ATTACHMENT 9B

THERMAL TREATMENT UNIT
SOIL SAMPLING AND ANALYSIS PLAN

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THERMAL TREATMENT UNIT SAMPLING AND ANALYSIS PLAN

1.0 Introduction

This Sampling and Analysis Plan (SAP) describes the proposed soil sampling methodology for the Thermal Treatment Unit (TTU) located at the Utah Test and Training Range (UTTR). The SAP is designed to satisfy the requirements specified in Module III Section G.1 and Section G.2 of the Resource Conservation and Recovery Act (RCRA) Part B Permit (the Permit) for the TTU at the UTTR. The soil sampling and analysis will provide data to support the ecological and human health risk assessments (Attachment 10 of the Permit) and to monitor treatment effectiveness at the TTU as required by R315-270-23(a)(2), R315-264-601, and R315-270-23(d). Where applicable, the soil sampling procedures and quality assurance/quality control (QA/QC) techniques as described in the latest UTTR *Basewide Quality Assurance Project Plan* (*BQAPP*)[1] will be used to collect soil samples. The *BQAPP* incorporates Environmental Protection Agency (EPA) test methods for evaluating soil contamination.

2.0 Thermal Treatment Unit Description

2.1 Site History

The TTU has been treating solid pyrotechnic, energetic, and propellant items for more than 30 years using both open burn (OB) and open detonation (OD) thermal treatment processes. Historically and currently, materials treated at the TTU have included excess solid propellant and missile motors, unserviceable or excess munitions, and explosive scrap and residues generated from Hill AFB and other DOD testing facilities and laboratories. The frequency of treatment varies according to the quantity of munitions declared unserviceable or excess during any given time period. OB treatment is restricted to February 22 through December 19 in order to take advantage of favorable weather conditions.

The first two TTU soil sampling events were conducted in 1989 and 1991 to support the 1991 RCRA Subpart X Permit Application for the TTU. A 2002 event was conducted to support additional revisions to the permit application including an update of the human health and ecological risk assessments (Attachment 10 of the Permit). Annual soil sampling has been conducted at the TTU from 2004 to 2011 in compliance with Module III of the Permit.

OB/OD operations will continue at the TTU for the foreseeable future, with the primary activity continuing to be open detonation of aluminized hazard class 1.1 propellant in missiles.

[1] The most current version of the UTTR Basewide Quality Assurance Project Plan can be found on the AFCEC Administrative Record Website (https://ar.afcec-cloud.af.mil/). It can be found by going to the website, choosing Hill AFB from the Installation List, and searching "UTTR Basewide Quality Assurance Project Plan" in the Subject or Title.

2.2 Site Description

The TTU occupies approximately 2 square miles in a gently southwestward sloping valley. This area is located approximately 5 miles northeast of the UTTR-North support facility (Oasis) and 20 miles north of Utah Exit 62 on Interstate 80. Access to the TTU is provided via Box Elder County Road 02230, which runs from Interstate 80 northward to the Union Pacific Railroad work site at Lakeside. Figure 1 shows the location of the TTU.

The TTU contains four sites used for treating waste ordnance by OB and/or OD. The four sites are shown in Figure 2. Sites 1 and 4 are the rocket motor and scrap propellant OB pads. Site 2 is the solid rocket propellant and whole motor OD pad. Site 3 is the location of the former munitions burn pan where small arms ammunition, flares, cartridge-actuated devices, and propellant-actuated devices were demilitarized. Site 3 was decommissioned and partially closed in 2018.

All the OB and/or OD operations performed at Sites 1, 2, and 4 are conducted by placing waste munitions items on ground level and initiating or detonating the materials to be treated using explosive charges. There are no engineered structures or containment facilities in place at these two sites; therefore, the release of contaminants into the surrounding area is possible. All OB operations at Site 3 were conducted in a burn pan. Therefore, the only potential for contamination is residue that may be carried off by the wind. Due to the depth of the local groundwater (see Attachment 1, Section 4.1 of the Permit), groundwater contamination from OB/OD activities at the TTU is not likely. A brief description of each site is provided below.

2.2.1 Site 1

Site 1, centered at 41° 8’ 13.58” North latitude and 112° 53’ 41” West longitude, was built in 1989 and is an OB pad used for thermal treatment of solid rocket propellants. OD does not take place at this location. The pad consists of a filled and raised area, with dimensions 300 ft north to south and 400 ft east to west. The surface of the OB pad consists of 8 to 12 in. of pit-run material, covered with 6 in. of 0.75 minus crushed gravel. Grounding rods are driven into the soil for each OB event as needed, isolating the propellant from electrostatic discharge. Figure 2 shows the location of this site.

2.2.2 Site 2

Site 2, the large rocket motor detonation area, contains four OB and OD pads. It is located in the east central portion of the TTU. It contains an upper area with three separate gravel pads connected by a series of gravel-covered roads, which provide access from all points within the TTU. The pads are used as staging areas for the OD of high explosive munitions and the OB of large rocket motors. These operations are carried out on the ground surface in the undeveloped areas immediately west of the pads. It also contains a large lower area that is the primary OD area for large rocket motors within the TTU.

2.2.3. Site 3

Site 3 is the location of the former miscellaneous munitions burn pan that was decommissioned and partially closed in 2018. Information about the partial closure and historical use of the burn pan is found in Attachment 8, Appendix A of the Permit.

2.2.4. Site 4

Site 4, centered at 41° E 06' 54" North latitude and 112° E 54' 8" West longitude, was built in 2008 and is an OB pad used for thermal treatment of solid rocket propellants and whole rocket motors. OD does not take place at this location. The pad consists of a filled and raised area, with dimensions 385 ft north to south and 325 ft east to west. The surface of the OB pad consists of 8 to 12 in. of pit-run material, covered with 6 in. of 0.75 minus crushed gravel. Grounding rods are driven into the soil for each OB event as needed, isolating the propellant from electrostatic discharge.

3.0 Sampling Program

3.1 Background

Initial soil sampling events (1989, 1991, 2002, and 2004) at the TTU consisted of taking discrete samples at random or biased sample locations. These data were valuable for providing concentrations at specific areas of concern (for example, in ash residue at Pad 1 and in the drainage area below Pad 2) but did not characterize average concentrations throughout the TTU area.

In 2005, Hill AFB initiated an incremental sampling program in an effort to understand general patterns of potential contamination and to evaluate average exposures to site workers or ecological receptors. Average concentrations of potential contaminants at the site can be evaluated through this incremental sampling program.

Incremental sampling is recommended in SW-846 Method 8330B, *Nitroaromatics, Nitramines, and Nitrate Esters by High Performance Liquid Chromatography (HPLC)* (EPA, 2006), and the *Guide for Characterization of Sites Contaminated with Energetic Materials* (Thiboutot et al., 2004). The EPA Region III OB/OD Permitting Guidelines document suggests that it may be useful for baseline characterization (EPA, 2002). Composite sampling plans have been employed at other military ranges in the United States and Canada to characterize levels of soil contamination. These include Schofield Barracks and Pohakuloa Training Area, Hawaii; Canadian Forces Base (CFB), Gagetown, New Brunswick; Cold Lake Air Weapons Range, Alberta (Pennington et al., 2004); CFB-Valcartier, Quebec; Donnelly Training Area, Alaska; Fort Polk, Louisiana (Jenkins et al., 2005); and Canadian Forces Ammunition Depot Dundurn, Saskatchewan (Ampleman et al., 1998).

3.2 Sample Quantity and Locations

Approximately 5 to 10 samples are collected during each sampling event including field duplicate samples. The number of samples is based primarily on the programmed budget allocation for the sampling activity. Sample locations are selected after consultation with Utah

Department of Waste Management and Radiation Control (DSHW) personnel, with the overall goal of supporting risk assessment and future closure activities by thoroughly characterizing distinct areas within the TTU (e.g., operational vs non-operational areas). Duplicate samples are always taken at Site 1 (the primary OB pad) and Site 2 (the primary OD pad) and may be taken at other locations to test sample repeatability and year to year variation. Sample quantities and locations will be detailed in event-specific sampling and analysis plans.

4.0 Soil Analysis and Constituents to be Monitored

Soil samples collected from within the TTU will be analyzed for energetics, perchlorate, nitroguanidine, and metals. The list of monitored constituents is based on potential chemical species that may be introduced to the site during treatment operations as outlined in the Waste Characterization Evaluation for the TTU (Attachment 2 of the Permit) and that may be of concern based on the ecological and human health risk assessments (Attachment 10 of the Permit) for the site. The complete list of analytes and the associated methods are provided in Table 1. All analytical work will be performed by a laboratory certified by the State of Utah for the methods specified in this SAP.

5.0 Schedule

Soil sampling will be conducted at the TTU on a biennial basis. OB/OD operations typically occur from April to October. Soil samples will be collected in the fall of each sampling year. Prior to sampling, UTTR personnel will be contacted to ensure that the majority of OB/OD operations have been completed for the year and coordinate explosive ordnance disposal (EOD) escort.

6.0 Soil Sampling Procedures

This section describes the procedures that will be used for soil sampling, including field documentation, sample collection methods, sample handling, and equipment decontamination. The procedures for soil sampling presented in this sampling plan for the TTU are derived from SW-846 Method 8330B Appendix A, *Collecting and Processing of Representative Samples for Energetic residues in Solid Matrices from Military Training Ranges* (EPA, 2006).

6.1 Documentation

Field documentation serves as the primary foundation for all field data collected for site evaluation. All field documentation will be accurate, legible, and written in indelible ink. Absolutely no pencils or erasures will be used. Incorrect entries in the field books, logs, or on forms will be crossed out with one line, initialed, and dated. Skipped pages or blank sections at the end of a page will be crossed out with an "X" covering the entire page or blank section; "No Further Entries," initials, and date will be written by the field person. The responsible field team member will write his/her signature, date, and time after the last entry of the day.

To further assist in the organization of the field book, logs, and forms, the date will be recorded on top of each page along with the significant activity description. In addition, all original field documentation will be retained in the project file. The description of field data documentation given below serves as an outline.

6.1.1 Field Logbooks

The field logbook will be a bound, weatherproof book with numbered pages, and will serve primarily as a daily log of the activities carried out during sampling. The logbook will serve as a diary of the events of the day. The soil sampling team members will be responsible for recording the following information:

- Health and safety activities (i.e., TTU escort, radios, review of evacuation route)
- Personnel contamination prevention and decontamination procedures
- Record of daily tailgate safety meetings
- Weather
- Equipment decontamination procedures
- Personnel and subcontractors on job site and time spent on the site
- Disposal of contaminated wastes [personal protective equipment (PPE), paper towels, Visqueen, etc.]
- Site name, soil sample number
- Soil sample information:

- Number of samples collected and type of containers used
- Date and time of sample collection
- Type of analyses requested
- QA/QC samples collected; names given to blind samples
- Field observations
- Problems encountered and corrective actions taken
- Deviations from the Sampling Plan
- Site visitors

6.2 General Protocol for Sample Collection

Samples will be taken within 100 meter (m) grids to evaluate average concentrations of energetics and metals. One hundred incremental surface samples will be collected within each grid to obtain a representative sample. The samples are collected at ground surface to about 1 centimeter (cm) below ground surface. The TTU contains a mixture of sands, silts, gravels, cobbles, and large rock. Sample locations will be adjusted slightly in the event that sample collection is inhibited by rocky soils or vegetation.

6.2.1 Soil Sampling Methods

The sampling grids for potential sample collection are presented in Figure 3. Each standard grid cell is 100 m by 100 m (10,000 square meters). Site 1, the Burn Pad will be sampled as one unit even though the area is larger than 10,000 square meters.

Samples representing each grid cell or quadrant will comprise 100 incremental samples of approximately 20 grams each. Each incremental sample will be collected in a systematic random grid within each cell or quadrant. Exact sample locations will be established by entering the selected grid at a random location near one of the corners and beginning to sample at approximate 10-m intervals (in a grid pattern) until 100 samples have been collected.

All samples will be collected from the top 1 cm of an approximately 25-square-centimeter surface area at each sample location and placed in clean polyethylene bags. Any observable particles of propellant, metal, plant material or other foreign material (i.e., not soil or rock) will be excluded from the sample upon collection.

Scoops or trowels used for surface soil sampling will be made of stainless steel. Dedicated sampling equipment will be used whenever feasible. The dedicated equipment will not be decontaminated between incremental samples taken within each grid.

6.3 Sample Handling and Shipment

6.3.1 Sample Containers

The sample containers used for soil sample collection are “ultra-clean” polyethylene bags. Bags are required due to the volume of sample and have been proven effective in previous studies.

When storing before and after sampling, the bags and jars will remain separate from any solvents, any other volatile organic materials, and any type of cleaner. Samples collected at the TTU do not require chemical preservatives.

6.3.2 Numbering and Labeling

A sample label will be affixed to all sample containers. Labels provided by the laboratory or another supplier may be used, and at a minimum will include the following information:

- Client name, project title, or project location (sufficiently specific for data management)
- Sample location
- Sample identification number
- Date and time of sample collection
- Type of sample (composite)
- Initials of sampler
- Preservative used
- Sample analysis method

This information will be written in indelible ink. If split samples are required, they will be labeled appropriately with a unique identification number.

6.3.3 Sampling Quality Assurance/Quality Control

The QA/QC of the field sampling and laboratory analytical procedures will be assessed by obtaining field replicates (preselected prior to sampling), matrix spikes (MS), matrix spike duplicates (MSD), and equipment blanks (if applicable). The analytical laboratory will take two additional subsamples from samples designated for MS/MSD analysis after grinding of the primary sample has been accomplished. Table 2 details QA/QC sample frequency for soil sampling at the TTU.

6.3.4 Chain-of-Custody

Chain-of-Custody (COC) procedures allow for the tracking of possession and handling of individual samples from the time of field collection through laboratory analysis. Documentation of custody is accomplished through a COC record that lists each sample and the individuals responsible for sample collection, shipment, and receipt. A sample is considered in custody if it is:

- In a person's possession; or
- In view after being in physical possession; or
- Locked or sealed so that no one can tamper with it after it has been in an individual's physical custody; or
- In a secured area, restricted to authorized personnel.

A COC record is used to record the samples taken and the analyses requested. Information recorded includes time and date of sample collection, sample number, type of sample, sampler's signature, required analysis, and type of containers and preservatives used. The sampler will retain a copy of the COC record prior to release to a second or third party.

COC records will be placed in a plastic bag, secured to the lid of the cooler, and transported with the samples. When the sample(s) are transferred, both the receiving and relinquishing individuals will sign the record. Signed air bills will serve as evidence of custody transfer between the field sampler and courier as well as courier and laboratory. If a carrier service is used to ship the samples (e.g., Federal Express), custody will remain with the sampler until it is relinquished to the laboratory. The sampler will retain copies of the COC record and air bill. If the COC records are sequentially numbered, the record number and air bill number will be cross-referenced in the field logbook.

6.3.5 Sample Preservation/Storage

Sample containers and holding time requirements will be as required by the analytical method as detailed in the *BQAPP*. The proposed analytical methods do not require chemical preservation. For preservation, each sample will be refrigerated or placed in a cooler containing ice to maintain sample temperature of 4 degrees Celsius (4°C) (± 2°C). Sample temperature upon arrival at the analytical laboratory will be officially documented based on the temperature of an included temperature blank or by recording the container temperature as measured by an infrared thermometer.

6.3.6 Custody Seals

Custody seals will be used on each shipping container to ensure custody. Custody seals consist of security tape with the initials of the sampler and the date placed over the lid of each cooler containing samples. The tape will be affixed such that the seal must be broken to gain access to the contents. Custody seals will be placed on coolers prior to the sampling team's release to a second or third party (e.g., shipment to the laboratory).

6.3.7 Sample Shipping

Procedures for packaging and transporting samples to the laboratory are based on the actual chemical, physical, and hazard properties of the material. The procedures may also be based on an estimation of contaminant concentrations/properties in the samples to be shipped. Soil samples collected from the TTU are identified as environmental samples collected for chemical analysis and do not require stamped or certified containers.

6.3.7.1 Sample Shipping via Commercial Carrier

For the soil samples that are shipped to the contract laboratory via a commercial carrier, the following procedures apply:

- Sample labels will be completed and attached to sample containers as described in Section 6.3.2.
- The samples will be placed upright in a waterproof metal (or equivalent strength plastic) ice chest or cooler.
- Ice in double Ziploc™ bags (to prevent leakage) will be placed around, among, and on top of the samples. Enough ice will be used so that the samples will be chilled and maintained at 4°C (± 2°C) during transport to the laboratory. Dry ice will not be used. Experience has shown that blue ice is inadequate.
- To prevent the sample containers from shifting inside the cooler, the remaining space in the cooler will be filled with inert cushioning material, such as shipping peanuts, additional bubble pack, or cardboard dividers.
- The original copy of the completed COC form will be placed in a waterproof plastic bag and taped to the inside of the cooler lid.
- The lid will be secured by wrapping strapping tape completely around the cooler in two locations.
- “This Side Up” labels will be placed on two sides of the cooler.
- Custody seals will be placed in two locations (the front right and back left of the cooler) across the cooler closure to ensure that any tampering is detected. The date and initials of the sampler will be written on the custody seal.
- A copy of the COC record and the signed air bill will be retained for the project files.

6.4 Sampling Equipment Decontamination

The following procedures will be used to decontaminate non-dedicated sampling equipment that may come into contact with soil samples. To minimize decontamination procedures in the field, disposable equipment will be used wherever feasible. The following procedures will be used to decontaminate nondedicated equipment:

- Wash and scrub equipment with phosphate-free, laboratory-grade detergent (e.g. Alconox™ or equivalent); steam cleaning may also be performed, if possible;
- Rinse with distilled water; and
- Triple-rinse with distilled water.

Personnel involved in decontamination activities will wear appropriate protective clothing as defined in the project-specific health and safety plan, which will be included in a project-specific Work Plan.

6.5 Health and Safety Plan

Each year, a health and safety plan will be generated and included in the event-specific SAP. As part of maintaining safety during soil sampling activities, field staff and other accompanying individuals will review the health and safety plan before entering the site and comply with its requirements. In addition, all parties going to the TTU must coordinate with EOD or 75 CEU (two weeks in advance) to provide escort while on the TTU.

7.0 Data Management

7.1 Data Transfer

Data management tasks associated with this project will include the transfer of electronic data between analytical laboratories and the data validation staff, the data validation staff and the data manager, and the data manager and Hill AFB data manager. To facilitate smooth data flow, the Air Force Environmental Resources Program Information Management System (ERPIMS) will be used as the basis for data management. The ERPIMS format provides a set of codes and structure for data deliverables. Data management will be performed in the following sequence:

- The field sampling team will obtain samples according to a predetermined location. A global positioning system (GPS) will be used to demarcate the location of each grid corner where soil samples are taken at the TTU.
- The samples obtained during the day will be continuously logged on a COC form.

The COCs will be delivered to the data manager who will enter the data from the COCs to the field database. The data manager can then track the status of the analytical samples.

7.2 Data Validation

All analytical laboratory data will be validated using *BQAPP* guidance prior to reporting. Data validation will begin promptly when an acceptable electronic data deliverable is received from

the laboratory. Electronic copies of the analytical data will also be sent to the data validators for reference during data validation.

Validation information is stored in relational tables; therefore, validation reports that summarize the findings are automatically printed at the conclusion of each validation session. The project chemist will review all validation reports prior to completion of the validation process. Recommendations from the project chemist regarding flagged data will also be included in the report. Upon completion of the process, the validated analytical data and reports are transmitted electronically to the data manager. The validated data are then re-entered into the project database.

Validated data will be used in the assessments of human health and ecological risk screens which incorporate statistical comparisons of TTU soils with background. Statistical analysis of apparent trends in analyte concentration may also be utilized. Data flagged as "R" (rejected) will not be included in the ecological or human health risk assessments nor will it be included in any statistical assessments of the TTU site.

7.3 Data Reporting

Sampling data will be presented in a summary report. The data from sampling will be reported in five formats:

- A traditional hard-copy report containing a description of the sampling event, analytical data, field data, and data validation reports will be generated for each sampling event.
- An electronic version of the analytical data will be delivered to Hill AFB in an ERPIMS-compliant format for inclusion into the Hill AFB environmental database.
- A portable document format (.pdf) file of the hard copy report will be provided to allow cross-platform file sharing and convenient intranet/internet publication.
- Native files of the hard copy report will be provided for storage in the Hill AFB archive system.
- Complete laboratory reports of the data from each sampling event will be submitted as .pdf files with the electronic version of each sampling report.

The hard copy of the annual summary report will be submitted to Hill AFB within 30 days of the receipt of the validated data from the analytical laboratory. A copy of the validated data will be submitted to the Director within 180 days of the soil sampling event.

8.0 References

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Thiboutot, S., G. Ampleman, and A.D. Hewitt, 2004. *Guide for Characterization of Sites Contaminated with Energetic Materials*. ERDC/CRREL TR-02-1, U.S. Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH.

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TABLE 1
Method, Analyte, and Typical Method Detection Limit List

Method	Analyte	MDL	Units
6860	Perchlorate	0.0011	mg/kg
7471	Mercury	0.0047	mg/kg
SW8332M	Picric acid	0.028	mg/kg
SW8330 Mod	Nitroguanidine	0.0316	mg/kg
SW8330	Nitroglycerin	1.7	mg/kg
	Pentaerythrite tetranitrate (PETN)	1.9	mg/kg
SW9056	Chloride	2.4	mg/kg
	Nitrate	0.5	mg/kg
	Sulfate	2	mg/kg
SW6010B	Aluminum	4.9	mg/kg
	Barium	0.12	mg/kg
	Beryllium	0.15	mg/kg
	Cadmium	0.025	mg/kg
	Calcium	6.2	mg/kg
	Cobalt	0.1	mg/kg
	Copper	0.56	mg/kg
	Iron	1.5	mg/kg
	Lead	0.1	mg/kg
	Magnesium	10	mg/kg
	Manganese	0.078	mg/kg
	Nickel	0.24	mg/kg
	Potassium	41	mg/kg
	Sodium	59	mg/kg
	Strontium	0.064	mg/kg
	Vanadium	0.62	mg/kg
	Zinc	0.35	mg/kg
SW6020	Antimony	0.1	mg/kg
	Chromium	0.0303	mg/kg
	Molybdenum	0.00821	mg/kg
	Selenium	0.0397	mg/kg
	Silver	0.1	mg/kg
	Arsenic	0.0147	mg/kg
	Thallium	0.01	mg/kg
SW8330	1,3,5-Trinitrobenzene	0.2	mg/kg
	1,3-Dinitrobenzene	0.06	mg/kg
	2,4,6-Trinitrotoluene (TNT)	0.2	mg/kg
	2,4-Dinitrotoluene	0.05	mg/kg
	2,6-Dinitrotoluene	0.05	mg/kg
	2-Amino-4,6-Dinitrotoluene	0.05	mg/kg
	2-Nitrotoluene	0.2	mg/kg
	3-Nitrotoluene	0.2	mg/kg
	4-Nitrotoluene	0.2	mg/kg
	HMX	0.1	mg/kg
	Nitrobenzene	0.2	mg/kg
	Cyclotrimethylene trinitromine (RDX)	0.13	mg/kg
	Tetryl (trinitrophenylmethylnitramine)	0.05	mg/kg

NOTES:
MDL = Method Detection Limit
mg/kg = Milligram per Kilogram
ng/kg = Nanogram per Kilogram

TABLE 2
BQAPP Required QA/QC Sample Frequency

QA/QC Sample Type	BQAPP-Required Frequency	Number Collected per TTU Sampling Round[1]
Field Duplicates	1 for every 10 field samples	2
Matrix Spikes	1 for every 20 field samples	1
Matrix Spike Duplicates	1 for every 20 field samples	1
Equipment Blanks	1 for every 20 field samples	1

[1] Based on 10 field samples collected per round

TABLE 3
Analyte, Container, and Holding Time List

Method	Matrix	Container(1)	Preservative	Holding Time
SW6010B—Metals	Soil	8-oz. jar	Chill to 4ºC	180 days from sample collection to analysis
SW6020—Metals	Soil	share	Chill to 4ºC	180 days from sample collection to analysis
7471—Mercury	Soil	share	Chill to 4ºC	28 days from sample collection to analysis
6860—Perchlorate	Soil	8-oz. jar	Chill to 4ºC	-No holding time for extraction but will be done as soon as possible -28 days from sample extraction to analysis
SW9056—Chloride, Nitrate, and Sulfate	Soil	8-oz. jar	Chill to 4ºC	-No holding time for extraction but will be done as soon as possible -28 days from sample extraction to analysis (chloride and sulfate) -48 hours from sample extraction to analysis (nitrate)
SW8330—Energetics	Soil	8-oz. jar	Chill to 4ºC	-30 days from sample collection to extraction(2) -40 days from sample extraction to analysis
SW8330-Mod—Nitroguanidine	Soil	4-oz. jar	Chill to 4ºC	-14 days from sample collection to extraction(2) -40 days from sample extraction to analysis

NOTES:
°C = Degree Celsius
oz = Ounce
(1)All samples will be collected in an ultra clean bag. The laboratory will segregate appropriately after grinding.
(2)Time extended to allow for grinding.

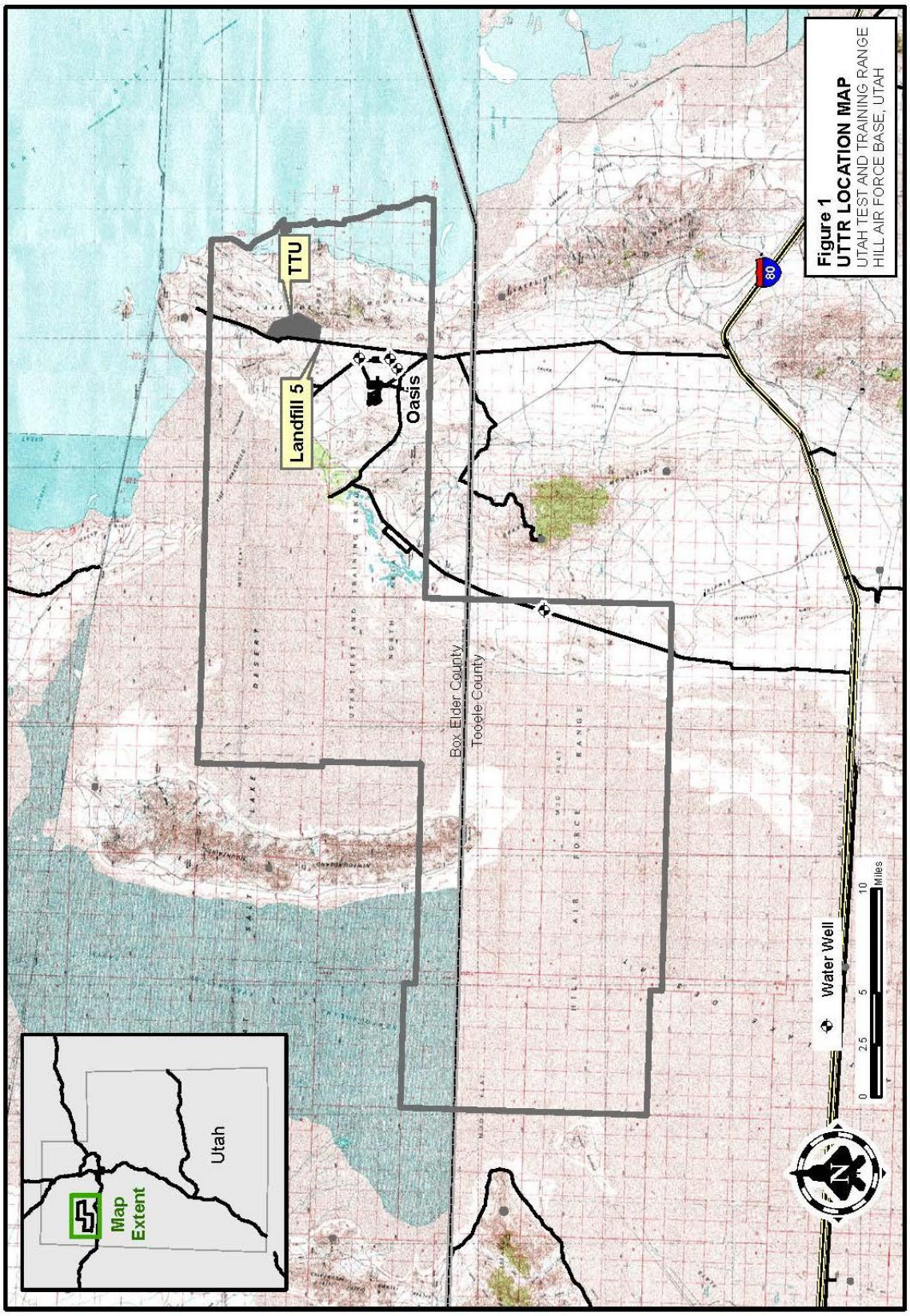
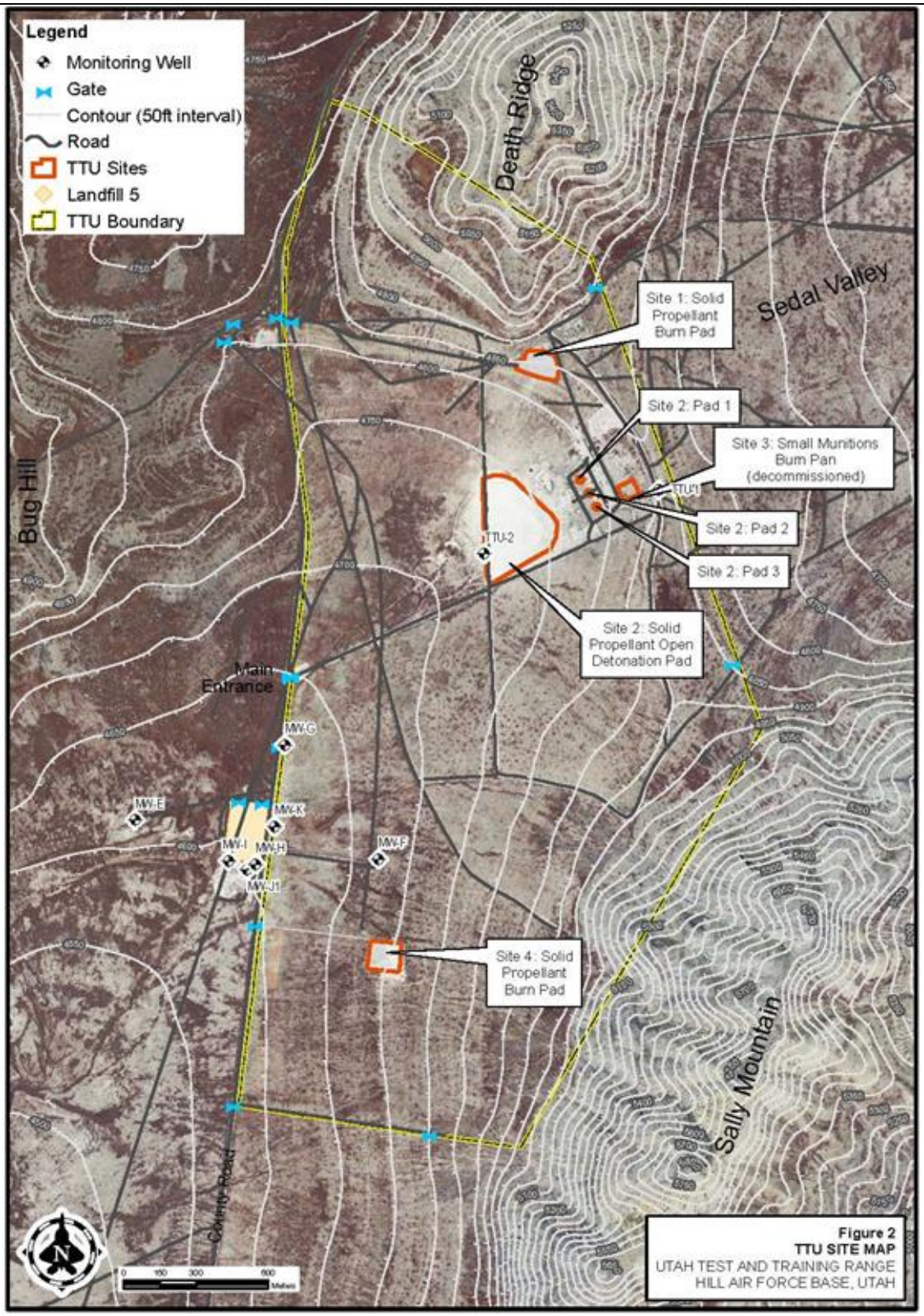
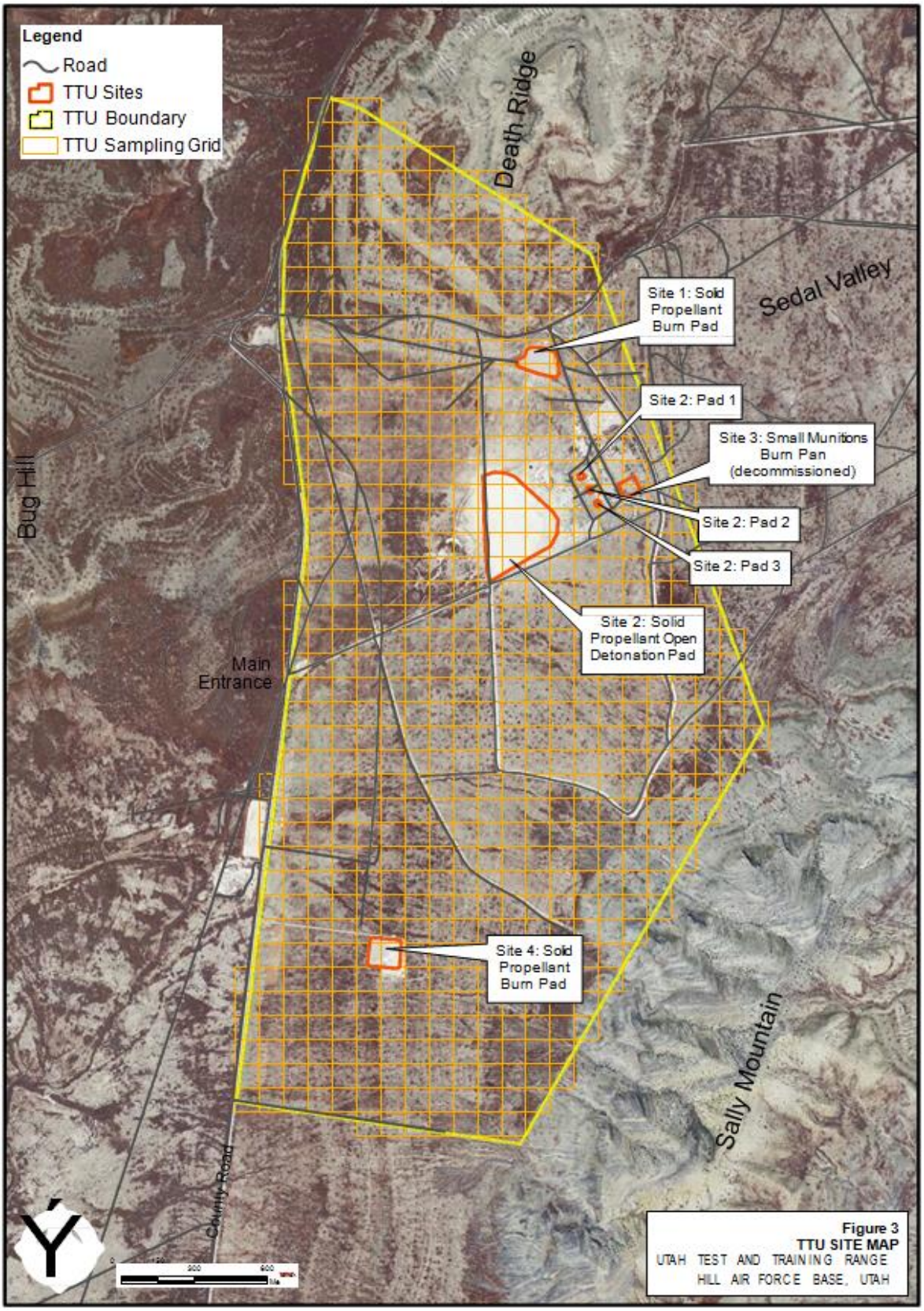


Figure 1
UTTR LOCATION MAP
UTAH TEST AND TRAINING RANGE
HILL AIR FORCE BASE, UTAH
TTU
Landfill 5
Oasis
80
Box Elder County
Tooele County
Water Well
0
2.5
5
10
Miles
N
Utah
Map Extent


Legend
Monitoring Well
Gate
Contour (50ft interval)
Road
TTU Sites
Landfill 5
TTU Boundary
Death Ridge
Sedal Valley
Bug Hill
Site 1: Solid Propellant Burn Pad
Site 2: Pad 1
Site 3: Small Munitions Burn Pan (decommissioned)
Site 2: Pad 2
Site 2: Pad 3
Site 2: Solid Propellant Open Detonation Pad
Site 4: Solid Propellant Burn Pad
TTU-1
TTU-2
Main Entrance
MW-C
MW-E
MW-K
MW-I
MW-H
MW-J1
MW-F
County Road
Sally Mountain
Figure 2
TTU SITE MAP
UTAH TEST AND TRAINING RANGE
HILL AIR FORCE BASE, UTAH


Legend
Road
TTU Sites
TTU Boundary
TTU Sampling Grid
Death Ridge
Sedal Valley
Site 1: Solid Propellant Burn Pad
Site 2: Pad 1
Site 3: Small Munitions Burn Pan (decommissioned)
Site 2: Pad 2
Site 2: Pad 3
Site 2: Solid Propellant Open Detonation Pad
Bug Hill
Main Entrance
Site 4: Solid Propellant Burn Pad
Sally Mountain
County Road
Figure 3
TTU SITE MAP
UTAH TEST AND TRAINING RANGE
HILL AIR FORCE BASE, UTAH