

6/10/97



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RF/ER-96-0020 96-DMR-ERM-0031

REV 3

Field Sampling Plan for the Source Removal of Trenches
T-3 and T-4 (IHSSs 110 and 111 1)

**Instructions "NEW" - Appendix 7, Field Sampling Plan Addendum To Support The Final
Disposition Of Treated Drum Carcasses From The T-3/T-4 And Ryan's Pit
Source Removal Projects, Pages 1-10 File Appendix 7 following
Appendix 6 of RF/ER-96-0020, Field Sampling Plan for the Source
Removal at Trenches T-3 and T-4 IHSS 110, 111 1**

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ROCKY FLATS PLANT

Field Sampling Plan
for the Source Removal at Trenches T-3 and T-4
IHSS 110, 111 1

ENVIRONMENTAL MANAGEMENT DEPARTMENT

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Appendix 7

**FIELD SAMPLING PLAN ADDENDUM
TO SUPPORT THE FINAL DISPOSITION OF
TREATED DRUM CARCASSES FROM THE
T-3/T-4 AND RYAN'S PIT SOURCE REMOVAL PROJECTS**

1 0 INTRODUCTION

This appendix to the FSP was developed to support the characterization and disposition of treated drum carcasses excavated from Trenches T-3 and T-4, also known as IHSS's 110 and 111 1, at RFETS. Nine roll-off containers were filled with various wastes from the T-3/T-4 project and are currently planned for disposition during FY-97. The drums being addressed by this plan were placed into six, 18-yd³ roll-off containers following treatment using low temperature thermal desorption technology. In addition, two drums have been treated from the Ryan's Pit Source Removal (IHSS 109) and are included in the volume noted above. The drums from T-3/T-4 and Ryan's Pit contain low levels of radionuclide contamination, and prior to treatment, contained significant levels of volatile organic compounds (VOCs). The VOCs have been removed as part of the treatment process. It is expected that the drums will be disposed of as low-level waste at the Department of Energy's (DOE) Nevada Test Site (NTS) facility.

2.0 SAMPLING OBJECTIVES

The purpose of this sampling effort is to collect data to satisfy requirements to allow for an approval of a Determination of Equivalent Technology (DET) being sought from the EPA and to verify attainment of the hazardous waste requirements of the NTS Waste Acceptance Criteria (WAC), Rev 0, September 19, 1996. Evaluation of radiological parameters and characteristics of the other three roll-offs planned for disposition at NTS is being addressed in separate documents.

The crushed, treated drum carcasses being sampled have been processed through the thermal desorption unit during the T-3/T-4 and Ryan's Pit Source Removal Projects. The

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drums are contained in six, 18- cubic yard roll-off containers. Based on the thermal desorption treatment of the drums (an approved technology for treating hazardous debris under 40 CFR 268.45), the drums will no longer be hazardous waste provided that an approved Determination of Equivalent Technology is granted by the EPA and the waste does not exhibit a characteristic. The purpose of this sampling is to collect a composite sample of the drums to verify that the crushed, treated drums are not a characteristic hazardous waste. A more detailed discussion follows.

On September 18, 1996 DOE petitioned EPA Headquarters to grant a DET pursuant to 40 CFR §268.45 for the Ryan's Pit and T-3/T-4 drum carcasses treated using thermal desorption. Based upon the DOE submission, on November 27, 1996 EPA Headquarters issued a conditional DET. As specified in the regulations, a written DET approval renders the debris non hazardous and no longer subject to RCRA Subtitle C requirements (See 40 CFR §261.3(f) and §268.45(c)). In the conditional DET, EPA Headquarters found that

"(t)he replacement standards approved under this DET sets for the hazardous debris organics the use of thermal desorption as the applicable treatment standard and this DET is conditioned on DOE demonstrating to EPA how the debris were thermally desorbed and segregated, and to DOE demonstrating to EPA that the debris does not show a hazardous waste characteristic listed in the 40 CFR 268.21-261.24 (e.g. ignitability, corrosivity, reactivity, and Toxicity Characteristic metals). Table 4 is a list of documents that DOE should submit to EPA Region VIII officials in order to demonstrate how DOE has complied with this DET. DOE should consult in writing with Region 8 on specific documents and reports that can be submitted in support of or as a substitute of those items required under Table 4. Once EPA Region 8 provides DOE with written confirmation on the type of documents that can satisfy the items listed under Table 4 of this Notice, DOE may dispose of the treated debris."

Table 4 of the DET includes six requirements

"1. A certification by DOE that the thermally desorbed debris have been separated from thermally desorbed hazardous soils,

2 A certification by DOE that the treated debris do not exhibit other hazardous characteristics listed in the 40 CFR 261 21 through 261 24 or (3) below,

3 A certification by DOE that any treated debris which exhibited other hazardous characteristics listed in the 40 CFR 261 21 through 261 24, was treated to applicable treatment standards under the 40 CFR 268 40 and 268 48,

4 A certification by DOE that the treated soil and other wastewater and nonwastewater forms resulting from the thermal desorption of debris meet applicable treatment standards under 40 CFR 268 40 and 268 48

5 Operating logs documenting that the debris have been treated under the same or higher range of operating temperatures and the same or longer residence time conditions applied to hazardous soils, and

6 Submittal of a DET compliance report to appropriate persons in EPA Region VIII and the CDPHE that consolidates the compliance certification supporting compliance with this DET "

Based upon discussions with Region VIII EPA, requirements 1, 4, 5 and 6 can be satisfied by submitting the closeout reports for the two projects with written certifications in the cover letter. A single representative sample (a composite of coupons of metal from each roll-off container) tested for toxicity characteristics must be collected and analyzed to satisfy requirement 2. There is sufficient knowledge of process that RFETs and EPA Region VIII have agreed that testing for reactivity, ignitability or corrosivity is not required. Requirement 3 is only triggered if the treated drum carcasses exhibit a toxicity characteristic.

When EPA Region VIII has received the closeout reports and the sample results show that the drum carcasses do not exhibit a toxicity characteristic, EPA will issue a letter stating that conditions of the approval have been addressed.

In addition to EPA's requirements, the NTS requires a statistically valid sampling approach. An approach developed to meet NTS requirements follows.

Numerous drum carcasses and other material (collectively described as debris) were extracted from the T3/T4 Trenches during the excavation and treatment of the soils. This material was subsequently segregated and stored in roll off containers until such a time they could be dispositioned. In order to meet the WAC for the NTS, the debris must achieve a 90% confidence that the material has been characterized in accordance with the TCLP methodology. To meet this requirement, Simple Random Sampling is proposed with a Prespecified Margin Of Error of 10% per Gilbert, 1978. The number of samples to be collected is based upon the following statistical calculation

where $n = (Z_{1-\alpha/2}\sigma/d)^2$, and

n = the number of samples (coupons) to be collected

$Z_{1-\alpha/2}$ = standard normal deviate

$1 - \alpha$ = confidence level (95%)

σ = standard deviation (22)

d_r = relative error (10%)

The number of drums were estimated based upon the total weight of the roll-off minus the tare weight of the roll-off and assuming the standard weight of 1 drum to be 29 kg. Based upon this assumption, the total number of drums estimated to be in the roll-offs are 651. In order to be more conservative a 95% confidence was used. Performing the calculation for this level of confidence, the total number of samples required is 21 samples. Three (3) iterations of the calculation were performed based upon the quantiles of the t distribution from Gilbert. However, a total of 24 samples (coupons) will be collected from the six roll off containers by random sampling within the segments to achieve a higher confidence (See Figure A7-1)

To assist in analyzing a single representative sample, the laboratory performing the analyses will be given written instructions regarding analyses of coupons (the coupons are described later in this document). The TCLP VOA analysis requires approximately 20 grams of sample while the TCLP metals, semivolatile organics analysis requires approximately 100 grams of sample material. Four coupons are expected to be collected

from individual drums contained in each of the six roll-off containers and combined into one composite sample for analyses. Thus, the sample jar will contain 24 coupons. It is expected that the total sample mass from the 24 coupons will be 300-350 grams, only 120 grams of which will be analyzed. The laboratory performing the analyses will be instructed to cut portions from each and every coupon such that the material analyzed has components from each coupon. The laboratory will be instructed to make efforts such that each portion of coupon is approximately equal in mass. Excess sample material will be stored at the laboratory pending the results of the TCLP analyses. In the event that the sample exceeds select TCLP hazardous waste standards, the laboratory may be instructed to analyze the remaining portions of coupon material for underlying hazardous constituents.

3 0 SAMPLE LOCATION AND FREQUENCY

As stated in Section 2 0, four coupons will be cut from drums located in each of 6 roll-off containers. Not more than one coupon will be cut/sampled from each drum. The roll-offs being sampled are

X06786,
X06787,
X06788,
X06789,
X06790,
X06933

The roll-off containers are 16 feet long, 8 feet wide and 4 feet deep. For health and safety reasons, the coupons are being collected from drum carcasses located at the top surface, along the lengthwise axis located opposite from the lid opening mechanism. This health and safety limitation will not effect the representativeness of the sample because the treated drums were extensively homogenized during the excavation, treatment and materials handling process. As such coupons collected from drums located along the top surface, bottom or middle or any x-y location should be no more likely to be above or below a TCLP standard than any other drum. Within this location limitation, and to meet the requirements of Section 2, the sample (coupon) locations within this area were

randomly determined. This was done by dividing the lengthwise axes into four quadrants and subsequently randomly selecting one location (from a possible 3 locations) within each quadrant. Each roll-off will be sampled using a different set of randomly generated sampling locations. Table A7-1 lists the sampling locations for each roll-off. The samples will be collected approximately 1-2 feet from the side of the roll-off. As an example, Figure A7-1 provides the sampling locations for roll-off number X06786. The distances of these samples from the hook end (side opposite the end dump) of the roll-off are as follows: 3 feet, 7 feet, 10 feet, and 14 feet.

Table A7-1 Sampling Locations For Each Roll-Off

Roll-off Number	Quadrant			
	1	2	3	4
X06786	3	3		2
X06787	2	2	1	3
X06788	1	2	2	2
X06789	1	2	3	2
X06790	1	1	3	2
X06933	2	2	2	2

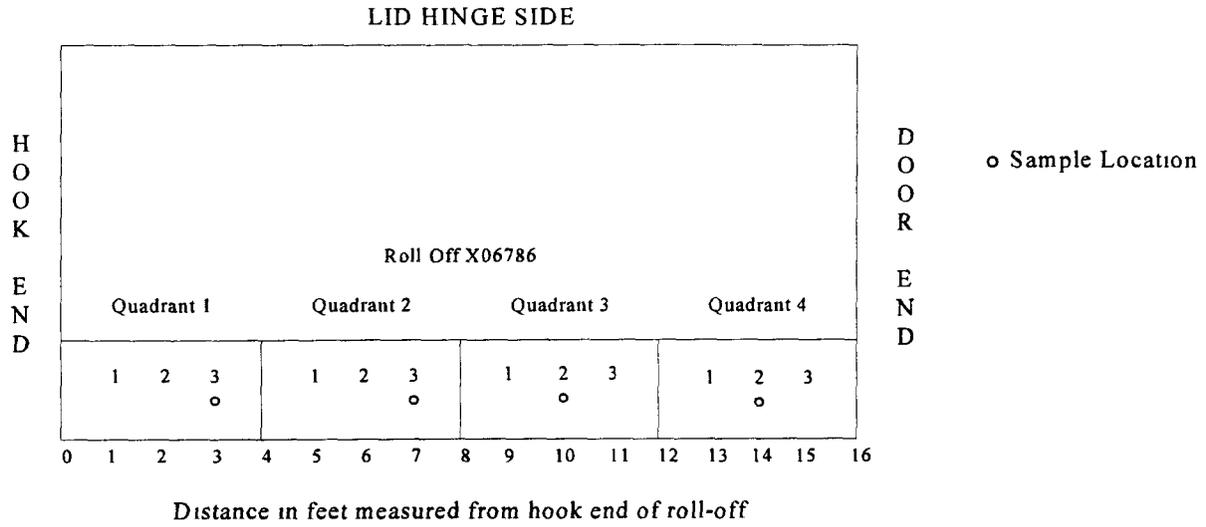


Figure A7-1 Sample (Coupon) Locations for Roll-Off Container X06786

All samples taken to meet NTS WAC will be placed in the appropriate containers and analyzed within the specified holding times as shown in Table A7-2

Table A7-2 Sample Types and Associated Analytical Methods

Analytical Method	Analytes	Container	Preservative	Holding Time
TCLP SW-846 1311 (extraction)	TCLP metals (Method 6010A, except Hg, Method 7470) TCLP Semivolatiles (Method 8270/8270A) TCLP Chlorinated Herbicides (Method 8150) TCLP Organochlorine Pesticides (Method 8080) TCLP Volatiles (Method 8240A/8260)	250-ml wide mouth glass jar, as appropriate	Cool 4° C	180 days from extraction, 180 days from extraction to analysis except Hg 28 days to extraction, 28 days from extraction to analysis 14 days to TCLP extraction, 7 days to preparative extraction, 40 days from preparative extraction to analysis 14 days to TCLP extraction 7 days to preparative extraction, 40 days from preparative extraction to analysis 14 days to TCLP extraction, 7 days to preparative extraction 40 days from preparative extraction to analysis 14 days to extraction, 14 days from extraction to analysis
SW846 Method 8240A	Volatiles (trip blank) - 1 per VOA shipment	2 x 40 ml VOA vials - Teflon lined septa lids	Cool, 4° C, HCl to pH<2	14 days

4 0 SAMPLE DESIGNATION

The samples will be assigned unique nine digit numbers as described in Section 4 0 of the main body of the FSP It is expected that this TCLP sample will have the sample number DB00040RM assigned to it In addition, the samples will carry the appropriate Report Identification Number (RIN), event and bottle number(s) required by the RFETS Analytical Projects Office

5 0 SAMPLING EQUIPMENT AND PROCEDURES

Samples are expected to be collected/extracted from the drums using a power drill equipped with a hole saw (e g , 1-3/8" diameter) to cut coupons from the metal drums Care will be taken to cut or collect pieces small enough to be placed inside sample containers No more than one coupon will be collected from a single drum Additional personnel may be used to hold the drums in place (safety precaution) and to apply a fine distilled water spray to minimize dust generation (radiological precaution)

It is expected that the sample will be placed into a 250 ml teflon lined wide mouth glass jar However, if all the coupons will not fit, the jar size may be increased as necessary A 250 ml wide mouth jar is first being proposed because its size and geometry will support the onsite gamma spectroscopy of the sample using a HPGe detector This will in turn be used to support the offsite shipment of the sample

Equipment substitutions such as stainless steel scissors or cutters may be used if conditions warrant, provided the substitutions are documented in the field logbook Other equipment will include standard items, such as general decontamination equipment, chain of custody seals and forms, logbooks, etc

6 0 SAMPLE HANDLING AND ANALYSIS

Sample collection will follow *Environmental Management Department (EMD) Operating Procedures Volume I Field Operations 5-21000-OPS-FO 13, Containerization, Preserving, Handling, and Shipping of Soil and Water Samples*, in accordance with the Section 5 1 of the main body of the FSP. When metallic, reusable sampling equipment is used, the equipment will be decontaminated in accordance with EMD Operating Procedure 5-21000-OPS-FO 03, *General Equipment Decontamination, Section 5 3, Cleaning Procedures for Stainless Steel or Metal Sampling Equipment*. Since the coupons will be analyzed as a single sample by the laboratory, equipment rinse samples are not planned to be collected. A trip blank will be shipped blind to the laboratory with the regular sample, to assist in the evaluation of VOCs, if detected (e.g., to evaluate cross contamination). If it is necessary to perform radiological screening on samples to ascertain DOT shipping requirements, custody sealed samples may be removed from coolers and screened as long as they are returned to a cool environment, promptly after screening.

Field data shall be documented on the forms developed for this project, and in accordance with the referenced procedure. The originator shall authenticate (legibly sign and date) each completed hardcopy of the data. A peer reviewer, someone other than the originator, shall perform a peer review on each hardcopy of data. The peer reviewer shall authenticate (legibly sign and date) each hardcopy completed by the originator. Any modifications shall be lined-through, initialed, and dated by the reviewer (in ink). Data planned for computerized reduction and analysis shall be entered into electronic form in accordance with the procedure, 4-B29-ER-OPS-FO 14, *Field Data Management*.