil filters, antifreeze, hydraulic fluid, and shop cleaning rags). The wastes are collected and recycled directly by a vendor or are sent to the CHWSF for subsequent disposition. Oil filters are collected for oil and metal reclamation. The oil is removed from the filters and is managed as described above. The filter casings are usually crushed and reclaimed for their metal content. Other materials that are reclaimed or recycled include batteries, silver, and a number of solvents. As delineated below, all these materials except solvents are not classified as hazardous waste, and therefore are not encompassed by this WAP.
- Antifreeze, which is recycled, is not regulated as a hazardous waste by any Federal or State provisions.
 - Lead-acid batteries are recycled according to 40 CFR §§266.80 and 261.6(a)(3).
 - Used oil is managed as a recyclable material as required by 40 CFR §279.
 - Silver at DPG is recycled in accordance with 40 CFR §266 Subpart F.
 - Shop cleaning rags, which are laundered, are not regulated by any Federal or State provisions.
- 2.04 However, if any of these materials become contaminated by other regulated hazardous wastes, they are treated in accordance with the regulations covering the contaminants.
- 2.05 The waste analysis procedures are categorized into eight specific segments related to the hazardous waste analysis process at DPG. These eight specific segments are detailed in Sections 2.1 through 2.8. Section 2.1 identifies generator responsibilities for the waste analysis process. Section 2.2 identifies current waste streams at DPG. Section 2.3 describes the criteria and rationale for selecting waste analysis parameters for each of these waste streams.
- 2.06 Sampling procedures are presented in Section 2.4 and include the following:
- Sampling Protocols and Equipment,
 - Sample Preservation and Storage,
 - Sampling Quality Assurance (QA)/Quality Control (QC) Procedures, and
 - Health and Safety Protocols.

- 2.07 Section 2.5 describes the methods used for waste analysis characterization (e.g., generator knowledge, laboratory testing, analytical methods) and discusses the following laboratory requirements:
- QA/QC programs (both qualitative and quantitative), and
 - Data management systems.
- 2.08 Section 2.6 discusses the frequency of analysis. The following special procedural requirements are covered in Section 2.7:
- Procedures for receiving wastes at the CHWSF from off-site generators,
 - Procedures for ignitable, reactive, and incompatible wastes, and
 - Procedures to ensure compliance with Land Disposal Restrictions (LDRs).

2.09 Evaluation of the WAP program is described in Section 2.8.

2.1 GENERATORS: 40 CFR 262; UTAH ADMIN. CODE R315-262

- 2.1.1 DPG generators are required to manage their hazardous wastes in compliance with applicable hazardous waste regulations. This includes obtaining the appropriate containers for storage, proper accumulation of their hazardous wastes, proper characterization of the waste and ensuring that the wastes are properly transferred to the CHWSF. When a generator believes a hazardous waste will be generated, a request is made to the CHWSF operator for a container of the appropriate type and size. The CHWSF operator assists in the container selection. The generator then accumulates the waste at a satellite accumulation site or a 90-day temporary storage site. Most commonly, waste is stored at a satellite accumulation area until the accumulation limit is reached then moved to a 90-day temporary storage site or the CHWSF within 72 hours. Storage time in the 90-day temporary storage site will not exceed 90 days unless an extension has been granted by the Director, Utah Division of Waste Management and Radiation Control (UDWMRC) (Director) due to unusual circumstances.
- 2.1.2 Based on the generator's knowledge of the waste generating process, the generator requests that chemical and/or physical analyses be conducted on a sample of the waste. In certain situations, generator knowledge is sufficient to fully characterize a waste; however, additional testing is often required. The goal of the testing is to obtain sufficient information to properly characterize the waste so that it may be stored safely and the appropriate treatment and disposal methods chosen. A unique number to the waste that was tested ties all analytical data, received from the testing. (The barcode number from the container sampled is also associated with the analytical data). This procedure ensures that the appropriate data is associated with the appropriate waste when materials are transferred from on-site generators to the CHWSF. If generators are uncertain as to which tests to request, they consult with the Directorate of Environmental Programs (DEP). Testing of waste samples is conducted by a Utah certified laboratory. The CHWSF operator acts as an interface between the generator and the laboratory; procuring analytical services, shipping the sample, and ensuring the generator receives the test results upon request. All commercial laboratory data is reviewed for usability (analytical methods, reporting limits, holding times, etc.).
- 2.1.3 The CHWSF operator uses available process knowledge and the analytical results to complete both the Hazardous Waste Tracking System (HWTS) data requirements and the labeling of the waste container. The CHWSF operator who can accept or reject the characterization then reviews the generator's turn-in data. (All improperly characterized wastes are rejected and typically require supplemental testing.) The CHWSF operator coordinates the ultimate off-site treatment and/or disposal. The CHWSF operator is responsible for verifying that all containers have been

accurately marked and labeled, that manifest and LDR notification forms are completed properly and that all vehicles transporting hazardous waste are placarded appropriately. DEP is responsible for signing manifests and LDR notification forms. Additionally, DEP is responsible for performing an audit of analytical results and waste characterization.

2.2 WASTES: 40 CFR 261; UTAH ADMIN. CODE R315-261-1 THROUGH R315-261-33

2.2.1 This section describes the hazardous wastes generated at DPG that are managed by the CHWSF. The typical hazardous wastes (excluding chemical agent-related wastes) generated at DPG and managed at the CHWSF are summarized into the following categories:

- Waste acids and caustics,
- Waste paints and thinners,
- Lab pack waste,
- Waste solvents,
- Spilled materials,
- Waste fuels,
- Smoke and obscurant test wastes,
- Waste photo processing chemicals where silver recovery is not effective or not used,
- Non-recyclable waste oil sludge and antifreeze sludge,
- Dugway Thermal Treatment Facility (DTTF) treatment residues,
- Installation Restoration Program (IRP) Wastes,
- Investigative Derived Wastes (IDW), and
- Orphan wastes (wastes whose generation history is unknown).

2.2.2 The types of wastes generated and the primary management practices employed for these wastes are summarized in Table 1. Management practices include:

- Recycling, and
- Storage/Disposal.

Table 1. Summary of Non Chemical Agent-Related Hazardous Wastes Generated at Dugway Proving Ground and Management Options		
Waste Material	EPA Hazardous Waste Number	Primary Management Options
Solvent, Alcohol	D001 ¹ , F003 ¹	Storage/Disposal
Excess Lab Chemicals	Varied	Storage/Disposal
Charcoal Filters	D011	Storage/Disposal
Simulant Decontamination Solution	D002	Storage/Disposal
Solvents	D001	Storage/Disposal
Fuel & Fuel Filters	D001, D018 ¹	Storage/Disposal
White and Red Phosphorus	D001	Storage/Disposal
Hexachloroethane Projectiles, Smoke Grenades, and Smoke Pots	D034	Storage/Disposal
Fog Oil	D001 ¹	Storage/Disposal
Sulfuric Acid Obscurant	D002	Storage/Disposal
Paint	D001 ¹ , D007 ¹ , D008	Storage/Disposal
Solvents	D001 ¹ , F002 ¹ , F003 ¹ , F005 ¹	Recycle
Dry Cleaning Solvents	F002 ¹ , D039 ¹	Storage/Disposal
Battery Acid	D002	Storage/Disposal

Table 1. Summary of Non Chemical Agent-Related Hazardous Wastes Generated at Dugway Proving Ground and Management Options		
DTTF Residual Ash ²	Varied	Storage/Disposal
Lacquer Thinner	D001	Storage/Disposal
Mineral Spirits	D001	Storage/Disposal
Enamel Thinner	D001	Storage/Disposal
Xylene Epoxy	U239	Storage/Disposal
Solvent, Cleaning Compound	D001 ¹ , F002 ¹	Recycle
Personal Protective Equipment	Varied	Storage/Disposal
IRP Waste	Varied	Storage/Disposal
IDW	Varied	Storage/Disposal
Orphan Waste ³	Varied	Storage/Disposal
Photo Processing Chemicals	D011	Storage/Disposal
Waste Oil Sludge	D001 ¹ , D008 ¹ , D018 ¹ , F002 ¹ , F003 ¹ , F005 ¹	Storage/Disposal
Antifreeze Sludge	D001 ¹ , D008 ¹ , D018 ¹ , F002 ¹ , F003 ¹ , F005 ¹	Storage/Disposal
¹ Designated EPA Hazardous Waste Number <u>may</u> apply depending on the chemical characteristics of the material. ² The DTTF part of the Waste Analysis Plan contains additional waste management information for the DTTF Area. ³ Orphan wastes are uncharacterized wastes with no identifiable generator. DTTF Dugway Thermal Treatment Facility EPA U.S. Environmental Protection Agency IDW Investigative Derived Waste IRP Installation Restoration Program		

2.2.3 Solvent recycling is accomplished through a contracted turnkey solvent recycling operation. Storage/Disposal represents the containerization and storage of waste at the CHWSF with subsequent off-site treatment and/or off-site disposal.

2.2.4 Basic chemical properties associated with specific non-chemical agent waste streams generated at DPG are presented in Table 2. The properties presented in the table provide important information for the proper management of hazardous wastes.

Table 2. Non-Chemical Agent-Related Hazardous Waste Management Characteristics									
Waste Material Constituents	Possible EPA Hazardous Waste Codes	Chemical Abstract Number	Incompatibility	Ignitability¹	Corrosivity²	Reactivity³	Toxicity⁴	Acutely Hazardous⁵	Reportable Quantity⁶ (lbs)
Waste Acids and Caustics									
Caustic Rinse ⁷	D002	Varies	Acids	-	Yes	-	-	-	100
Battery Acid	D002	7664-93-9	Bases	-	Yes	-	-	-	100
Waste Paints and Thinners									
Lacquer Thinners	D001	Varies	Acids, Bases, Peroxides	Yes	-	-	-	-	100
Mineral Spirits	D001	Varies	Acids, Bases, Peroxides	Yes	-	-	-	-	100

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Paint Thinners	D001	Varies	Acids, Bases, Peroxides	Yes	-	-	-	-	100
Synthetic Enamel Thinners	D001	Varies	Acids, Bases, Peroxides	Yes	-	-	-	-	100
Paints	D001 D007 D008	Varies	Acids, Bases, Peroxides	Yes	-	-	Yes	-	100 ⁸
Lab Pack Waste									
Various	Various	Varies	Varies	Potentially	Potentially	Potentially	Potentially	Potentially	Potentially
Waste Solvents									
Various	D001 F002 F003 F005	Varies	Acids, Bases, Amines, Azo compounds, Cyanides, Sulfides, Peroxides	Yes	-	-	Yes	-	100 ⁸
Spilled Materials									
Various	Various	Varies	-	Potentially	Potentially	Potentially	Potentially	Potentially	Potentially
Waste Fuels									
Various	D001 D018	-	Acids, Bases, Peroxides	Yes	-	-	Yes	-	100 ⁸
Smoke and Obscurant-Related Wastes									
White Phosphorous (WP Smoke)	D001	7723-14-0	Oxidizing agents	Yes	-	-	-	-	100
Fuming Sulfuric Acid	D002	7664-93-9	Bases	-	Yes	-	-	-	100
Red Phosphorous (RP Smoke)	D001	-	-	Yes	-	-	-	-	100
Fog Oil SGF-2	Possible D001	-	Strong oxidizing agents	Combustible	-	-	-	-	100 ⁸
Diesel Fuel Oil, No. 2-0	D001	-	Strong oxidizing agents	Yes	-	-	-	-	100
Photo Processing Chemicals									
Silver	D011	-	-	-	-	-	Yes	-	1
Waste Oil Sludge and Antifreeze Sludge									
Various	Possibly D001	-	Strong oxidizing	Yes	-	-	Yes	-	100 ⁸

**Table 2.
 Non-Chemical Agent-Related Hazardous Waste Management Characteristics**

Waste Material Constituents	Possible EPA Hazardous Waste Codes	Chemical Abstract Number	Incompatibility	Ignitability ¹	Corrosivity ²	Reactivity ³	Toxicity ⁴	Acutely Hazardous ⁵	Reportable Quantity ⁶ (lbs)
	D008 D018 F002 F003 F005		agents						
DTTF Residual Ash⁹									
Various	Varies	-	-	-	-	-	Yes	-	Potentially
IRP Waste									
Various	Varies	-	Varies	Potentially	Potentially	Potentially	Potentially	Potentially	Potentially
Unknown (Includes Investigation Derived Wastes and Orphan Wastes)									
Various	Varies	-	Varies	Potentially	Potentially	Potentially	Potentially	Potentially	Potentially
- Indicates the data are not applicable.									
¹ Ignitability is defined in 40 CFR §261.21.									
² Corrosivity is defined in 40 CFR §261.22.									
³ Reactivity is defined in 40 CFR §261.23.									
⁴ Toxic is defined in 40 CFR §261.24.									
⁵ Acutely hazardous is defined in 40 CFR §261.11.									
⁶ Spills greater than the reportable quantity must be reported to the Utah Division of Waste Management and Radiation Control and the U.S. Environmental Protection Agency.									
⁷ Denotes simulant decontamination solution.									
⁸ Reportable quantity identified is for D001 characteristic waste, the reportable quantity may vary if additional waste codes apply.									
⁹ The DTTF part of the waste analysis plan contains additional waste management information for the DTTF Area.									
CFR	Code of Federal Regulations								
DTTF	Dugway Thermal Treatment Facility								
EPA	U.S. Environmental Protection Agency								
IRP	Installation Restoration Program								
lbs	pounds								
No.	Number								
RP	Red Phosphorous								
SGF	Standard Grade Fuel								
WP	White Phosphorous								

2.2.4 WASTE ACIDS AND CAUSTICS

2.2.4.1 This waste includes waste acids and caustics designated as characteristic corrosive wastes, D002. Battery acid may be generated during vehicle maintenance. Caustic rinse waste is generated by DPG through the decontamination of simulants in test chambers. Reagent acids and caustics generated by the various DPG laboratories are addressed under Lab Pack Wastes. These wastes are assigned the proper waste code(s) after performing analytical testing and/or applying historical process and/or generator knowledge.

2.2.5 WASTE PAINTS AND THINNERS

2.2.5.1 This waste includes paints and thinners, designated as characteristic ignitable and characteristic wastes, U.S. Environmental Protection Agency (EPA) waste code numbers D001, D007 (chromium), D008 (lead), and D035 (Methyl Ethyl Ketone). The paint is generated from installation maintenance projects. Thinners are used for thinning and removing paint. These wastes are assigned the proper waste code(s) after performing analytical testing and/or applying historical process and/or generator knowledge.

2.2.6 LAB PACK WASTE

2.2.6.1 Small containers of hazardous wastes (typically 5-gallon containers or smaller), which include off-specification and outdated chemicals, when properly packed in containers to meet U.S. Department of Transportation (DOT) and EPA requirements, are called “lab packs.” The types of chemicals, which fit this category are numerous and will vary with time. Lab packs will be packaged in accordance with standing operating procedure (SOP) HWSF-20.

2.2.7 WASTE SOLVENTS

2.2.7.1 Spent solvents are listed wastes, coded F001 through F005, and may also be designated as characteristic ignitable waste D001. The solvents at DPG are used primarily for cleaning. However, the analytical laboratories also use solvents for preparing solutions required for analytical testing (e.g., sample extraction, standards). These wastes are either managed under a turn-key recycling contract or are assigned the proper waste code(s) after performing analytical testing and/or applying historical process and/or generator knowledge.

2.2.8 SPILLED MATERIALS

2.2.8.1 Spills occurring at a location other than the CHWSF involving fuels, oils, chemical products or wastes are cleaned up in accordance with the DPG Installation Spill Contingency Plan. Spilled materials, equipment decontamination solutions, personal protective equipment, etc., are managed as hazardous waste, unless user knowledge or chemical analyses indicate that the material, when spilled, is not a hazardous waste.

2.2.9 WASTE FUELS

2.2.9.1 Waste fuels are usually designated as characteristic for ignitability (D001) and potentially characteristically toxic for organic constituents, such as benzene (D018). EPA waste code(s) are assigned after performing analytical testing and/or applying historical process and/or generator knowledge.

2.2.10 SMOKE AND OBSCURANT TEST WASTES

2.2.10.1 Smoke disseminating devices are used extensively at DPG. Many of the obscurant devices contain hazardous waste constituents, including white phosphorus (D001) and red phosphorous (D001). Projectiles, smoke grenades, and smoke pots containing hexachloroethane are also used at DPG. These projectiles, smoke grenades, and smoke pots are classified as characteristic toxic waste (D034) if they are not spent when discarded or if they are spent but residue remains when they are discarded; and are non-hazardous if they are completely spent when discarded. Obscurants used at DPG in current, and possible future operations are shown in Table 3. Not all

of the obscurants listed in Table 3 result in a hazardous waste. Simulants currently used at DPG for open air testing are not hazardous waste when disposed. EPA waste code(s) are assigned after performing analytical testing and/or applying historical process and/or generator knowledge.

Table 3. Obscurants Used at Dugway Proving Ground¹		
Obscurant	Time Period for Obscurant Use	
	Current	Future
White phosphorous	√	√
Red phosphorous	√	√
Brass powder	√	√
Fog oil, SGF-2	√	√
Diesel fuel oil No. 2	√	√
Oil Red 2144 (dye tracer)	√	√
Sudan 3 (dye tracer)	√	√
Tinopal (Fluorescent tracer)	√	√
Fuming Sulfuric Acid	√	√
Hexachloroethane projectiles, smoke grenades, and smoke pots	√	√
¹ Other obscurants may be tested or used in the future. No. Number		

2.2.11 RESERVED

2.2.12 WASTE PHOTO PROCESSING CHEMICALS

Waste photo-processing chemicals where silver recovery is not effective or not used are D011 characteristic hazardous wastes. These wastes are assigned the proper waste code(s) after performing analytical testing and/or applying historical process and/or generator knowledge.

2.2.13 NON-RECYCLABLE WASTE OIL SLUDGE AND ANTIFREEZE SLUDGE

2.2.13.1 Occasionally, recycling activities involving used oil and antifreeze generate non-recyclable residual sludges in containers and tanks. These wastes can potentially carry characteristic hazardous waste codes D001, D008, and D018.

2.2.14 DUGWAY THERMAL TREATMENT FACILITY TREATMENT RESIDUES

2.2.14.1 Two wastes are generated by the DTTF Area. These wastes include residual ash from the burning or detonation of propellants, explosives, and pyrotechnics (PEP) and scrap metal from detonation of PEP. The residual ash may be hazardous because of metals. The scrap metal is nonhazardous. Waste PEP that is treated by DTTF is discussed in the DTTF Area part of this WAP.

2.2.15 INSTALLATION RESTORATION PROGRAM (IRP) WASTES

2.2.15.1 Potentially contaminated environmental media (i.e., soils and groundwater), potentially contaminated debris (e.g., concrete, wood, metal), or other wastes generated as a result of site restorations are referred to as IRP wastes. These wastes are assigned the proper waste code(s)

after performing analytical testing and/or applying historical process knowledge. If designated as hazardous, IRP waste is ultimately disposed of at an off-site Treatment, Storage, and Disposal Facility (TSDF). Wastes accepted into the Dugway CHWSF will be characterized using analytical methods listed in Tables 4 and 5 or other UDWMRC approved methods.

Table 4. Sampling Procedures and Typical Analyses for Non-Chemical Agent Hazardous Wastes.				
Waste Description	Sampling Procedures¹	Typical Sampling Equipment	Sampling Frequency	Typical Analyses²
LIQUIDS				
Waste Acids and Caustics	SOP HWSF-02	Coliwasa	Each occurrence ³	Corrosivity/pH TCLP Metals
Waste Paints and Thinners	SOP HWSF-02	Coliwasa	Each occurrence ³	Ignitability Corrosivity/pH TCLP Metals/Organics
Waste Solvents	SOP HWSF-02	Coliwasa	Each occurrence ³	Ignitability Corrosivity/pH TCLP Metals/Organics
Spill Liquids	SOP HWSF-02	Various	Each occurrence ³	Corrosivity/pH Various ⁵
Smoke and Obscurant Test Wastes ⁴	SOP HWSF-02	Various	Each drum	Ignitability Corrosivity/pH TCLP Metals
Waste Fuels	SOP HWSF-02	Coliwasa	Each occurrence ³	Ignitability TCLP Volatiles TCLP Semi-volatiles
Waste Photo Processing Liquids	SOP HWSF-02	Various	Each occurrence ³	Corrosivity/pH TCLP Metals
IRP Liquids	SOP HWSF-02	Coliwasa	Each occurrence ³	Corrosivity/pH Various ⁵
IDW Liquids	SOP HWSF-02	Coliwasa	Each occurrence ³	Corrosivity/pH Various ⁵
Orphan Waste Liquids	SOP HWSF-02	Coliwasa	Each drum	Ignitability Corrosivity/pH TCLP Metals TCLP Volatiles TCLP Semi-volatiles
SOILS/SOLIDS				
Lab Pack Waste	NA	NA	NA	HazCat Fingerprint as needed
Spill Solids	SOP HWSF-02	Stainless Steel Spoon Plastic Scoop	Each occurrence ³	Ignitability Various ⁵

Table 4. Sampling Procedures and Typical Analyses for Non-Chemical Agent Hazardous Wastes.				
Waste Description	Sampling Procedures¹	Typical Sampling Equipment	Sampling Frequency	Typical Analyses²
Smoke and Obscurant Test Wastes	SOP HWSF-02	Stainless Steel Spoon Plastic Scoop	Each drum	Ignitability Corrosivity/pH TCLP Metals
Waste Oil or Antifreeze Sludge	SOP HWSF-02	Stainless Steel Spoon Plastic Scoop	Each drum	Ignitability Corrosivity/pH TCLP Metals
DTTF Residual Ash	SOP HWSF-02	Stainless Steel Spoon Plastic Scoop	Each drum	TCLP Metals TCLP Semivolatiles
IRP Solids	SOP HWSF-02	Stainless Steel Spoon Plastic Scoop	Each occurrence ³	Various ⁵
IDW Solids	SOP HWSF-02	Stainless Steel Spoon Plastic Scoop	Each occurrence ³	Various ⁵
Orphan Waste Solids	SOP HWSF-02	Stainless Steel Spoon Plastic Scoop	Each drum	Ignitability Corrosivity/pH TCLP Metals TCLP Volatiles TCLP Semivolatiles

¹ Equivalent sampling methods may be used if approved by the UDWMC.
² Approved analytical methods are listed in Table 5.
³ Each occurrence means that each time a waste is generated a representative sample will be collected for that batch of waste.
⁴ Includes used fog oil and diesel fuel.
⁵ "Various" analyses are to be determined based on the waste description or process knowledge.

Coliwasa Composite Liquid Waste Sampler	IRP	Installation Restoration Program
DTTF Dugway Thermal Treatment Facility	NA	Not Applicable
HazCat Hazard Categorization	TCLP	Toxicity Characteristic Leaching Procedure
IDW Investigative Derived Waste	SOP	Standard Operating Procedure
UDWMC Utah Division of Waste Management and Radiation Control		
HWSF Hazardous Waste Storage Facility		

2.2.16 INVESTIGATIVE DERIVED WASTES (IDW)

2.2.16.1 Potentially contaminated environmental media (e.g., soils and groundwater) generated as a result of physical environmental investigations regarding past practices and site restoration, are referred to as IDW. These wastes are assigned the proper waste code(s) after performing analytical testing and/or applying historical process knowledge. If designated as hazardous, the IDW is ultimately disposed of at an off-site TSDF. Wastes accepted into the Dugway CHWSF will be characterized using analytical methods listed in Tables 4 and 5 or other UDWMC-approved methods.

Table 5. Analytical Methods, Sample Containers, and Holding Times for Non-Chemical Agent Hazardous Waste				
Determination	Method Reference¹	Container²	Preservative for Liquid Samples³	Recommended Maximum Holding Time

Table 5. Analytical Methods, Sample Containers, and Holding Times for Non-Chemical Agent Hazardous Waste				
Determination	Method Reference¹	Container²	Preservative for Liquid Samples³	Recommended Maximum Holding Time
Ignitability	EPA 1010	T,G	2 °C - 6°C	Analyze: 7 days
Corrosivity/pH	EPA 9040	T,P,G	2 °C - 6°C	Analyze: 24 hours
Corrosivity/pH	EPA 9045	T,P,G	2 °C - 6°C	Analyze: 24 hours
TCLP Metals (As, Ba, Cd, Cr, Pb, Se, Ag)	EPA 1311/6010	T,G	2 °C - 6°C	TCLP: 180 days Analyze: 180 days
TCLP Mercury	EPA 1311/7470	T,G	2 °C - 6°C	TCLP: 28 days Analyze: 28 days
TCLP Volatiles	EPA 1311/8260	T,G	2 °C - 6°C	TCLP: 14 days Analyze: 14 days
TCLP Semi volatiles	EPA 1311/8270	T,G	2 °C - 6°C	TCLP: 14 days Prepare: 7 days Analyze: 40 days
TCLP Pesticides	EPA 1311/8081	T,G	2 °C - 6°C	TCLP: 14 days Prepare: 7 days Analyze: 40 days
TCLP Herbicides	EPA 1311/8151	T,G	2 °C - 6°C	TCLP: 14 days Prepare: 7 days Analyze: 40 days
Total Metals (As, Ba, Cd, Cr, Pb, Se, Ag)	EPA 6010	T,P	pH <2 with HNO ₃	Analyze: 180 days
Total Mercury	EPA 7470	T,P	pH <2 with HNO ₃	Analyze: 28 days
Total Volatiles	EPA 8260	T,G	pH <2 with HCl or H ₂ SO ₄ 2 °C - 6°C	Analyze: 14 days
Total Semivolatiles	EPA 8270	T,G	2 °C - 6°C	Prepare: 7 days Analyze: 40 days
Total Pesticides	EPA 8081	Amber Glass	2 °C - 6°C	Prepare: 7 days Analyze: 40 days
Total Herbicides	EPA 8151	Amber Glass	2 °C - 6°C	Prepare: 7 days Analyze: 40 days
Metals	EPA 6020	TFE or PFA	Nitric Acid	14 days

Table 5. Analytical Methods, Sample Containers, and Holding Times for Non-Chemical Agent Hazardous Waste				
Determination	Method Reference¹	Container²	Preservative for Liquid Samples³	Recommended Maximum Holding Time
¹ Unless otherwise noted, methods are EPA SW-846 Methods. Use currently approved method revisions. Equivalent methods may be used if approved by the UDWRC.				
² Container for solid samples is generally 4-6 ounce clear wide-mouth glass jar.				
³ Preservation for solid samples is generally cooling to <6°C but not freezing.				
<	Less than	P	Plastic (polyethylene)	
EPA	U.S. Environmental Protection Agency	PFA	Perfluoroalkoxy	
G	Glass	T	Teflon®	
HCl	Hydrochloric Acid	TFE	Tetrafluoroethylene	
HNO ₃	Nitric Acid	TCLP	Toxicity Characteristic Leaching Procedure	
H ₂ SO ₄	Sulfuric Acid	UDWRC	Utah Division of Waste Management and Radiation Control	

2.2.16 ORPHAN WASTES

2.2.16.1 The purpose of including "orphan" wastes as a category in the WAP is to provide a management system for handling waste materials for which only incomplete identification information is available. Examples would be small quantities of unlabeled vials, or bottles, or unmarked or mislabeled drums. DEP assumes the generator responsibilities for these wastes and fulfills the requirements of 40 CFR §262.11 and Utah Admin. Code R315-262-11 by researching the location where the waste is found, the type of container the waste is in, and attempting to establish a history for the waste. These wastes are generally assigned hazardous waste codes by DEP based on results of research and analytical testing according to the list of tests in Section 2.3.1. In rare cases, a waste may be discovered about which nothing is known and no information can be found. In these "special cases", DPG will contact UDWRC to discuss and reach an agreement on how to proceed with the waste characterization.

2.2.17 WASTE ANALYSIS PARAMETERS: 40 CFR 264.13(b)(i); UTAH ADMIN. CODE R315-264-13

2.2.17.1 The analytical parameters used to characterize a waste, and the rationale for their selection, are based upon the specific waste that has been generated. The parameter most frequently used to characterize hazardous waste is generator knowledge. That is, based upon the generator's knowledge of the waste generating process, the physical and chemical properties of a hazardous waste can be identified. In absence of complete generator knowledge, physical and chemical testing of a sample of the waste must be conducted.

2.3.1 CRITERIA FOR PARAMETER SELECTION: 40 CFR 261.21 THROUGH 261.33; UTAH ADMIN. CODE R315-261-20 THROUGH R315-261-33

- 2.3.2 When generator knowledge is not available, waste characterization may be performed by conducting analytical tests such as:
- Ignitability/flashpoint,
 - Corrosivity/pH,
 - Toxicity Characteristic Leaching Procedure (TCLP) Metals,
 - TCLP Volatiles,
 - TCLP Semivolatiles,

- TCLP Pesticides, and/or
- TCLP Herbicides.

- 2.3.3 The data obtained from these tests are sufficient to characterize the wastes at DPG where no generator knowledge is available.
- 2.3.4 When complete generator knowledge is available to characterize a waste, then no chemical testing is required. A good example of a type of waste with complete generator knowledge is lab packs of outdated chemical reagents.
- 2.3.5 In the majority of situations, some generator knowledge will exist which requires supplemental analytical testing of a sample of the waste. To minimize unnecessary testing, knowledge of hazardous waste operations at the generator sites serves as the basis for the rationale used to select specific testing parameters. Table 6 shows analytical testing requirements that may be necessary when complete generator knowledge is unavailable. If analyses are not specified, then the generator should consult DEP for guidance.

Table 6. Rationale for Selection of Analyses to Perform on Non-Chemical Agent Hazardous Wastes When Complete Generator Knowledge is Unavailable		
Waste Description	Waste Parameter(s)¹	Rationale for Selection
Waste Acids and Bases	<ul style="list-style-type: none"> • Corrosivity (pH) • TCLP Metals (waste acids only) 	<ul style="list-style-type: none"> • Identify wastes that may compromise container structural integrity. • Identify metals for compliance with regulatory limits.
Waste Paints and Thinners	<ul style="list-style-type: none"> • Ignitability (flash point) • Corrosivity (pH) • TCLP Metals/Organics 	<ul style="list-style-type: none"> • Identify appropriate storage conditions. • Identify metals levels for compliance with regulatory limits.
Lab Pack Waste	<ul style="list-style-type: none"> • Visual • Knowledge² • Hazard Categorization • Finger Print 	<ul style="list-style-type: none"> • Identify appropriate container label specifications for safe handling. • Identify appropriate storage conditions.
Waste Solvents	<ul style="list-style-type: none"> • Ignitability (flash point) • TCLP Metals/Organics • Corrosivity (pH) 	<ul style="list-style-type: none"> • Identify appropriate storage conditions. • Identify metals for compliance with regulatory limits. • Identify potential reactivity and relevant health and safety precautions.
Spilled Materials	<ul style="list-style-type: none"> • Knowledge • Various (consult DEP) 	<ul style="list-style-type: none"> • Various
Waste Fuels	<ul style="list-style-type: none"> • Ignitability (flash point) • Corrosivity (pH) • TCLP Metals, Volatiles, and Semivolatiles 	<ul style="list-style-type: none"> • Identify appropriate storage conditions. • Identify metal and organic constituents for compliance with regulatory limits.
Smoke and Obscurant Test Wastes	<ul style="list-style-type: none"> • Corrosivity (pH) • Ignitability (flash point) • TCLP Metals • TCLP Semivolatiles • Knowledge 	<ul style="list-style-type: none"> • Identify appropriate storage conditions. • Identify metal and organic constituents for compliance with regulatory limits. • Various
Waste Photo Processing Chemicals	<ul style="list-style-type: none"> • Corrosivity (pH) • TCLP Metals 	<ul style="list-style-type: none"> • Identify wastes that may compromise container structural integrity. • Identify metals for compliance with regulatory limits.
Used Oil	<ul style="list-style-type: none"> • Total Halogens 	<ul style="list-style-type: none"> • Identify appropriate storage conditions. • Identify halogens for compliance with regulatory limits.

Table 6. Rationale for Selection of Analyses to Perform on Non-Chemical Agent Hazardous Wastes When Complete Generator Knowledge is Unavailable			
Waste Description	Waste Parameter(s)¹	Rationale for Selection	
Antifreeze Sludge	<ul style="list-style-type: none"> • TCLP Lead 	<ul style="list-style-type: none"> • Identify appropriate storage conditions. • Identify levels of lead for compliance with regulatory limits. 	
DTTF Residual Ash ³	<ul style="list-style-type: none"> • TCLP Metals • TCLP Semivolatiles 	<ul style="list-style-type: none"> • Identify metal and organic constituents for compliance with regulatory limits. 	
IRP Waste	<ul style="list-style-type: none"> • Various (consult DEP) 	<ul style="list-style-type: none"> • Various 	
IDW	<ul style="list-style-type: none"> • Various (consult DEP) 	<ul style="list-style-type: none"> • Various 	
Orphan Waste	<ul style="list-style-type: none"> • Various (consult DEP) 	<ul style="list-style-type: none"> • Various 	
¹ Listed analyses are conducted only if generator knowledge is not sufficient to fully characterize the waste. ² Material safety data sheets will be used as generator knowledge for characterization of laboratory packs. ³ The DTTF part of the Waste Analysis Plan contains additional DTTF waste management information.			
DEP	Directorate of Environmental Program	IRP	Installation Restoration Program
DTTF	Dugway Thermal Treatment Facility	TCLP	Toxicity Characteristic Leaching Procedure
IDW	Investigative Derived Waste		

2.3.6 Generator knowledge may be documented by the following:

- Constituent and physical parameter information on material safety data sheets,
- HWTS turn-in document describing the process that generated the waste, and/or
- Satellite site drum logs, which include the product materials that were used in the generation of the waste.

2.3.7 It is DPG's intention to use the terms "visual" and "knowledge" to represent a set of chemical and physical properties whose values determine the characteristics of a waste. Within this context, the terms "visual" and "knowledge" are characterization parameters. To better clarify what is meant by the terms "visual" and "knowledge," definitions are provided. "Visual" means visual inspection of waste containers for identification or leaks and, if required, visual inspection of the wastes to determine physical parameters such as color, layering, physical state, etc., which are visible to the human eye. "Knowledge" means determination of expected physical and chemical properties of a waste based on knowledge of the process generating the waste, known reactants, and products. The rationale for parameter selection beyond generator knowledge is described in the following section.

2.4 RATIONALE FOR PARAMETER SELECTION: 40 CFR 264.13; UTAH ADMIN. CODE R315-264-13

2.4.1 The rationale for the selection of analytical parameters is presented in Table 6. The CHWSF requires analyses for any parameters that cannot be supplied through generator knowledge. In the interim, before characterization is complete, the CHWSF will ensure that the waste is segregated from potentially incompatible waste. Additional analyses may be required by the treatment facility to determine if the chosen method of treatment is appropriate for the waste and will treat all hazardous characteristics or underlying hazardous constituents of the waste. Additional analysis may also be required by the disposal facility to determine if the land disposal restrictions have been met.

2.4.2 IDW is characterized based on the approved work plan for the investigation. For further information refer to Module IV – RCRA Corrective Action Program..

2.5 SAMPLING PROCEDURES: 40 CFR 264.13(b)(3), 261 APPENDIX I; UTAH ADMIN.

CODE R315-264-13, R315-261 APPENDIX I

2.5.1 Sampling protocols and equipment, preservation and storage criteria, QA/QC procedures, and health and safety protocols are described below.

2.5.1 SAMPLING PROTOCOLS AND EQUIPMENT

2.5.1.1 Since there are a number of wastes generated from activities at DPG, Table 4 lists the wastes and specific devices and methods (where appropriate) that are used to obtain a representative sample from each waste. Generally, one representative sample is collected for each waste batch or container. For purposes of this discussion, a batch is a volume of homogeneous waste from a single waste generating activity, which is stored in one or more containers. The matrix type, the laboratory performing the test, the parameter chosen, and any additional QC requirements, dictates the sample size.

2.5.1.2 As liquid waste (excluding IDW, chemical spill materials, and orphan waste) is collected into drums, an accumulation log is generated noting the contents of the drum. If additional characterization is necessary, composite samples are collected from a waste batch following the EPA guidelines and using appropriate sampling techniques such as those listed in Table 4 or other UDWMRC-approved methods. The sample is transferred to the appropriate container (Table 5), sealed, identified with a unique sample number, and then packaged for shipment to a commercial laboratory. If non-disposable sampling equipment is used, it is cleaned and decontaminated after each use. Upon receipt at the CHWSF, each drum is visually inspected for its integrity and all labels and paper work are checked for completeness and accuracy.

2.5.1.3 Orphan wastes require analysis for the entire list of analytical parameters in Section 2.3.1. Chemical spill materials can generally be characterized based on the nature of the chemical, which has been spilled. Occasionally additional testing may be required, necessitating waste sampling. IDW generally does not require sampling, since it is characterized based on historical process knowledge and analytical data from the environmental media generating the IDW. Sampling is not required for lab pack waste prior to handling.

2.5.2 SAMPLE PRESERVATION AND STORAGE

2.5.2.1 The sampler collects the liquid and solid samples for analysis by a Utah certified laboratory. The samples are preserved according to hazardous waste requirements and packaged into a chilled cooler in accordance with the sampling methods listed in Table 4, or other UDWMRC-approved methods, to ensure that the laboratory under the proper conditions receives samples. Upon receipt by the laboratory, samples are logged in and placed into a refrigerated storage unit until analysis. The laboratory ensures that the length of time for sample storage does not exceed the sample holding time, as specified in the analytical method.

2.5.3 SAMPLING QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

2.5.3.1 All sampling conducted in relation to this WAP, for the purpose of hazardous waste characterization, is performed in accordance with standard hazardous waste QA/QC procedures. This section provides a general summary of sampling QA/QC procedures. These QA/QC procedures include, but are not limited to, the following:

- Sample custody,
- Trained/experienced sample collectors, and
- Collection of QC samples.

- 2.5.3.2 Custody procedures are instituted to ensure the integrity of a sample by tracing the possession and handling of the sample. Sample custody includes the generation of chain-of-custody (COC) forms at the time of sample collection and maintenance of sample custody from sample receipt to sample storage or disposition. Other components of sample custody include use of labels on each sample container, use of a field logbook during sample collection, and initiation of a sample request form.
- 2.5.3.3 Sample custody is defined and maintained as follows:
- The sample is in a person's physical custody, or
 - The sample is in view of the person after taking possession, or
 - The sample is secured by that person so that no one can tamper with it, or
 - The sample is secured by that person in an area that is restricted to authorized personnel.
- 2.5.3.4 Samplers are trained to perform sample collection in a manner that will ensure consistency, eliminate contamination, and avoid loss of analyte. In addition, samplers receive additional training as indicated in Attachment 1-4, CHWSF Training Plan.
- 2.5.3.5 Field QC samples may include trip blanks, rinse blanks, and/or duplicate samples. Trip blanks are used to verify that field procedures do not contaminate containers or samplers. They are prepared using analyte-free water when samples are to be analyzed for volatile organic compounds (VOCs). At least one trip blank is prepared and analyzed for each cooler used for storing and transporting VOC samples.
- 2.5.3.6 Rinse blanks are used to detect cross-contamination resulting from the use of non-dedicated (re-used) sampling equipment. At least one rinse blank is collected for every 20 samples per parameter group and matrix, when dedicated sampling equipment is used. This blank is prepared in the field by rinsing the cleaned sampling equipment with analyte-free water and collecting the rinsate.
- 2.5.3.7 Duplicates are samples collected at the same time from the same source and are used to measure sample homogeneity and analytical precision. Duplicates will be collected at the request of the waste generator, DEP or the CHWSF operator.

2.5.4 HEALTH AND SAFETY PROTOCOLS

- 2.5.4.1 Routine safety procedures are observed during sampling activities. These include the use of safety equipment and protective clothing during sampling activities, and precautions taken to ensure that spills or leaks do not occur as a result of sampling. Sampling personnel are knowledgeable about emergency safety procedures and are required to have adequate health and safety training.

2.6 LABORATORY AND ANALYTICAL METHODS: 40 CFR 260.11(c)(3); UTAH ADMIN. CODE R315-261 APPENDIX II, R315-261 APPENDIX III

- 2.6.0 Specific analyses have been chosen to characterize each waste. Specific EPA test methods have been assigned for the analyses. These methods were developed to detect the presence of various compounds and are described in Section 2.5.1. Section 2.5.2 of the WAP includes the qualifications and/or requirements a laboratory must possess to perform the specified test methods used for each type of waste. Other EPA analytical methods may apply as needed.

2.6.1 TESTING AND ANALYTICAL METHODS

2.6.1.1 The selection of analytical testing methods for the wastes is based on requirements for complete characterization and final waste disposition. Selection of test methods is also based on the physical state of the waste, analyses of interest, and required detection limits. Table 4 lists the types of waste generated at DPG and the analyses that are appropriate for each waste type. EPA methods contained in SW-846 Test Methods for Evaluating Solid Waste are followed.

2.6.2 LABORATORY REQUIREMENTS

2.6.2.1 Commercial laboratories selected to analyze liquid and solid samples possess the following:

- A comprehensive QA/QC program,
- An effective data management system,
- Experience in analyzing hazardous waste samples, and
- State of Utah certification.

2.6.2.2 A comprehensive laboratory QA/QC program includes, at a minimum, sample custody procedures, written procedures for each analytical method, instrument calibration procedures, an analyst training program, data review procedures, internal laboratory QC samples, and performance audits. The laboratory must have a data management system that allows them to meet analytical holding time and results reporting requirements. The laboratory must also achieve method detection limits sufficient to meet the established regulatory limits.

2.6.2.3 The laboratory must have sufficient instrumentation to perform the analyses and be able to demonstrate proficiency in analytical methodologies by successfully participating in a performance-auditing program, such as a State certification program. The laboratory may also participate in other performance auditing or national standards programs. Furthermore, individual analysts will have the education and/or experience necessary to perform the analyses as specified in the methods. These laboratories will be required to submit to an on-site facilities and operations audit upon request. Additionally, laboratory raw, final, and QC documentation must be available for validation upon request (however, this may be at an additional cost to the generator).

2.7 ANALYSIS AND WASTE RE-EVALUATION FREQUENCIES

2.7.0 This section contains information related to the frequency of analysis for hazardous wastes routinely generated at DPG. A description of the frequency of waste re-evaluation in relationship to analysis is presented.

2.7.1 FREQUENCY OF ANALYSIS: 40 CFR 264.13(b)(4); UTAH ADMIN. CODE R315-264-13

2.7.1.1 Each hazardous waste to be analyzed must be tested at a particular frequency. This frequency varies depending on the waste stream. Three situations exist at DPG, which affect frequency of analysis.

- Some large volume wastes at DPG are analyzed by batch (see Section 2.4.1 for the definition of batch). This means that each time a waste batch is generated it is analyzed independently for hazardous waste characterization. Batch wastes are generated by non-routine processes.
- Other smaller volume wastes, which are generated periodically from non-routine

processes, are analyzed when the collection container becomes completely filled. This means that a composite sample of the waste is taken from the filled collection container and analyzed independently for hazardous waste characterization.

- Finally, certain wastes generated routinely, which show homogeneity from batch to batch, may be selected by the Permittee for management as a waste stream. Such wastes will be reviewed annually by the generator to verify that the waste characteristics have not changed and analyzed at least once every three (3) years to document that the waste characteristics are constant.

2.7.1.2 These three approaches are consistent with all regulatory requirements. In addition, waste analysis will be verified whenever new or modified wastes are known or suspected to exist.

2.7.2 FREQUENCY OF WASTE RE-EVALUATION: 40 CFR 264.13(b)(4); UTAH ADMIN. CODE R315-264-13

2.7.2.1 Wastes are re-evaluated when a change in the generating process occurs. Homogeneous waste streams, for which each batch is not independently analyzed, are re-evaluated by the generator annually and the analysis is verified at least every three years to ensure that the waste has not changed significantly in physical or chemical characteristics. Annual waste evaluation and triennial verification of analysis will be documented in the CHWSF operating record. If a significant discrepancy or change in the waste characteristics is discovered during the evaluation or analysis, a written report describing the discrepancy and efforts to reconcile the discrepancy will be submitted to the Director of UDWRC. More general re-evaluation of the entire waste analysis program is discussed in Section 2.8.

2.8 SPECIAL PROCEDURAL REQUIREMENTS

2.8.0 This section on special procedural requirements presents procedures related to:

- Receiving waste from off-site generators,
- Ignitable, reactive, and incompatible wastes, and
- Ensuring compliance with LDRs.

2.8.1 PROCEDURES FOR RECEIVING WASTES FROM OFF-SITE GENERATORS: 40 CFR 264.13(b)(5); UTAH ADMIN. CODE R315-264-13

2.8.1.1 Wastes generated off-site are not accepted at the CHWSF. If, for any reason, DPG generates a waste off-site, approval from the Director of the DWMRC must be obtained prior to transporting the waste to the CHWSF for storage. The type, quantity and origin of off-site waste will be recorded in the CHWSF operating record.

2.8.2 PROCEDURES FOR IGNITABLE, REACTIVE, AND INCOMPATIBLE WASTES: 40 CFR 264.13(b)(6) AND 264.17; UTAH ADMIN. CODE R315-264-17

2.8.2.1 The CHWSF stores ignitable, reactive, and incompatible wastes. Every aspect of facility design and operation will acknowledge the hazards inherent in managing these waste types. The facility will evaluate wastes for ignitability, reactivity, and incompatibility.

2.8.3 PROCEDURES TO ENSURE COMPLIANCE WITH LAND DISPOSAL RESTRICTIONS: 40 CFR 264.13, 268.7, 268.9, 268.30 THROUGH 268.38, 268.40 THROUGH 268.43, 268.48, 268.50, AND 268 APPENDIX III, IV, VI, VII, VIII, IX, AND

XI.; UTAH ADMIN. CODE R315-264-13, R315-268

- 2.8.3.1 This section provides a description of procedures DPG will use to comply with applicable LDR regulations. DPG will use analytical procedures, as necessary, to determine the appropriate characteristic or listed waste codes that are applicable to each individual waste stream to be stored at the CHWSF. Additionally, analytical procedures will be used, as necessary, to identify underlying hazardous constituents for wastes exhibiting the characteristics of ignitability (D001), corrosivity (D002), and/or the characteristics of organic toxicity (D012 through D043). (Ignitable (D001), corrosive (D002) and organic toxic (D012 through D043) wastes that meet certain exception criteria including specific technology-based treatment methods and specific waste subcategories are excluded from the requirement to meet underlying hazardous constituent identification as specified in 40 CFR §§268.7(a), 268.37, and 268.38.)
- 2.8.3.2 Based on the waste codes that apply to the waste streams and any applicable underlying hazardous constituents, it will be determined if the wastes are restricted from land disposal. Documentation of the determination will be maintained in the CHWSF. Documentation of where a restricted waste is stored, treated, or disposed will also be maintained in the operating record.
- 2.8.3.3 DPG generates and stores the following wastes subject to the LDRs: D001 through D043, F001, F002, F003, F004, F005, F027, P001 through P018, P020 through P024, P026 through P031, P033, P034, P036 through P051, P054, P056 to P060, P062 to P078, P081 through P082, P084, P085, P087 through P089, P092 through P099, P101 through P106, P108 through P116, P118 through P123, U001 through U012, U014 through U039, U041 through U053, U055 through U064, U066 through U099, U101 through U103, U105 through U138, U140 through U174, U176 through U194, U196, U197, U200 through U211, U213 through U223, U225 through U228, U234 through U240, U243, U244, U246 through U249, U279, U404, U328, U353, and U359.
- 2.8.3.4 DPG will have the waste or an extract of the waste analyzed using appropriate analysis, where applicable, to determine whether the waste meets numeric treatment standards listed in 40 CFR §§268.40 through 268.43.
- 2.8.3.5 Because DPG is a generator of restricted waste, it will comply with the notification and certification requirements applicable to generators by use of the following applicable forms:
- Notification and certification of restricted waste meeting treatment standards: this form will be submitted to the treatment or disposal facility with the initial shipment of the restricted waste meeting treatment standards and will include the information required by 40 CFR 268.7(a)(3)(i) and (iii). Subsequent shipments of the same restricted waste to the same facility do not require the notification or certification paperwork.
 - Notification of restricted waste not meeting treatment standards: this form will be submitted to the treatment facility with the initial shipment of restricted wastes not meeting treatment standards and will include the information required by 40 CFR 268.7(a)(2). Subsequent shipments of the same restricted waste to the same facility do not require the notification paperwork.
 - Notification of restricted waste exempt from land disposal prohibitions: this form will be submitted to the treatment or disposal facility with each shipment of restricted wastes subject to a case-by-case extension, a no-migration petition, or an extension of the effective date and will include the information required by 40 CFR §268.7(a)(4).
 - Notification and certification of waste no longer exhibiting a characteristic that are sent to Subtitle D facilities: this form will be submitted to the Director for the initial shipment of

formerly characteristic waste sent to a Subtitle D facility and will include the information listed in 40 CFR 268.9(d). Subsequent shipments of the same waste no longer exhibiting a characteristic to the same Subtitle D facility do not require notification and certification paperwork.

- Notification and certification applicable to lab packs: this form will be submitted to the treatment facility with each shipment of lab packs and will include the information required by 40 CFR 268.7(a)(9)(i) through (iv) and 268.7(a)(7).

2.8.3.5 All containerized wastes, including restricted wastes, are stored in containers that are clearly marked with the contents of the container (including EPA Hazardous Waste Code) and the date waste was accepted at the CHWSF. Any restricted waste that is stored for a period of time exceeding 1 year will be recorded in the facility operating record. The entry in the operating record will include a justification for storage beyond 1 year.

2.8.3.6 DPG does not currently treat restricted wastes and, therefore, is not requesting a variance from a treatment standard under this permit.

2.9 WASTE ANALYSIS PROGRAM EVALUATIONS: 40 CFR 264.13; UTAH ADMIN. CODE R315-264-13

2.9.0 The designated program manager for this WAP will conduct a programmatic review when any of the following situations occur:

- Processes are changed, or other factors affecting waste identification have occurred,
- Permits are modified or reissued,
- Regulations affecting the definition of hazardous wastes are promulgated, which may result in an increase in the number, or types, of hazardous wastes managed at the facility, or
- Regulations are promulgated affecting management of existing wastes at the facility.

2.9.1 DPG will use this information to refine the waste characterization and management process.

3.0 WASTE ANALYSIS PLAN FOR CHEMICAL AGENT-RELATED WASTE

3.01 DPG personnel and contractors generate chemical agent-related waste as a result of DPG's mission and support activities. To gain a better understanding of the source of waste generated due to chemical agent-related activities, a discussion of the chemical agent operations is provided herein. For purposes of this WAP, chemical agent is used to denote any of the compounds listed in Utah Admin. Code R315-261-33

Table 7		
Chemical Agent Compounds Listed in Utah Admin. Code R315-261-33		
Agent	Common Name	Chemical Name
CX	Phosgene Oxime	dichloroformoxime
GA	Tabun	ethyl N,N-dimethylphosphoramidocyanidate
GB	Sarin	isopropyl methylphosphonofluoridate
GD	Soman	pinacolyl methylphosphonofluoridate
GF	Cyclosarin	Cyclohexyl methylphosphonofluoridate
H	Mustard	bis-(2-chloroethyl)sulfide
HD	Distilled Mustard	bis-(2-chloroethyl)sulfide
HL	Mustard/Lewisite	see components

HN1	Nitrogen Mustard	bis-(2-chloroethyl)ethylamine
HN2	Nitrogen Mustard	bis-(2-chloroethyl)methylamine
HN3	Nitrogen Mustard	tris-(2-chloroethyl)amine
HT	Mustard/T	see components
L	Lewisite	2-chlorovinylchloroarsine
T	O-Mustard	bis (2-chloroethylthioethyl) ether
VX		o-ethyl S-(2-diisopropylaminoethyl) methylphosphonothiolate

3.02 There are six categories of chemical agent-related waste generating activities performed at DPG. These include:

- Protection: testing of protective equipment by means of both liquid and vapor agent challenges;
- Detection: testing of detectors by agent challenges to evaluate detection ability;
- Decontamination: evaluation of decontamination chemicals, equipment, and/or procedures for decontamination effectiveness with various chemical agents;
- Chemical agent contamination/decontamination survivability: capability of a system and its crew to withstand a chemical agent-contaminated environment;
- Demilitarization and treaty verification: documentation that appropriate protocols and procedures are being maintained; and
- Compliance: conducting chemical analysis for chemical agent in support of safety and environmental programs.

3.03 The waste analysis procedures associated with the wastes generated from these activities are categorized into eight specific segments related to the hazardous waste characterization process at DPG. The eight specific segments are detailed in Sections 3.1 through 3.8.

3.04 Section 3.1 provides information on generators at DPG. Section 3.2 identifies current chemical agent-related wastes generated at DPG. Section 3.3 describes the criteria and rationale for selecting waste analysis parameters for each waste. Sampling procedures are presented in Section 3.4 and include the following:

- Sampling protocols and equipment,
- Sample preservation and storage,
- Sampling QA/QC procedures, and
- Health and safety protocols.

3.05 Section 3.5 describes the laboratory testing and analytical methods used including laboratory requirements. The following laboratory requirements are described:

- QA/QC programs (both qualitative and quantitative), and
- Data management systems.

3.06 Section 3.6 discusses the frequency of analysis. Special procedural requirements are included in Section 3.7 and are as follows:

- Procedures for receiving wastes from off-site generators,
- Procedures for ignitable, reactive, and incompatible wastes, and
- Procedures to ensure compliance with LDRs.

3.07 Section 3.8 discusses the waste analysis program evaluations.

3.1 GENERATORS: 40 CFR 262; UTAH ADMIN. CODE R315-262

3.1.0 Generator responsibilities include those identified in Section 2.1 of this WAP. Additionally, generators of chemical agent-related wastes are responsible for providing documentation of the level of decontamination of physically solid chemical agent-related hazardous wastes and for providing documentation of the level of detoxification of liquid chemical agent-related hazardous wastes.

3.2 WASTES: 40 CFR 261; UTAH ADMIN. CODE R315-261-20 THROUGH R315-261-33

3.2.0 This section of the WAP identifies the chemical agent-related wastes generated at DPG. Table 7 summarizes the types of chemical agent-related wastes typically generated and their associated hazardous waste identification numbers.

Table 8. Summary of Chemical Agent-Related Hazardous Wastes Generated at Dugway Proving Ground and Management Options.	
Waste Material	EPA Hazardous Waste Number
Spent Decontamination Solution	F999 or P999, F002, F003, F005, Possibly D001, D002, D004-D011, D018, D022, D019, D035, D038, D039
Decontaminated Solid Test Items (Decontaminated Debris ¹)	F999, Possibly D004, D007, D022
Mask Filters	F999, D007
Carbon Ventilation Filters	F999, D011 ³
Ventilation Duct Work, HEPA Equipment Filters, and Pre-filters	F999
Range Recovered Munitions	P999, D003, D004
Personal Protective Equipment	F999, Any Possible EPA Code
Spilled Materials	P999, Possibly F999, D001, D002, D004, D022, Any possible EPA code
IDW	P999, F999, Any Possible EPA Code
IRP Wastes	P999, F999, Any Possible EPA Code
Miscellaneous Chemical Agent-Related Wastes Including Orphan and Spilled Wastes	P999 and/or F999, Any Possible EPA Code
¹ Debris is used here as defined in 40 CFR §268.2(g). ² Mask filters that have not been exposed to chemical agent vapor do not carry the F999 waste code. ³ Carbon filters that have not been exposed to detectable levels of chemical agent vapor are managed as D011 hazardous waste.	
CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
HEPA	High Efficiency Particulate Air
IDW	Investigative Derived Waste
IRP	Installation Restoration Program

3.2.1 The primary management option for the chemical agent-related wastes generated at DPG is

storage, with subsequent off-site treatment and disposal. As a waste generator, DPG conducts treatment of liquid chemical agent and chemical agent-contaminated debris in the accumulation container. Treatment by a waste generator in the accumulation container does not require a hazardous waste permit.

- 3.2.2 Most chemical agent-related wastes at DPG are generated at the following locations:
- Building 3445 (formerly Building 3008),
 - Bushnell Materiel Test Facility (BMTF) in Building 8027, and
 - Combined Chemical Test Facility (CCTF) in Buildings 4156 and 4165.
- 3.2.3 Building 3445 and the BMTF are subsequently referred to as the Test Chambers.
- 3.2.4 The chemical agent-related wastes generated at DPG are summarized into the following categories:
- Spent decontamination solutions (liquid),
 - Decontaminated test-related debris (solid),
 - Debris combined with decontamination solutions (liquid),
 - Ventilation system wastes (solid),
 - Chemical agent-related spilled materials (liquid or solid),
 - IRP and IDW Wastes (liquid or solid),
 - Oils and hydraulic fluids potentially or actually contaminated with chemical agent (solid), and
 - Construction/demolition debris potentially or actually contaminated with chemical agent (solid).
- 3.2.5 A discussion of these wastes is presented in the following sections.

3.3 SPENT CHEMICAL AGENT DECONTAMINATION SOLUTIONS (LIQUID)

- 3.3.0 Military equipment and supplies are exposed to various chemical agents in the Test Chambers and the CCTF. Either during or upon completion of each test, the test items and other associated debris are decontaminated according to the DPG SOP WDC-ENV-003, "Chemical Test Division Hazardous Waste Management Plan", Chemical, with a solution appropriate for the chemical agents used during the test. In addition, small volumes of chemical agent, chemical agent laboratory standards, and off-specification chemical agent from the CCTF and Test Chambers are detoxified with a decontamination solution appropriate for the particular chemical agent.
- 3.3.1 If detoxification of chemical agents removed from range recovered munitions occurs at DPG, a treatment permit will be required and liquid waste generated from the decontamination process will be categorized as spent decontamination solution. Munition bodies will be managed and transported as recyclable hazardous waste.
- 3.3.2 The decontamination solutions solubilize and react with the chemical agents to destroy them. The degradation effected by chemical reactions includes neutralization, hydrolysis, and oxidation. The spent decontamination solution is considered a listed hazardous waste by the State.
- 3.3.3 Upon verification of detoxification to the Action Levels listed in the Quality Assurance Program Plan (QAPP) for Chemical Agent-Related Waste (Attachment 1-10) and hazardous waste characterization as necessary for storage of the decontamination solutions, these wastes are collected and stored at the CHWSF for eventual shipment to an off-site TSDF. Further analyses

may be required to characterize the waste for treatment and compliance with LDRs.

3.4 DECONTAMINATED TEST-RELATED SOLIDS (SOLID)

3.4.0 A variety of solids become contaminated with chemical agent as a result of operations at DPG. These solids can be divided into two categories. First, there are the solids being directly tested (e.g., a specific piece of equipment intentionally exposed to chemical agent in order to evaluate its functionality in such an atmosphere). Second, there are the solids that are ancillary to the test operation (e.g., personal protective equipment (PPE) worn by personnel during testing and specialized apparatus designed to conduct testing on military equipment). Both directly tested and ancillary solids may be constructed of plexiglass, wood, metal, rubber, plastics, and paper. These solid items may be decontaminated as part of a test plan for housekeeping purposes. The following are typical categories for these solids:

- Test supplies and equipment such as vehicles, mask canisters, filters, mannequins, etc.;
- Operational equipment and supplies such as contaminated expendable equipment and supplies, filters, hoses, etc.;
- PPE such as boots, masks, gloves, etc.; and
- Laboratory wastes such as expendable plasticware, glassware, paper towels, etc.

3.4.1 After decontamination with the appropriate decontamination solution, the test items and solids will be containerized as debris and monitored in accordance with methods listed in Attachment 1-10, CHWSF Quality Assurance Program Plan, Table 2.

3.4.2 Some solid items are so minimally contaminated in testing that they do not require decontamination according to Army Regulations and do not require any further characterization (e.g., by air monitoring). However, UDWMRC is concerned about chemical agent off-gassing from solid test items. Therefore, DPG will perform air monitoring on all other solid test-related items (excluding PPE and sampling items generated during waste handling and waste sampling activities). Minimally contaminated solid items are those items that are exposed to low concentration chemical agent solutions described in Table 9. Once discarded, these items become F999 hazardous waste.

Table 9. Low Concentration Agent Solutions.	
Agent	Maximum Concentration¹
GA, GB, GD, and GF	2,000 µg/ml (0.002%)
H, HD, HT, and HN3	10,000 µg/ml (0.01%)
Lewisite and HL	5,000 µg/ml (0.005%)
VX	1,000 µg/ml (0.001%)
¹ Agent solution cannot exceed the maximum concentration to be considered low concentration solutions. Solid items exposed to low concentration solutions are considered minimally contaminated.	
%	Percent
GA	Ethyl N,N-dimethylphosphoramidocyanidate
GB	Isopropyl methylphosphonofluoridate
GD	Pinacolyl methylphosphonofluoridate
GF	Cyclohexyl methylphosphonofluoridate
H	Levinstein mustard
HD	Dichlorodiethyl sulfide (Distilled Mustard)
HL	mustard/Lewisite mixture
HN3	nitrogen mustard
HT	mustard/HT mixture
ml	milliliter
VX	methylphosphonothioic acid S-[2-[bis(1-methyl)amino]ethyl]-0-ethylester
µg	microgram

3.5 SOLIDS COMBINED WITH DECONTAMINATION SOLUTION (LIQUID)

- 3.5.0 Solid items described in Section 3.2.2 (test-related solids), are initially placed in decontamination solution in a hood or chamber. To prepare the item for transportation or storage, the item is removed from the solution and placed in a larger container. The liquid decontamination solution from the original container is then added to the new container. Some additional decontamination solution may be added in order to keep the solid items in full contact with decontamination solution.
- 3.5.1 Solid items described in Sections 3.2.6 (IRP/IDW wastes) and 3.2.8 (construction debris) are prepared for transportation or storage by combining the items with liquid decontamination solution. Some additional decontamination solution may be added in order to keep the solid items in full contact with decontamination solution.
- 3.5.2 The solids and combined decontamination solution may be managed at the CHWSF based upon analytical results demonstrating that the agent concentration in the decontamination solution is less than the action levels listed in the QAPP (Attachment 1-10) using procedures and methods listed in Table 2 of that document. Results of the testing will be documented as specified in the QAPP. If the decontamination solution is above the action levels for any chemical agent, additional decontamination solution will be added until the appropriate level of detoxification is achieved.

Table 10. Sampling Procedures and Typical Analyses for Chemical Agent-related Hazardous Wastes.				
Waste Description	Sampling Procedures¹	Typical Sampling Equipment	Sampling Frequency	Typical Analyses²
LIQUIDS				
Spent Decontamination Solutions	CL-055R SOP HWSF-02	Glass Coliwasa	One per batch	Agent Residues Corrosivity/pH Ignitability TCLP Metals TCLP Volatiles TCLP Semivolatiles
Debris Combined with Decontamination Solution	CL-055R SOP HWSF-02	Glass Coliwasa	One per drum	Agent Residues Corrosivity/pH Ignitability TCLP Metals
Chemical Agent-Related Spill Liquids	CL-055R SOP HWSF-02	Glass Coliwasa	Each occurrence	Agent Residues Ignitability Various ³
IRP and IDW Liquids	CL-055R SOP HWSF-02	Glass Coliwasa	Each occurrence	Agent Residues Ignitability Various ³
SOILS/SOLIDS				
Decontaminated Test-Related Debris	CL-022R CL-044R	Air Monitoring	Each item or each drum	Agent Residues
Ventilation System Wastes	CL-022R CL-044R	Air Monitoring	Each filter	Agent Residues
Chemical Agent-Related Spill Solids	CL-022R CL-044R	Air Monitoring	Each occurrence	Agent Residues Various ³
IRP and IDW Solids	CL-022R CL-044R CL-057R SOP HWSF-02	Stainless Steel Spoon, Plastic Scoop, or Air Monitoring ⁴	Each occurrence	Agent Residues Various ³
Oils and Hydraulic Fluids	CL-022R CL-044R	Air Monitoring	Each occurrence	Agent Residues
Construction or Demolition Debris	CL0-057R CL-022R CL-044R SOP HWSF-02	Stainless Steel Spoon, Plastic Scoop, or Air Monitoring	Each occurrence	Agent Residues Various ³

Table 10. Sampling Procedures and Typical Analyses for Chemical Agent-related Hazardous Wastes.				
Waste Description	Sampling Procedures¹	Typical Sampling Equipment	Sampling Frequency	Typical Analyses²
¹ Equivalent sampling procedures may be used if approved by the UDWMRC. ² Chemical agent analysis is required for each agent with which the waste has come in contact. Approved analytical methods are listed in Table 8. ³ "Various" analyses are to be determined based on the waste description or process knowledge. ⁴ Or as described in an approved HWMU or SWMU specific sampling or waste management plan as required in Module IV. Coliwasa Composite Liquid Waste Sampler IDW Investigative Derived Waste IRP Installation Restoration Program TCLP Toxicity Characteristic Leaching Procedure UDWMRC Utah Division of Waste Management and Radiation Control SOP Standard Operating Procedure HWSF Hazardous Waste Storage Facility				

3.6 VENTILATION SYSTEM WASTES (SOLID)

3.6.0 Chemical agent contaminated prefilters, high efficiency particulate air (HEPA) filters, plenums, duct work and activated carbon filters are periodically removed from the ventilation systems at the CCTF and the Test Chambers. After removal, the ventilation filters are bagged; monitored in accordance with the procedures and methods listed in Tables 8 and 10, or other equivalent UDWMRC-approved method; and then containerized. If necessary, DPG will decontaminate these wastes. Once the ventilation filters are sufficiently decontaminated they will be transported to and stored at the CHWSF prior to shipment to a hazardous waste permitted TSDF.

3.6.1 HEPA, prefilters, plenums and ductwork contaminated with chemical agent are managed as F999 hazardous wastes because they meet the definition of residue from the testing of nerve, military, and chemical agents. Activated carbon filters containing carbon, which have been contaminated with chemical agent, are managed as F999, and D011 hazardous waste.

3.7 CHEMICAL AGENT-RELATED SPILLED MATERIALS (LIQUID OR SOLID)

3.7.0 In the event of a chemical agent spill, the spill area is decontaminated. If liquid, the spill residues are managed according to procedures in Section 3.2.1. If solid, the spill residues are managed according to procedures in Section 3.2.2 or 3.2.3.

3.8 INSTALLATION RESTORATION PROGRAM (IRP) AND INVESTIGATIVE DERIVED WASTES (IDW) (LIQUID OR SOLID)

3.8.0 This section applies to chemical agent-related IRP and IDW wastes to be managed at the CHWSF. These wastes are assigned waste code(s) based on historical process knowledge and associated analytical data. Dugway must certify that all chemical agent-related IRP and IDW wastes accepted for storage at the CHWSF meet the F999 (residues from demilitarization, treatment, or testing of specified nerve, military, and chemical agents) listing criteria as outlined by Utah Admin. Code R315-261-31(e)(1).

3.8.1 Chemical agent action levels for liquids, soil/solids, and air monitoring are listed in Table 7 of the QAPP (Attachment 1-10). Sampling procedures and typical analyses for liquids, soil/solids, and air monitoring are listed in Table 10 of this WAP.

- 3.8.2 Wastes associated with IRP and IDW soil/solids (i.e., PPE, sampling debris, rinse water, etc.) do not need additional analytical testing if the results from extraction and analysis of the associated soil/solids are less than the agent action levels. IRP and IDW liquid wastes (such as groundwater) are analyzed to ensure that agent concentrations are below action levels.
- 3.8.3 IRP and IDW soil/solid wastes are extracted and analyzed to ensure that agent concentrations are below action levels. Optionally, soil/solid wastes may be combined with decontamination solution and managed as described in Section 3.2.3. If neither of these options is practical, soil/solid wastes will be air monitored to ensure that agent concentrations are below action levels. DPG will notify UDWMRC if air monitoring is used for IRP or IDW waste characterization.

3.9 OILS AND HYDRAULIC FLUIDS POTENTIALLY OR ACTUALLY CONTAMINATED WITH CHEMICAL AGENT (SOLID)

- 3.9.0 Oils and hydraulic fluids that have the potential to be contaminated with chemical agent are generated occasionally. These wastes are generated as a liquid and then absorbent is placed in the container in accordance with R315-270-1(c)(2)(vii). The physically solid waste is bagged and monitored in accordance with the procedures and methods listed in Table 10 of this document, or other UDWMRC-approved method. If necessary, the waste materials will be decontaminated in the accumulation container or additional absorbent will be added. This process will continue until the chemical agent-contaminated material has been sufficiently decontaminated. Once sufficiently decontaminated, the material will be moved to a 90-day storage area and then transported to the CHWSF.

3.10 CONSTRUCTION/DEMOLITION DEBRIS POTENTIALLY CONTAMINATED WITH CHEMICAL AGENT (SOLID)

- 3.10.0 This section applies to chemical agent-related construction or demolition debris to be managed at the CHWSF. These wastes are assigned waste code(s) based on historical process knowledge and associated analytical data. Dugway must certify that all chemical agent-related construction or demolition wastes accepted for storage at the CHWSF meet the F999 (residues from demilitarization, treatment, or testing of specified nerve, military, and chemical agents) listing criteria as outlined by Utah Admin. Code R315-261-31.
- 3.10.1 Sampling procedures and typical analyses are listed in Table 10 of this WAP. Chemical agent analytical methods are listed in Table 2 and chemical agent action levels for soil/solids and air monitoring are listed in Table 7 of the QAPP (Attachment 1-10).
- 3.10.2 Wastes associated with construction or demolition soil/solids (i.e., PPE, sampling debris, rinse water, etc.) do not need additional analytical testing if the results from extraction and analysis of the associated soil/solids are less than the agent action levels.
- 3.10.3 Construction or demolition soil/solid wastes are extracted and analyzed to ensure that agent concentrations are below action levels. Optionally, soil/solid wastes may be combined with decontamination solution and managed as described in Section 3.2.3. If neither of these options is practical, soil/solid wastes will be air monitored to ensure that agent concentrations are below action levels. DPG will notify UDWMRC if air monitoring is used for construction or demolition debris waste characterization.

3.11 WASTE ANALYSIS PARAMETERS AND THE RATIONALE FOR PARAMETER

SELECTION: 40 CFR 264.13(b)(1), 40 CFR 261.21 THROUGH 261.33; UTAH ADMIN. CODE R315-264-13, R315-261-20 THROUGH R315-261-33

- 3.11.0 The analytical parameters used to characterize a chemical agent-related waste, and the rationale for their selection, are based upon the specific waste that has been generated. The parameter most frequently used to characterize hazardous waste is generator knowledge. The rationale for parameter selection beyond generator knowledge is described in the following paragraphs.
- 3.11.1 The analytical parameters and rationale for their selection are summarized in Table 11. When generator knowledge is insufficient for safe and compliant long-term storage of chemical agent-related hazardous waste, analyses will be performed to characterize the waste. Some examples of information necessary to safely store hazardous wastes are physical state, flashpoint, pH, and hazard class.

Table 11. Rationale for Selection of Analyses to Perform on Chemical Agent-Related Hazardous Waste Materials.		
Waste Material	Waste Parameter(s)¹	Rationale for Selection
Spent Decontamination Solutions	<ul style="list-style-type: none"> • Agent Residues • pH • Flash Point • TCLP Metals • TCLP Volatiles* • TCLP Semivolatiles* <p>*If contamination suspected</p>	<ul style="list-style-type: none"> • Identify completeness of reaction, ensure agent levels are less than the Army approved level, ensure safe handling of the waste • Identify appropriate storage conditions • Identify wastes that may compromise container structural integrity
Decontaminated Test-Related Debris	<ul style="list-style-type: none"> • Agent Residues 	<ul style="list-style-type: none"> • Identify completeness of reaction and ensure agent levels meet an Army approved level for safe handling of the waste
Debris Combined with Decontamination Solutions	<ul style="list-style-type: none"> • Agent Residues • pH • Flash Point • TCLP Metals • TCLP Volatiles* • TCLP Semivolatiles* <p>*If contamination suspected</p>	<ul style="list-style-type: none"> • Identify completeness of reaction, ensure agent levels are less than the Army approved level, ensure safe handling of the waste • Identify appropriate storage conditions • Identify wastes that may compromise container structural integrity
Ventilation System Solid Wastes	<ul style="list-style-type: none"> • Agent Residues 	<ul style="list-style-type: none"> • Identify completeness of reaction and ensure agent levels meet an Army approved level for safe handling of the waste
Liquid Chemical Agent-Related Spill Materials	<ul style="list-style-type: none"> • Agent Residues • Flash Point 	<ul style="list-style-type: none"> • Identify completeness of reaction, ensure agent levels

Table 11. Rationale for Selection of Analyses to Perform on Chemical Agent-Related Hazardous Waste Materials.		
Waste Material	Waste Parameter(s)¹	Rationale for Selection
	<ul style="list-style-type: none"> • pH • Various (Consult DEP) 	meet an Army approved level for safe handling of the waste <ul style="list-style-type: none"> • Identify appropriate storage conditions
Solid Chemical Agent-Related Spill Materials	<ul style="list-style-type: none"> • Agent Residues • Various (Consult DEP) 	<ul style="list-style-type: none"> • Identify completeness of reaction and ensure agent levels meet an Army approved level for safe handling of the waste
IRP and IDW Wastes	<ul style="list-style-type: none"> • Agent Residues • Various (Consult DEP) 	<ul style="list-style-type: none"> • Identify completeness of reaction and ensure agent levels meet an Army approved level for safe handling of solid and liquid wastes
Oils and Hydraulic Fluids	<ul style="list-style-type: none"> • Agent Residues • Various (Consult DEP) 	<ul style="list-style-type: none"> • Identify completeness of reaction and ensure agent levels meet Army approved level for safe handling of solid and liquid wastes²
Construction/Demolition Debris	<ul style="list-style-type: none"> • Agent Residues • Various (Consult DEP) 	<ul style="list-style-type: none"> • Identify completeness of reaction and ensure agent levels meet Army approved level for safe handling of solid and liquid wastes²
¹ Flash Point, pH, and Agent Residues are required for liquid wastes. Other listed analyses for liquids are conducted only if generator knowledge is not sufficient to fully characterize the waste for disposal. ² Oily wastes are solidified in an inert absorbent material and are handled as solid chemical agent-related wastes. DEP Directorate of Environmental Programs IDW Investigative Derived Waste IRP Installation Restoration Program TCLP Toxicity Characteristic Leaching Procedure		

3.11.2 Spent decontamination solutions will be tested for the appropriate chemical agents to verify detoxification by comparison against an Army approved health-based level (See QAPP Attachment 1-10, Table 7). Decontaminated test-related debris, as well as ventilation system wastes, will be characterized based on generator knowledge of the individual materials or pieces of equipment and verification of decontamination. Chemical agent-related spill residues will be tested based on knowledge of the material or waste that is spilled. In addition, chemical agent-related liquid spill residues will be tested for chemical agent to verify detoxification by comparison against an Army-approved health-based level. Solid spill residues will be characterized based on knowledge of the material spilled, and monitoring will be performed in accordance with the procedures and methods listed in Table 2 of the QAPP (Attachment 1-10), or other equivalent UDMRC-approved method.

- 3.11.3 Decontamination solutions have the potential to leach metals out of test items. Test plan writers, waste managers, and the DEP evaluate the potential for such leaching during development of the test plan and require additional characterization analyses as necessary. Additionally, chlorine bleach decontamination solutions can react with certain organic materials to generate chloroform. Test plan writers also evaluate the potential for chloroform generation and require additional characterization analyses as necessary. These parameters can be tested for after the waste has been accepted into the CHWSF.
- 3.11.4 Additional analyses for all types of chemical agent-related wastes will be conducted if DPG or the designated disposal facility feels that other characteristics of the waste would alter management methods or proper waste identification. These parameters can be tested for after the waste has been accepted into the CHWSF.

3.12 SAMPLING PROCEDURES: 40 CFR 264.13(b)(3) AND 261 APPENDIX I; UTAH ADMIN. CODE R315-264-13, R315-261 APPENDIX I

- 3.12.0 Sampling of liquid, solid, and combined wastes for chemical agent analytical testing is performed using methods specified in Table 10 or other UDWMRC-approved method. If additional hazardous waste characterization is necessary, the generator will submit a sample request form to DEP, to which DEP will respond by authorizing the CHWSF contractor to collect a sample of the waste for characterization. The sample is then submitted to a State certified analytical laboratory.
- 3.12.1 The sampling protocols and equipment, preservation and storage procedures, QA/QC procedures, and health and safety protocol are described below.

3.13 SAMPLING PROTOCOLS AND EQUIPMENT

- 3.13.0 Generally, the two types of wastes generated from chemical agent testing are liquids and solids. Exhibit 3-4 lists the specific devices and methods (where appropriate) that are used to obtain a representative sample from each waste. One representative sample is collected for each drum or batch of liquid waste and for each decontaminated solid material. QC samples are collected as defined in the QAPP (Attachment 1-10) for analysis of chemical agent-related wastes. The sample size for liquid wastes is dictated by the laboratory performing the test, the parameter chosen, and any additional QC requirements.
- 3.13.1 Liquid waste is segregated based on compatibility. As the waste is collected into drums, an accumulation log is generated noting the type of waste added to the drums, the test that generated the waste, the volume of waste added, the initials of the person adding the waste, and the date. The information provided by the individual generators is the basis for characterization on generator knowledge. In many instances, the maximum possible concentration of chemical agents can be calculated based on the quantity of chemical agent used in the testing performed by the individual scientists and engineers. When generator knowledge cannot be used to determine the concentration of chemical agent present, waste samples are collected from the waste container. Most wastes generated at the Test Chambers are generated in batches, with hazardous constituent concentrations that are very test-specific. Samples are collected from containers generated at the Test Chambers on an as-generated basis. Liquid waste samples are collected and sampled using methods listed in Table 10 or other UDWMRC-approved method.
- 3.13.2 Solid waste from tests is segregated into various waste streams based on the type of waste and type of decontamination procedure used, for example: solids decontaminated with bleach solution; solids decontaminated with caustic solution; mask filters containing carbon; and HEPA,

pre-filters, and carbon filters from the ventilation system. Mask filters are collected in drums. Air monitoring samples from containers of contaminated gas mask filters are collected on an as-generated basis.

- 3.13.3 HEPA, pre-filters, and carbon filters from the ventilation system are tested on as-generated basis. Small-decontaminated test-related debris is placed into drums and an accumulation log is generated noting the contents, the test that generated the waste, the initials of the person adding the waste, and the date. Air monitoring samples from containers of decontaminated test-related debris are collected on an as-generated basis. Large decontaminated solids may require specialized collection containers, such as roll-off containers. If a roll-off container is used, the contents are recorded as added. If the large items are not already verified sufficiently decontaminated, the container will be covered and sampled in accordance with methods listed in Table 10, or other equivalent UDWMRC-approved method.
- 3.13.4 Decontamination sampling for solids consists of containerizing waste item(s) in a plastic bag or by wrapping with plastic film (larger items) and allowing the item to off-gas for a minimum of 4 hours at a minimum temperature of 70 degrees Fahrenheit (°F) prior to analysis. Following the off gassing, the air surrounding the item in the container is sampled in accordance with methods listed in Table 10, or other equivalent UDWMRC-approved method.

3.14 SAMPLE PRESERVATION AND STORAGE

- 3.14.0 Liquid samples collected for chemical agent analysis are transported to the CCTF, logged in by a sample custodian, and placed into a secured refrigerated storage unit until analysis. Preservatives are not required for samples taken for chemical agent analysis. Procedures for liquid samples collected for all other (non-chemical agent) analytes are discussed in Section 2.4.2.

3.15 SAMPLING QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

- 3.15.0 This section provides a general summary of QA/QC procedures related to chemical agent decontamination sampling. All sampling conducted in relation to this WAP for the purpose of hazardous waste characterization uses appropriate QA/QC procedures as discussed in Section 2.4.3 of this WAP.
- 3.15.1 For liquid chemical agent-related wastes, custody procedures are instituted to ensure the integrity of a sample by tracing the possession and handling of the sample. Sample custody includes the generation of COC forms at the time of sample collection and maintenance of sample custody from sample receipt to sample storage or disposition. Other components of sample custody include use of labels on each sample container, use of a field logbook during sample collection, and initiation of a sample request form. Sample custody is defined and maintained as follows:
- The sample is in a persons physical custody, or
 - The sample is in view of the person after taking possession, or
 - The sample is secured by that person so that no one can tamper with it, or
 - The sample is secured by that person in an area that is restricted to authorized personnel.
- 3.15.2 The sampling personnel are trained to collect chemical agent-related liquid samples according to UDWMRC-approved sampling methods. These procedures are designed to ensure consistency in sample collection.
- 3.15.3 QC samples may consist of field duplicates and rinse blanks that are incorporated into the sample

collection procedures. Field duplicate samples are two collocated samples collected independently at a sampling location during a single act of sampling and are used to measure the effectiveness of obtaining a representative sample. For chemical agent-related liquid wastes, collection of a field duplicate sample involves collecting a second sample from a drum at the time the initial sample is collected. For chemical agent-related solid wastes, field duplicates are not collected (see QAPP, Attachment 1-10). Running distilled water over decontaminated reusable sampling equipment and collecting the water into a sample container may be used to prepare rinse blank samples. Rinse blank samples are not taken if disposable collection equipment is used (see QAPP, Attachment 1-10). Rinse blank samples are used to measure the effectiveness of equipment decontamination procedures. Rinse blank samples are not applicable to the type of chemical agent-related solid waste sampling performed under this WAP. Trip blank samples are not prepared for analysis of chemical agent-related wastes (see QAPP, Attachment 1-10).

3.16 HEALTH AND SAFETY PROTOCOLS

3.16.0 Routine safety procedures are observed during sampling activities. These include use of safety equipment and protective clothing during sampling, and precautions taken to ensure that liquid does not escape from the drums or other storage containers. Sampling personnel are knowledgeable about emergency safety procedures and specifically about the hazards of chemical agents.

3.17 LABORATORY TESTING AND ANALYTICAL METHODS: 40 CFR 260.11(c)(3); UTAH ADMIN. CODE R315-261 APPENDIX II, R315-261 APPENDIX III

3.17.0 For each type of waste, specific analyses have been chosen to characterize the wastes. Specific test methods have been assigned for the analyses. Methods were developed by the EPA or by the Army to detect the presence of various compounds. This section of the WAP includes the qualifications and/or requirements a laboratory must possess to perform the specified test methods used for each type of waste and identifies the test methods for each waste.

3.18 LABORATORY REQUIREMENTS

3.18.0 Liquid chemical agent-related waste decontamination verification analyses are conducted at DPG by the CCTF. The CCTF must function under many of the same types of requirements as those for a commercial laboratory. The requirements the CCTF are subject to are listed below:

- A comprehensive QA/QC program ,
- An effective data management system, and
- Experience in analyzing hazardous waste samples.

3.18.1 A comprehensive laboratory QA/QC program includes, at a minimum, sample custody procedures, written procedures for each analytical method, instrument calibration procedures, an analyst training program, data review procedures, internal laboratory QC samples, and performance audits. The CCTF must have a data management system that allows them to meet analytical holding time and results reporting requirements.

3.18.2 The CCTF must have sufficient instrumentation to perform the analyses and be able to demonstrate proficiency in analytical methodologies by successfully participating in a performance-auditing program, such as the Army Chemical Agent Standard Analytical Reference Material program. Furthermore, individual analysts will have the education and/or experience necessary to perform the analyses as specified in the methods. Additionally, laboratory raw, final, and QC documentation must be available for validation upon request.

3.18.3 Solid chemical agent-related West Desert Technical Center (WDTC) or contractor personnel conduct waste monitoring. DPG's QAPP (Attachment 1-10) contains detailed sections describing: QA objectives; sampling procedures; sampling documentation and COC procedures; instrument calibration procedures; data management; reduction; validation and reporting requirements; internal QC checks; and performance audits. In addition, analysts follow written procedures outlined for each analytical method.

3.19 TESTING AND ANALYTICAL METHODS

3.19.0 Selection of test methods is based on the physical state of the waste, analytes of interest, and required detection limits. For chemical agent-related wastes, the EPA SW-846 Test Methods for Evaluating Solid Waste are used if an EPA-approved method exists, otherwise methods developed by the Army are used. Table 2 in the QAPP (Attachment 1-10) lists the chemical agent-related analytical methods that are appropriate for the chemical agent-related wastes generated at DPG.

3.19.1 Test methods used to analyze liquid samples for chemical agents were developed by the WDTC at DPG. The WDTC has developed detailed procedures that are followed for analysis of specific chemical agents for which no EPA methods currently exist (Table 2 in the QAPP). These procedures incorporate QA/QC elements that are present in EPA methods, including use of method blanks and method blank spikes.

3.20 ANALYSIS AND WASTE REEVALUATION FREQUENCIES

3.20.0 This section contains information related to the frequency of analysis for chemical agent-related hazardous wastes routinely generated at DPG. Also, a description of the frequency of waste reevaluation in relationship to analysis is presented.

3.21 FREQUENCY OF ANALYSIS: 40 CFR 264.13(b)(4); UTAH ADMIN. CODE R315-264-13

3.21.0 All chemical agent-related wastes, with the exception of large pieces of equipment, are analyzed at the same frequency as non-chemical agent-related wastes, as described in Section 2.6.1. Large pieces of equipment, which are generated periodically, are analyzed at the time of generation.

3.22 FREQUENCY OF WASTE RE-EVALUATION: 40 CFR 264.13(b)(4); UTAH ADMIN. CODE R315-264-13

3.22.0 Wastes are reevaluated when a change in the generating process occurs. More general reevaluation of the entire waste analysis program is discussed in Section 3.8.

3.23 SPECIAL PROCEDURAL REQUIREMENTS

3.23.0 This section on special procedural requirements presents procedures related to:

- Receiving waste from off-site generators
- Ignitable, reactive, and incompatible wastes
- Ensuring compliance with LDRs

3.24 PROCEDURES FOR RECEIVING WASTES FROM OFF-SITE GENERATORS: 40 CFR 264.13(b)(5); UTAH ADMIN. CODE R315-264-13

- 3.24.0 The CHWSF does not accept hazardous or chemical agent-related wastes (with State codes P999 or F999) from off-site generators.
- 3.25 PROCEDURES FOR IGNITABLE, REACTIVE AND INCOMPATIBLE WASTES: 40 CFR 264.13(b)(6) and 264.17; UTAH ADMIN. CODE R315-264-17**
- 3.25.0 The CHWSF stores ignitable, reactive, and incompatible wastes. Every aspect of facility design and operation will acknowledge the hazards inherent in managing these waste types. The facility will evaluate wastes for ignitability, reactivity, and incompatibility.
- 3.26 PROCEDURES TO ENSURE COMPLIANCE WITH LAND DISPOSAL RESTRICTIONS: 40 CFR §§264.13, 268.7, 268.9, 268.30 THROUGH 268.38, 268.40 THROUGH 268.43, 268.48, 268.50, AND 268 APPENDIX III, IV, VI, VII, VIII, IX, and XI; R315-264-13, 268-7, 268-9, 268-30 THROUGH 268-38, 268-40 THROUGH 268-43, 268-48, 268-50, AND 268 APPENDIX III, IV, VI, VII, VIII, IX, AND XI**
- 3.26.0 No LDRs exist for hazardous wastes carrying State codes P999 and F999. Procedures to comply with LDRs will be written into the hazardous waste permit for the CHWSF when the LDRs for P999 and F999 are established.
- 3.26.1 If P999 or F999 hazardous wastes should carry additional codes subject to LDRs, procedures discussed in Section 2.7.3 will be followed by DPG.
- 3.27 WASTE ANALYSIS PROGRAM EVALUATIONS: 40 CFR 264.13; UTAH ADMIN. CODE R315-264-13**
- 3.27.0 A programmatic review of the chemical agent-related WAP will be conducted if any of the situations identified in Section 2.8, for the non-chemical agent-related WAP, occur in relation to chemical agent-related wastes. The designated Program Manager conducts the programmatic review.