Appendix 8-B

HWSF Closure
Sampling and Analysis Plan

1.0 Introduction

This SAP describes the procedures that will be used to collect and analyze samples during clean closure of the Hazardous Waste Storage Facility (HWSF) at Hill AFB. The HWSF consists of Building 888, Building 898, and the outside storage areas within the fenced perimeter of the facility.

The closure activities to be conducted, as presented in the Closure Plan for the HWSF, include the following:

- Removal of waste inventory
- Decontamination of the facility and related equipment
- Disposal of contaminated material
- Decontamination verification sampling for certification of the closure process

1.1 Objectives of the SAP

The sampling activities described in this SAP will support the last closure activity listed above, decontamination verification sampling. The objective of this sampling is to verify successful decontamination of the storage and unloading areas at the HWSF. The results of the sampling will be used to determine the following:

- Whether the units being closed have been decontaminated sufficiently to meet closure performance standards
- Whether rinsates generated during closure can be discharged to the sanitary sewer directly; pretreated prior to discharge (e.g., at the industrial waste water treatment plant (IWTP) or sent to a permitted TDSF for disposal)
- Whether releases of constituents stored at the HWSF have occurred

1.2 Media to be Sampled

The following media will be sampled:

- Baseline water supply and cleaning solutions. Tap water and cleaning solutions will be sampled prior to decontamination activities to establish background concentrations in fluids used in the decontamination processes.
- Decontamination rinsate. The water used to perform a final rinse of each unit after the unit has been decontaminated will be sampled to evaluate the effectiveness of the decontamination procedures.
- Concrete and asphalt samples may be analyzed to assess whether a release below the concrete surface has occurred.

The following field methods will be used to execute this SAP:

- Grab sampling of various solutions using a COLIWASA-type sampler, dip sampler, or the discharge valve of the tank will be performed for base water supply, clean decontamination solution, final decontamination rinsate, and spent decontamination fluids.
- Mechanical-assisted grinding or coring may take place to provide concrete or asphalt samples.

2.0 Sampling Locations

The locations of samples to be collected to verify the decontamination process and assess any impacts to subsurface soil resulting from HWSF activities are presented in this section.

2.1 Rinsate Samples to Verify Decontamination

Buildings 888, 898 and the loading dock at building 888 will be subject to decontamination and sampling. Decontamination of outdoor storage areas is not anticipated; however, these areas will be assessed for potential releases. The objective of collecting rinsate samples is to determine whether units undergoing closure have been sufficiently decontaminated to satisfy closure performance standards. These standards are presented in permit Attachment 8, Closure Plan for the HWSF, Table 8-5, Clean Closure Standards. Decontamination and sampling will need to be repeated for individual storage units until one of the following is achieved:

- Final rinsate concentrations are below clean closure performance standards.
- Final rinsate concentrations are below the 95 percent upper confidence limit of concentrations of baseline samples (e.g., base water supply, clean decontamination solution).
- Decontamination of the unit to below performance standards is believed to be unfeasible.

If individual units cannot be successfully decontaminated (i.e., performance standards cannot be met), units will be dismantled and transported to a permitted TSDF. This is discussed in greater detail in the Closure Plan.

During decontamination processes, final rinsate from each area will be collected in separate 55-gallon containers or portable tanks. One sample will be collected from each batch of final rinsate used to decontaminate the waste storage and the unloading areas.

One sample from each storage and unloading area will be collected from the final rinsate applied to these areas. The rinsate will be collected from the secondary containment. A minimum of 10 samples from Building 898 (one from each bay) and 19 samples from Building 888 (one from each of the 11 bays, one from the each of the 7 storage closets, and one from the staging area) are estimated for the storage and unloading containment areas. The sampling methods and procedures are presented in Section 3.0, Sampling Methodology.

Final rinsate samples will be analyzed for the specific constituents that were handled in the unit being decontaminated. For example, if a storage area held containers with wastes containing VOCs, the final rinsate from the containment after decontamination would be analyzed for VOCs. The analytical methods are presented in Section 5.0.

2.2 Concrete Samples to Assess Impacts of HWSF Activities

Experience at other TSDF storage facilities designed and managed in accordance with 40 CFR 264 indicates that decontaminating equipment and structures usually results in clean closure. The final decontamination rinsate usually is below clean closure standards. Therefore, concrete samples will only be collected if the final rinsate exceeds clean closure standards.

Concrete samples may be collected directly below the storage areas and in areas that may be potential migration pathways for fluids to enter the subsurface. Potential migration pathway locations include cracks, holes, any other breach in the surface, or the presence of stained concrete. Sampling locations will be determined after the concrete surfaces have been inspected for cracks, holes, or other breaches in the integrity of the surface. One subsurface sample may be collected at each location using a grinder for a total of 22 samples estimated (one from each bay and the staging area). Samples will be collected at a depth of at least 1/2 inch below the concrete surface.

Concrete samples would be analyzed for constituents suspected of being released in the area. For example, the concrete underneath a secondary containment used to store metal-containing acids would be sampled for metals.

Procedures for concrete sampling are included in Section 3.0.

3.0 Sampling Methodology

The methodology for collecting the following samples is presented in Table 8-B-1:

- Baseline water supply samples
- Fresh decontamination solution samples
- Final decontamination rinsate samples
- Concrete samples for release assessment

Table 8-B-1
Typical Sampling Methods and Procedures

Sample Purpose	Location of Samples	Number of Samples	Sampling Procedures
Decontamination Acceptance			
Decontamination rinsate sampling	bldg. 898 bays (10) bldg. 888 storage bays (11) bldg. 888 storage closets (7) Staging area (1)	A minimum of 29 samples	• Begin sampling procedures only after unit has been emptied and has had final rinse; use splash and eye protection and gloves per Health and Safety Plan. • Perform final rinse of entire unit with clean rinse water. • Allow water to collect in containment. • Collect water sample from containment using dipper sampler. • Place sample in appropriate sample containers; label and place in cooler; complete chain-of-custody record. • Decontaminate sampler per decontamination procedures in Section 4.
Baseline water supply and decontamination solutions	Spigot, hydrant, or other source of water used for decontamination fluid	5	Baseline water supply: • Identify spigot, hydrant, or other source of water

Table 8-B-1
Typical Sampling Methods and Procedures

Sample Purpose	Location of Samples	Number of Samples	Sampling Procedures
			that will be used for the entire closure activity. • Turn on water supply and allow it to flow for at least 5 minutes before sampling; do not turn off the water supply until the sampling is complete. • Collect five grab samples at 5-minute intervals from the supply spigot.
	Fresh decontamination fluid	5	Fresh decontamination fluid: • Fill container or tank to be used during decontamination activities with water. • Add prescribed amount of detergent or cleaning solution. • Collect five grab samples from this batch of solution using a COLIWASA, sample bottle, or dip per sampler. • Place samples in appropriate sample containers, label, and place in cooler; complete chain-of-custody record. • Decontaminate dipper sampler per decontamination procedures in Section 4.
Release Assessment			
Concrete	Locations to be determined in field	22	• Identify concrete sampling locations at cracks, holes, or other ground surface breaches in the container storage units, based on visual inspection of ground surface integrity or at stain locations. • 22 concrete sampling locations may be identified. • Using an electric hand grinder with an appropriate grinding wheel, remove the top coating from the concrete. • Remove the grit from the ground-off area of concrete with a whisk broom. • Grind off the next approximately 1/8-inch layer of concrete. • Remove the grit from the ground-off area with a whisk broom. • Grind off the next approximately 1/8- to 1/4-inch of concrete and collect as samples. • Decontaminate by wiping down grinder as described in Section 4.2 and replacing grinding wheel after each sample.
Asphalt/Soil	**Locations to be determined in field**	**12 Minimum**	• **Asphalt and/or soil samples will be taken from outside storage areas in locations that show the potential for subsurface contamination as indicated by staining, cracking, or known use**

Table 8-B-1
Typical Sampling Methods and Procedures

Sample Purpose	Location of Samples	Number of Samples	Sampling Procedures
			patterns. • **Portions of asphalt cores as well as underlying soils may be sent for laboratory analysis**
Disposal/Treatment Requirements for Spent Decontamination Fluids			
Spent decontamination fluids	2,500-gallon portable tank or other (e.g., drums)	up to 5	• Collect grab sample using dipper or COLIWAS-type sampler or from tank bottom spigot from each tank as it fills and is awaiting disposal.
Quality Control Samples			
Field duplicates	Field-determined	1 per day per matrix type	• Collect field duplicate of verification sample at a frequency of 10% per day or 1 per day if fewer than 10 samples collected.
Equipment blanks	Equipment decontamination station	1 per day	• Decontaminate equipment as specified in Section 4. Rinse equipment using deionized water and collect rinsate in sample jar. Collect one per day.

4.0 Sampling Equipment and Decontamination

4.1 Sampling Equipment

Table 8-B-2 shows the types of sampling equipment suggested to collect the samples specified in this SAP.

Table 8-B-2
Typical Sample Collection Equipment

Equipment	Use
Dipper sampler	Sample liquid from sump
Composite liquid waste sampler (COLIWASA)	Sample liquids from 55-gallon drums and portable tanks
Plastic sheeting/plastic bags	Protect surfaces and package samples for shipping
Concrete coring machine or jackhammer	Core pads and slabs
Electric hand grinder	Grind concrete samples
Grit wheel for each concrete sampling location	Grind concrete samples
Stainless-steel hand trowel	Collect concrete or soil samples
Whisk broom	Remove ground-off concrete surface

Samplers also are recommended to use the following:

- PPE, as specified in the site Health and Safety Plan
- Weatherproof field logbooks and indelible markers
- Sample containers
- Packing material such as vermiculite
- Fiberglass tape
- Coolers and ice (or "blue ice") to store/ship samples
- Chain-of-custody forms, labels, and seals

Sampling containers will be provided by the laboratory.

4.2 Decontamination of Sampling Equipment

Equipment and sampling tools will be decontaminated after use according to the procedures specified below. Rinsate generated during decontamination of sampling equipment will be collected, analyzed, and placed in the onsite portable tanks or containers used to store the spent decontamination fluids. The rinsate will then be disposed of with the spent decontamination fluids.

Decontaminate sampling equipment as follows:

- Wash in a solution of tap water and detergent (TSP, Alconox, Liquinox, or equivalent) with a surfactant added as a wetting agent.
- Rinse with dilute nitric acid.
- Rinse with tap water.
- Spray-rinse with deionized water.
- Spray-rinse with reagent-grade methanol alcohol.
- Spray-rinse with deionized water.
- Air-dry.
- Collect decontamination rinsate for testing and appropriate disposal.

Wipe off the electric grinding wheel between sampling locations with a damp lint-free rag to remove concrete dust. Replace the grit wheel between sampling locations.

5.0 Analytical Parameters

Analysis of decontamination rinsate and concrete will depend on the type of wastes that the area handled. Water supply and decontamination fluid samples will be analyzed for VOCs, SVOCs, metals, and TPH.

The approximate numbers of samples and analytical methods are presented in Table 8-B-3. A sufficient number of background samples must be collected to establish the 95 percent confidence level concentration for baseline samples.

Table 8-B-3
Sample/Parameter Matrix

Sample Type	Parameters/Analytical Methods[a]	Approximate Number of Samples[b]
Baseline water supply	VOCs (8015, 8021, or 8260) SVOCs (8270) Cyanide (335.2) Metals (6010 or 7000 series) TPH (8015M)	5
Fresh decontamination solution	VOCs (8015, 8021, or 8260) SVOCs (8270) Cyanide (335.2) Metals (6010 or 7000 series) TPH (8015M)	5
Final decontamination rinsate	VOCs (8015, 8021, or 8260) SVOCs (8270) Cyanide (335.2) Metals (6010 or 7000 series) TPH (8015M)	A minimum of 29
Spent decontamination fluids	VOCs (8015, 8021, or 8260) SVOCs (8270) Cyanide (335.2) Metals (6010 or 7000 series) TPH (8015M)	5
Concrete	VOCs (8015, 8021, or 8260) SVOCs (8270) Cyanide (9012) Metals (6010 or 7000 series) TPH (8015M)	Depends on number of cracks; minimum of 22
Asphalt	VOCs: 8015, 8021, or 8260 SVOCs: 8270 Cyanide: 9012 Metals: 6010/7000 series	
Soil	VOCs: 8015, 8021, or 8260 SVOCs: 8270 Cyanide: 9012 Metals: 6010/7000 series TPH (8015M)	

[a]Analysis of decontamination rinsate and concrete will depend on the type of wastes to which the samples were potentially exposed. Methods cited are from 40 CFR 136 (Methods 601 and 602); *SW-846 Test Methods for Evaluating Solid Waste*, EPA, December 1986, Third Edition (3000 through 9000 series); and *Methods for Chemical Analysis of Water and Wastes*, EPA 600/4-79-020 (200 through 400 series).
[b]Not including QA/QC (See Section 6.0, Quality Assurance and Quality Control).

Note that analytical methods may be changed to reflect EPA-approved methods at time of closure through modification of the Permit in accordance with UAC R315-270-42.

6.0 Quality Assurance and Quality Control (QA/QC)

This section describes the laboratory analytical methods to be applied to the samples, the field QC samples to be collected, chain-of-custody procedures, and the labeling, packaging, preservation, and transportation of samples.

6.1 Analytical Laboratory Methods

Samples collected as part of the closure will be analyzed for the types of constituents handled at the HWSF. The primary wastes that are handled at the HWSF are listed in Table 8-4 of the Closure Plan. The selection of analytical methods will be based on the waste streams that are handled at the HWSF, which include: acid and base solutions with metals; wastewater containing cyanide, oil, or low concentrations organic compounds; oxidizing and reducing agents; and flammables. The following analytical methods will be used for the appropriate samples:

- VOCs in concrete or rinsate: EPA 8015, 8021, or 8260
- SVOCs in concrete or rinsate: EPA 8270
- Cyanide in rinsate: EPA 335.2
- Cyanide in concrete: EPA 9012
- Metals in concrete or rinsate: EPA 6010/7000 series
- TPH: EPA 8015M

6.2 Quality Control Samples

Three types of QC samples will be collected to document the accuracy and representativeness of the confirmation samples: field duplicate samples, equipment blank samples, and trip blanks.

6.2.1 Field Duplicate Samples

Field duplicate samples will be collected at a frequency of 1 per 10 liquid samples collected, with a minimum of 1 sample per day. The field duplicate will be obtained by collecting a split sample from a location at the same time, using the same procedures as those used to collect the original sample.

6.2.2 Equipment Blank Samples

Equipment blank samples are organic-compound-free water aliquots that are placed in contact with nondedicated sampling equipment after the equipment has been decontaminated using the procedures outlined in Section 4.2. Analytical results from these samples are used to evaluate the integrity of the decontamination process and to alert the field manager of possible cross-contamination of samples. A minimum of one equipment blank sample per day will be collected when nondedicated sampling equipment is used.

6.2.3 Trip Blank Samples

Trip blank samples are organic-compound-free water aliquots placed in volatile organics analysis (VOA) sample bottles. These bottles are placed in the coolers used to transport VOA samples to evaluate whether the samples have been contaminated after being placed in the sample bottles and prior to being removed by the analytical laboratory. These samples are collected only when VOA samples are collected.

6.3 Chain-of-Custody Procedures

Specific chain-of-custody procedures will be followed to ensure field sample integrity and tracking of sample custody. The possession of samples must be traceable from the time they are collected to the time they are analyzed by the contract laboratory.

The chain of custody of a sample is defined by the following criteria:

- The sample is in a person's possession or in that person's view after being in his or her possession.
- The sample was in a person's possession and was locked up or transferred to a designated secure area **by that person.**

Each time a sample changes hands, both the sender and receiver will sign and date a chain-of-custody form and specify which item(s) changed hands. When a sample shipment is sent to the laboratory, the top signature copy is enclosed in plastic with the sample documentation and secured to the inside of the sample shipment container. The second copy of the chain-of-custody form will be retained in the project files. A chain-of-custody record will be completed for each shipping container.

The following information is included on the chain-of-custody form:

- Sample number
- Signature of sampler
- Date and time of collection
- Place of collection
- Type of sample
- Number and type of container
- Inclusive dates of possession
- Signature of receiver

In addition to the chain-of-custody form, other components of sample tracking include sample labeling and packaging, the sample request sheet, the sample shipment receipt, the field notebook, and the laboratory logbook.

6.4 Labeling, Packaging/Preservation, and Transportation

6.4.1 Sample Identification and Labeling

All samples will be appropriately labeled for identification and tracking. Sample labels will be completed using waterproof-ink pens and will be affixed to containers at the time of sampling. A sample designation number will be used, containing identifiers that facilitate sample tracking and describe the following:

- Sample medium
  - R = final rinsate
  - CC = concrete
  - EB = equipment blank
  - TB = Trip blank
  - BW = baseline water supply

- CD = clean decontamination solutions
- SD = spent decontamination fluids

- Location, e.g.,
  - M1-898= Bay 1, Building 898
  - SC2-888= Storage Closet 2, Building 888
  - SA-888 = Staging Area, Building 888

- Sample number (e.g., 001)

Equipment blank and trip blank samples from any medium will be designated with an EB or a TB at the end of the sample number. Duplicate samples from any medium will be designated by a discrete sample number.

For example, the first rinsate sample collected from the staging area would be designated as R-SA-888--001.

Additional information on the sample label will include the date and time the sample was collected, the analytical parameter(s), and the names of personnel collecting the sample. Before packaging the samples, care will be taken to ensure that the exteriors of the sample containers are clean and that the sample labels are legible.

6.4.2 Sample Packaging/Preservation

Table 8-1-4 summarizes the packaging and preservation methods for each type of analysis. Sample containers will be provided by the analytical laboratory.

Table 8-B-4
Analyses, Containers, Preservation Methods, and Holding Times

Analysis	Method	Sample Medium	Container	Preservation	Holding Times
VOCs	EPA 8015, 8021, or 8260	Water supply, de-contamination solution, and rinsate	3-40 mL glass vials with tef-lon-septa	Cool, 4°C HCl to pH <2	14 days
	EPA 8015, 8021, or 8260	Concrete/Asphalt/ Soil	6-inch stain-less-steel sleeves	Cool, 4°C	14 days
SVOCs	EPA 8270	Water supply, de-contamination solution, and rinsate	1-liter amber glass with teflon-septa 250 mL widemouth glass with teflon-septa	Cool, 4°C	14 days
	EPA 8270	Concrete/Asphalt/ Soil	Polyethylene or glass containers	Cool, 4°C	14 days

Table 8-B-4
Analyses, Containers, Preservation Methods, and Holding Times

Analysis	Method	Sample Medium	Container	Preservation	Holding Times
Cyanide	EPA 335.2	Water supply, de-contamination solution, and rinsate	1-liter poly-ethylene or glass containers	Cool, 4°C NaOH, pH=12	14 days
	EPA9012	Concrete/Asphalt/ Soil	Polyethylene or glass containers	Cool, 4°C	14 days
Metals	EPA 6010/7000 series	Water supply, de-contamination solution, and rinsate	1-liter poly-ethylene or glass containers	Cool, 4°C HNO3, pH <2	6 months
	EPA 6010/7000 series	Concrete/Asphalt/ soil	Polyethylene or glass containers	Cool, 4°C	6 months
TPH (Gasoline)	EPA 8015M	Concrete/ soil	8-ounce wide-mouth jar	Cool, 4°C	14 days
	EPA 8015M	Water supply, de-contamination solution, and rinsate	1-liter glass container	Cool, 4°C HCl to pH <2	28 days
TPH (Middle Distallates)	EPA 8015M	Concrete/soil	8-ounce wide-mouth jar	Cool, 4°C	14 days
	EPA 8015M	Water supply, de-contamination solution, and rinsate	1-liter glass container	Cool, 4°C HCl to pH <2	28 days

Note: Analytical methods, containers, preservation methods, and holding times may change to reflect EPA-approved methods at time of closure (e.g., soil sample collection for VOCs using EPA Method 5035A).

The packaging procedures will be in accordance with all U.S. Department of Transportation and commercial carrier regulations. Only waterproof ice chests or coolers will be considered acceptable shipping containers.

Samples will be placed in a cooler immediately after collection and maintained at approximately 4°C. Samples will be packaged for shipment as follows:

- Seal drain plug in cooler.
- Place vermiculite or styrofoam peanuts in bottom of cooler.

- Wrap glass bottles with bubble wrap or styrofoam wrapping; place inside Ziploc-type plastic bags and place in cooler.
- Add ice double-bagged in Ziploc-type plastic bags or "blue ice".
- Fill with vermiculite, styrofoam peanuts, or bubble wrap.
- Attach chain-of-custody form in plastic bag to inside of cooler lid.
- Attach two chain-of-custody seals (front and back of container) so that the seals must be broken if the cooler is opened.
- Place name and address of receiving laboratory so it is clearly visible on the outside of the cooler.
- Secure the lid with fiber tape.

The samples will be preserved to ensure that sample integrity is maintained until the samples are analyzed. The holding times specified in Table 8-B-4 will not be exceeded.

6.4.3 Sample Transportation

All samples for analysis will be transported directly to the laboratory or shipped to the laboratory via overnight courier. In either case, the laboratory will be notified immediately when samples are shipped.

6.4.4 Documentation

The sampling team leader will maintain a field logbook that contains all information pertinent to the field sampling plan and includes at a minimum:

- Project name
- Project number
- Personnel
- Weather conditions
- Equipment decontamination
- Health and safety monitoring, if any
- Photograph log (if photographs are taken)
- Sample data
  - Location of sample site
  - Date of sample collection
  - Time of sample collection
  - Type of samples taken
  - Sample identification numbers
  - Sampling method
- Personnel decontamination procedures

Members of the field team using the notebook will make all entries in ink and will initial and date each page.

Documentation Corrections

Unless prohibited by weather conditions, all entries in field and laboratory notebooks will be written with waterproof ink. When an error is made, the individual who made the error will make the correction by crossing a line through the error and entering the correct information. The erroneous information should remain legible. All corrections will be initialed and dated.