

# **POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

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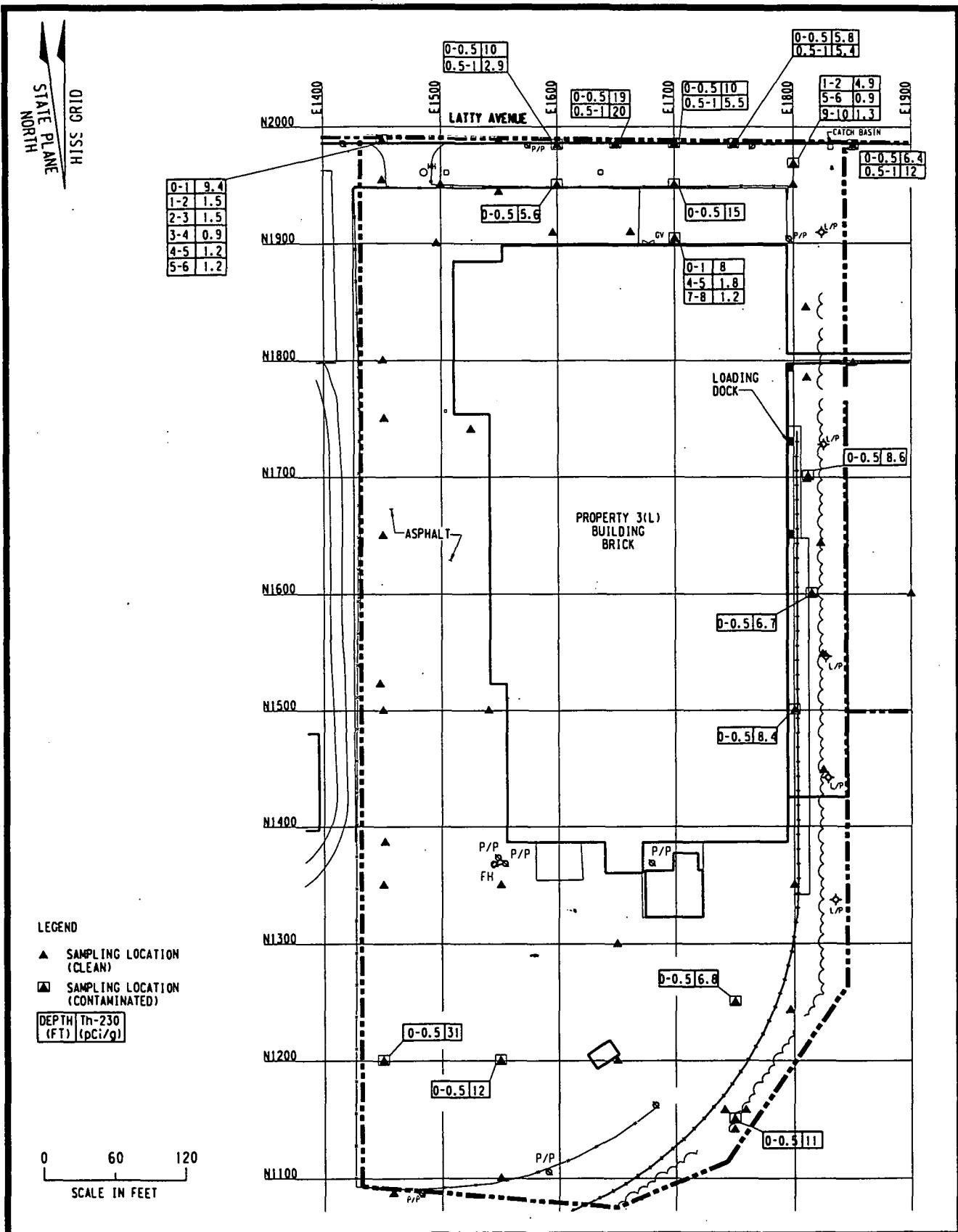
**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Characterization and Excavation Summary**



**Figure 1.**  
Characterization Sampling Locations  
at Property 3L

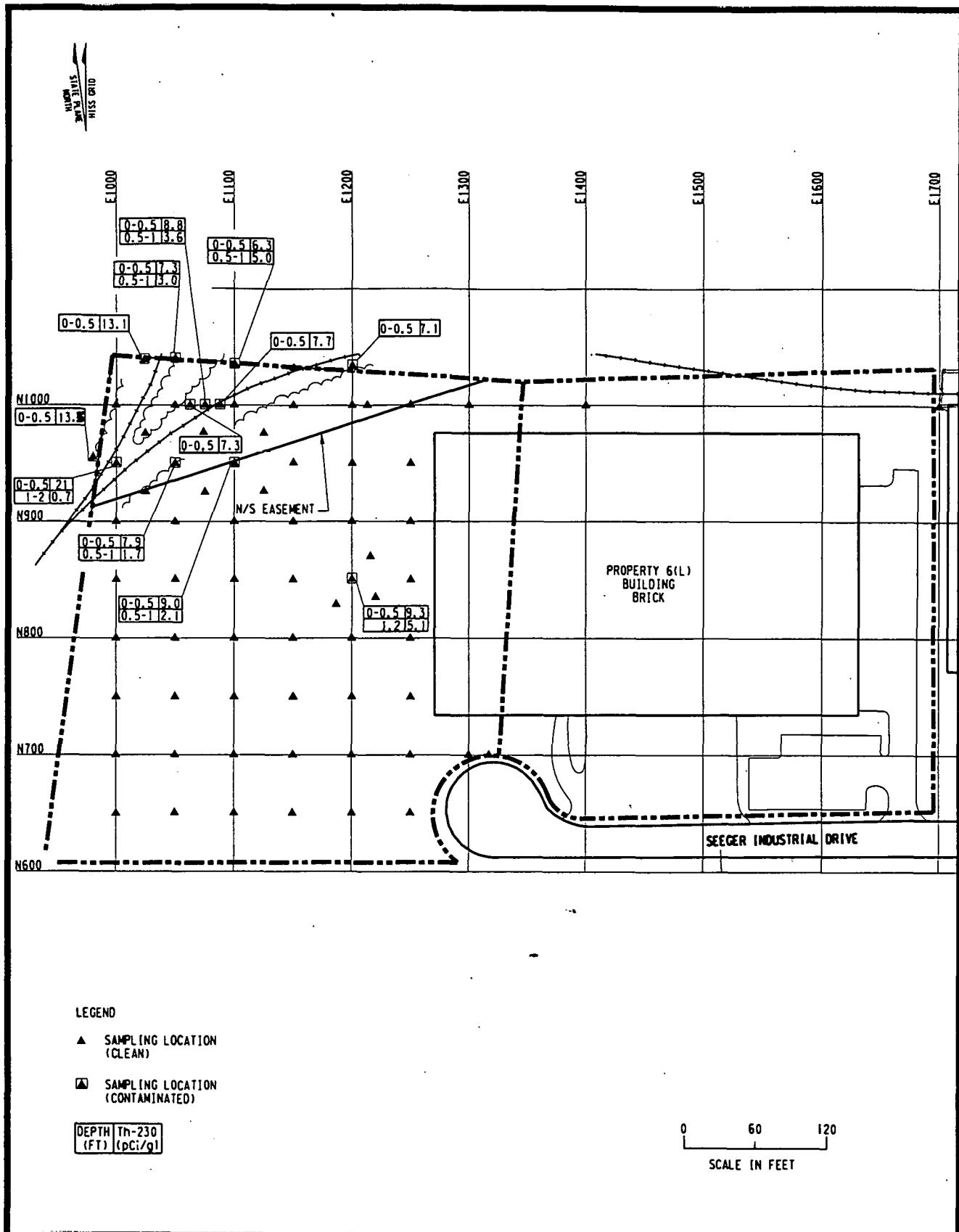
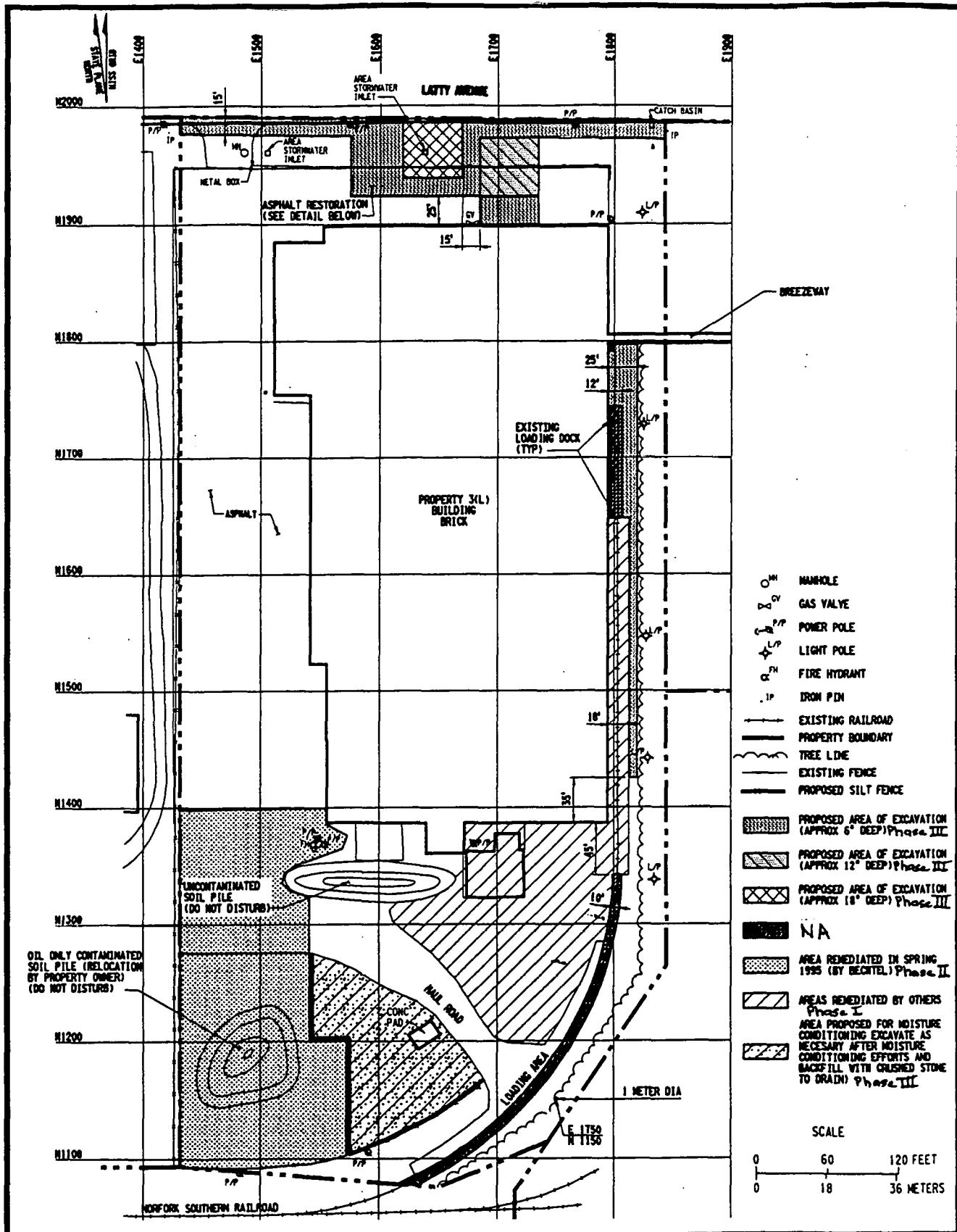
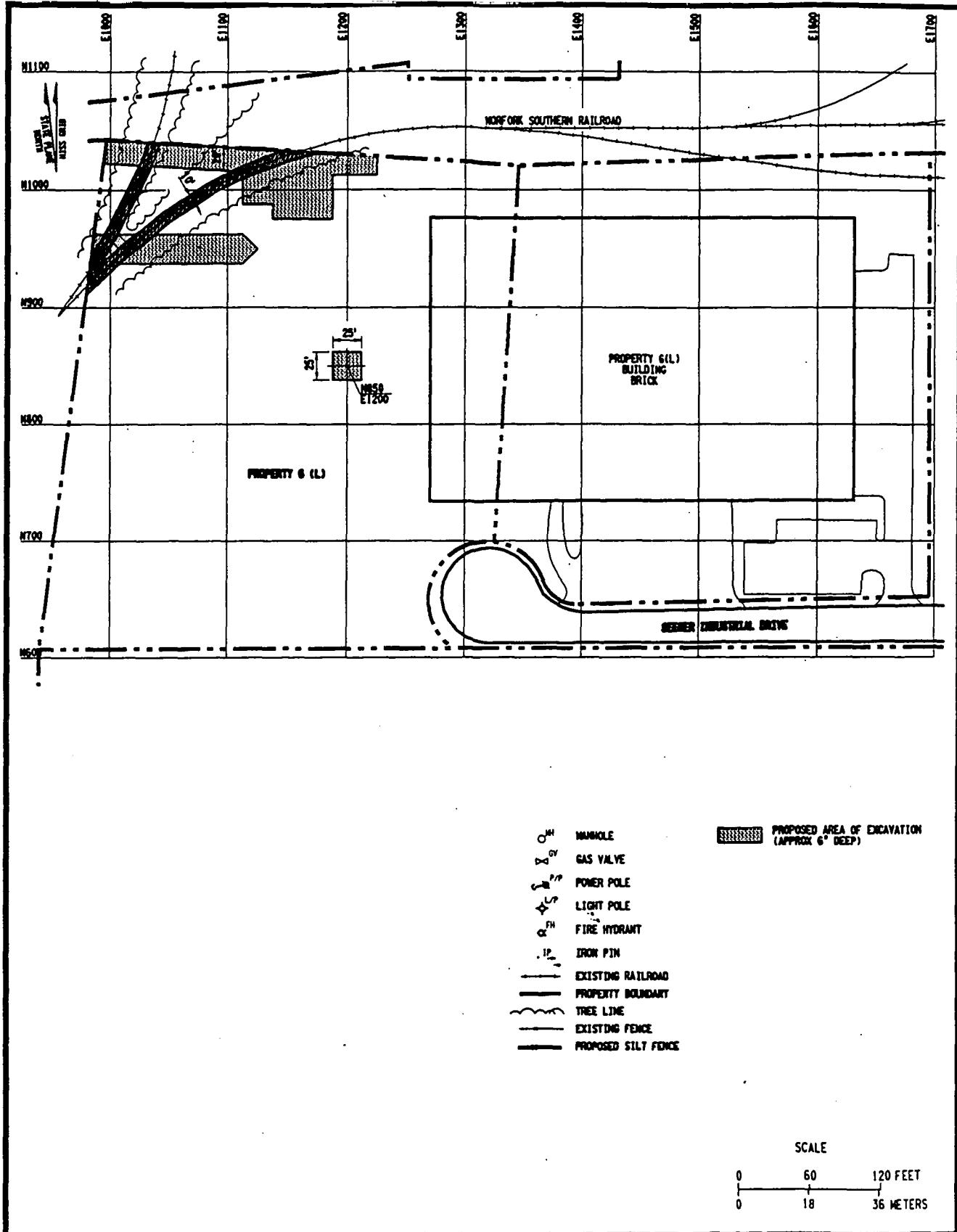


Figure 2  
Characterization Sampling Locations  
at Property 6L



**Figure 3**  
Areas of Excavation  
at Property 3L



140f090.dgn

**Figure 4**  
Areas of Excavation  
at Property 6L

**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Post-Remedial Action Survey Plan**

## LATTY AVENUE VICINITY PROPERTIES 3L AND 6L POST-REMEDIAL ACTION SURVEY PLAN

### PURPOSE

The purpose of this plan is to describe the methodologies that the Formerly Utilized Sites Remedial Action Program (FUSRAP) will use for radiological surveys, sampling, and analysis to document the final condition of the Latty Avenue Vicinity Properties 3L and 6L as free of radioactive contamination above the Department of Energy's health based criteria [DOE Order 5400.5 (Reference 1)]. Nothing herein is intended to compromise the Independent Verification Contractor's (IVC) independence; the purpose is to document the Prime Management Contractor's (PMC) plans to conduct post-remedial action surveying/sampling and to coordinate their actions with the IVC. This plan implements the DOE protocol for verification and certification of sites under FUSRAP (Reference 2).

Bechtel National, Inc. (BNI) will be the FUSRAP PMC, and the Oak Ridge Institute for Science and Education (ORISE) will act as the IVC.

### BACKGROUND

Manhattan Engineer District acquired the St. Louis Airport Site (SLAPS) in 1946 and used it from 1946 until 1966 to store residues from the St. Louis Downtown Site (SLDS). The residues included pitchblende raffinate residues, radium-bearing residues, barium sulfate cake, Colorado raffinate residues, and contaminated scrap. In 1966, these residues were purchased by Continental Mining and Milling Company of Chicago, removed from SLAPS, and placed in storage at 9200 Latty Avenue [currently the Hazelwood Interim Storage Site (HISS) and the adjacent Futura Coating site]. In the process of transporting the residues from SLAPS to Latty Avenue, some of the material was spilled from trucks onto the roadside. Characterization activities have established that contamination is present on most of the HISS vicinity properties (properties along Latty Avenue). Redistribution of the contamination on the properties has probably occurred as a result of flooding, surface runoff, and road and utility line activities (Reference 3).

## RESIDUAL CONTAMINATION GUIDELINES

The source of contamination of the designated properties was residues from the processing of uranium bearing ores. The applicable residual contamination guidelines are as follows:

<u>radionuclide</u> <sup>a</sup>	<u>soil concentration above background</u> <sup>b</sup>
Radium-226	5 pCi/g averaged over the first 15 cm of soil below the surface; 15 pCi/g when averaged over any 15-cm-thick soil layer below the surface layer.
Thorium-230	
Thorium-232	
Uranium-238	50 pCi/g averaged over any 15-cm-thick soil layer.

<sup>a</sup> Radium and thorium guidelines from Reference 1. Uranium guideline is site specific.

<sup>b</sup> These guidelines take into account ingrowth of radium-226 from thorium-230 and of radium-228 from thorium-232, and assume secular equilibrium. If either thorium-230 and radium-226 or thorium-232 and radium-228 are both present, not in secular equilibrium, the guidelines apply to the higher concentration. If other mixtures of radionuclides occur, the sum of the ratios of the soil concentration of each radionuclide to the allowable limit for that radionuclide will not exceed 1.

The residual contamination guidelines for fixed and transferable radioactive contamination (dpm/100 cm<sup>2</sup>) (Reference attached):

	<u>average</u>	<u>maximum</u>	<u>removable</u>
Alpha	500	1,500	20
Beta-Gamma	5,000	15,000	1,000

## DECONTAMINATION ACTIVITIES

A Real Estate Instrument (REI) shall be in place for the properties to be remediated. All designated areas of contamination are exterior to any buildings. At a minimum, remediation of the site will consist of excavation of soil exceeding the applicable residual contamination guidelines and decontamination of structures exceeding the residual contamination guidelines for fixed and transferrable criteria. Contaminated structures such as culverts, utility poles, and pipelines may be encountered during excavation.

Consequently, verification surveys and sampling will focus on confirming that soil and structures remaining after remedial action do not contain radioactive contamination at concentrations exceeding the applicable guidelines. To the extent necessary, equipment used during the decontamination activities will be cleaned and surveyed for surface contamination prior to release.

Areas where remedial activities will be conducted will include, but will not be limited to, those identified in the site characterization report (Reference 3) and the Design Drawings 140-DD433-C01, indicating the general areas to be excavated.

### POST-REMEDIATION SURVEYS AND SAMPLING

Following remediation, the FUSRAP Radiological Support Subcontractor (RSS), ThermoNuclear Services (TNS), will perform post-remedial action surveys and sampling to determine the completeness of the removal action and to document that the site now complies with the applicable criteria and can be released for use without radiological restrictions.

#### Survey Equipment

The recommended equipment for use by FUSRAP for Post-RA verification includes:

- Gamma scintillation detector (Eberline SPA-3 or equivalent)
- Low range/high range detector (HP-270 or equivalent)
- Reuter-Stokes Pressurized Ion Chamber (PIC)

The recommended equipment for use by FUSRAP for release of equipment and materials from the site includes:

- Alpha scintillation detector (Eberline AC-3 or equivalent)
- Alpha scintillation counter (Eberline SAC-4 or equivalent)
- Beta/Gamma Pancake GM detector (7 mg/cm<sup>2</sup> mylar shielded Eberline HP-210 or equivalent)

The types of calibration sources and methods for instrument calibration will be coordinated between Bechtel/TNS and ORISE to insure compatibility and reproducibility of results.

#### Background Measurements

Prior to performing post-remedial action surveys, TNS will obtain site-specific background measurements from three remote background locations in the general vicinity of the site (0.5 to 3 miles) according to TNS procedure 3C.2 (Reference 4A). The location for background measurements will be selected by Bechtel and TNS, and background measurements will be made at each location by TNS and ORISE. TNS and ORISE will utilize background concentrations for radionuclides in soil that were established for the St. Louis area and reported in the *Radiological Characterization Report for FUSRAP Properties in the St. Louis, Missouri, Area, August 1990*.

## Surveys

After completion of the excavation of contaminated soils, TNS shall conduct post-remedial action surveys to verify satisfactory decontamination of the area. A survey grid shall be established at the site, conforming to the specifications in TNS procedure 3B.1 (Reference 4B) and 191-IG-032, "Instruction Guide for Post-Remediation Radiological Survey of Soil" (Reference 5), and surveys shall be conducted in each square of the 10 m by 10 m grid. The grids shall be numbered in sequential order and recorded in the logbook with the coordinates for the center of each grid. To ensure comparability of post-remedial action results, ORISE will use the same grid.

Any structures within the excavations, such as culverts, utility poles, or pipes, will be surveyed for release according to TNS procedures 3A.2 and 3A.3 (References 4D and 4E) after all visible dirt has been removed.

TNS will measure external gamma radiation exposure rates at a height of 1 meter as required by 191-IG-032 (Reference 5); at the number of locations necessary to be representative of the entire remediated area as required by FCR-116-17 (attached, applies to all St. Louis Sites); using methods in accordance with TNS procedure 3B.3 (Reference 4C). The results of this survey will be submitted to the Bechtel ET team lead, including a sketch of grid locations and approximate excavation depths, before backfilling the excavation. This information will also be recorded in the sampling logbook.

## Soil Sampling

TNS shall also collect post-remedial action soil samples to verify satisfactory remediation of the properties. One post-remedial action composite sample shall be collected in each 100 m<sup>2</sup> grid as directed in 191-IG-032 and TNS procedure 4A.1 (References 4F and 5). Composite samples will be collected by taking individual samples (25 per 100 m<sup>2</sup>) from each sample grid and compositing these individual samples into one composite for that grid (Figure 1). ORISE may request concurrent splits.

The averaging criteria contained in *A Manual for Implementing Residual Radioactive Material Guidelines* (Reference 11) and DOE Order 5400.5, Chapter IV, Section 4 will be used for point sources/hot spots.

Samples from each grid shall be collected using properly decontaminated sampling equipment (Reference 6).

Proper chain of custody of the TNS samples shall be maintained by using the sample custody and labeling methodology described for sediment samples in 191-IG-028, "Instruction Guide for Surface Water and Sediment Sampling Activities" (Reference 7) and the sample

surveying, packaging, and shipping methodology in PI R4.7, "How to Ship Samples from a FUSRAP Site" (Reference 8).

All samples shall be shipped to the TNS laboratory in Oak Ridge, TN, for analysis by alpha spectroscopy (isotopic uranium, isotopic thorium, and radium-226). Seven day turn around time shall be requested.

#### Safety and Health

Safety and health risks associated with tasks described herein have been identified and addressed by the *Health and Safety Plan for the St. Louis Site* (Reference 9).

The work will be performed under a Hazardous Work Permit specific to the activities.

#### Quality Assurance/Quality Control

QA/QC field duplicate samples and measurements shall be collected at a frequency of one additional sample/measurement for each 20 collected.

Rinse blanks from decontaminated sampling equipment shall be collected at the rate of one rinse per day of sampling. Rinse blanks shall be collected according to the recommendations in 191-IG-028 (Reference 7).

#### Data Quality Objectives

The detection limit for alpha spectroscopy shall be no greater than 0.1 pCi/g. Quality indicator goals shall be as follows: Precision,  $\pm$  2 sigma; completeness, 100%; Accuracy,  $\pm$  25%. QA/QC samples are discussed in the previous section.

#### BECHTEL/ORISE COORDINATION

Bechtel is the contractor responsible for completing the remedial action. To define the areas for remediation, Bechtel used data collected by ORNL during designation, as well as supplemental information obtained by Bechtel as part of the pre-RA planning and scoping activities.

Bechtel will have responsibility for excavation of contaminated soil. Upon completion of these activities, TNS will perform a post-RA survey. ORISE will then commence verification of the remediated properties. ORISE will perform a walkover survey on the surface of the ground. The result of this walkover survey shall be used to determine whether there are areas requiring additional remediation. This survey is expected to include all areas

previously identified as being contaminated on the designated properties. Bechtel will assist ORISE in this survey by interfacing with the property owners in advance to secure their approval for property access.

Bechtel will initiate remediation concurrent with ORISE verification activities, to the extent that remediation does not interfere with verification. Bechtel will provide ORISE access to remediation results as they become available. The Bechtel Site Superintendent will notify ORISE when remediation of an area is complete, and ORISE will perform final independent verification surveys of the area. ORISE may collect soil sample splits concurrent with Bechtel sampling efforts.

Measurements taken by Bechtel and ORISE at identical locations should agree within the 95 percent confidence interval for the analytical methods used (Reference 2). For consistency and ease of data comparison, Bechtel and ORISE shall utilize the same type of calibration techniques, calibration sources, and survey techniques in conducting the surveys. Bechtel and ORISE shall establish a mutually agreeable survey grid across the decontaminated areas and shall conduct their surveys referring to that grid.

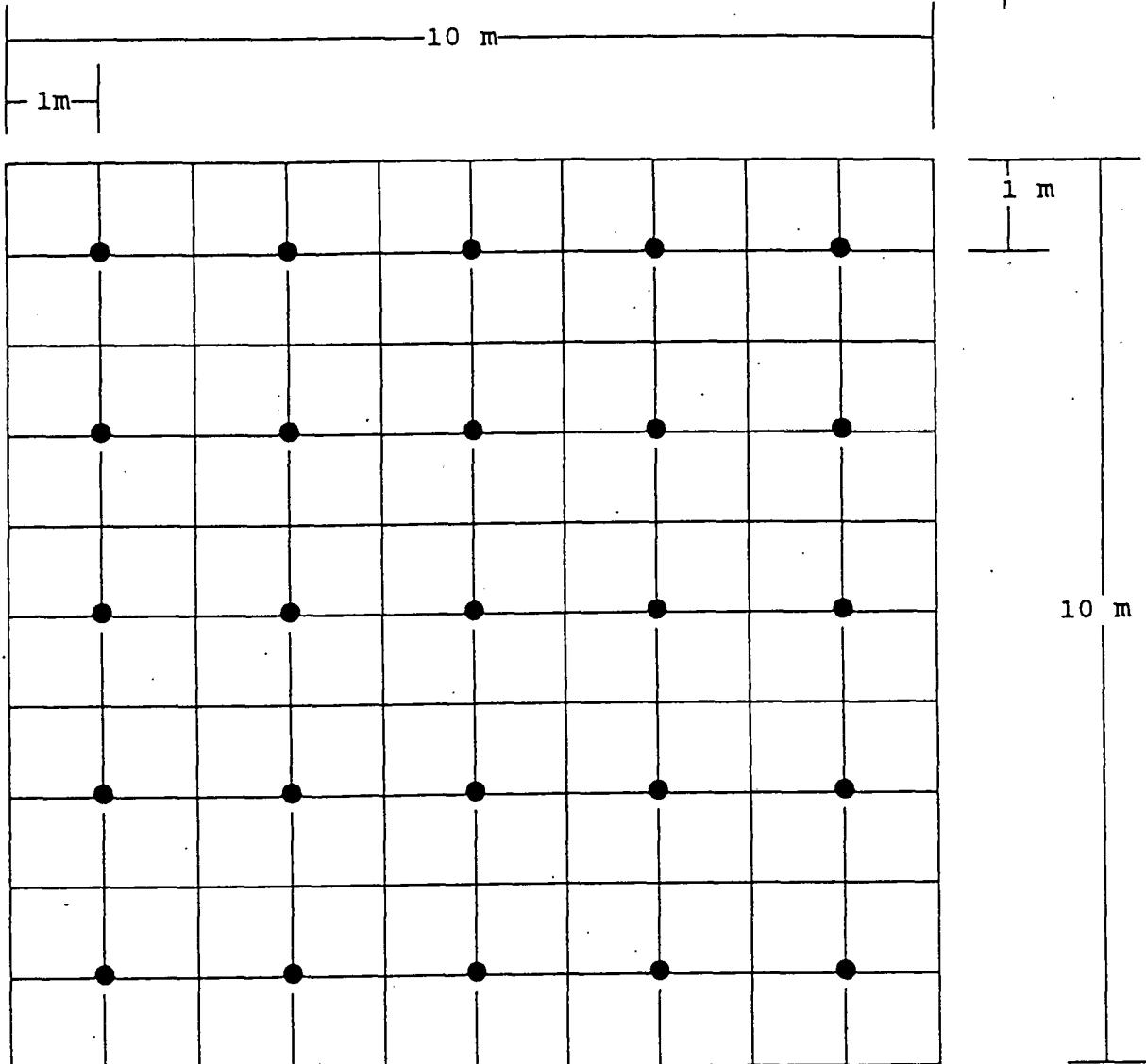
Upon agreement by both parties that the site meets the applicable residual contamination guidelines as determined by direct measurements and analytical results, ORISE will then demobilize, and Bechtel will remain to restore the site to the condition agreed upon by the property owners.

Bechtel will provide final verified sample results to ORISE as soon as they are available. A letter documenting the release of the properties for unrestricted use shall be prepared by Bechtel and sent to the property owners within 3 months following demobilization. Bechtel will also prepare one Post-Remedial Action Report (PRAR) per year for the St. Louis properties remediated during the year for DOE review (copy to ORISE). A Certification Docket will be completed by Bechtel after the completion of all additional St. Louis vicinity properties. ORISE will issue a verification report to DOE with a copy to Bechtel (Reference 2).

#### REFERENCES

- (1) DOE Order 5400.5, *Radiation Protection of the Public and Environment*, Washington, D.C.
- (2) DOE, 1990, *Verification and Certification Protocol for the Office of Environmental Restoration FUSRAP and D&D Program*, Revision 3, November.
- (3) DOE/OR/20722-203, *Radiological Characterization Report for FUSRAP Properties in the St. Louis, Missouri, Area*, August 1990.

- (4) ThermoNuclear Services (TNS), *Health Physics Operational Procedures Manual*:
  - A) 3C.2 "Determination of Background"
  - B) 3B.1 "Delineation of Survey Areas in Open Land"
  - C) 3B.3 "Gamma Ray Exposure Rate Surveys at 1-Meter in Open and Enclosed Areas"
  - D) 3A.2 "Direct Surface Contamination Survey"
  - E) 3A.3 "Transferable Surface Contamination Survey"
  - F) 4A.1 "Systematic and Bias Surface Soil Sampling (Radiological)"
- (5) BNI, 1993, "Instruction Guide for Post-Remediation Radiological Survey of Soil," 191-IG-032, Revision 0; and FCR 116-17.
- (6) BNI, 1992, "Instruction Guide for Decontamination of Field Sampling Equipment at FUSRAP Sites," 191-IG-011, Revision 5.
- (7) BNI, 1993, "Instruction Guide for Surface Water and Sediment Sampling Activities," 191-IG-028, Revision 0.
- (8) BNI, 1994, "How to Ship Samples from a FUSRAP Site," PI R4.7, Revision 2.
- (9) BNI, 1993, *Health and Safety Plan for the St. Louis Site*, 116/134/140/153-HSP, Rev. 0.
- (10) Fiore to Price, "Uranium Cleanup Guidelines for St. Louis, MO, FUSRAP Sites," November 6, 1990, CCN 072892.
- (11) DOE/CH/8901, *A Manual for Implementing Residual Radioactive Material Guidelines*, June 1989.



● Sample Locations

FIGURE 1: Survey Grid - 10 m x 10 m

# Site Specific Release Criteria

Date: May 8, 1995

Quaker State Site

WBS: 140

Isotope(s): Th-230, Uranium and Uranium Daughters

History: Contaminated during the transpartation of process wastes to the St Louis Airport Site for storage.

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## Survey Contamination Guidelines dpm/100 cm<sup>2</sup>

	Alpha	Beta-Gamma
Removable:	20	1,000
Total:	500	5,000
Maximum:	1,500	15,000

Chemical Considerations: None

Note: Alpha and Beta-Gamma limits are applied independently. The measured values may be averaged over 1 square meter to meet fixed and removable criteria provided the maximum values in any 100 cm<sup>2</sup> do not exceed three times the fixed and removable criteria.

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Concurrences:

9

H&S Supervisor W.F. Hennix Date 5-8-95 ET Team Lead J.W. Kuhn Date 5/8/95

(See FUSRAP PI 24.026 and DOE Orders 5480.11 & 5400.5)



## FIELD CHANGE REQUEST/FIELD CHANGE NOTICE

JOB NO. 14501

Page 1 of 1

FCR NO.

116-17

FCN NO.

PREPARER AND DATE: Matt 8/3/95CHECKER AND DATE: P.Shaffer 8/3/95

AFFECTED DOCUMENTS (WI, drawings, specifications, Scope of Work, SSRS Form, etc.) and Rev. No.

FUSRAP 191-IG-032, Post Remediation Radiological Survey of Soil, Section 2.2.2, Rev. 0

## REASON FOR CHANGE

To collect post-remedial action (RA) coneshield gamma measurements, and gamma exposure rate measurements in a cost effective and timely manner. Further, to provide adequate and sufficient information used to determine the Department of Energy guidelines for residual radioactive contamination in soil.

## EXISTING CONDITIONS

Section 2.2.2 states that coneshield gamma scan locations shall be positioned so that total coverage of the post remedial action grid is provided. Section 2.2.2 also states that gamma exposure rate survey measurements shall be taken in the middle of each post-remediation survey grid block.

These surveys, as stated, are currently being performed in post-RA areas at the St. Louis Site.

## DESCRIPTION OF CHANGE

The intent of employing the cone shield when performing gamma scans is to eliminate the contribution of radioactivity from surfaces above and adjacent to the area actually being measured (i.e., the vertical faces of a trench excavation). In most of the excavations being performed in the St.Louis area, the soils being surveyed are in open areas. Therefore, this contribution or "shine" is not a factor. Walkover scans of these areas with a FIDLER before post RA soil sample collection is done when releasing excavated areas.

Therefore, use of a coneshield shall be necessary only in excavations where "shine" will be a factor, or unless otherwise directed by the ET Team Lead or designee.

Additionally, under the above guidance, gamma exposure rate measurements using a pressurized ion chamber or PIC, is prescribed and performed on each of the 100 square meter grids of a remediated soil area. These areas are typically measured with the PIC subsequent to a walkover with a FIDLER, which in turn directs collection of a post-RA soil sample. It is the current practice to perform this measurement after the collection of a soil sample that is below the site specific guidelines, or after successful remediation has been performed.

Based on current methodology, it has been determined to be more cost effective and productive to perform enough of the above readings necessary, in order to be representative of the entire remediated area. Frequency of measurements will be determined by the ET Team Lead or designee on a case by case basis. Upon determination of this frequency, direction to field personnel will be documented in the applicable work guidance document for the specific remedial action.

S/C NO. <u>N/A</u>	DISPOSITION OF FCR REQUIRED BY DATE <u>8/9/95</u>	SITE SUPERINTENDENT SIGNATURE AND DATE <u>C.J. Mattson</u> <u>8/8/95</u>		
FCO NO. <u>N/A</u>				
FCR CHANGE APPROVED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	FCR OR FCN TO BE INCORPORATED INTO AFFECTED DOCUMENTS YES <input checked="" type="checkbox"/> SEE REMARKS	REVISION TO QAA OR QAP REQUIRED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	TEAM LEADER CONCURRENCE INITIALS AND DATE <u>J.M.</u> <u>8/4/95</u>	PROJECT ENGINEER DEPARTMENT MANAGER SIGNATURE AND DATE <u>J.M.</u> <u>8.8.95</u>

**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Post-Remedial Action Soil Sample Summary**

**Sum of Ratios for Property 3L Post-Remedial Action Soil Samples (Phase I)**

Background Values	pCi/g		
	1.1	Site WBS	= 140
	0.9	U-238 Guideline	= 50 pCi/g
	1.3		
	1.0		
	1.0		

	Sample Depth (ft)	Guideline pCi/g	U-238	R-226	Th-230	Th-232	R-228	Sum Of Ratios	Pass/Fail
Sample ID#									
140-HV-3649	> 0.5	15	3.4	1.1	1.6	0.8	1.4	0.09	PASS
140-HV-3651	> 0.5	15	3.7	0.8	1.5	1.0	1.1	0.07	PASS
140-HV-3653	> 0.5	15	7.4	1.2	4.6	1.1	1.1	0.35	PASS
140-HV-3655	> 0.5	15	4.1	1.1	3.6	1.0	1.1	0.22	PASS
140-HV-3657	> 0.5	15	3.0	1.1	1.5	1.1	1.4	0.08	PASS
140-HV-3659	> 0.5	15	5.1	1.1	1.2	1.2	1.0	0.09	PASS
140-HV-3661	> 0.5	15	3.4	1.2	1.5	1.4	1.3	0.09	PASS
140-HV-3663	> 0.5	15	3.5	0.9	3.3	0.8	0.9	0.18	PASS
140-HV-3665	> 0.5	15	4.5	1.1	1.9	1.3	0.8	0.13	PASS
140-HV-3666	> 0.5	15	3.4	0.8	2.3	1.4	1.1	0.14	PASS
140-HV-3668	> 0.5	15	2.1	1.0	2.0	0.9	1.1	0.07	PASS
140-HV-3670	> 0.5	15	2.2	1.1	1.9	1.3	1.5	0.10	PASS
140-HV-3671	> 0.5	15	2.2	1.1	2.3	1.5	1.2	0.12	PASS
140-HV-3673	> 0.5	15	3.5	1.2	9.0	1.2	1.3	0.58	PASS
140-HV-3675	> 0.5	15	2.3	1.0	1.8	0.9	1.3	0.08	PASS
140-HV-3677	> 0.5	15	2.0	1.2	1.8	0.9	1.1	0.06	PASS
140-HV-3679	> 0.5	15	3.3	0.9	3.9	1.1	0.9	0.22	PASS
140-HV-3681	> 0.5	15	2.1	0.9	2.2	1.2	0.9	0.09	PASS
140-HV-3682	> 0.5	15	2.1	0.9	2.6	1.4	0.7	0.13	PASS
140-HV-3684	> 0.5	15	3.2	1.0	1.8	1.2	1.1	0.09	PASS
140-HV-3686	> 0.5	15	2.5	0.9	2.4	1.1	1.2	0.11	PASS
140-HV-3688	> 0.5	15	2.7	0.8	7.4	1.1	1.7	0.49	PASS
140-HV-3691	> 0.5	15	3.3	0.9	3.9	1.1	0.9	0.22	PASS

**Sum of Ratios for Property 3L Post-Remedial Action Soil Samples (Phase II)**

Background Values	U-238	1.1	Site WBS =	140
	R-226	0.9	U-238 Guideline =	50
	Th-230	1.3		
	Th-232	1.0		
	R-228	1.0		

Sample ID#	Sample Depth	Guideline	U-238	R-226	Th-230	Th-232	R-228	Sum Of Ratios	Pass/Fail	
	ft	pCi/g								
140-QS-001	0.5	TO	1	15	1.4	1.3	3.0	0.8	2.7	0.23 PASS
140-QS-002	0.5	TO	1	15	1.0	1.1	1.9	1.1	1.6	0.08 PASS
140-QS-003	0.5	TO	1	15	1.4	1.0	2.5	1.2	4.7	0.33 PASS
140-QS-004	0.5	TO	1	15	1.2	1.2	2.1	0.9	3.3	0.21 PASS
140-QS-005	0.5	TO	1	15	1.6	1.4	4.5	1.2	4.8	0.48 PASS
140-QS-006	0.5	TO	1	15	1.8	1.8	1.9	1.0	0.4	0.05 PASS
140-QS-007	0.5	TO	1	15	1.5	1.9	1.7	0.9	0.2	0.07 PASS
140-QS-008	0.5	TO	1	15	1.6	1.0	2.1	0.9	3.7	0.24 PASS
140-QS-009	0.5	TO	1	15	2.1	2.4	8.8	1.1	3.0	0.65 PASS
140-QS-010	0.5	TO	1	15	1.6	1.1	3.5	1.4	2.9	0.28 PASS
140-QS-011	0.5	TO	1	15	1.4	1.4	2.2	1.0	2.2	0.15 PASS
140-QS-012	0.5	TO	1	15	1.8	1.5	1.7	1.1	2.4	0.13 PASS
140-QS-013	0.5	TO	1	15	1.9	1.0	7.5	1.0	2.6	0.54 PASS
140-QS-014	0.5	TO	1	15	1.9	1.1	3.4	0.8	10.1	0.76 PASS
140-QS-015	0.5	TO	1	15	1.4	1.2	3.3	1.2	0.4	0.15 PASS
140-QS-016	0.5	TO	1	15	1.9	1.1	2.0	0.5	0.1	0.06 PASS
140-QS-017	0.5	TO	1	15	1.5	1.6	3.2	0.7	0.3	0.13 PASS
140-QS-018	0.5	TO	1	15	2.1	1.6	7.8	0.5	1.8	0.51 PASS
140-QS-019	0.5	TO	1	15	1.8	1.4	3.4	0.7	2.3	0.24 PASS
140-QS-020	0.5	TO	1	15	1.9	1.3	2.9	0.6	1.8	0.18 PASS
140-QS-021	0.5	TO	1	15	1.6	1.2	3.6	1.2	1.4	0.19 PASS
140-QS-022	0.5	TO	1	15	1.6	1.1	3.1	0.8	1.9	0.19 PASS
140-QS-023	0.5	TO	1	15	2.0	1.1	6.5	0.5	2.9	0.49 PASS
140-QS-024	0.5	TO	1	15	2.1	1.8	2.2	0.5	3.4	0.24 PASS
140-QS-025	0.5	TO	1	15	3.2	0.8	3.5	1.1	2.1	0.26 PASS
140-QS-026	0.5	TO	1	15	1.9	0.7	1.6	0.5	5.0	0.30 PASS
140-QS-027	0.5	TO	1	15	2.7	1.2	1.8	0.6	1.8	0.12 PASS
140-QS-028	0.5	TO	1	15	1.3	1.2	3.6	0.6	1.3	0.18 PASS
140-QS-029	0.5	TO	1	15	2.6	1.3	2.1	0.5	1.7	0.13 PASS
140-QS-030	0.5	TO	1	15	1.7	1.6	2.7	0.8	8.7	0.62 PASS
140-QS-031	0.5	TO	1	15	1.3	1.3	2.2	0.6	2.2	0.14 PASS
140-QS-032	0.5	TO	1	15	2.0	1.3	2.2	0.3	2.6	0.18 PASS

Sum of Ratios for Properties 3L and 6L Post-Remedial Action Soil Samples (Phase III)

Background Values	pCi/g		Site WBS = 140 U-238 Guideline = 50 pCi/g
	U-238	1.1	
	R-226	0.9	
	Th-230	1.3	
	Th-232	1.0	
	R-228	1.0	

Sample ID#	Sample Depth	Guideline	U-238	R-226	Th-230	Th-232	R-228	Sum Of Ratios	Pass/Fail
	ft	pCi/g							
140-3L-152	0.5	TO	1	15	1.6	1.7	3.2	1.2	0.15 PASS
140-3L-153	0.5	TO	1	15	1.2	0.8	2.2	1.1	0.07 PASS
140-3L-154	0.5	TO	1	15	1.6	0.9	6.9	0.9	0.38 PASS
140-3L-155	0.5	TO	1	15	1.3	1.1	1.7	0.7	0.03 PASS
140-3L-156	0.5	TO	1	15	1.4	1.4	1.4	1.0	0.04 PASS
140-6L-157	0.5	TO	1	15	1.4	1.1	1.8	1.1	0.05 PASS
140-3L-158	0.5	TO	1	15	1.1	1.2	6.0	0.9	0.31 PASS
140-3L-159	0.5	TO	1	15	1.3	1.1	2.5	1.0	0.08 PASS
140-3L-160	0.5	TO	1	15	1.3	1.0	2.6	0.9	0.09 PASS
140-3L-161	0.5	TO	1	15	0.8	1.0	2.0	0.7	0.05 PASS
140-3L-162	0.5	TO	1	15	1.5	0.7	4.2	1.0	0.20 PASS
140-3L-163	0.5	TO	1	15	1.9	1.2	1.8	0.8	0.05 PASS
140-3L-164	0.5	TO	1	15	1.6	0.8	3.0	0.7	0.12 PASS
140-3L-165	0.5	TO	1	15	1.1	1.2	1.8	0.8	0.03 PASS
140-3L-166	0.5	TO	1	15	1.1	1.0	4.3	1.2	0.21 PASS
140-3L-167	0.5	TO	1	15	1.4	1.1	4.8	1.5	0.27 PASS
140-3L-168	0.5	TO	1	15	1.6	1.1	1.7	1.2	0.05 PASS
140-6L-169	0.5	TO	1	15	1.6	0.8	3.5	1.3	0.18 PASS
140-6L-170	0.5	TO	1	15	1.1	1.3	3.3	1.5	0.17 PASS
140-6L-171	0.5	TO	1	15	2.2	1.8	3.1	1.0	0.14 PASS
140-6L-172	0.5	TO	1	15	1.2	1.7	3.6	1.3	0.18 PASS
140-6L-173	0.5	TO	1	15	1.2	1.6	3.7	1.0	0.16 PASS
140-6L-174	0.5	TO	1	15	1.6	1.5	3.8	1.2	0.19 PASS
140-6L-175	0.5	TO	1	15	1.2	0.8	3.1	1.2	0.14 PASS
140-6L-176	0.5	TO	1	15	1.3	1.1	3.4	0.9	0.14 PASS
140-6L-177	0.5	TO	1	15	1.1	1.5	4.2	1.0	0.19 PASS
140-6L-178	0.5	TO	1	15	1.3	0.8	3.8	1.3	0.19 PASS
140-6L-179	0.5	TO	1	15	1.2	1.1	3.4	1.0	0.14 PASS
140-6L-180	0.5	TO	1	15	1.3	1.4	5.8	1.6	0.34 PASS
140-6L-181	0.5	TO	1	15	1.3	1.5	4.9	1.3	0.26 PASS
140-6L-182	0.5	TO	1	15	1.5	1.3	7.3	2.1	0.48 PASS
140-3L-184	0.5	TO	1	15	1.4	0.9	2.5	1.6	0.13 PASS
140-3L-185	0.5	TO	1	15	1.5	1.3	2.0	1.0	0.05 PASS
140-3L-186	0.5	TO	1	15	0.8	1.0	2.3	1.0	0.07 PASS
140-3L-187	0.5	TO	1	15	0.9	1.3	1.6	1.2	0.03 PASS
140-3L-188	0.5	TO	1	15	0.8	1.3	1.2	1.0	0.03 PASS
140-3L-189	0.5	TO	1	15	1.2	1.2	1.8	0.8	0.04 PASS
140-6L-190	0.5	TO	1	15	1.6	1.3	3.6	0.5	0.16 PASS
140-6L-191	0.5	TO	1	15	1.5	1.1	2.8	1.2	0.12 PASS
140-6L-192	0.5	TO	1	15	1.1	1.1	3.4	1.4	0.17 PASS
140-3L-194	0.5	TO	1	15	1.4	1.7	3.9	0.5	0.18 PASS
140-3L-195	0.5	TO	1	15	1.3	1.3	3.6	0.9	0.16 PASS
140-3L-196	0.5	TO	1	15	1.2	2.2	3.4	1.0	0.14 PASS
140-3L-197	0.5	TO	1	15	1.7	1.1	6.5	1.3	0.38 PASS
140-3L-198	0.5	TO	1	15	1.1	1.7	6.6	0.7	0.35 PASS
140-3L-199	0.5	TO	1	15	1.8	0.8	3.6	0.4	0.17 PASS
140-3L-213	0.5	TO	1	15	1.6	0.7	1.9	0.5	0.05 PASS
140-3L-214	0.5	TO	1	15	1.0	4.5	4.0	0.8	0.24 PASS
140-3L-215	0.5	TO	1	15	1.1	0.8	1.9	0.5	0.04 PASS
140-3L-216	0.5	TO	1	15	1.1	1.0	1.8	0.6	0.03 PASS
140-3L-217	0.5	TO	1	15	1.4	0.9	1.8	0.5	0.04 PASS
140-3L-218	0.5	TO	1	15	1.1	1.3	2.1	0.9	0.05 PASS
140-3L-219	0.5	TO	1	15	1.2	1.0	1.7	0.5	0.03 PASS

Sample ID#	Grid
140-HV-3649	1
140-HV-3651	3
140-HV-3653	5
140-HV-3655	7
140-HV-3657	9
140-HV-3659	11
140-HV-3661	13
140-HV-3663	15
140-HV-3665	17
140-HV-3666	18
140-HV-3668	20
140-HV-3670	22
140-HV-3671	23
140-HV-3673	25
140-HV-3675	27
140-HV-3677	29
140-HV-3679	31
140-HV-3681	33
140-HV-3682	34
140-HV-3684	36
140-HV-3686	38
140-HV-3688	40
140-HV-3691	43

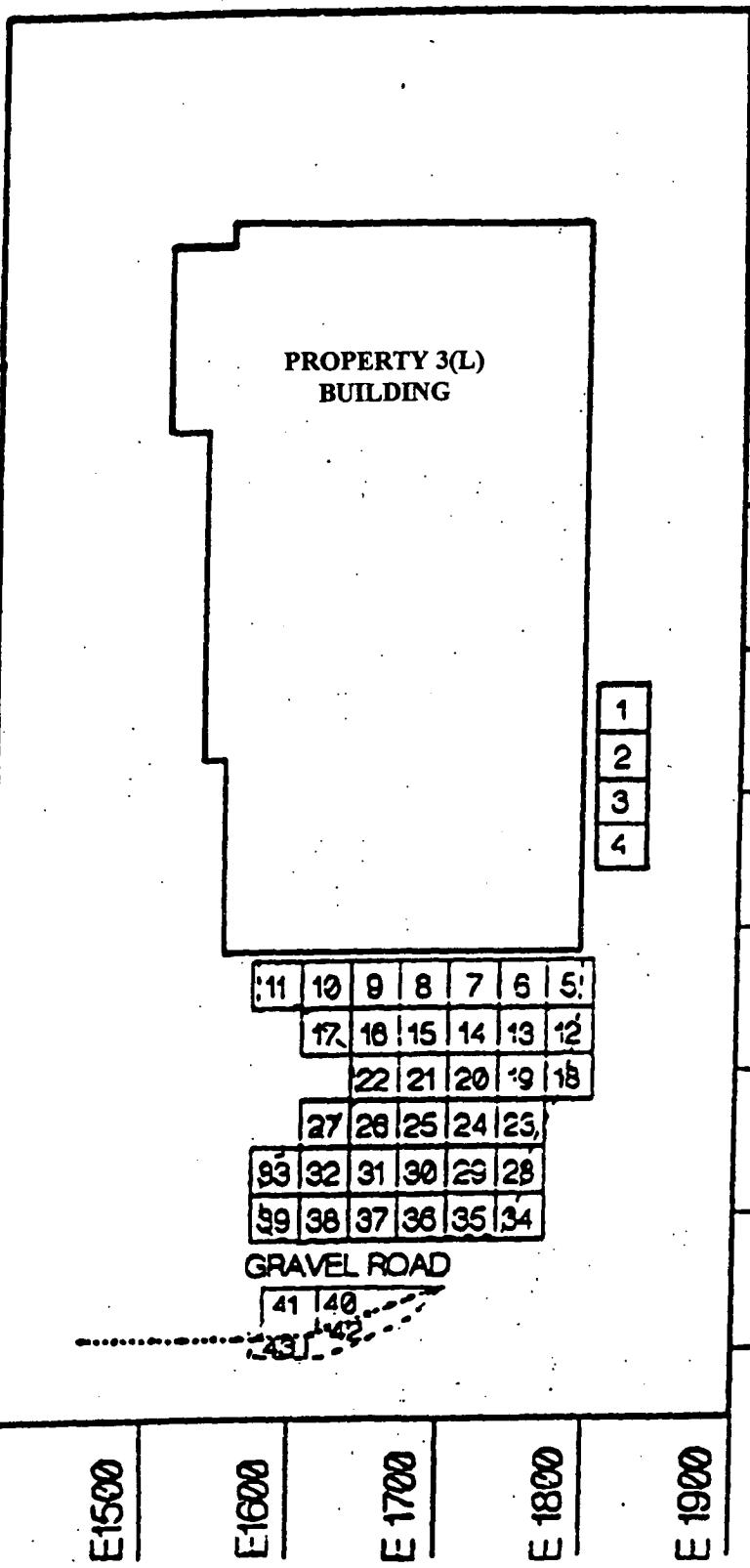
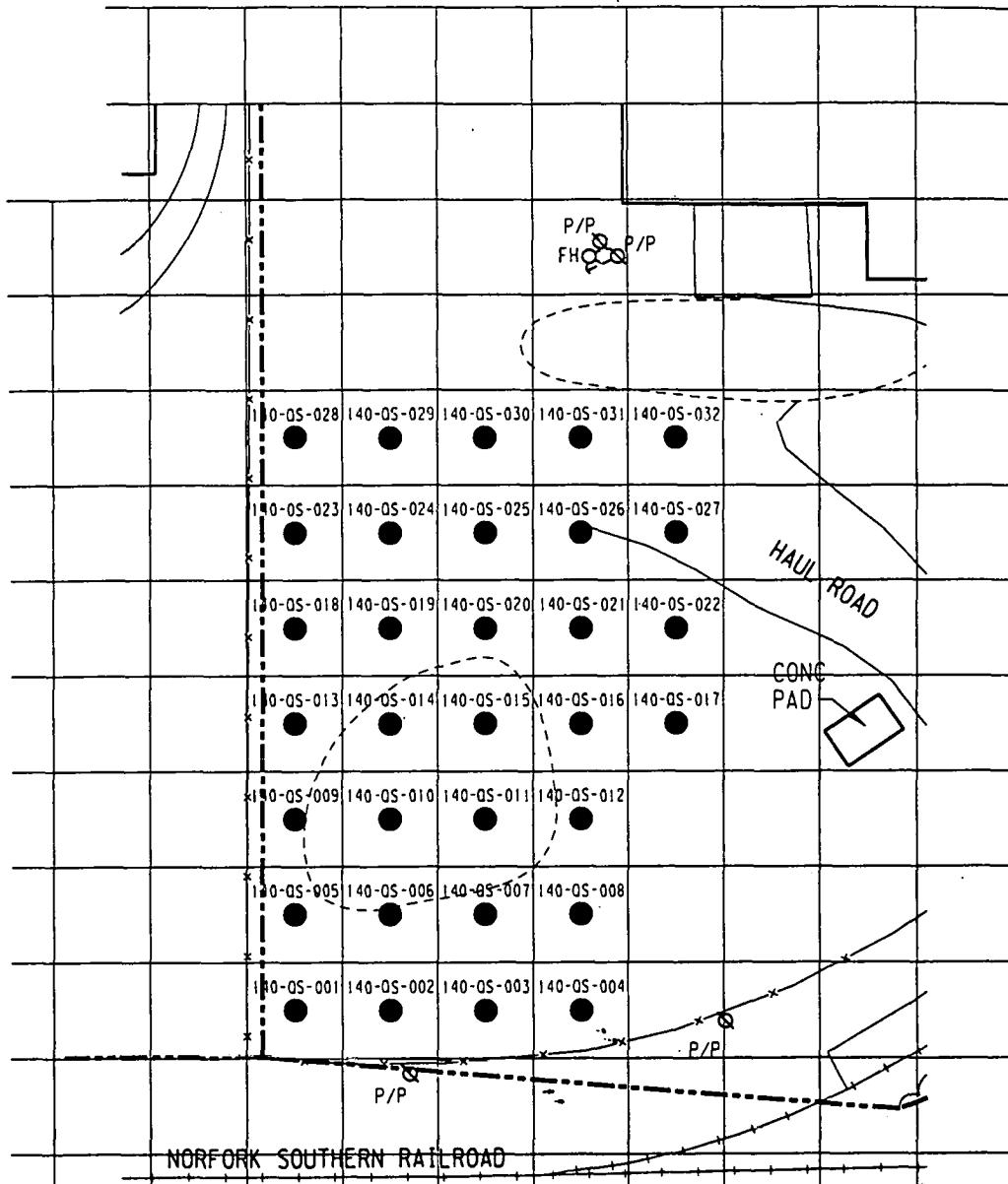


Figure 5  
Post-Remedial Action Grids  
at Property 3L (Phase I)

STATE PLANE  
NORTH  
HIS GRID



SCALE  
0 10 20 METERS

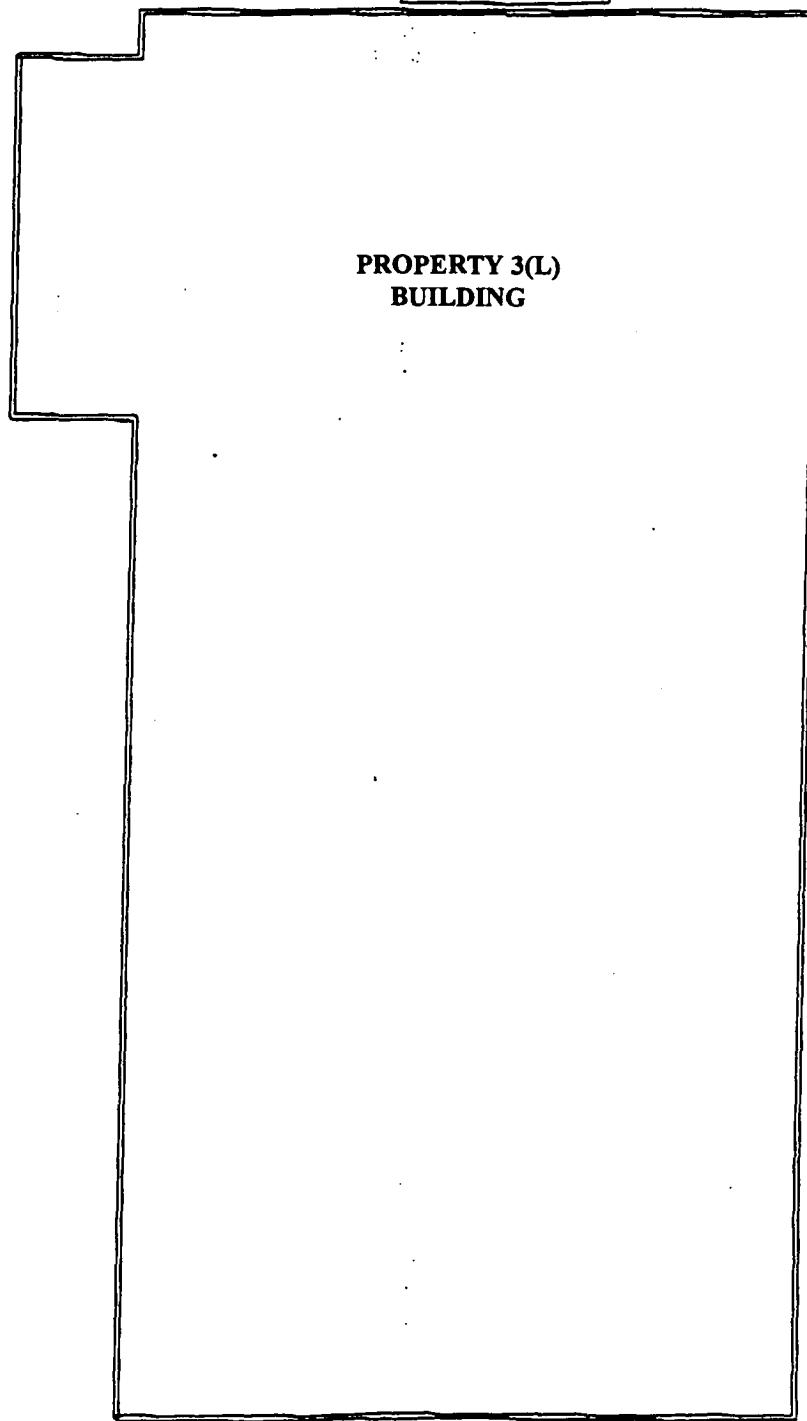
140f091.dgn

Figure 6  
Post Remedial Action Grid  
at Property 3L (Phase II)

LATTY AVENUE

140-3L
167

140-3L-166	140-3L 184	140-3L 182	140-3L 180	140-3L 158	140-3L 154	140-3L-153	140-3L-152
140-3L 165	140-3L 183	140-3L 161	140-3L 159	140-3L 155			
140-3L-156							



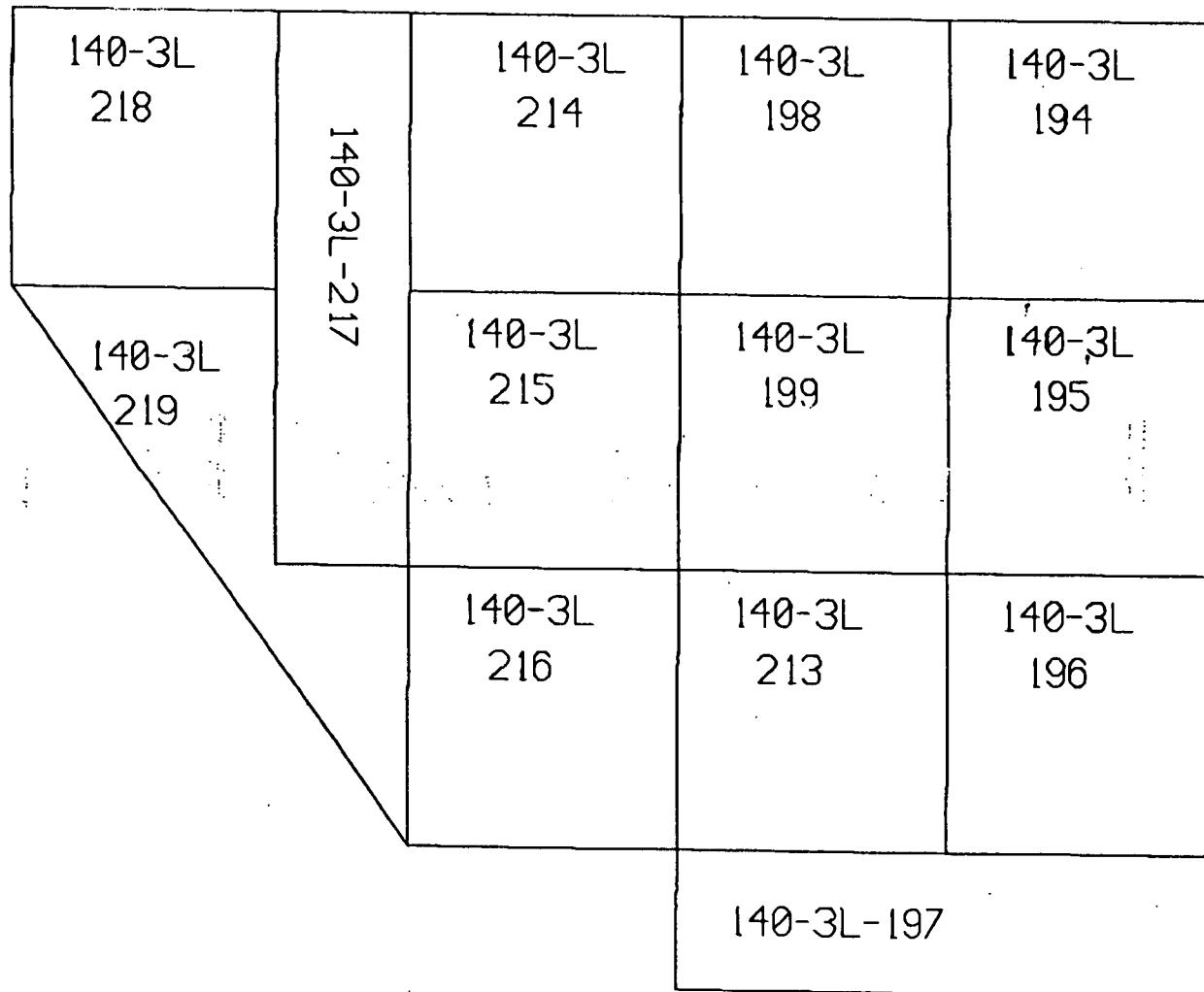
PROPERTY 3(L)  
BUILDING

140-3L-169
140-3L-188
140-3L-187
140-3L-186
140-3L-185
140-3L-184

140-3L-168 IS A 1mX1m SPOT LOCATED E1750 N1150

Figure 7  
Post-Remedial Action Grids  
at Property 3L (Phase III)

HIGH GRID  
NORTH  
STATE PLANE



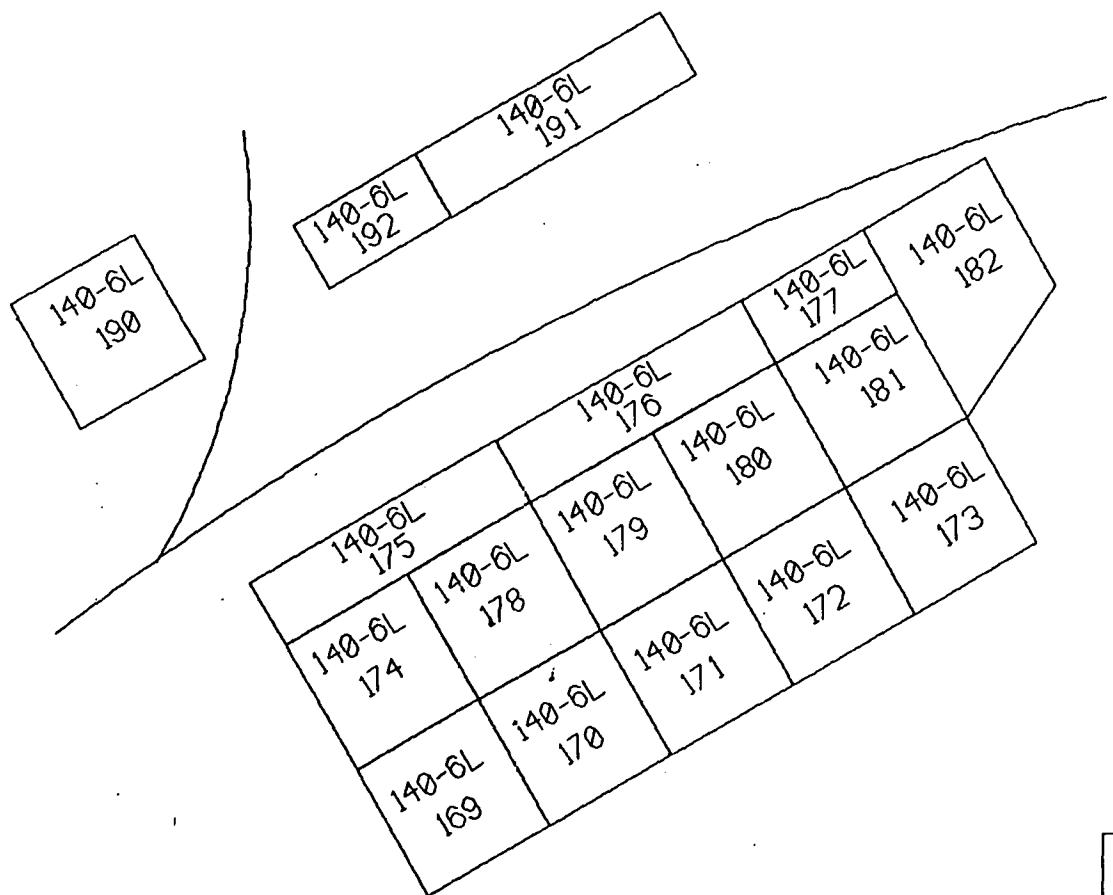
Area used for moisture conditioning of soil prior to loading. See Figure 3.

**Figure 8**  
**Post-Remedial Action Grids**  
**at Property 3L (Phase III)**

0100 SSIH  
STATE PLANE  
NORTH

PROPERTY 6(L)  
BUILDING

140-6L  
157



**Figure 9**  
**Post-Remedial Action Grids**  
**at Property 6L (Phase III)**

**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Post-Remedial Action Soil Sample Results (Data)**

**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Post-Remedial Action Soil Sample Results (Data)**

**GAMMA EXPOSURE RATE SURVEYS**

**TMA/Eberline**  
**GAMMA EXPOSURE RATE SURVEY**

Sho: HISs V.P. 3L

Location: 3L

Date: 10-3-95

Surveyed By: Brown / PHILLIPS

**Survey No.:** \_\_\_\_\_

Serial No.: C 8073

Cal. Due: 8-30-95

## **INSTRUMENT AND DETECTOR**

**Scalor Model:** Lydum 12S - Micro Rmates

Calibration Factor: as 1 cpm/ $\mu$ R/hr

Serial No.: S917

**Detector Model:** \_\_\_\_\_

Cal. Due: 12-9-95

**Serial No.:** \_\_\_\_\_

Count Time: 19

Cal. Due: ✓

Post-it® Fax Note		7671	Date 10-3-95	# of pages 2
TO	From _____			
Co./Dept.	Co. _____			
Phone #	Phone # _____			
Fax #	Fax # _____			

WE HAVE AN EXTENSION ON THE CH-ONE SITE

**actaround On-Site:**

$\mu$ R/mr (PIC)

#### SEM (Instrument + Detector)

### **TMA/berline GAMMA EXPOSURE RATE SURVEY**

Sites: Hiss R.P. GL

Location: 6c

Date: 10-4-95

Surveyed By: PHILLIPS / Brown

**Survey No.:** \_\_\_\_\_

PAC

**Serial No.:** CSD 73

**Cal. Due:** 8-30-95

## **INSTRUMENT AND DETECTOR**

Scalor Model: LUDLUM 125-Micro R meter Calibration Factor: 1.4 conv/mR/hr

**Serial No.:** 5517

**Detector Model:** )

Cal. Due: 12-9-95

**Serial No.:**

Count Time: ~1

**Cal. Due:** 

### **Background Off-Site:**

Mr/Mr (PIC)

### **cpm (Instrument + Detector)**

**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Post-Remedial Action Soil Sample Results (Data)**

**SAMPLES:**

**140-HV-3649  
140-HV-3651  
140-HV-3653  
140-HV-3655  
140-HV-3657  
140-HV-3659  
140-HV-3661**

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-13731	Sampling Event:	HIS_CH94
Work Order Number:	E9408047	DATAFUSR Number:	D-18190
Customer Number:	271	Date Received:	08/12/94
Environmental Category:	RI	Date Analyzed:	09/01/94

Sample ID	Date Collected	Top Depth			Matrix	F/UF Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Flag	Qualifier Code
		Depth	Depth	Matrix												
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	RA-226	1.10	0.47	PCI/G	GAMMASPEC	0.31			
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	RA-228	1.40	0.77	PCI/G	GAMMASPEC	0.45	J	LCS	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	TH-228	1.40	0.77	PCI/G	GAMMASPEC	0.45	J	LCS	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	TH-232	0.75	0.00	PCI/G	GAMMASPEC	0.75	UJ	ERR	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	U-235	1.40	0.00	PCI/G	GAMMASPEC	1.40	UJ	LCS	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	U-238	3.40	0.00	PCI/G	GAMMASPEC	3.40	UJ	ERR	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	AM-241	0.34	0.00	PCI/G	GAMMASPEC	0.34	UJ	LCS	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	K-40	16.30	2.90	PCI/G	GAMMASPEC	2.00	J	LCS	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	TL-208	0.75	0.00	PCI/G	GAMMASPEC	0.75	UJ	LCS	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	BI-214	0.86	0.40	PCI/G	GAMMASPEC	0.31	J	LCS	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	PB-212	0.54	0.00	PCI/G	GAMMASPEC	0.54	UJ	LCS	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	PB-214	1.70	1.20	PCI/G	GAMMASPEC	0.22	J	LCS	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	AC-228	1.40	0.77	PCI/G	GAMMASPEC	0.45	J	LCS	
140-HV-3649	06/04/94	0.00	0.50	SL	1.005	DRY	REG	TOTU	2.90	0.29	UG/G	KPA	0.10	U	BLK	
140-HV-3649	06/04/94	0.00	0.50	SL	1.024	DRY	REG	TH-230	1.60	0.51	PCI/G	ALPHASPEC	0.14			
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	RA-226	0.84	0.18	PCI/G	GAMMASPEC	0.29			
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	RA-228	1.10	0.56	PCI/G	GAMMASPEC	0.42	J	LCS	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	TH-228	1.10	0.56	PCI/G	GAMMASPEC	0.42	J	LCS	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	TH-232	0.97	0.52	PCI/G	GAMMASPEC	0.41			
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	U-235	0.77	0.00	PCI/G	GAMMASPEC	0.77	UJ	LCS	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	U-238	3.70	2.00	PCI/G	GAMMASPEC	2.10			
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	AM-241	0.19	0.00	PCI/G	GAMMASPEC	0.19	UJ	LCS	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	K-40	13.80	2.10	PCI/G	GAMMASPEC	1.80	J	LCS	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	TL-208	0.82	0.24	PCI/G	GAMMASPEC	0.41	J	LCS	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	PB-212	1.00	0.18	PCI/G	GAMMASPEC	0.17	J	LCS	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	PB-214	0.90	0.10	PCI/G	GAMMASPEC	0.21	J	LCS	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	RA-224	1.00	0.18	PCI/G	GAMMASPEC	0.22	J	LCS	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	AC-228	1.10	0.56	PCI/G	GAMMASPEC	0.42	J	LCS	
140-HV-3651	06/14/94	0.00	0.50	SL	1.003	DRY	REG	TOTU	2.80	0.28	UG/G	KPA	0.10	U	BLK	
140-HV-3651	06/14/94	0.00	0.50	SL	1.058	DRY	REG	TH-230	1.50	0.45	PCI/G	ALPHASPEC	0.11			

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-13731	Sampling Event:	HIS_CH94
Work Order Number:	E9408047	DATAFUSR Number:	D-18190
Customer Number:	271	Date Received:	08/12/94
Environmental Category:	RI	Date Analyzed:	09/01/94

Sample ID	Date Collected	Top Depth			Bottom Depth			Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI	Qualifier
		Depth	Depth	Matrix	Depth	Depth	Matrix											MDA	Flag
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY	REG	RA-226		1.20	0.38	PCI/G	GAMMASPEC	0.99					
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY	REG	RA-228		1.10	0.32	PCI/G	GAMMASPEC	0.50	J	LCS			
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY	REG	TH-228		1.10	0.32	PCI/G	GAMMASPEC	0.50	J	LCS			
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY	REG	TH-232		1.10	0.28	PCI/G	GAMMASPEC	0.49					
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY	REG	U-235		0.88	0.00	PCI/G	GAMMASPEC	0.88	UJ	LCS			
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY	REG	U-238		7.40	1.70	PCI/G	GAMMASPEC	2.50					
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY	REG	AM-241		0.21	0.00	PCI/G	GAMMASPEC	0.21	UJ	LCS			
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY	REG	K-40		12.30	2.20	PCI/G	GAMMASPEC	2.20	J	LCS			
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY	REG	TL-208		1.20	0.07	PCI/G	GAMMASPEC	0.49	J	LCS			
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY	REG	BI-212		1.50	1.50	PCI/G	GAMMASPEC	2.00	UJ	LCS			
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY	REG	BI-214		1.00	0.31	PCI/G	GAMMASPEC	0.35	J	LCS			
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY	REG	PB-212		1.30	0.21	PCI/G	GAMMASPEC	0.21	J	LCS			
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY	REG	PB-214		1.30	0.40	PCI/G	GAMMASPEC	0.25	J	LCS			
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY	REG	RA-224		1.30	0.21	PCI/G	GAMMASPEC	0.26	J	LCS			
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY	REG	AC-228		1.10	0.32	PCI/G	GAMMASPEC	0.50	J	LCS			
140-HV-3653	06/14/94	0.00	0.50	SL	1.004	DRY	REG	TOTU		3.40	0.34	UG/G	KPA	0.10	U	BLK			
140-HV-3653	06/14/94	0.00	0.50	SL	1.064	DRY	REG	TH-230		4.60	1.10	PCI/G	ALPHASPEC	0.13					
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY	REG	RA-226		1.10	0.46	PCI/G	GAMMASPEC	0.33					
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY	REG	RA-228		1.10	0.66	PCI/G	GAMMASPEC	0.48	J	LCS			
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY	REG	TH-228		1.10	0.66	PCI/G	GAMMASPEC	0.48	J	LCS			
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY	REG	TH-232		1.00	0.42	PCI/G	GAMMASPEC	0.48					
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY	REG	U-235		0.83	0.00	PCI/G	GAMMASPEC	0.83	UJ	LCS			
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY	REG	U-238		4.10	2.70	PCI/G	GAMMASPEC	2.40					
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY	REG	AM-241		0.21	0.00	PCI/G	GAMMASPEC	0.21	UJ	LCS			
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY	REG	K-40		8.20	2.10	PCI/G	GAMMASPEC	2.10	J	LCS			
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY	REG	TL-208		1.10	0.47	PCI/G	GAMMASPEC	0.48	J	LCS			
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY	REG	BI-214		0.78	0.23	PCI/G	GAMMASPEC	0.33	J	LCS			
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY	REG	PB-212		1.20	0.20	PCI/G	GAMMASPEC	0.20	J	LCS			
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY	REG	RA-224		1.20	0.20	PCI/G	GAMMASPEC	0.25	J	LCS			
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY	REG	AC-228		1.10	0.66	PCI/G	GAMMASPEC	0.48	J	LCS			

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-13731	Sampling Event:	HIS_CH94
Work Order Number:	E9408047	DATAFUSR Number:	D-18190
Customer Number:	271	Date Received:	08/12/94
Environmental Category:	RI	Date Analyzed:	08/29/94

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Flag	Qualifier Code
140-HV-3655	06/15/94	0.00	0.50	SL	1.002	DRY	REG	TOTU	3.40	0.34	UG/G	KPA	0.10	U	BLK
140-HV-3655	06/15/94	0.00	0.50	SL	1.216	DRY	REG	TH-230	3.60	0.86	PCI/G	ALPHASPEC	0.12		
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY	REG	RA-226	1.10	0.24	PCI/G	GAMMASPEC	0.33		
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY	REG	RA-228	1.40	1.10	PCI/G	GAMMASPEC	0.48	J	LCS
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY	REG	TH-228	1.40	1.10	PCI/G	GAMMASPEC	0.48	J	LCS
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY	REG	TH-232	1.10	0.44	PCI/G	GAMMASPEC	0.48		
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY	REG	U-235	0.13	0.15	PCI/G	GAMMASPEC	0.96	UJ	LCS
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY	REG	U-238	3.00	2.10	PCI/G	GAMMASPEC	2.40		
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY	REG	AM-241	0.21	0.00	PCI/G	GAMMASPEC	0.21	UJ	LCS
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY	REG	K-40	14.50	2.40	PCI/G	GAMMASPEC	2.10	J	LCS
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY	REG	TL-208	1.10	0.48	PCI/G	GAMMASPEC	0.48	J	LCS
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY	REG	BI-214	1.20	0.25	PCI/G	GAMMASPEC	0.33	J	LCS
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY	REG	PB-212	1.20	0.20	PCI/G	GAMMASPEC	0.20	J	LCS
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY	REG	AC-228	1.40	1.10	PCI/G	GAMMASPEC	0.48	J	LCS
140-HV-3657	06/15/94	0.00	0.50	SL	1.004	DRY	REG	TOTU	3.20	0.32	UG/G	KPA	0.10	U	BLK
140-HV-3657	06/15/94	0.00	0.50	SL	1.064	DRY	REG	TH-230	1.50	0.45	PCI/G	ALPHASPEC	0.12		
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY	REG	RA-226	1.10	0.20	PCI/G	GAMMASPEC	0.34		
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY	REG	RA-228	1.00	0.65	PCI/G	GAMMASPEC	0.49	J	LCS
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY	REG	TH-232	1.00	0.65	PCI/G	GAMMASPEC	0.49	J	LCS
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY	REG	U-235	1.20	0.06	PCI/G	GAMMASPEC	0.48		
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY	REG	U-238	0.90	0.00	PCI/G	GAMMASPEC	0.90	UJ	LCS
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY	REG	AM-241	5.10	2.00	PCI/G	GAMMASPEC	2.40		
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY	REG	K-40	0.22	0.00	PCI/G	GAMMASPEC	0.22	UJ	LCS
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY	REG	TL-208	11.00	2.10	PCI/G	GAMMASPEC	2.10	J	LCS
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY	REG	BI-214	1.30	0.42	PCI/G	GAMMASPEC	0.48	J	LCS
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY	REG	PB-212	1.30	0.21	PCI/G	GAMMASPEC	0.20	J	LCS
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY	REG	AC-228	1.00	0.65	PCI/G	GAMMASPEC	0.49	J	LCS
140-HV-3659	06/15/94	0.00	0.50	SL	1.001	DRY	REG	TOTU	1.20	0.32	UG/G	KPA	0.10	U	BLK
140-HV-3659	06/15/94	0.00	0.50	SL	1.356	DRY	REG	TH-230	3.20	0.33	PCI/G	ALPHASPEC	0.04		
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	RA-226	1.20	0.45	PCI/G	GAMMASPEC	0.38		

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-13731	Sampling Event:	HIS_CH94
Work Order Number:	E9408047	DATAFUSR Number:	D-18190
Customer Number:	271	Date Received:	08/12/94
Environmental Category:	RI	Date Analyzed:	09/01/94

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Qualifer Flag	Code
	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	RA-228	1.30	0.77	PCI/G	GAMMASPEC	0.54	J	LCS
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	TH-228	1.30	0.77	PCI/G	GAMMASPEC	0.54	J	LCS
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	TH-232	1.40	0.61	PCI/G	GAMMASPEC	0.54		
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	U-235	1.00	0.00	PCI/G	GAMMASPEC	1.00	UJ	LCS
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	U-238	3.40	2.40	PCI/G	GAMMASPEC	2.70		
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	AM-241	0.25	0.00	PCI/G	GAMMASPEC	0.25	UJ	LCS
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	K-40	13.70	2.40	PCI/G	GAMMASPEC	2.40	J	LCS
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	TL-208	1.40	0.33	PCI/G	GAMMASPEC	0.54	J	LCS
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	PB-212	1.30	0.20	PCI/G	GAMMASPEC	0.23	J	LCS
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	RA-224	1.30	0.20	PCI/G	GAMMASPEC	0.29	J	LCS
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	AC-228	1.30	0.77	PCI/G	GAMMASPEC	0.54	J	LCS
140-HV-3661	08/03/94	0.00	0.50	SL	1.004	DRY	REG	TOTU	3.60	0.36	UG/G	KPA	0.10		
140-HV-3661	08/03/94	0.00	0.50	SL	1.199	DRY	REG	TH-230	1.50	0.37	PCI/G	ALPHASPEC	0.06		

D-18190

**TMA/Eberline**

601 Scarboro Rd.  
Oak Ridge, TN 37830  
(615) 481-0683 Fax (615) 483-4621

TMA/E-OR-2305

September 7, 1994

Mr. Jim McCague  
Bechtel National, Inc.  
P.O. Box 350  
Oak Ridge, TN 37831-0350

**CASE NARRATIVE**

Work Order #94-08-047-OR  
State of Utah Certificate #E-235

**SAMPLE RECEIPT**

This work order contains seven surface soil samples received 08/12/94. All samples were analyzed for Total Uranium, Thorium-230, and Gamma Spectroscopy.

Gamma Spectroscopy analysis consists of the following parameters:

List I: The measured activity or the sample specific MDA for the following isotopes will always be reported.

Ra226	Th228	U235	Am241
Ra228	Th232	U238	K40

List II: Activities for the following isotopes will be reported from the gamma spectral analysis only if there is a positive result.

Be-7	Nb-95	I-131	Nd-147	Pb-214
Na-22	Nb-95m	I-133	Pm-144	Ra-223
Na-24	Mo-99	I-135	Pm-146	Ra-224
Cr-51	Ru-103	Cs-134	Pm-149	Ac-228
Mn-54	Ru-106	Cs-136	Eu-152	Th-234
Fe-59	Cd-109	Cs-137	Eu-154	Pa-231
Co-57	Ag-110m	Ba-133	Eu-155	Pa-234
Co-58	Sn-113	Ba-140	Hg-203	Pa-234m
Co-60	Sb-124	La-140	Tl-208	Np-239
Zn-65	Sb-135	Ce-141	Bi-212	
Y-88	Sb-127	Ce-143	Bi-214	
Zr-65	Te-132	Ce-144	Pb-212	

<u>CLIENT ID</u>	<u>LAB ID</u>
140-HV-3649	94-08-047-04
140-HV-3651	94-08-047-05
140-HV-3653	94-08-047-06
140-HV-3655	94-08-047-07
140-HV-3657	94-08-047-08
140-HV-3659	94-08-047-09
140-HV-3661	94-08-047-10

The file name for these samples is 9408047.TXT.

PROBLEMS OR UNUSUAL CIRCUMSTANCES

Results for Uranium-238 by Gamma Spectroscopy for Sample # 140-HV-3653 may be slightly bias positive due to Compton scatter from other Gamm emitting radionuclides within this sample. Initial calibrations, self absorption factors, and tracer recoveries, where applicable, are within specified criteria. No problems or unusual circumstances were noted during the analytical process.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package and in the electronic data submitted on diskette has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

  
M. R. McDougall  
Laboratory Manager

Date: 9/7/94

## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	08/12/94
Work Order Number:	9408047	Date Analyzed	09/01/94
Customer Number:	271		
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	MDA
QCSPIKE	08/12/94	0.00	0.00	SL		390.0	DRY	LCST	RA-226	33.60	0.67	PCI/G	GAMMASPEC	0.37
QCSPIKE	08/12/94	0.00	0.00	SL		390.0	DRY	LCSF	RA-226	32.10	3.10	PCI/G	GAMMASPEC	0.37
QCSPIKE	08/12/94	0.00	0.00	SL		399.1	DRY	LCST	TH-232	11.50	0.12	PCI/G	GAMMASPEC	0.51
QCSPIKE	08/12/94	0.00	0.00	SL		399.1	DRY	LCSF	TH-232	12.60	1.80	PCI/G	GAMMASPEC	0.51
QCSPIKE	08/12/94	0.00	0.00	SL		390.0	DRY	LCST	U-238	32.70	0.66	PCI/G	GAMMASPEC	2.60
QCSPIKE	08/12/94	0.00	0.00	SL		390.0	DRY	LCSF	U-238	41.00	8.90	PCI/G	GAMMASPEC	2.60
QCSPIKE	08/12/94	0.00	0.00	SL		1.001	DRY	LCST	TOTU	40.00	0.08	UG/G	KPA	0.10
QCSPIKE	08/12/94	0.00	0.00	SL		1.001	DRY	LCSF	TDTU	40.99	4.10	UG/G	KPA	0.10
QCSPIKE	08/12/94	0.00	0.00	SL		1	DRY	LCST	TH-230	5.40	0.11	PCI/G	ALPHASPEC	0.09
QCSPIKE	08/12/94	0.00	0.00	SL		1	DRY	LCSF	TH-230	6.20	1.30	PCI/G	ALPHASPEC	0.09
QCBLANK	08/12/94	0.00	0.00	SL		591.7	DRY	PB	RA-226	0.24	0.00	PCI/G	GAMMASPEC	0.24
QCBLANK	08/12/94	0.00	0.00	SL		591.7	DRY	PB	TH-232	0.35	0.00	PCI/G	GAMMASPEC	0.35
QCBLANK	08/12/94	0.00	0.00	SL		591.7	DRY	PB	U-238	1.70	0.00	PCI/G	GAMMASPEC	1.70
QCBLANK	08/12/94	0.00	0.00	SL		1.001	DRY	PB	TOTU	0.72	0.07	UG/G	KPA	0.10
QCBLANK	08/12/94	0.00	0.00	SL		1	DRY	PB	TH-230	0.12	0.10	PCI/G	ALPHASPEC	0.05
140-HV-3649	06/04/94	0.00	0.50	SL		459.4	DRY	REPL	RA-226	1.40	0.27	PCI/G	GAMMASPEC	0.31
140-HV-3649	06/04/94	0.00	0.50	SL		459.4	DRY	REPL	RA-228	1.10	1.00	PCI/G	GAMMASPEC	0.45
140-HV-3649	06/04/94	0.00	0.50	SL		459.4	DRY	REPL	TH-228	1.10	1.00	PCI/G	GAMMASPEC	0.45
140-HV-3649	06/04/94	0.00	0.50	SL		459.4	DRY	REPL	TH-232	0.81	0.00	PCI/G	GAMMASPEC	0.81
140-HV-3649	06/04/94	0.00	0.50	SL		459.4	DRY	REPL	U-235	1.30	0.00	PCI/G	GAMMASPEC	1.30
140-HV-3649	06/04/94	0.00	0.50	SL		459.4	DRY	REPL	U-238	3.40	3.50	PCI/G	GAMMASPEC	2.20
140-HV-3649	06/04/94	0.00	0.50	SL		459.4	DRY	REPL	AM-241	0.34	0.00	PCI/G	GAMMASPEC	0.34
140-HV-3649	06/04/94	0.00	0.50	SL		459.4	DRY	REPL	K-40	16.20	2.90	PCI/G	GAMMASPEC	2.00
140-HV-3649	06/04/94	0.00	0.50	SL		459.4	DRY	REPL	TL-208	0.81	0.00	PCI/G	GAMMASPEC	0.81
140-HV-3649	06/04/94	0.00	0.50	SL		459.4	DRY	REPL	BI-214	1.30	0.38	PCI/G	GAMMASPEC	0.31
140-HV-3649	06/04/94	0.00	0.50	SL		459.4	DRY	REPL	PB-212	0.53	0.00	PCI/G	GAMMASPEC	0.53
140-HV-3649	06/04/94	0.00	0.50	SL		459.4	DRY	REPL	PB-214	0.54	0.00	PCI/G	GAMMASPEC	0.54
140-HV-3649	06/04/94	0.00	0.50	SL		459.4	DRY	REPL	AC-228	1.10	1.00	PCI/G	GAMMASPEC	0.45
140-HV-3649	06/04/94	0.00	0.50	SL		1.003	DRY	REPL	TOTU	3.00	0.30	UG/G	KPA	0.10
140-HV-3649	06/04/94	0.00	0.50	SL		1.189	DRY	REPL	TH-230	2.10	0.57	PCI/G	ALPHASPEC	0.12

Approved by: M. R. M. Donald  
09/07/94

Bonnie Coon Oster

**TMA/Eberline**  
A Division of Thermo Terra Tech

Page 1 of 5

Oak Ridge Laboratory • 601 Scarboro Road • Oak Ridge, TN 37830 • (615) 481-0683

## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	08/12/94
Work Order Number:	9408047	Date Received	08/12/94
Customer Number:	271	Date Analyzed	09/01/94
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth		Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	MDA
		Depth	Bottom											
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	RA-226	1.10	0.47	PCI/G	GAMMASPEC	0.31	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	RA-228	1.40	0.77	PCI/G	GAMMASPEC	0.45	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	TH-228	1.40	0.77	PCI/G	GAMMASPEC	0.45	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	TH-232	0.75	0.00	PCI/G	GAMMASPEC	0.75	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	U-235	1.40	0.00	PCI/G	GAMMASPEC	1.40	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	U-238	3.40	0.00	PCI/G	GAMMASPEC	3.40	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	AM-241	0.34	0.00	PCI/G	GAMMASPEC	0.34	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	K-40	16.30	2.90	PCI/G	GAMMASPEC	2.00	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	TL-208	0.75	0.00	PCI/G	GAMMASPEC	0.75	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	BI-214	0.86	0.40	PCI/G	GAMMASPEC	0.31	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	PB-212	0.54	0.00	PCI/G	GAMMASPEC	0.54	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	PB-214	1.70	1.20	PCI/G	GAMMASPEC	0.22	
140-HV-3649	06/04/94	0.00	0.50	SL	459.4	DRY	REG	AC-228	1.40	0.77	PCI/G	GAMMASPEC	0.45	
140-HV-3649	06/04/94	0.00	0.50	SL	1.005	DRY	REG	TOTU	2.90	0.29	UG/G	KPA	0.10	
140-HV-3649	06/04/94	0.00	0.50	SL	1.024	DRY	REG	TH-230	1.60	0.51	PCI/G	ALPHASPEC	0.14	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	RA-226	0.84	0.18	PCI/G	GAMMASPEC	0.29	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	RA-228	1.10	0.56	PCI/G	GAMMASPEC	0.42	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	TH-228	1.10	0.56	PCI/G	GAMMASPEC	0.42	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	TH-232	0.97	0.52	PCI/G	GAMMASPEC	0.41	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	U-235	0.77	0.00	PCI/G	GAMMASPEC	0.77	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	U-238	3.70	2.00	PCI/G	GAMMASPEC	2.10	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	AM-241	0.19	0.00	PCI/G	GAMMASPEC	0.19	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	K-40	13.80	2.10	PCI/G	GAMMASPEC	1.80	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	TL-208	0.82	0.24	PCI/G	GAMMASPEC	0.41	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	PB-212	1.00	0.18	PCI/G	GAMMASPEC	0.17	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	PB-214	0.90	0.10	PCI/G	GAMMASPEC	0.21	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	RA-224	1.00	0.18	PCI/G	GAMMASPEC	0.22	
140-HV-3651	06/14/94	0.00	0.50	SL	498.3	DRY	REG	AC-228	1.10	0.56	PCI/G	GAMMASPEC	0.42	
140-HV-3651	06/14/94	0.00	0.50	SL	1.003	DRY	REG	TOTU	2.80	0.28	UG/G	KPA	0.10	
140-HV-3651	06/14/94	0.00	0.50	SL	1.058	DRY	REG	TH-230	1.50	0.45	PCI/G	ALPHASPEC	0.11	

Approved by:  
09/07/94

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## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	08/12/94
Work Order Number:	9408047	Date Received	08/12/94
Customer Number:	271	Date Analyzed	09/01/94
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	MDA
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY		REG	RA-226	1.20	0.38	PCI/G	GAMMASPEC	0.99
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY		REG	RA-228	1.10	0.32	PCI/G	GAMMASPEC	0.50
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY		REG	TH-228	1.10	0.32	PCI/G	GAMMASPEC	0.50
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY		REG	TH-232	1.10	0.28	PCI/G	GAMMASPEC	0.49
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY		REG	U-235	0.88	0.00	PCI/G	GAMMASPEC	0.88
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY		REG	U-238	7.40	1.70	PCI/G	GAMMASPEC	2.50
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY		REG	AM-241	0.21	0.00	PCI/G	GAMMASPEC	0.21
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY		REG	K-40	12.30	2.20	PCI/G	GAMMASPEC	2.20
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY		REG	TL-208	1.20	0.07	PCI/G	GAMMASPEC	0.49
140-HV-3553	06/14/94	0.00	0.50	SL	415.3	DRY		REG	BI-212	1.50	1.50	PCI/G	GAMMASPEC	2.00
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY		REG	BI-214	1.00	0.31	PCI/G	GAMMASPEC	0.35
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY		REG	PB-212	1.30	0.21	PCI/G	GAMMASPEC	0.21
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY		REG	PB-214	1.30	0.40	PCI/G	GAMMASPEC	0.25
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY		REG	RA-224	1.30	0.21	PCI/G	GAMMASPEC	0.26
140-HV-3653	06/14/94	0.00	0.50	SL	415.3	DRY		REG	AC-228	1.10	0.32	PCI/G	GAMMASPEC	0.50
140-HV-3653	06/14/94	0.00	0.50	SL	1.004	DRY		REG	TOTU	3.40	0.34	UG/G	KPA	0.10
140-HV-3653	06/14/94	0.00	0.50	SL	1.064	DRY		REG	TH-230	4.60	1.10	PCI/G	ALPHASPEC	0.13
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY		REG	RA-226	1.10	0.46	PCI/G	GAMMASPEC	0.33
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY		REG	RA-228	1.10	0.66	PCI/G	GAMMASPEC	0.48
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY		REG	TH-228	1.10	0.66	PCI/G	GAMMASPEC	0.48
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY		REG	TH-232	1.00	0.42	PCI/G	GAMMASPEC	0.48
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY		REG	U-235	0.83	0.00	PCI/G	GAMMASPEC	0.83
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY		REG	U-238	4.10	2.70	PCI/G	GAMMASPEC	2.40
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY		REG	AM-241	0.21	0.00	PCI/G	GAMMASPEC	0.21
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY		REG	K-40	8.20	2.10	PCI/G	GAMMASPEC	2.10
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY		REG	TL-208	1.10	0.47	PCI/G	GAMMASPEC	0.48
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY		REG	BI-214	0.78	0.23	PCI/G	GAMMASPEC	0.33
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY		REG	PB-212	1.20	0.20	PCI/G	GAMMASPEC	0.20
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY		REG	RA-224	1.20	0.20	PCI/G	GAMMASPEC	0.25
140-HV-3655	06/15/94	0.00	0.50	SL	429.0	DRY		REG	AC-228	1.10	0.66	PCI/G	GAMMASPEC	0.48

Approved by: M. R. M.  
09/07/94

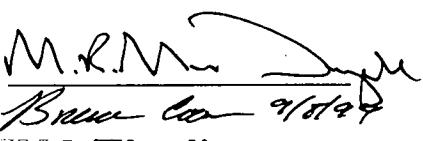
Boon Carr 9/8/94

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## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	08/12/94
Work Order Number:	9408047	Date Received	08/12/94
Customer Number:	271	Date Analyzed	08/29/94
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical	
													Method	MDA
140-HV-3655	06/15/94	0.00	0.50	SL	1.002	DRY		REG	TOTU	3.40	0.34	UG/G	KPA	0.10
140-HV-3655	06/15/94	0.00	0.50	SL	1.216	DRY		REG	TH-230	3.60	0.86	PCI/G	ALPHASPEC	0.12
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY		REG	RA-226	1.10	0.24	PCI/G	GAMMASPEC	0.33
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY		REG	RA-228	1.40	1.10	PCI/G	GAMMASPEC	0.48
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY		REG	TH-228	1.40	1.10	PCI/G	GAMMASPEC	0.48
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY		REG	TH-232	1.10	0.44	PCI/G	GAMMASPEC	0.48
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY		REG	U-235	0.13	0.15	PCI/G	GAMMASPEC	0.96
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY		REG	U-238	3.00	2.10	PCI/G	GAMMASPEC	2.40
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY		REG	AM-241	0.21	0.00	PCI/G	GAMMASPEC	0.21
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY		REG	K-40	14.50	2.40	PCI/G	GAMMASPEC	2.10
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY		REG	TL-208	1.10	0.48	PCI/G	GAMMASPEC	0.48
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY		REG	BI-214	1.20	0.25	PCI/G	GAMMASPEC	0.33
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY		REG	PB-212	1.20	0.20	PCI/G	GAMMASPEC	0.20
140-HV-3657	06/15/94	0.00	0.50	SL	428.8	DRY		REG	AC-228	1.40	1.10	PCI/G	GAMMASPEC	0.48
140-HV-3657	06/15/94	0.00	0.50	SL	1.004	DRY		REG	TOTU	3.20	0.32	UG/G	KPA	0.10
140-HV-3657	06/15/94	0.00	0.50	SL	1.064	DRY		REG	TH-230	1.50	0.45	PCI/G	ALPHASPEC	0.12
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY		REG	RA-226	1.10	0.20	PCI/G	GAMMASPEC	0.34
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY		REG	RA-228	1.00	0.65	PCI/G	GAMMASPEC	0.49
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY		REG	TH-228	1.00	0.65	PCI/G	GAMMASPEC	0.49
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY		REG	TH-232	1.20	0.06	PCI/G	GAMMASPEC	0.48
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY		REG	U-235	0.90	0.00	PCI/G	GAMMASPEC	0.90
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY		REG	U-238	5.10	2.00	PCI/G	GAMMASPEC	2.40
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY		REG	AM-241	0.22	0.00	PCI/G	GAMMASPEC	0.22
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY		REG	K-40	11.00	2.10	PCI/G	GAMMASPEC	2.10
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY		REG	TL-208	1.30	0.42	PCI/G	GAMMASPEC	0.48
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY		REG	PB-212	1.30	0.21	PCI/G	GAMMASPEC	0.20
140-HV-3659	06/15/94	0.00	0.50	SL	426.9	DRY		REG	AC-228	1.00	0.65	PCI/G	GAMMASPEC	0.49
140-HV-3659	06/15/94	0.00	0.50	SL	1.001	DRY		REG	TOTU	3.20	0.32	UG/G	KPA	0.10
140-HV-3659	06/15/94	0.00	0.50	SL	1.356	DRY		REG	TH-230	1.20	0.33	PCI/G	ALPHASPEC	0.04
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY		REG	RA-226	1.20	0.45	PCI/G	GAMMASPEC	0.38

Approved by:   
09/07/94

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## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	08/12/94
Work Order Number:	9408047		
Customer Number:	271	Date Analyzed	09/01/94
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth		Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical	
		Top	Bottom										Method	MDA
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	RA-228	1.30	0.77	PCI/G	GAMMASPEC	0.54	
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	TH-228	1.30	0.77	PCI/G	GAMMASPEC	0.54	
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	TH-232	1.40	0.61	PCI/G	GAMMASPEC	0.54	
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	U-235	1.00	0.00	PCI/G	GAMMASPEC	1.00	
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	U-238	3.40	2.40	PCI/G	GAMMASPEC	2.70	
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	AM-241	0.25	0.00	PCI/G	GAMMASPEC	0.25	
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	K-4D	13.70	2.40	PCI/G	GAMMASPEC	2.40	
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	TL-208	1.40	0.33	PCI/G	GAMMASPEC	0.54	
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	PB-212	1.30	0.20	PCI/G	GAMMASPEC	0.23	
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	RA-224	1.30	0.20	PCI/G	GAMMASPEC	0.29	
140-HV-3661	08/03/94	0.00	0.50	SL	382.5	DRY	REG	AC-228	1.30	0.77	PCI/G	GAMMASPEC	0.54	
140-HV-3661	08/03/94	0.00	0.50	SL	1.004	DRY	REG	TOTU	3.60	0.36	UG/G	KPA	0.10	
140-HV-3661	08/03/94	0.00	0.50	SL	1.199	DRY	REG	TH-230	1.50	0.37	PCI/G	ALPHASPEC	0.06	

Approved by:  
09/07/94  
M.R. Mullins  
Brae Cor 9/8/94

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061100

(C) 14-1018-11 47

NORFAS 49

AIRBILL NO. 4115839685	FIELD SAMPLE FORM SITE ACTIVITY SAMPLES							Samplers (print name then sign) ROGER C. HALL Roger C. Hall			
Site Name: HSS VP (QUAKER STATE)		WBS No.: 140			Activity Support (Job) No.: 271						
Sample ID Sample Grid Point	Sample Type (1)	Sample Time	Date of Sample	Preserved with	Purpose (2)	Depth cm <input type="checkbox"/> ft <input checked="" type="checkbox"/>	Priority (Days)	Analysis Required		Remarks	
140-HV-3649 Grid #1 Prop. #3L	SS	1052	6/14/94	NONE	VR	0-0.5	21	TOTAL U, Th-230 Th-232, Ra-226, Ra-228			
140-HV-3651 Grid #3 Prop. #3L	SS	1345	6/14/94	NONE	VR	0-0.5	21				
140-HV-3653 Grid #5 Prop. #3L	SS	1535	6/14/94	NONE	VR	0-0.5	21				
140-HV-3655 Grid #7 Prop. #3L	SS	1055	6/15/94	NONE	VR	0-0.5	21				
140-HV-3657 Grid #9 Prop. #3L	SS	1224	6/15/94	NONE	VR	0-0.5	21				
140-HV-3659 Grid #11 Prop. #3L	SS	1520	6/15/94	NONE	VR	0-0.5	21				
140-HV-3661 Grid #13 Prop. #3L	SS	1300	8/3/94	NONE	VR	0-0.5	21				
SAMPLE TYPE (1)		PURPOSE (2)		CHAIN OF CUSTODY RECORD							
Surface Soil	SS	Rad Character	RC	REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME			
Bias Soil	BS	Verification	VR	SHIP FOR ANALYSIS	Roger C. Hall	AIRBORNE	8/11/94	1500			
Profile Soil	PS	Quality Control	QC								
Sediment Silt	SD	Hot Spot	HS								
Other	OR	Resample	RS								
Vegetation	VE	Background	BG								
Ground Water	GW	Routine	RT								
Surface Water	SW	Special	SP								
*This package conforms to the conditions and limitations specified in 40CFR173.421 for excepted radioactive material, limited quantity, D.O.S. UN 2810.											
Shipper: TMA 9170 LARRY AVE BERKELEY, MO 63134		Ship to: TMA 601 SCARBORO ROAD OAK RIDGE, TN 37830		Page 1 of 2							



**Thermo Analytical Inc.**  
**TMA/Eberline**

3-12190

# **TMA/EBERLINE OAK RIDGE LABORATORY TRACER REPORT**

September 6, 1994

**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Post-Remedial Action Soil Sample Results (Data)**

**SAMPLES:**

**140-HV-3663**

**140-HV-3665**

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-13730	Sampling Event:	HIS_CH94
Work Order Number:	E9408046	DATAUSR Number:	0-18191
Customer Number:	271	Date Received:	08/12/94
Environmental Category:	RI	Date Analyzed:	08/31/94

Sample ID	Date Collected	Top Bottom				Smp_type	Analyte	Result	Error	Units	Analytical Method	MDA	BNI Flag	Qualifier Code	
		Depth	Depth	Matrix	F/UF Vol.										
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY	REG	RA-226	0.92	0.20	PCI/G	GAMMASPEC	0.21	J	RPL
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY	REG	RA-228	0.85	0.22	PCI/G	GAMMASPEC	0.39	J	LCS
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY	REG	TH-228	0.85	0.22	PCI/G	GAMMASPEC	0.39	J	LCS
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY	REG	TH-232	0.82	0.07	PCI/G	GAMMASPEC	0.21	U	BLK
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY	REG	U-235	0.21	0.13	PCI/G	GAMMASPEC	0.57	UJ	LCS
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY	REG	U-238	1.10	1.70	PCI/G	GAMMASPEC	3.50	UJ	EGR
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY	REG	AM-241	0.19	0.00	PCI/G	GAMMASPEC	0.19	UJ	LCS
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY	REG	K-4D	11.60	2.40	PCI/G	GAMMASPEC	2.10	J	LCS
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY	REG	TL-208	0.79	0.17	PCI/G	GAMMASPEC	0.36	J	LCS
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY	REG	BI-212	1.80	0.00	PCI/G	GAMMASPEC	1.80	UJ	LCS
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY	REG	AC-228	0.85	0.22	PCI/G	GAMMASPEC	0.39	J	LCS
140-HV-3663	08/03/94	0.00	0.50	SL	1.004	DRY	REG	TOTU	3.87	0.39	UG/G	KPA	0.10		
140-HV-3663	08/03/94	0.00	0.50	SL	1.114	DRY	REG	TH-230	3.30	0.71	PCI/G	ALPHASPEC	0.07		
140-HV-3663	08/03/94	0.00	0.50	SL	1.114	DRY	REG	TH-232	1.30	0.35	PCI/G	ALPHASPEC	0.04	U	BLK
140-HV-3665	08/03/94	0.00	0.50	SL	387.3	DRY	REG	RA-226	1.10	0.42	PCI/G	GAMMASPEC	0.25	J	RPL
140-HV-3665	08/03/94	0.00	0.50	SL	387.3	DRY	REG	RA-228	0.83	0.00	PCI/G	GAMMASPEC	0.83	UJ	LCS
140-HV-3665	08/03/94	0.00	0.50	SL	387.3	DRY	REG	TH-228	0.83	0.00	PCI/G	GAMMASPEC	0.83	UJ	LCS
140-HV-3665	08/03/94	0.00	0.50	SL	387.3	DRY	REG	TH-232	1.30	0.50	PCI/G	GAMMASPEC	0.43	U	BLK
140-HV-3665	08/03/94	0.00	0.50	SL	387.3	DRY	REG	U-235	0.96	0.00	PCI/G	GAMMASPEC	0.96	UJ	LCS
140-HV-3665	08/03/94	0.00	0.50	SL	387.3	DRY	REG	U-238	4.50	2.60	PCI/G	GAMMASPEC	4.10		
140-HV-3665	08/03/94	0.00	0.50	SL	387.3	DRY	REG	AM-241	0.23	0.00	PCI/G	GAMMASPEC	0.23	UJ	LCS
140-HV-3665	08/03/94	0.00	0.50	SL	387.3	DRY	REG	K-40	16.00	3.00	PCI/G	GAMMASPEC	2.50	J	LCS
140-HV-3665	08/03/94	0.00	0.50	SL	387.3	DRY	REG	TL-208	1.30	0.61	PCI/G	GAMMASPEC	0.43	J	LCS
140-HV-3665	08/03/94	0.00	0.50	SL	387.3	DRY	REG	BI-212	1.70	1.60	PCI/G	GAMMASPEC	1.40	J	LCS
140-HV-3665	08/03/94	0.00	0.50	SL	387.3	DRY	REG	PB-214	1.00	0.37	PCI/G	GAMMASPEC	0.24	J	LCS
140-HV-3665	08/03/94	0.00	0.50	SL	1.003	DRY	REG	TOTU	3.23	0.32	UG/G	KPA	0.10	U	BLK
140-HV-3665	08/03/94	0.00	0.50	SL	1.001	DRY	REG	TH-230	1.90	0.53	PCI/G	ALPHASPEC	0.06	U	BLK
140-HV-3665	08/03/94	0.00	0.50	SL	1.001	DRY	REG	TH-232	1.40	0.44	PCI/G	ALPHASPEC	0.06		

**TMA/Eberline**

601 Scarboro Rd.  
Oak Ridge, TN 37830  
(615) 481-0683 Fax (615) 483-4621

TMA/E-OR-2304

September 6, 1994

Mr. Jim McCague  
Bechtel National, Inc.  
P.O. Box 350  
Oak Ridge, TN 37831-0350

**CASE NARRATIVE**

Work Order #94-08-046-OR  
State of Utah Certificate #E-235

**SAMPLE RECEIPT**

This work order contains two surface soil samples received 08/12/94. Both samples were analyzed for Total Uranium, Thorium-230, Thorium-232, and Gamma Spectroscopy.

Gamma Spectroscopy analysis consists of the following parameters:

List I: The measured activity or the sample specific MDA for the following isotopes will always be reported.

Ra226	Th228	U235	Am241
Ra228	Th232	U238	K40

List II: Activities for the following isotopes will be reported from the gamma spectral analysis only if there is a positive result.

Be-7	Nb-95	I-131	Nd-147	Pb-214
Na-22	Nb-95m	I-133	Pm-144	Ra-223
Na-24	Mo-99	I-135	Pm-146	Ra-224
Cr-51	Ru-103	Cs-134	Pm-149	Ac-228
Mn-54	Ru-106	Cs-136	Eu-152	Th-234
Fe-59	Cd-109	Cs-137	Eu-154	Pa-231
Co-57	Ag-110m	Ba-133	Eu-155	Pa-234
Co-58	Sn-113	Ba-140	Hg-203	Pa-234m
Co-60	Sb-124	La-140	Tl-208	Np-239
Zn-65	Sb-135	Ce-141	Bi-212	
Y-88	Sb-127	Ce-143	Bi-214	
Zr-65	Te-132	Ce-144	Pb-212	

<u>CLIENT ID</u>	<u>LAB ID</u>
140-HV-3663	94-08-046-04
140-HV-3665	94-08-046-05

The file name for these samples is 9408046.TXT.

PROBLEMS OR UNUSUAL CIRCUMSTANCES

Initial calibrations, self absorption factors, and tracer recoveries, where applicable, are within specified criteria. No problems or unusual circumstances were noted during the analytical process.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package and in the electronic data submitted on diskette has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.



M. R. McDougall  
Laboratory Manager

Date: 9/6/94

## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	08/12/94
Work Order Number:	9408046	Date Received	08/12/94
Customer Number:	271	Date Analyzed	08/31/94
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	MDA
QCSPIKE	08/12/94	0.00	0.00	SL	390.0	DRY		LCST	RA-226	33.60	0.67	PCI/G	GAMMASPEC	0.24
QCSPIKE	08/12/94	0.00	0.00	SL	390.0	DRY		LCSF	RA-226	32.30	2.90	PCI/G	GAMMASPEC	0.24
QCSPIKE	08/12/94	0.00	0.00	SL	399.1	DRY		LCST	TH-232	11.50	0.12	PCI/G	GAMMASPEC	0.42
QCSPIKE	08/12/94	0.00	0.00	SL	399.1	DRY		LCSF	TH-232	11.50	1.20	PCI/G	GAMMASPEC	0.42
QCSPIKE	08/12/94	0.00	0.00	SL	390.0	DRY		LCST	U-238	32.70	0.66	PCI/G	GAMMASPEC	4.10
QCSPIKE	08/12/94	0.00	0.00	SL	390.0	DRY		LCSF	U-238	39.00	9.20	PCI/G	GAMMASPEC	4.10
QCSPIKE	08/12/94	0.00	0.00	SL	1.001	DRY		LCST	TOTU	40.00	0.08	UG/G	KPA	0.10
QCSPIKE	08/12/94	0.00	0.00	SL	1.001	DRY		LCSF	TOTU	40.99	4.10	UG/G	KPA	0.10
QCSPIKE	08/12/94	0.00	0.00	SL	1	DRY		LCST	TH-230	5.40	0.11	PCI/G	ALPHASPEC	0.06
QCSPIKE	08/12/94	0.00	0.00	SL	1	DRY		LCSF	TH-230	5.80	1.30	PCI/G	ALPHASPEC	0.06
QCSPIKE	08/12/94	0.00	0.00	SL	1	DRY		LCST	TH-232	5.00	0.18	PCI/G	ALPHASPEC	0.06
QCSPIKE	08/12/94	0.00	0.00	SL	1	DRY		LCSF	TH-232	5.30	1.20	PCI/G	ALPHASPEC	0.06
QCBLANK	08/12/94	0.00	0.00	SL	591.7	DRY		PB	RA-226	0.16	0.00	PCI/G	GAMMASPEC	0.16
QCBLANK	08/12/94	0.00	0.00	SL	591.7	DRY		PB	TH-232	0.28	0.00	PCI/G	GAMMASPEC	0.28
QCBLANK	08/12/94	0.00	0.00	SL	591.7	DRY		PB	U-238	2.70	0.00	PCI/G	GAMMASPEC	2.70
QCBLANK	08/12/94	0.00	0.00	SL	1.001	DRY		PB	TOTU	0.72	0.07	UG/G	KPA	0.10
QCBLANK	08/12/94	0.00	0.00	SL	1	DRY		PB	TH-230	0.52	0.21	PCI/G	ALPHASPEC	0.09
QCBLANK	08/12/94	0.00	0.00	SL	1	DRY		PB	TH-232	0.12	0.09	PCI/G	ALPHASPEC	0.08
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY		REPL	RA-226	1.20	0.04	PCI/G	GAMMASPEC	0.21
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY		REPL	RA-228	0.96	0.61	PCI/G	GAMMASPEC	0.39
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY		REPL	TH-228	0.96	0.61	PCI/G	GAMMASPEC	0.39
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY		REPL	TH-232	0.93	0.49	PCI/G	GAMMASPEC	0.21
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY		REPL	U-235	0.84	0.00	PCI/G	GAMMASPEC	0.84
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY		REPL	U-238	3.40	2.00	PCI/G	GAMMASPEC	3.50
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY		REPL	AM-241	0.20	0.00	PCI/G	GAMMASPEC	0.20
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY		REPL	K-40	10.80	2.20	PCI/G	GAMMASPEC	2.10
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY		REPL	TL-208	0.87	0.32	PCI/G	GAMMASPEC	0.36
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY		REPL	BI-212	1.10	0.86	PCI/G	GAMMASPEC	1.20
140-HV-3663	08/03/94	0.00	0.50	SL	457.2	DRY		REPL	AC-228	0.96	0.61	PCI/G	GAMMASPEC	0.39
140-HV-3663	08/03/94	0.00	0.50	SL	1.001	DRY		REPL	TOTU	3.70	0.37	UG/G	KPA	0.10

Approved by: M.L.M.  
09/06/94

**TMA/Eberline**  
A Division of Thermo Terra Tech

Oak Ridge Laboratory • 601 Scarboro Road • Oak Ridge, TN 37830 • (615) 481-0683

## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	08/12/94
Work Order Number:	9408046	Date Received	08/12/94
Customer Number:	271	Date Analyzed	08/24/94
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method		MDA
													Method	MDA	
140-HV-3663	08/03/94	0.00	0.50	SL		1.079	DRY	REPL	TH-230	4.00	0.82	PCI/G	ALPHASPEC	0.05	
140-HV-3663	08/03/94	0.00	0.50	SL		1.079	DRY	REPL	TH-232	1.00	0.31	PCI/G	ALPHASPEC	0.09	
140-HV-3663	08/03/94	0.00	0.50	SL		457.2	DRY	REG	RA-226	0.92	0.20	PCI/G	GAMMASPEC	0.21	
140-HV-3663	08/03/94	0.00	0.50	SL		457.2	DRY	REG	RA-228	0.85	0.22	PCI/G	GAMMASPEC	0.39	
140-HV-3663	08/03/94	0.00	0.50	SL		457.2	DRY	REG	TH-228	0.85	0.22	PCI/G	GAMMASPEC	0.39	
140-HV-3663	08/03/94	0.00	0.50	SL		457.2	DRY	REG	TH-232	0.82	0.07	PCI/G	GAMMASPEC	0.21	
140-HV-3663	08/03/94	0.00	0.50	SL		457.2	DRY	REG	U-235	0.21	0.13	PCI/G	GAMMASPEC	0.57	
140-HV-3663	08/03/94	0.00	0.50	SL		457.2	DRY	REG	U-238	1.10	1.70	PCI/G	GAMMASPEC	3.50	
140-HV-3663	08/03/94	0.00	0.50	SL		457.2	DRY	REG	AM-241	0.19	0.00	PCI/G	GAMMASPEC	0.19	
140-HV-3663	08/03/94	0.00	0.50	SL		457.2	DRY	REG	K-40	11.60	2.40	PCI/G	GAMMASPEC	2.10	
140-HV-3663	08/03/94	0.00	0.50	SL		457.2	DRY	REG	TL-208	0.79	0.17	PCI/G	GAMMASPEC	0.36	
140-HV-3663	08/03/94	0.00	0.50	SL		457.2	DRY	REG	BI-212	1.80	0.00	PCI/G	GAMMASPEC	1.80	
140-HV-3663	08/03/94	0.00	0.50	SL		457.2	DRY	REG	AC-228	0.85	0.22	PCI/G	GAMMASPEC	0.39	
140-HV-3663	08/03/94	0.00	0.50	SL		1.004	DRY	REG	TOTU	3.87	0.39	UG/G	KPA	0.10	
140-HV-3663	08/03/94	0.00	0.50	SL		1.114	DRY	REG	TH-230	3.30	0.71	PCI/G	ALPHASPEC	0.07	
140-HV-3663	08/03/94	0.00	0.50	SL		1.114	DRY	REG	TH-232	1.30	0.35	PCI/G	ALPHASPEC	0.04	
140-HV-3665	08/03/94	0.00	0.50	SL		387.3	DRY	REG	RA-226	1.10	0.42	PCI/G	GAMMASPEC	0.25	6
140-HV-3665	08/03/94	0.00	0.50	SL		387.3	DRY	REG	RA-228	0.83	0.00	PCI/G	GAMMASPEC	0.83	
140-HV-3665	08/03/94	0.00	0.50	SL		387.3	DRY	REG	TH-228	0.83	0.00	PCI/G	GAMMASPEC	0.83	
140-HV-3665	08/03/94	0.00	0.50	SL		387.3	DRY	REG	TH-232	1.30	0.50	PCI/G	GAMMASPEC	0.43	CO
140-HV-3665	08/03/94	0.00	0.50	SL		387.3	DRY	REG	U-235	0.96	0.00	PCI/G	GAMMASPEC	0.96	
140-HV-3665	08/03/94	0.00	0.50	SL		387.3	DRY	REG	U-238	4.50	2.60	PCI/G	GAMMASPEC	4.10	
140-HV-3665	08/03/94	0.00	0.50	SL		387.3	DRY	REG	AM-241	0.23	0.00	PCI/G	GAMMASPEC	0.23	
140-HV-3665	08/03/94	0.00	0.50	SL		387.3	DRY	REG	K-40	16.00	3.00	PCI/G	GAMMASPEC	2.50	
140-HV-3665	08/03/94	0.00	0.50	SL		387.3	DRY	REG	TL-208	1.30	0.61	PCI/G	GAMMASPEC	0.43	
140-HV-3665	08/03/94	0.00	0.50	SL		387.3	DRY	REG	BI-212	1.70	1.60	PCI/G	GAMMASPEC	1.40	
140-HV-3665	08/03/94	0.00	0.50	SL		387.3	DRY	REG	PB-214	1.00	0.37	PCI/G	GAMMASPEC	0.24	
140-HV-3665	08/03/94	0.00	0.50	SL		1.003	DRY	REG	TOTU	3.23	0.32	UG/G	KPA	0.10	
140-HV-3665	08/03/94	0.00	0.50	SL		1.001	DRY	REG	TH-230	1.90	0.53	PCI/G	ALPHASPEC	0.06	
140-HV-3665	08/03/94	0.00	0.50	SL		1.001	DRY	REG	TH-232	1.40	0.44	PCI/G	ALPHASPEC	0.06	

Approved by: M.R.M.  
09/06/94  
Brian C. S. [Signature]

Page 2 of 2

94-08-746

NORFAS #3

AIRBILL NO.

4115839685

# FIELD SAMPLE FORM SITE ACTIVITY SAMPLES

Samplers (print name then sign)

Roger C Hall

Roger C Hall

Site Name: HISS VP (QUAKER STATE)

WBS No.: 140

Activity Support (Job) No.: 271

	Sample ID Sample Grid Point	Sample Type (1)	Sample Time	Date of Sample	Preserved with	Purpose (2)	Depth cm ft	Priority (Days)	Analysis Required	Remarks
4-	140-HV-3663 GRID #15 Prop #3L	SS	1400	8/3/94	NONE	VR	0-0.5	21	TOTAL U, Th-230 Th-232, Ra-226, Ra-228	
5-	140-HV-3665 GRID #17 Prop #3L	SS	1600	8/3/94	NONE	VR	0-0.5	21		
6-	140-HV-3666 GRID #18 Prop #3L	SS	1030 1000 <sup>cm</sup> 8/4/94	8/4/94	NONE	VR	0-0.5	21		Not Received Q90 8/10/94
7-	140-HV-3668 GRID #20 Prop #3L	SS	1130	8/4/94	NONE	VR	0-0.5	21		Q90 8/12/94
8-	140-HV-3670 GRID #22 Prop #3L	SS	1430	8/4/94	NONE	VR	0-0.5	21		Q90 8/14/94
9-	140-HV-3672 GRID #24 Prop #3L	SS	1500	8/9/94	NONE	VR	0-0.5	21		Not Received
					RCH	8/11/94			<b>Received</b> AUG 12 1994 TMA/Eberline Oak Ridge Lab	Q90 8/12/94

## SAMPLE TYPE (1)

## PURPOSE (2)

Surface Soil	S S	Rad Character	R C
Bias Soil	B S	Verification	V R
Profile Soil	P S	Quality Control	Q C
Sediment Silt	S D	Hot Spot	H S
Other	O R	Resample	R S
Vegitation	V E	Background	B G
Ground Water	G W	Routine	R T
Surface Water	S W	Special	S P

This package conforms to the conditions and limitations specified in 40 CFR 173.421 for excepted radioactive material, limited quantity, a.c.e., UN 2040.

## CHAIN OF CUSTODY RECORD

REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME
SHIP FOR ANALYSIS	Roger C Hall	AIRBORNE	8/11/94	1500
analysis	(initial)	(initial)	8/12/94	1000

Recorded by: RCHALL

Date: 8/11/94 Time: 1230

Total number of samples in this box

13

Total number of samples in this shipment

13

Total number of boxes in this shipment

1

Shipper: TMA

9170 LATTY AVE  
BERKELEY, MO 63134

Ship to: TMA

601 SCARBORO ROAD  
OAK RIDGE, TN 37830

Page 2 of 2



**Thermo Analytical Inc.**  
**TMA/Eberline**

**TMA/Eberline**

U-18191

# **TMA/EBERLINE OAK RIDGE LABORATORY TRACER REPORT**

September 6, 1994

**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Post-Remedial Action Soil Sample Results (Data)**

**SAMPLES:**

**140-HV-3666  
140-HV-3668  
140-HV-3670  
140-HV-3671  
140-HV-3673  
140-HV-3675  
140-HV-3677**

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-13864	Sampling Event:	MISSCH94
Work Order Number:	E9408112	DATAFUSR Number:	D-18339
Customer Number:	271	Date Received:	08/26/94
Environmental Category:	RI	Date Analyzed:	09/12/94

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/U/F Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Qualifier Flag	Code
	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
140-HV-3666	08/04/94	0.00	0.50	SL	461.1	DRY	REG	RA-226	0.77	0.20	PCI/G	GAMMASPEC	0.32		
140-HV-3666	08/04/94	0.00	0.50	SL	461.1	DRY	REG	RA-228	1.10	0.36	PCI/G	GAMMASPEC	0.53	J	LCS
140-HV-3666	08/04/94	0.00	0.50	SL	461.1	DRY	REG	TH-228	1.10	0.36	PCI/G	GAMMASPEC	0.53	U	BLK
140-HV-3666	08/04/94	0.00	0.50	SL	461.1	DRY	REG	TH-232	0.95	0.57	PCI/G	GAMMASPEC	0.47	U	BLK
140-HV-3666	08/04/94	0.00	0.50	SL	461.1	DRY	REG	U-235	1.30	0.00	PCI/G	GAMMASPEC	1.30	UJ	LCS
140-HV-3666	08/04/94	0.00	0.50	SL	461.1	DRY	REG	U-238	3.40	0.00	PCI/G	GAMMASPEC	3.40	UJ	LCS
140-HV-3666	08/04/94	0.00	0.50	SL	461.1	DRY	REG	AM-241	0.32	0.00	PCI/G	GAMMASPEC	0.32	UJ	LCS
140-HV-3666	08/04/94	0.00	0.50	SL	461.1	DRY	REG	K-40	14.80	2.70	PCI/G	GAMMASPEC	3.30	J	LCS
140-HV-3666	08/04/94	0.00	0.50	SL	1.002	DRY	REG	TOTU	3.40	0.35	UG/G	KPA	0.10		
140-HV-3666	08/04/94	0.00	0.50	SL	1.142	DRY	REG	TH-228	1.20	0.41	PCI/G	ALPHASPEC	0.11	U	BLK
140-HV-3666	08/04/94	0.00	0.50	SL	1.142	DRY	REG	TH-230	2.30	0.62	PCI/G	ALPHASPEC	0.06	U	BLK
140-HV-3666	08/04/94	0.00	0.50	SL	1.142	DRY	REG	TH-232	1.40	0.43	PCI/G	ALPHASPEC	0.06	U	BLK
140-HV-3668	08/04/94	0.00	0.50	SL	456.0	DRY	REG	RA-226	0.99	0.28	PCI/G	GAMMASPEC	0.32		
140-HV-3668	08/04/94	0.00	0.50	SL	456.0	DRY	REG	RA-228	1.10	0.42	PCI/G	GAMMASPEC	0.53	J	LCS
140-HV-3668	08/04/94	0.00	0.50	SL	456.0	DRY	REG	TH-228	1.10	0.42	PCI/G	GAMMASPEC	0.53	U	BLK
140-HV-3668	08/04/94	0.00	0.50	SL	456.0	DRY	REG	TH-232	0.94	0.50	PCI/G	GAMMASPEC	0.48	U	BLK
140-HV-3668	08/04/94	0.00	0.50	SL	456.0	DRY	REG	U-235	0.23	0.14	PCI/G	GAMMASPEC	1.00	UJ	LCS
140-HV-3668	08/04/94	0.00	0.50	SL	456.0	DRY	REG	U-238	0.55	1.80	PCI/G	GAMMASPEC	2.10	UJ	LCS
140-HV-3668	08/04/94	0.00	0.50	SL	456.0	DRY	REG	AM-241	0.22	0.00	PCI/G	GAMMASPEC	0.22	UJ	LCS
140-HV-3668	08/04/94	0.00	0.50	SL	456.0	DRY	REG	K-40	13.90	2.20	PCI/G	GAMMASPEC	3.40	J	LCS
140-HV-3668	08/04/94	0.00	0.50	SL	1.001	DRY	REG	TOTU	3.30	0.33	UG/G	KPA	0.10		
140-HV-3668	08/04/94	0.00	0.50	SL	1.138	DRY	REG	TH-228	1.10	0.34	PCI/G	ALPHASPEC	0.09	U	BLK
140-HV-3668	08/04/94	0.00	0.50	SL	1.138	DRY	REG	TH-230	2.00	0.49	PCI/G	ALPHASPEC	0.09	U	BLK
140-HV-3668	08/04/94	0.00	0.50	SL	1.138	DRY	REG	TH-232	0.85	0.29	PCI/G	ALPHASPEC	0.12	U	BLK
140-HV-3670	08/04/94	0.00	0.50	SL	434.4	DRY	REG	RA-226	1.10	0.36	PCI/G	GAMMASPEC	0.34		
140-HV-3670	08/04/94	0.00	0.50	SL	434.4	DRY	REG	RA-228	1.50	0.61	PCI/G	GAMMASPEC	0.56	J	LCS
140-HV-3670	08/04/94	0.00	0.50	SL	434.4	DRY	REG	TH-228	1.50	0.61	PCI/G	GAMMASPEC	0.56	U	BLK
140-HV-3670	08/04/94	0.00	0.50	SL	434.4	DRY	REG	TH-232	1.20	0.80	PCI/G	GAMMASPEC	0.69	U	BLK
140-HV-3670	08/04/94	0.00	0.50	SL	434.4	DRY	REG	U-235	1.30	0.00	PCI/G	GAMMASPEC	1.30	UJ	LCS
140-HV-3670	08/04/94	0.00	0.50	SL	434.4	DRY	REG	U-238	0.39	3.40	PCI/G	GAMMASPEC	2.20	UJ	LCS

## FLAGGED SAMPLE RESULTS REPRT

TMA/Eberline Number:	E-13864	Sampling Event:	HISCH94
Work Order Number:	E9408112	DATAFUSR Number:	D-18339
Customer Number:	271	Date Received:	08/26/94
Environmental Category:	RI	Date Analyzed:	09/12/94

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Flag	Qualifier Code
	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
140-HV-3670	08/04/94	0.00	0.50	SL		434.4	DRY	REG	AM-241	0.33	0.00	PCI/G	GAMMASPEC	0.33	UJ	LCS
140-HV-3670	08/04/94	0.00	0.50	SL		434.4	DRY	REG	K-40	15.90	3.20	PCI/G	GAMMASPEC	3.50	J	LCS
140-HV-3670	08/04/94	0.00	0.50	SL		1.003	DRY	REG	TOTU	3.20	0.32	UG/G	KPA	0.10		
140-HV-3670	08/04/94	0.00	0.50	SL		1.030	DRY	REG	TH-228	1.30	0.45	PCI/G	ALPHASPEC	0.08	U	BLK
140-HV-3670	08/04/94	0.00	0.50	SL		1.030	DRY	REG	TH-230	1.90	0.57	PCI/G	ALPHASPEC	0.08	U	BLK
140-HV-3670	08/04/94	0.00	0.50	SL		1.030	DRY	REG	TH-232	1.30	0.45	PCI/G	ALPHASPEC	0.08	U	BLK
140-HV-3671	08/04/94	0.00	0.50	SL		421.9	DRY	REG	RA-226	1.10	0.31	PCI/G	GAMMASPEC	0.35		
140-HV-3671	08/04/94	0.00	0.50	SL		421.9	DRY	REG	RA-228	1.20	0.46	PCI/G	GAMMASPEC	0.58	J	LCS
140-HV-3671	08/04/94	0.00	0.50	SL		421.9	DRY	REG	TH-228	1.20	0.46	PCI/G	GAMMASPEC	0.58	U	BLK
140-HV-3671	08/04/94	0.00	0.50	SL		421.9	DRY	REG	TH-232	1.00	0.54	PCI/G	GAMMASPEC	0.52	U	BLK
140-HV-3671	08/04/94	0.00	0.50	SL		421.9	DRY	REG	U-235	0.25	0.16	PCI/G	GAMMASPEC	1.10	UJ	LCS
140-HV-3671	08/04/94	0.00	0.50	SL		421.9	DRY	REG	U-238	0.60	1.90	PCI/G	GAMMASPEC	2.20	UJ	LCS
140-HV-3671	08/04/94	0.00	0.50	SL		421.9	DRY	REG	AM-241	0.23	0.00	PCI/G	GAMMASPEC	0.23	UJ	LCS
140-HV-3671	08/04/94	0.00	0.50	SL		421.9	DRY	REG	K-40	15.00	2.30	PCI/G	GAMMASPEC	3.60	J	LCS
140-HV-3671	08/04/94	0.00	0.50	SL		1.005	DRY	REG	TOTU	3.30	0.33	UG/G	KPA	0.10		
140-HV-3671	08/04/94	0.00	0.50	SL		1.017	DRY	REG	TH-228	1.20	0.42	PCI/G	ALPHASPEC	0.07	U	BLK
140-HV-3671	08/04/94	0.00	0.50	SL		1.017	DRY	REG	TH-230	2.30	0.63	PCI/G	ALPHASPEC	0.12	U	BLK
140-HV-3671	08/04/94	0.00	0.50	SL		1.017	DRY	REG	TH-232	1.50	0.47	PCI/G	ALPHASPEC	0.12	U	BLK
140-HV-3673	08/09/94	0.00	0.50	SL		476.4	DRY	REG	RA-226	1.20	0.11	PCI/G	GAMMASPEC	0.31		
140-HV-3673	08/09/94	0.00	0.50	SL		476.4	DRY	REG	RA-228	1.30	0.21	PCI/G	GAMMASPEC	0.51	J	LCS
140-HV-3673	08/09/94	0.00	0.50	SL		476.4	DRY	REG	TH-228	1.30	0.21	PCI/G	GAMMASPEC	0.51	U	BLK
140-HV-3673	08/09/94	0.00	0.50	SL		476.4	DRY	REG	TH-232	1.00	0.51	PCI/G	GAMMASPEC	0.46	U	BLK
140-HV-3673	08/09/94	0.00	0.50	SL		476.4	DRY	REG	U-235	1.30	0.00	PCI/G	GAMMASPEC	1.30	UJ	LCS
140-HV-3673	08/09/94	0.00	0.50	SL		476.4	DRY	REG	U-238	3.50	0.00	PCI/G	GAMMASPEC	3.50	UJ	LCS
140-HV-3673	08/09/94	0.00	0.50	SL		476.4	DRY	REG	AM-241	0.33	0.00	PCI/G	GAMMASPEC	0.33	UJ	LCS
140-HV-3673	08/09/94	0.00	0.50	SL		476.4	DRY	REG	K-40	14.40	2.90	PCI/G	GAMMASPEC	3.20	J	LCS
140-HV-3673	08/09/94	0.00	0.50	SL		1.002	DRY	REG	TOTU	3.60	0.36	UG/G	KPA	0.10		
140-HV-3673	08/09/94	0.00	0.50	SL		1.297	DRY	REG	TH-228	1.10	0.36	PCI/G	ALPHASPEC	0.12	U	BLK
140-HV-3673	08/09/94	0.00	0.50	SL		1.297	DRY	REG	TH-230	9.00	1.90	PCI/G	ALPHASPEC	0.10	J	TCR
140-HV-3673	08/09/94	0.00	0.50	SL		1.297	DRY	REG	TH-232	1.20	0.39	PCI/G	ALPHASPEC	0.05	U	BLK

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-13864	Sampling Event:	HISSCH94
Work Order Number:	E9408112	DATAFUSR Number:	D-18339
Customer Number:	271	Date Received:	08/26/94
Environmental Category:	RI	Date Analyzed:	09/13/94

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Qualifier Flag	Code
	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
140-HV-3675	08/15/94	0.00	0.50	SL	488.0	DRY	REG	RA-226	1.00	0.14	PCI/G	GAMMASPEC	0.30			
140-HV-3675	08/15/94	0.00	0.50	SL	488.0	DRY	REG	RA-228	1.30	0.70	PCI/G	GAMMASPEC	0.50	J	LCS	
140-HV-3675	08/15/94	0.00	0.50	SL	488.0	DRY	REG	TH-228	1.30	0.70	PCI/G	GAMMASPEC	0.50	U	BLK	
140-HV-3675	08/15/94	0.00	0.50	SL	488.0	DRY	REG	TH-232	1.00	0.22	PCI/G	GAMMASPEC	0.45	U	BLK	
140-HV-3675	08/15/94	0.00	0.50	SL	488.0	DRY	REG	U-235	0.78	0.00	PCI/G	GAMMASPEC	0.78	UJ	LCS	
140-HV-3675	08/15/94	0.00	0.50	SL	488.0	DRY	REG	U-238	2.30	0.00	PCI/G	GAMMASPEC	2.30	UJ	LCS	
140-HV-3675	08/15/94	0.00	0.50	SL	488.0	DRY	REG	AM-241	0.19	0.00	PCI/G	GAMMASPEC	0.19	UJ	LCS	
140-HV-3675	08/15/94	0.00	0.50	SL	488.0	DRY	REG	K-40	8.90	1.90	PCI/G	GAMMASPEC	3.20	J	LCS	
140-HV-3675	08/15/94	0.00	0.50	SL	1.003	DRY	REG	TOTU	3.30	0.33	UG/G	KPA	0.10			
140-HV-3675	08/15/94	0.00	0.50	SL	1.119	DRY	REG	TH-228	1.00	0.36	PCI/G	ALPHASPEC	0.17	U	BLK	
140-HV-3675	08/15/94	0.00	0.50	SL	1.119	DRY	REG	TH-230	1.80	0.53	PCI/G	ALPHASPEC	0.10	U	BLK	
140-HV-3675	08/15/94	0.00	0.50	SL	1.119	DRY	REG	TH-232	0.94	0.34	PCI/G	ALPHASPEC	0.10	U	BLK	
140-HV-3677	08/16/94	0.00	0.50	SL	466.9	DRY	REG	RA-226	1.20	0.23	PCI/G	GAMMASPEC	0.32			
140-HV-3677	08/16/94	0.00	0.50	SL	466.9	DRY	REG	RA-228	1.10	0.25	PCI/G	GAMMASPEC	0.52	J	LCS	
140-HV-3677	08/16/94	0.00	0.50	SL	466.9	DRY	REG	TH-228	1.10	0.25	PCI/G	GAMMASPEC	0.52	U	BLK	
140-HV-3677	08/16/94	0.00	0.50	SL	466.9	DRY	REG	TH-232	0.91	0.49	PCI/G	GAMMASPEC	0.47	U	BLK	
140-HV-3677	08/16/94	0.00	0.50	SL	466.9	DRY	REG	U-235	1.30	0.00	PCI/G	GAMMASPEC	1.30	UJ	LCS	
140-HV-3677	08/16/94	0.00	0.50	SL	466.9	DRY	REG	U-238	0.97	3.00	PCI/G	GAMMASPEC	2.00	UJ	LCS	
140-HV-3677	08/16/94	0.00	0.50	SL	466.9	DRY	REG	AM-241	0.35	0.00	PCI/G	GAMMASPEC	0.35	UJ	LCS	
140-HV-3677	08/16/94	0.00	0.50	SL	466.9	DRY	REG	K-40	14.20	2.90	PCI/G	GAMMASPEC	3.30	J	LCS	
140-HV-3677	08/16/94	0.00	0.50	SL	1.001	DRY	REG	TOTU	3.20	0.32	UG/G	KPA	0.10			
140-HV-3677	08/16/94	0.00	0.50	SL	1.111	DRY	REG	TH-228	0.97	0.31	PCI/G	ALPHASPEC	0.13	U	BLK	
140-HV-3677	08/16/94	0.00	0.50	SL	1.111	DRY	REG	TH-230	1.80	0.46	PCI/G	ALPHASPEC	0.08	U	BLK	
140-HV-3677	08/16/94	0.00	0.50	SL	1.111	DRY	REG	TH-232	0.90	0.29	PCI/G	ALPHASPEC	0.09	U	BLK	

**TMA/Eberline**

601 Scarboro Rd.  
Oak Ridge, TN 37830  
(615) 481-0683 Fax (615) 483-4621

TMA/E-OR-2343

September 20, 1994

Mr. Jim McCague  
Bechtel National, Inc.  
P.O. Box 350  
Oak Ridge, TN 37831-0350

**CASE NARRATIVE**  
Work Order #94-08-112-OR  
State of Utah Certificate #E-235

**SAMPLE RECEIPT**

This work order contains seven surface soil samples received 08/26/94. All samples were analyzed for Total Uranium, Isotopic Thorium, and Gamma Spectroscopy. Per Marty Gray, we are reporting all List I analytes by Gamma Spectroscopy and Isotopic Thorium.

Gamma Spectroscopy analysis consists of the following parameters:

List I: The measured activity or the sample specific MDA for the following isotopes will always be reported.

Ra-226	Th-228	U-235	Am-241
Ra-228	Th-232	U-238	K-40

**CLIENT ID**

**LAB ID**

140-HV-3666	94-08-112-04
140-HV-3668	94-08-112-05
140-HV-3670	94-08-112-06
140-HV-3671	94-08-112-07
140-HV-3673	94-08-112-08
140-HV-3675	94-08-112-09
140-HV-3677	94-08-112-10

The file name for these samples is 9408112.TXT.

PROBLEMS OR UNUSUAL CIRCUMSTANCES

Initial calibrations, self absorption factors, and tracer recoveries, where applicable, are within specified criteria. No problems or unusual circumstances were noted during the analytical process.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package and in the electronic data submitted on diskette has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

  
M. R. McDougall  
Laboratory Manager

Date: 9/26/94

## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	08/26/94
Work Order Number:	9408112	Date Analyzed	09/12/94
Customer Number:	271		
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical	
													Method	MDA
QCSPIKE	08/26/94	0.00	0.00	SL		390.0	DRY	LCST	RA-226	33.60	0.67	PCI/G	GAMMASPEC	0.38
QCSPIKE	08/26/94	0.00	0.00	SL		390.0	DRY	LCSF	RA-226	35.30	5.10	PCI/G	GAMMASPEC	0.38
QCSPIKE	08/26/94	0.00	0.00	SL		399.1	DRY	LCST	TH-232	11.50	0.12	PCI/G	GAMMASPEC	0.55
QCSPIKE	08/26/94	0.00	0.00	SL		399.1	DRY	LCSF	TH-232	12.00	2.70	PCI/G	GAMMASPEC	0.55
QCSPIKE	08/26/94	0.00	0.00	SL		390.0	DRY	LCST	U-238	32.70	0.66	PCI/G	GAMMASPEC	2.40
QCSPIKE	08/26/94	0.00	0.00	SL		390.0	DRY	LCSF	U-238	46.20	17.10	PCI/G	GAMMASPEC	2.40
QCSPIKE	08/26/94	0.00	0.00	SL		1.002	DRY	LCST	TOTU	100.20	0.20	UG/G	KPA	0.10
QCSPIKE	08/26/94	0.00	0.00	SL		1.002	DRY	LCSF	TOTU	103.30	10.30	UG/G	KPA	0.10
QCSPIKE	08/26/94	0.00	0.00	SL		1	DRY	LCST	TH-228	4.90	0.18	PCI/G	ALPHASPEC	0.07
QCSPIKE	08/26/94	0.00	0.00	SL		1	DRY	LCSF	TH-228	5.90	1.40	PCI/G	ALPHASPEC	0.07
QCSPIKE	08/26/94	0.00	0.00	SL		1	DRY	LCST	TH-230	5.20	0.11	PCI/G	ALPHASPEC	0.07
QCSPIKE	08/26/94	0.00	0.00	SL		1	DRY	LCSF	TH-230	5.40	1.30	PCI/G	ALPHASPEC	0.07
QCSPIKE	08/26/94	0.00	0.00	SL		1	DRY	LCST	TH-232	4.90	0.18	PCI/G	ALPHASPEC	0.07
QCSPIKE	08/26/94	0.00	0.00	SL		1	DRY	LCSF	TH-232	5.80	1.30	PCI/G	ALPHASPEC	0.07
QCBLANK	08/26/94	0.00	0.00	SL		591.7	DRY	PB	RA-226	0.25	0.00	PCI/G	GAMMASPEC	0.25
QCBLANK	08/26/94	0.00	0.00	SL		591.7	DRY	PB	TH-232	0.37	0.00	PCI/G	GAMMASPEC	0.37
QCBLANK	08/26/94	0.00	0.00	SL		591.7	DRY	PB	U-238	1.60	0.00	PCI/G	GAMMASPEC	1.60
QCBLANK	08/26/94	0.00	0.00	SL		1.002	DRY	PB	TOTU	0.63	0.06	UG/G	KPA	0.10
QCBLANK	08/26/94	0.00	0.00	SL		1	DRY	PB	TH-228	0.33	0.18	PCI/G	ALPHASPEC	0.06
QCBLANK	08/26/94	0.00	0.00	SL		1	DRY	PB	TH-230	0.72	0.29	PCI/G	ALPHASPEC	0.11
QCBLANK	08/26/94	0.00	0.00	SL		1	DRY	PB	TH-232	0.19	0.14	PCI/G	ALPHASPEC	0.06
14D-HV-3666	08/04/94	0.00	0.50	SL		461.1	DRY	REPL	RA-226	0.93	0.04	PCI/G	GAMMASPEC	0.32
14D-HV-3666	08/04/94	0.00	0.50	SL		461.1	DRY	REPL	RA-228	1.20	1.20	PCI/G	GAMMASPEC	0.53
14D-HV-3666	08/04/94	0.00	0.50	SL		461.1	DRY	REPL	TH-228	1.20	1.20	PCI/G	GAMMASPEC	0.53
14D-HV-3666	08/04/94	0.00	0.50	SL		461.1	DRY	REPL	TH-232	1.20	1.10	PCI/G	GAMMASPEC	0.47
14D-HV-3666	08/04/94	0.00	0.50	SL		461.1	DRY	REPL	U-235	1.30	0.00	PCI/G	GAMMASPEC	1.30
14D-HV-3666	08/04/94	0.00	0.50	SL		461.1	DRY	REPL	U-238	4.40	3.80	PCI/G	GAMMASPEC	2.10
14D-HV-3666	08/04/94	0.00	0.50	SL		461.1	DRY	REPL	AM-241	0.35	0.00	PCI/G	GAMMASPEC	0.35
14D-HV-3666	08/04/94	0.00	0.50	SL		461.1	DRY	REPL	K-4D	14.40	2.70	PCI/G	GAMMASPEC	3.30
14D-HV-3666	08/04/94	0.00	0.50	SL		1.003	DRY	REPL	TOTU	3.80	0.38	UG/G	KPA	0.10

Approved by: M. R. M. - J. S. C.  
09/20/94

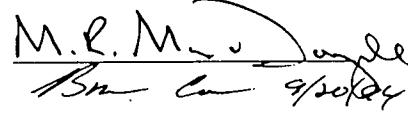
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## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:	
Work Order Number:	9408112
Customer Number:	271
Environmental Category:	RI

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical	
													Method	MDA
140-HV-3666	08/04/94	0.00	0.50	SL		1.085	DRY	REPL	TH-228	1.00	0.33	PCI/G	ALPHASPEC	0.10
140-HV-3666	08/04/94	0.00	0.50	SL		1.085	DRY	REPL	TH-230	2.60	0.59	PCI/G	ALPHASPEC	0.08
140-HV-3666	08/04/94	0.00	0.50	SL		1.085	DRY	REPL	TH-232	1.20	0.35	PCI/G	ALPHASPEC	0.08
140-HV-3666	08/04/94	0.00	0.50	SL		461.1	DRY	REG	RA-226	0.77	0.20	PCI/G	GAMMASPEC	0.32
140-HV-3666	08/04/94	0.00	0.50	SL		461.1	DRY	REG	RA-228	1.10	0.36	PCI/G	GAMMASPEC	0.53
140-HV-3666	08/04/94	0.00	0.50	SL		461.1	DRY	REG	TH-228	1.10	0.36	PCI/G	GAMMASPEC	0.53
140-HV-3666	08/04/94	0.00	0.50	SL		461.1	DRY	REG	TH-232	0.95	0.57	PCI/G	GAMMASPEC	0.47
140-HV-3666	08/04/94	0.00	0.50	SL		461.1	DRY	REG	U-235	1.30	0.00	PCI/G	GAMMASPEC	1.30
140-HV-3666	08/04/94	0.00	0.50	SL		461.1	DRY	REG	U-238	3.40	0.00	PCI/G	GAMMASPEC	3.40
140-HV-3666	08/04/94	0.00	0.50	SL		461.1	DRY	REG	AM-241	0.32	0.00	PCI/G	GAMMASPEC	0.32
140-HV-3666	08/04/94	0.00	0.50	SL		461.1	DRY	REG	K-40	14.80	2.70	PCI/G	GAMMASPEC	3.30
140-HV-3666	08/04/94	0.00	0.50	SL		1.002	DRY	REG	TOTU	3.40	0.35	UG/G	KPA	0.10
140-HV-3666	08/04/94	0.00	0.50	SL		1.142	DRY	REG	TH-228	1.20	0.41	PCI/G	ALPHASPEC	0.11
140-HV-3666	08/04/94	0.00	0.50	SL		1.142	DRY	REG	TH-230	2.30	0.62	PCI/G	ALPHASPEC	0.06
140-HV-3666	08/04/94	0.00	0.50	SL		1.142	DRY	REG	TH-232	1.40	0.43	PCI/G	ALPHASPEC	0.06
140-HV-3668	08/04/94	0.00	0.50	SL		456.0	DRY	REG	RA-226	0.99	0.28	PCI/G	GAMMASPEC	0.32
140-HV-3668	08/04/94	0.00	0.50	SL		456.0	DRY	REG	RA-228	1.10	0.42	PCI/G	GAMMASPEC	0.53
140-HV-3668	08/04/94	0.00	0.50	SL		456.0	DRY	REG	TH-228	1.10	0.42	PCI/G	GAMMASPEC	0.53
140-HV-3668	08/04/94	0.00	0.50	SL		456.0	DRY	REG	TH-232	0.94	0.50	PCI/G	GAMMASPEC	0.48
140-HV-3668	08/04/94	0.00	0.50	SL		456.0	DRY	REG	U-235	0.23	0.14	PCI/G	GAMMASPEC	1.00
140-HV-3668	08/04/94	0.00	0.50	SL		456.0	DRY	REG	U-238	0.55	1.80	PCI/G	GAMMASPEC	2.10
140-HV-3668	08/04/94	0.00	0.50	SL		456.0	DRY	REG	AM-241	0.22	0.00	PCI/G	GAMMASPEC	0.22
140-HV-3668	08/04/94	0.00	0.50	SL		456.0	DRY	REG	K-40	13.90	2.20	PCI/G	GAMMASPEC	3.40
140-HV-3668	08/04/94	0.00	0.50	SL		1.001	DRY	REG	TOTU	3.30	0.33	UG/G	KPA	0.10
140-HV-3668	08/04/94	0.00	0.50	SL		1.138	DRY	REG	TH-228	1.10	0.34	PCI/G	ALPHASPEC	0.09
140-HV-3668	08/04/94	0.00	0.50	SL		1.138	DRY	REG	TH-230	2.00	0.49	PCI/G	ALPHASPEC	0.09
140-HV-3668	08/04/94	0.00	0.50	SL		1.138	DRY	REG	TH-232	0.85	0.29	PCI/G	ALPHASPEC	0.12
140-HV-3670	08/04/94	0.00	0.50	SL		434.4	DRY	REG	RA-226	1.10	0.36	PCI/G	GAMMASPEC	0.34
140-HV-3670	08/04/94	0.00	0.50	SL		434.4	DRY	REG	RA-228	1.50	0.61	PCI/G	GAMMASPEC	0.56
140-HV-3670	08/04/94	0.00	0.50	SL		434.4	DRY	REG	TH-228	1.50	0.61	PCI/G	GAMMASPEC	0.56

Approved by:  
09/20/94

  
M. L. M.  
Benton, Eberline

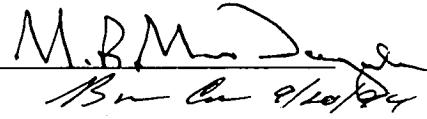
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## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	08/26/94
Work Order Number:	9408112		
Customer Number:	271	Date Analyzed	09/12/94
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth		Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical	
		Top	Bottom										Method	MDA
140-HV-3670	08/04/94	0.00	0.50	SL	434.4	DRY	REG	TH-232	1.20	0.80	PCI/G	GAMMASPEC	0.69	
140-HV-3670	08/04/94	0.00	0.50	SL	434.4	DRY	REG	U-235	1.30	0.00	PCI/G	GAMMASPEC	1.30	
140-HV-3670	08/04/94	0.00	0.50	SL	434.4	DRY	REG	U-238	0.39	3.40	PCI/G	GAMMASPEC	2.20	
140-HV-3670	08/04/94	0.00	0.50	SL	434.4	DRY	REG	AM-241	0.33	0.00	PCI/G	GAMMASPEC	0.33	
140-HV-3670	08/04/94	0.00	0.50	SL	434.4	DRY	REG	K-40	15.90	3.20	PCI/G	GAMMASPEC	3.50	
140-HV-3670	08/04/94	0.00	0.50	SL	1.003	DRY	REG	TOTU	3.20	0.32	UG/G	KPA	0.10	
140-HV-3670	08/04/94	0.00	0.50	SL	1.030	DRY	REG	TH-228	1.30	0.45	PCI/G	ALPHASPEC	0.08	
140-HV-3670	08/04/94	0.00	0.50	SL	1.030	DRY	REG	TH-230	1.90	0.57	PCI/G	ALPHASPEC	0.08	
140-HV-3670	08/04/94	0.00	0.50	SL	1.030	DRY	REG	TH-232	1.30	0.45	PCI/G	ALPHASPEC	0.08	
140-HV-3671	08/04/94	0.00	0.50	SL	421.9	DRY	REG	RA-226	1.10	0.31	PCI/G	GAMMASPEC	0.35	
140-HV-3671	08/04/94	0.00	0.50	SL	421.9	DRY	REG	RA-228	1.20	0.46	PCI/G	GAMMASPEC	0.58	
140-HV-3671	08/04/94	0.00	0.50	SL	421.9	DRY	REG	TH-228	1.20	0.46	PCI/G	GAMMASPEC	0.58	
140-HV-3671	08/04/94	0.00	0.50	SL	421.9	DRY	REG	TH-232	1.00	0.54	PCI/G	GAMMASPEC	0.52	
140-HV-3671	08/04/94	0.00	0.50	SL	421.9	DRY	REG	U-235	0.25	0.16	PCI/G	GAMMASPEC	1.10	
140-HV-3671	08/04/94	0.00	0.50	SL	421.9	DRY	REG	U-238	0.60	1.90	PCI/G	GAMMASPEC	2.20	
140-HV-3671	08/04/94	0.00	0.50	SL	421.9	DRY	REG	AM-241	0.23	0.00	PCI/G	GAMMASPEC	0.23	
140-HV-3671	08/04/94	0.00	0.50	SL	421.9	DRY	REG	K-40	15.00	2.30	PCI/G	GAMMASPEC	3.60	
140-HV-3671	08/04/94	0.00	0.50	SL	1.005	DRY	REG	TOTU	3.30	0.33	UG/G	KPA	0.10	
140-HV-3671	08/04/94	0.00	0.50	SL	1.017	DRY	REG	TH-228	1.20	0.42	PCI/G	ALPHASPEC	0.07	
140-HV-3671	08/04/94	0.00	0.50	SL	1.017	DRY	REG	TH-230	2.30	0.63	PCI/G	ALPHASPEC	0.12	
140-HV-3671	08/04/94	0.00	0.50	SL	1.017	DRY	REG	TH-232	1.50	0.47	PCI/G	ALPHASPEC	0.12	
140-HV-3673	08/09/94	0.00	0.50	SL	476.4	DRY	REG	RA-226	1.20	0.11	PCI/G	GAMMASPEC	0.31	
140-HV-3673	08/09/94	0.00	0.50	SL	476.4	DRY	REG	RA-228	1.30	0.21	PCI/G	GAMMASPEC	0.51	
140-HV-3673	08/09/94	0.00	0.50	SL	476.4	DRY	REG	TH-228	1.30	0.21	PCI/G	GAMMASPEC	0.51	
140-HV-3673	08/09/94	0.00	0.50	SL	476.4	DRY	REG	TH-232	1.00	0.51	PCI/G	GAMMASPEC	0.46	
140-HV-3673	08/09/94	0.00	0.50	SL	476.4	DRY	REG	U-235	1.30	0.00	PCI/G	GAMMASPEC	1.30	
140-HV-3673	08/09/94	0.00	0.50	SL	476.4	DRY	REG	U-238	3.50	0.00	PCI/G	GAMMASPEC	3.50	
140-HV-3673	08/09/94	0.00	0.50	SL	476.4	DRY	REG	AM-241	0.33	0.00	PCI/G	GAMMASPEC	0.33	
140-HV-3673	08/09/94	0.00	0.50	SL	476.4	DRY	REG	K-40	14.40	2.90	PCI/G	GAMMASPEC	3.20	
140-HV-3673	08/09/94	0.00	0.50	SL	1.002	DRY	REG	TOTU	3.60	0.36	UG/G	KPA	0.10	

Approved by:  
09/20/94



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## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	08/26/94
Work Order Number:	9408112		
Customer Number:	271	Date Analyzed	09/13/94
Environmental Category:	RI		

Sample ID	Date Collected	Top		Bottom		F/UF Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical	
		Depth	Depth	Matrix									Method	MDA
140-HV-3673	08/09/94	0.00	0.50	SL	1.297 DRY	REG	TH-228		1.10	0.36	PCI/G	ALPHASPEC	0.12	
140-HV-3673	08/09/94	0.00	0.50	SL	1.297 DRY	REG	TH-230		9.00	1.90	PCI/G	ALPHASPEC	0.10	
140-HV-3673	08/09/94	0.00	0.50	SL	1.297 DRY	REG	TH-232		1.20	0.39	PCI/G	ALPHASPEC	0.05	
140-HV-3675	08/15/94	0.00	0.50	SL	488.0 DRY	REG	RA-226		1.00	0.14	PCI/G	GAMMASPEC	0.30	
140-HV-3675	08/15/94	0.00	0.50	SL	488.0 DRY	REG	RA-228		1.30	0.70	PCI/G	GAMMASPEC	0.50	
140-HV-3675	08/15/94	0.00	0.50	SL	488.0 DRY	REG	TH-228		1.30	0.70	PCI/G	GAMMASPEC	0.50	
140-HV-3675	08/15/94	0.00	0.50	SL	488.0 DRY	REG	TH-232		1.00	0.22	PCI/G	GAMMASPEC	0.45	
140-HV-3675	08/15/94	0.00	0.50	SL	488.0 DRY	REG	U-235		0.78	0.00	PCI/G	GAMMASPEC	0.78	
140-HV-3675	08/15/94	0.00	0.50	SL	488.0 DRY	REG	U-238		2.30	0.00	PCI/G	GAMMASPEC	2.30	
140-HV-3675	08/15/94	0.00	0.50	SL	488.0 DRY	REG	AM-241		0.19	0.00	PCI/G	GAMMASPEC	0.19	
140-HV-3675	08/15/94	0.00	0.50	SL	488.0 DRY	REG	K-40		8.90	1.90	PCI/G	GAMMASPEC	3.20	
140-HV-3675	08/15/94	0.00	0.50	SL	1.003 DRY	REG	TDTU		3.30	0.33	UG/G	KPA	0.10	
140-HV-3675	08/15/94	0.00	0.50	SL	1.119 DRY	REG	TH-228		1.00	0.36	PCI/G	ALPHASPEC	0.17	
140-HV-3675	08/15/94	0.00	0.50	SL	1.119 DRY	REG	TH-230		1.80	0.53	PCI/G	ALPHASPEC	0.10	
140-HV-3675	08/15/94	0.00	0.50	SL	1.119 DRY	REG	TH-232		0.94	0.34	PCI/G	ALPHASPEC	0.10	
140-HV-3677	08/16/94	0.00	0.50	SL	466.9 DRY	REG	RA-226		1.20	0.23	PCI/G	GAMMASPEC	0.32	
140-HV-3677	08/16/94	0.00	0.50	SL	466.9 DRY	REG	RA-228		1.10	0.25	PCI/G	GAMMASPEC	0.52	
140-HV-3677	08/16/94	0.00	0.50	SL	466.9 DRY	REG	TH-228		1.10	0.25	PCI/G	GAMMASPEC	0.52	
140-HV-3677	08/16/94	0.00	0.50	SL	466.9 DRY	REG	TH-232		0.91	0.49	PCI/G	GAMMASPEC	0.47	
140-HV-3677	08/16/94	0.00	0.50	SL	466.9 DRY	REG	U-235		1.30	0.00	PCI/G	GAMMASPEC	1.30	
140-HV-3677	08/16/94	0.00	0.50	SL	466.9 DRY	REG	U-238		0.97	3.00	PCI/G	GAMMASPEC	2.00	
140-HV-3677	08/16/94	0.00	0.50	SL	466.9 DRY	REG	AM-241		0.35	0.00	PCI/G	GAMMASPEC	0.35	
140-HV-3677	08/16/94	0.00	0.50	SL	466.9 DRY	REG	K-40		14.20	2.90	PCI/G	GAMMASPEC	3.30	
140-HV-3677	08/16/94	0.00	0.50	SL	1.001 DRY	REG	TOTU		3.20	0.32	UG/G	KPA	0.10	
140-HV-3677	08/16/94	0.00	0.50	SL	1.111 DRY	REG	TH-228		0.97	0.31	PCI/G	ALPHASPEC	0.13	
140-HV-3677	08/16/94	0.00	0.50	SL	1.111 DRY	REG	TH-230		1.80	0.46	PCI/G	ALPHASPEC	0.08	
140-HV-3677	08/16/94	0.00	0.50	SL	1.111 DRY	REG	TH-232		0.90	0.29	PCI/G	ALPHASPEC	0.09	

Approved by:  
09/20/94*M.L.M.*  
*Bonita 9/20/94*

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44-118-112

NORFAS #34

AIRBILL NO. 4115839781	FIELD SAMPLE FORM SITE ACTIVITY SAMPLES							Samplers (print name then sign) <u>Roger C Hall</u> <u>Roger C Hall</u>							
Site Name: HISS VP (QUAKER STATE)		WBS No.: 140			Activity Support (Job) No.: 271										
Sample ID Sample Grid Point	Sample Type (1)	Sample Time	Date of Sample	Preserved with	Purpose (2)	Depth cm <input type="checkbox"/> ft <input checked="" type="checkbox"/>	Priority (Days)	Analysis Required		Remarks					
140-HV-3666 Grid #18 Prop#3L	SS	1030	8/4/94	NONE	VR	0-0.5	21	TOTAL U, Th-230, Th-232 Ra-226, Ra-228							
140-HV-3668 Grid #20 Prop#3L	SS	1130	8/4/94												
140-HV-3670 Grid #22 Prop#3L	SS	1430	8/4/94												
140-HV-3671 Grid #23 Prop#3L	SS	1500	8/4/94												
140-HV-3673 Grid #25 Prop#3L	SS	1530	8/4/94												
140-HV-3675 Grid #27 Prop#3L	SS	1520	8/15/94												
140-HV-3677 Grid #29 Prop#3L	SS	1115	8/16/94												
SAMPLE TYPE (1)		PURPOSE (2)		CHAIN OF CUSTODY RECORD											
Surface Soil Bias Soil Profile Soil Sediment Silt Other Vegetation Ground Water Surface Water	SS BS PS SD OR VE GW SW	Rad Character Verification Quality Control Hot Spot Resample Background Routine Special	RC VR QC HS RS BG RT SP	REASON SHIP FOR ANALYSIS	RELINQUISHED BY Roger C Hall	RECEIVED BY AIRBORNE	DATE 8/25/94	TIME 1500							
<p><i>This package conforms to the conditions and limitations specified in 19CFR173.401 for excepted radioactive material, limited quantity, a.o.s., UN 3010.</i></p> <table border="1"> <tr> <td>Recorded by: <u>R.C.Hall</u></td> </tr> <tr> <td>Date: <u>8/25/94</u> Time: <u>1000</u></td> </tr> <tr> <td>Total number of samples in this box <u>14</u></td> </tr> <tr> <td>Total number of samples in this shipment <u>14</u></td> </tr> <tr> <td>Total number of boxes in this shipment <u>1</u></td> </tr> </table>											Recorded by: <u>R.C.Hall</u>	Date: <u>8/25/94</u> Time: <u>1000</u>	Total number of samples in this box <u>14</u>	Total number of samples in this shipment <u>14</u>	Total number of boxes in this shipment <u>1</u>
Recorded by: <u>R.C.Hall</u>															
Date: <u>8/25/94</u> Time: <u>1000</u>															
Total number of samples in this box <u>14</u>															
Total number of samples in this shipment <u>14</u>															
Total number of boxes in this shipment <u>1</u>															
Shipper: TMA 9170 LATTY AVE BERKELEY, Mo 63134	Ship to: TMA 601 SCARBORO ROAD OAK RIDGE, TN 37830							Page <u>1</u> of <u>2</u>							
Shipping Container meets DOT Transferable Criteria <u>YES</u>															
Shipping container dose rate <u>0.01</u> mrem/hr.															

**TMA/EBERLINE OAK RIDGE LABORATORY  
TRACER REPORT**

September 20, 1994

Bechtel Sample ID	Analyte	Tracer	Recovery
140-HV-3666	TH-228	TH-229	51.3 %
140-HV-3666	TH-230	TH-229	51.3 %
140-HV-3666	TH-232	TH-229	51.3 %
140-HV-3668	TH-228	TH-229	64.3 %
140-HV-3668	TH-230	TH-229	64.3 %
140-HV-3668	TH-232	TH-229	64.3 %
140-HV-3670	TH-228	TH-229	49.4 % ✓
140-HV-3670	TH-230	TH-229	49.4 % ✓
140-HV-3670	TH-232	TH-229	49.4 % ✓
140-HV-3671	TH-228	TH-229	57.6 %
140-HV-3671	TH-230	TH-229	57.6 %
140-HV-3671	TH-232	TH-229	57.6 %
140-HV-3673	TH-228	TH-229	48.8 %
140-HV-3673	TH-230	TH-229	48.8 %
140-HV-3673	TH-232	TH-229	48.8 %
140-HV-3675	TH-228	TH-229	49.2 % ✓
140-HV-3675	TH-230	TH-229	49.2 %
140-HV-3675	TH-232	TH-229	49.2 %
140-HV-3677	TH-228	TH-229	67.0 %
140-HV-3677	TH-230	TH-229	67.0 %
140-HV-3677	TH-232	TH-229	67.0 %

**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Post-Remedial Action Soil Sample Results (Data)**

**SAMPLES:**

**140-HV-3679  
140-HV-3681  
140-HV-3682  
140-HV-3684  
140-HV-3686  
140-HV-3688  
140-HV-3691**

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-13865	Sampling Event:	MISSCH94
Work Order Number:	E9408113	DATAFUSR Number:	D-18340
Customer Number:	271	Date Received:	08/26/94
Environmental Category:	RI	Date Analyzed:	09/12/94

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Qualifier Flag	Code
	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
140-HV-3679	08/16/94	0.00	0.50	SL	433.7	DRY	REG	RA-226	1.20	0.20	PCI/G	GAMMASPEC	0.40			
140-HV-3679	08/16/94	0.00	0.50	SL	433.7	DRY	REG	RA-228	0.87	0.00	PCI/G	GAMMASPEC	0.87	UJ	LCS	
140-HV-3679	08/16/94	0.00	0.50	SL	433.7	DRY	REG	TH-228	0.87	0.00	PCI/G	GAMMASPEC	0.87	UJ	ERR	
140-HV-3679	08/16/94	0.00	0.50	SL	433.7	DRY	REG	TH-232	0.99	0.46	PCI/G	GAMMASPEC	0.44	U	BLK	
140-HV-3679	08/16/94	0.00	0.50	SL	433.7	DRY	REG	U-235	1.30	0.00	PCI/G	GAMMASPEC	1.30	UJ	LCS	
140-HV-3679	08/16/94	0.00	0.50	SL	433.7	DRY	REG	U-238	3.70	0.00	PCI/G	GAMMASPEC	3.70	UJ	ERR	
140-HV-3679	08/16/94	0.00	0.50	SL	433.7	DRY	REG	AM-241	0.37	0.00	PCI/G	GAMMASPEC	0.37	UJ	LCS	
140-HV-3679	08/16/94	0.00	0.50	SL	433.7	DRY	REG	K-40	12.20	2.80	PCI/G	GAMMASPEC	3.10	J	LCS	
140-HV-3679	08/16/94	0.00	0.50	SL	1.003	DRY	REG	TOTU	3.40	0.34	UG/G	KPA	0.10			
140-HV-3679	08/16/94	0.00	0.50	SL	1.079	DRY	REG	TH-228	1.20	0.38	PCI/G	ALPHASPEC	0.11			
140-HV-3679	08/16/94	0.00	0.50	SL	1.142	DRY	REG	TH-230	3.80	0.81	PCI/G	ALPHASPEC	0.09			
140-HV-3679	08/16/94	0.00	0.50	SL	1.142	DRY	REG	TH-232	1.30	0.37	PCI/G	ALPHASPEC	0.09	U	BLK	
140-HV-3681	08/16/94	0.00	0.50	SL	484.7	DRY	REG	RA-226	0.87	0.55	PCI/G	GAMMASPEC	0.35			
140-HV-3681	08/16/94	0.00	0.50	SL	484.7	DRY	REG	RA-228	0.89	0.00	PCI/G	GAMMASPEC	0.89	UJ	LCS	
140-HV-3681	08/16/94	0.00	0.50	SL	484.7	DRY	REG	TH-228	0.89	0.00	PCI/G	GAMMASPEC	0.89	UJ	ERR	
140-HV-3681	08/16/94	0.00	0.50	SL	484.7	DRY	REG	TH-232	0.75	0.00	PCI/G	GAMMASPEC	0.75	UJ	ERR	
140-HV-3681	08/16/94	0.00	0.50	SL	484.7	DRY	REG	U-235	1.20	0.00	PCI/G	GAMMASPEC	1.20	UJ	LCS	
140-HV-3681	08/16/94	0.00	0.50	SL	484.7	DRY	REG	U-238	1.70	2.60	PCI/G	GAMMASPEC	2.10	UJ	EGR	
140-HV-3681	08/16/94	0.00	0.50	SL	484.7	DRY	REG	AM-241	0.30	0.00	PCI/G	GAMMASPEC	0.30	UJ	LCS	
140-HV-3681	08/16/94	0.00	0.50	SL	484.7	DRY	REG	K-40	12.50	2.70	PCI/G	GAMMASPEC	2.80	J	LCS	
140-HV-3681	08/16/94	0.00	0.50	SL	1.001	DRY	REG	TOTU	3.60	0.36	UG/G	KPA	0.10			
140-HV-3681	08/16/94	0.00	0.50	SL	1.082	DRY	REG	TH-228	1.30	0.38	PCI/G	ALPHASPEC	0.08			
140-HV-3681	08/16/94	0.00	0.50	SL	1.082	DRY	REG	TH-230	2.20	0.54	PCI/G	ALPHASPEC	0.05	U	BLK	
140-HV-3681	08/16/94	0.00	0.50	SL	1.082	DRY	REG	TH-232	1.20	0.36	PCI/G	ALPHASPEC	0.05	U	BLK	
140-HV-3682	08/17/94	0.00	0.50	SL	472.7	DRY	REG	RA-226	0.94	0.08	PCI/G	GAMMASPEC	0.36			
140-HV-3682	08/17/94	0.00	0.50	SL	472.7	DRY	REG	RA-228	0.69	0.00	PCI/G	GAMMASPEC	0.69	UJ	LCS	
140-HV-3682	08/17/94	0.00	0.50	SL	472.7	DRY	REG	TH-228	0.69	0.00	PCI/G	GAMMASPEC	0.69	UJ	ERR	
140-HV-3682	08/17/94	0.00	0.50	SL	472.7	DRY	REG	TH-232	0.89	0.09	PCI/G	GAMMASPEC	0.40	U	BLK	
140-HV-3682	08/17/94	0.00	0.50	SL	472.7	DRY	REG	U-235	0.78	0.00	PCI/G	GAMMASPEC	0.78	UJ	LCS	
140-HV-3682	08/17/94	0.00	0.50	SL	472.7	DRY	REG	U-238	0.72	2.00	PCI/G	GAMMASPEC	2.10	UJ	EGR	

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-13865	Sampling Event:	HISCH94
Work Order Number:	E9408113	DATAFUSR Number:	D-18340
Customer Number:	271	Date Received:	08/26/94
Environmental Category:	RI	Date Analyzed:	09/12/94

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Qualifier Flag	Code
	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
140-HV-3682	08/17/94	0.00	0.50	SL	472.7	DRY	REG	AM-241	0.20	0.00	PCI/G	GAMMASPEC	0.20	UJ	LCS	
140-HV-3682	08/17/94	0.00	0.50	SL	472.7	DRY	REG	K-40	9.50	2.00	PCI/G	GAMMASPEC	2.90	J	LCS	
140-HV-3682	08/17/94	0.00	0.50	SL	1.001	DRY	REG	TOTU	3.50	0.35	UG/G	KPA	0.10			
140-HV-3682	08/17/94	0.00	0.50	SL	1.011	DRY	REG	TH-228	1.60	0.43	PCI/G	ALPHASPEC	0.09			
140-HV-3682	08/17/94	0.00	0.50	SL	1.011	DRY	REG	TH-230	2.60	0.60	PCI/G	ALPHASPEC	0.09	U	BLK	
140-HV-3682	08/17/94	0.00	0.50	SL	1.011	DRY	REG	TH-232	1.40	0.40	PCI/G	ALPHASPEC	0.13	U	BLK	
140-HV-3684	08/17/94	0.00	0.50	SL	532.1	DRY	REG	RA-226	1.00	0.27	PCI/G	GAMMASPEC	0.32			
140-HV-3684	08/17/94	0.00	0.50	SL	532.1	DRY	REG	RA-228	1.10	0.09	PCI/G	GAMMASPEC	0.46	J	LCS	
140-HV-3684	08/17/94	0.00	0.50	SL	532.1	DRY	REG	TH-228	1.10	0.09	PCI/G	GAMMASPEC	0.46			
140-HV-3684	08/17/94	0.00	0.50	SL	532.1	DRY	REG	TH-232	1.00	0.12	PCI/G	GAMMASPEC	0.36	U	BLK	
140-HV-3684	08/17/94	0.00	0.50	SL	532.1	DRY	REG	U-235	1.10	0.00	PCI/G	GAMMASPEC	1.10	UJ	LCS	
140-HV-3684	08/17/94	0.00	0.50	SL	532.1	DRY	REG	U-238	3.20	0.00	PCI/G	GAMMASPEC	3.20	UJ	ERR	
140-HV-3684	08/17/94	0.00	0.50	SL	532.1	DRY	REG	AM-241	0.31	0.00	PCI/G	GAMMASPEC	0.31	UJ	LCS	
140-HV-3684	08/17/94	0.00	0.50	SL	532.1	DRY	REG	K-40	12.50	2.40	PCI/G	GAMMASPEC	2.60	J	LCS	
140-HV-3684	08/17/94	0.00	0.50	SL	1.005	DRY	REG	TOTU	3.00	0.30	UG/G	KPA	0.10	U	BLK	
140-HV-3684	08/17/94	0.00	0.50	SL	1.231	DRY	REG	TH-228	1.30	0.35	PCI/G	ALPHASPEC	0.04			
140-HV-3684	08/17/94	0.00	0.50	SL	1.231	DRY	REG	TH-230	1.80	0.43	PCI/G	ALPHASPEC	0.04	U	BLK	
140-HV-3684	08/17/94	0.00	0.50	SL	1.231	DRY	REG	TH-232	1.20	0.33	PCI/G	ALPHASPEC	0.04	U	BLK	
140-HV-3686	08/19/94	0.00	0.50	SL	484.9	DRY	REG	RA-226	0.89	0.28	PCI/G	GAMMASPEC	0.35			
140-HV-3686	08/19/94	0.00	0.50	SL	484.9	DRY	REG	RA-228	1.20	0.39	PCI/G	GAMMASPEC	0.50	J	LCS	
140-HV-3686	08/19/94	0.00	0.50	SL	484.9	DRY	REG	TH-228	1.20	0.39	PCI/G	GAMMASPEC	0.50			
140-HV-3686	08/19/94	0.00	0.50	SL	484.9	DRY	REG	TH-232	1.10	0.36	PCI/G	GAMMASPEC	0.39	U	BLK	
140-HV-3686	08/19/94	0.00	0.50	SL	484.9	DRY	REG	U-235	0.77	0.00	PCI/G	GAMMASPEC	0.77	UJ	LCS	
140-HV-3686	08/19/94	0.00	0.50	SL	484.9	DRY	REG	U-238	2.50	1.60	PCI/G	GAMMASPEC	2.10			
140-HV-3686	08/19/94	0.00	0.50	SL	484.9	DRY	REG	AM-241	0.18	0.12	PCI/G	GAMMASPEC	0.20	UJ	LCS	
140-HV-3686	08/19/94	0.00	0.50	SL	484.9	DRY	REG	K-40	12.40	2.20	PCI/G	GAMMASPEC	2.80	J	LCS	
140-HV-3686	08/19/94	0.00	0.50	SL	1.002	DRY	REG	TOTU	4.90	0.49	UG/G	KPA	0.10			
140-HV-3686	08/19/94	0.00	0.50	SL	1.046	DRY	REG	TH-228	1.10	0.32	PCI/G	ALPHASPEC	0.05			
140-HV-3686	08/19/94	0.00	0.50	SL	1.046	DRY	REG	TH-230	2.40	0.55	PCI/G	ALPHASPEC	0.08	U	BLK	
140-HV-3686	08/19/94	0.00	0.50	SL	1.046	DRY	REG	TH-232	1.10	0.33	PCI/G	ALPHASPEC	0.08	U	BLK	

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-13865	Sampling Event:	MISSCH94
Work Order Number:	E9408113	DATAFUSR Number:	D-18340
Customer Number:	271	Date Received:	08/26/94
Environmental Category:	RI	Date Analyzed:	09/13/94

Sample ID	Date Collected	Top Depth		Bottom Depth		Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	MDA	BNI Flag	Qualifier Code
		Top Depth	Bottom Depth	Matrix	Result													
140-HV-3688	08/18/94	0.00	0.50	SL	366.8 DRY	REG	RA-226	0.76	0.00	PCI/G	GAMMASPEC	0.76	UJ	ERR				
140-HV-3688	08/18/94	0.00	0.50	SL	366.8 DRY	REG	RA-228	1.70	1.30	PCI/G	GAMMASPEC	0.66	J	LCS				
140-HV-3688	08/18/94	0.00	0.50	SL	366.8 DRY	REG	TH-228	1.70	1.30	PCI/G	GAMMASPEC	0.66						
140-HV-3688	08/18/94	0.00	0.50	SL	366.8 DRY	REG	TH-232	1.30	0.75	PCI/G	GAMMASPEC	0.52	U	BLK				
140-HV-3688	08/18/94	0.00	0.50	SL	366.8 DRY	REG	U-235	1.60	0.00	PCI/G	GAMMASPEC	1.60	UJ	LCS				
140-HV-3688	08/18/94	0.00	0.50	SL	366.8 DRY	REG	U-238	0.23	3.10	PCI/G	GAMMASPEC	2.70	UJ	EGR				
140-HV-3688	08/18/94	0.00	0.50	SL	366.8 DRY	REG	AM-241	0.40	0.00	PCI/G	GAMMASPEC	0.40	UJ	LCS				
140-HV-3688	08/18/94	0.00	0.50	SL	366.8 DRY	REG	K-40	13.30	3.20	PCI/G	GAMMASPEC	3.70	J	LCS				
140-HV-3688	08/18/94	0.00	0.50	SL	1.002 DRY	REG	TOTU	3.10	0.31	UG/G	KPA	0.10	U	BLK				
140-HV-3688	08/18/94	0.00	0.50	SL	1.017 DRY	REG	TH-228	0.91	0.32	PCI/G	ALPHASPEC	0.12						
140-HV-3688	08/18/94	0.00	0.50	SL	1.017 DRY	REG	TH-230	7.40	1.50	PCI/G	ALPHASPEC	0.10						
140-HV-3688	08/18/94	0.00	0.50	SL	1.017 DRY	REG	TH-232	1.10	0.36	PCI/G	ALPHASPEC	0.05	U	BLK				
140-HV-3691	08/19/94	0.00	0.50	SL	463.4 DRY	REG	RA-226	0.85	0.08	PCI/G	GAMMASPEC	0.37						
140-HV-3691	08/19/94	0.00	0.50	SL	463.4 DRY	REG	RA-228	0.90	0.62	PCI/G	GAMMASPEC	0.52	J	LCS				
140-HV-3691	08/19/94	0.00	0.50	SL	463.4 DRY	REG	TH-228	0.90	0.62	PCI/G	GAMMASPEC	0.52						
140-HV-3691	08/19/94	0.00	0.50	SL	463.4 DRY	REG	TH-232	0.96	0.81	PCI/G	GAMMASPEC	0.41	U	BLK				
140-HV-3691	08/19/94	0.00	0.50	SL	463.4 DRY	REG	U-235	0.78	0.00	PCI/G	GAMMASPEC	0.78	UJ	LCS				
140-HV-3691	08/19/94	0.00	0.50	SL	463.4 DRY	REG	U-238	3.30	2.80	PCI/G	GAMMASPEC	2.20						
140-HV-3691	08/19/94	0.00	0.50	SL	463.4 DRY	REG	AM-241	0.20	0.00	PCI/G	GAMMASPEC	0.20	UJ	LCS				
140-HV-3691	08/19/94	0.00	0.50	SL	463.4 DRY	REG	K-40	14.30	2.30	PCI/G	GAMMASPEC	2.90	J	LCS				
140-HV-3691	08/19/94	0.00	0.50	SL	1.001 DRY	REG	TOTU	3.00	0.30	UG/G	KPA	0.10	U	BLK				
140-HV-3691	08/19/94	0.00	0.50	SL	1.013 DRY	REG	TH-228	1.30	0.40	PCI/G	ALPHASPEC	0.15						
140-HV-3691	08/19/94	0.00	0.50	SL	1.013 DRY	REG	TH-230	3.90	0.90	PCI/G	ALPHASPEC	0.10						
140-HV-3691	08/19/94	0.00	0.50	SL	1.013 DRY	REG	TH-232	1.10	0.37	PCI/G	ALPHASPEC	0.10	U	BLK				

**TMA/Eberline**

601 Scarboro Rd.  
Oak Ridge, TN 37830  
(615) 481-0683 Fax (615) 483-4621

TMA/E-OR-2344

September 20, 1994

Mr. Jim McCague  
Bechtel National, Inc.  
P.O. Box 350  
Oak Ridge, TN 37831-0350

CASE NARRATIVE

Work Order #94-08-113-OR  
State of Utah Certificate #E-235

SAMPLE RECEIPT

This work order contains seven surface soil samples received 08/26/94. All samples were analyzed for Total Uranium, Isotopic Thorium, and Gamma Spectroscopy. Per Marty Gray, we are reporting List I analytes by Gamma Spectroscopy and Isotopic Thorium.

Gamma Spectroscopy analysis consists of the following parameters:

List I: The measured activity or the sample specific MDA for the following isotopes will always be reported.

Ra-226	Th-228	U-235	Am-241
Ra-228	Th-232	U-238	K-40

CLIENT ID

LAB ID

140-HV-3679	94-08-113-04
140-HV-3681	94-08-113-05
140-HV-3682	94-08-113-06
140-HV-3684	94-08-113-07
140-HV-3686	94-08-113-08
140-HV-3688	94-08-113-09
140-HV-3691	94-08-113-10

The file name for these samples is 9408113.TXT.

**TMA**

**Thermo Analytical Inc.**

**TMA/Eberline**

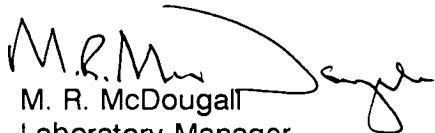
D-18340

PROBLEMS OR UNUSUAL CIRCUMSTANCES

Initial calibrations, self absorption factors, and tracer recoveries, where applicable, are within specified criteria. No problems or unusual circumstances were noted during the analytical process.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package and in the electronic data submitted on diskette has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

  
M. R. McDougall  
Laboratory Manager

Date: 9/20/94

## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	08/26/94
Work Order Number:	9408113	Date Received	08/26/94
Customer Number:	271	Date Analyzed	09/12/94
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth		Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical	
		Top	Bottom										Method	MDA
QCSPIKE	08/26/94	0.00	0.00	SL		390.0	DRY	LCST	RA-226	33.60	0.67	PCI/G	GAMMASPEC	0.44
QCSPIKE	08/26/94	0.00	0.00	SL		390.0	DRY	LCSF	RA-226	35.80	3.90	PCI/G	GAMMASPEC	0.44
QCSPIKE	08/26/94	0.00	0.00	SL		399.1	DRY	LCST	TH-232	11.50	0.12	PCI/G	GAMMASPEC	0.47
QCSPIKE	08/26/94	0.00	0.00	SL		399.1	DRY	LCSF	TH-232	11.70	3.30	PCI/G	GAMMASPEC	0.47
QCSPIKE	08/26/94	0.00	0.00	SL		390.0	DRY	LCST	U-238	32.70	0.66	PCI/G	GAMMASPEC	2.60
QCSPIKE	08/26/94	0.00	0.00	SL		390.0	DRY	LCSF	U-238	40.10	15.30	PCI/G	GAMMASPEC	2.60
QCSPIKE	08/26/94	0.00	0.00	SL		1.002	DRY	LCST	TOTU	100.20	0.20	UG/G	KPA	0.10
QCSPIKE	08/26/94	0.00	0.00	SL		1.002	DRY	LCSF	TOTU	103.30	10.30	UG/G	KPA	0.10
QCSPIKE	08/26/94	0.00	0.00	SL		1	DRY	LCST	TH-228	4.90	0.17	PCI/G	ALPHASPEC	0.09
QCSPIKE	08/26/94	0.00	0.00	SL		1	DRY	LCSF	TH-228	5.30	1.10	PCI/G	ALPHASPEC	0.09
QCSPIKE	08/26/94	0.00	0.00	SL		1	DRY	LCST	TH-230	5.20	0.11	PCI/G	ALPHASPEC	0.11
QCSPIKE	08/26/94	0.00	0.00	SL		1	DRY	LCSF	TH-230	6.30	1.20	PCI/G	ALPHASPEC	0.11
QCSPIKE	08/26/94	0.00	0.00	SL		1	DRY	LCST	TH-232	4.90	0.17	PCI/G	ALPHASPEC	0.09
QCSPIKE	08/26/94	0.00	0.00	SL		1	DRY	LCSF	TH-232	5.30	1.10	PCI/G	ALPHASPEC	0.09
QCBLANK	08/26/94	0.00	0.00	SL		591.7	DRY	PB	RA-226	0.29	0.00	PCI/G	GAMMASPEC	0.29
QCBLANK	08/26/94	0.00	0.00	SL		591.7	DRY	PB	TH-232	0.32	0.00	PCI/G	GAMMASPEC	0.32
QCBLANK	08/26/94	0.00	0.00	SL		591.7	DRY	PB	U-238	1.70	0.00	PCI/G	GAMMASPEC	1.70
QCBLANK	08/26/94	0.00	0.00	SL		1.002	DRY	PB	TOTU	0.63	0.06	UG/G	KPA	0.10
QCBLANK	08/26/94	0.00	0.00	SL		1	DRY	PB	TH-228	0.17	0.12	PCI/G	ALPHASPEC	0.05
QCBLANK	08/26/94	0.00	0.00	SL		1	DRY	PB	TH-230	0.59	0.23	PCI/G	ALPHASPEC	0.05
QCBLANK	08/26/94	0.00	0.00	SL		1	DRY	PB	TH-232	0.23	0.14	PCI/G	ALPHASPEC	0.05
140-HV-3679	08/16/94	0.00	0.50	SL		433.7	DRY	REPL	RA-226	1.00	0.26	PCI/G	GAMMASPEC	0.40
140-HV-3679	08/16/94	0.00	0.50	SL		433.7	DRY	REPL	RA-228	1.30	0.49	PCI/G	GAMMASPEC	0.56
140-HV-3679	08/16/94	0.00	0.50	SL		433.7	DRY	REPL	TH-228	1.30	0.49	PCI/G	GAMMASPEC	0.56
140-HV-3679	08/16/94	0.00	0.50	SL		433.7	DRY	REPL	TH-232	1.10	0.25	PCI/G	GAMMASPEC	0.44
140-HV-3679	08/16/94	0.00	0.50	SL		433.7	DRY	REPL	U-235	0.90	0.00	PCI/G	GAMMASPEC	0.90
140-HV-3679	08/16/94	0.00	0.50	SL		433.7	DRY	REPL	U-238	2.40	0.00	PCI/G	GAMMASPEC	2.40
140-HV-3679	08/16/94	0.00	0.50	SL		433.7	DRY	REPL	AM-241	0.20	0.00	PCI/G	GAMMASPEC	0.20
140-HV-3679	08/16/94	0.00	0.50	SL		433.7	DRY	REPL	K-40	12.40	2.20	PCI/G	GAMMASPEC	3.10
140-HV-3679	08/16/94	0.00	0.50	SL		1.001	DRY	REPL	TOTU	3.30	0.33	UG/G	KPA	0.10

Approved by: M.R.M.  
09/20/94

*Brice  
9/20/94*

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## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	08/26/94
Work Order Number:	9408113		
Customer Number:	271	Date Analyzed	09/13/94
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical	
													Method	MDA
140-HV-3679	08/16/94	0.00	0.50	SL		1.182	DRY	REPL	TH-228	1.10	0.32	PCI/G	ALPHASPEC	0.04
140-HV-3679	08/16/94	0.00	0.50	SL		1.182	DRY	REPL	TH-230	3.10	0.66	PCI/G	ALPHASPEC	0.07
140-HV-3679	08/16/94	0.00	0.50	SL		1.182	DRY	REPL	TH-232	1.20	0.34	PCI/G	ALPHASPEC	0.04
140-HV-3679	08/16/94	0.00	0.50	SL		433.7	DRY	REG	RA-226	1.20	0.20	PCI/G	GAMMASPEC	0.40
140-HV-3679	08/16/94	0.00	0.50	SL		433.7	DRY	REG	RA-228	0.87	0.00	PCI/G	GAMMASPEC	0.87
140-HV-3679	08/16/94	0.00	0.50	SL		433.7	DRY	REG	TH-228	0.87	0.00	PCI/G	GAMMASPEC	0.87
140-HV-3679	08/16/94	0.00	0.50	SL		433.7	DRY	REG	TH-232	0.99	0.46	PCI/G	GAMMASPEC	0.44
140-HV-3679	08/16/94	0.00	0.50	SL		433.7	DRY	REG	U-235	1.30	0.00	PCI/G	GAMMASPEC	1.30
140-HV-3679	08/16/94	0.00	0.50	SL		433.7	DRY	REG	U-238	3.70	0.00	PCI/G	GAMMASPEC	3.70
140-HV-3679	08/16/94	0.00	0.50	SL		433.7	DRY	REG	AM-241	0.37	0.00	PCI/G	GAMMASPEC	0.37
140-HV-3679	08/16/94	0.00	0.50	SL		433.7	DRY	REG	K-40	12.20	2.80	PCI/G	GAMMASPEC	3.10
140-HV-3679	08/16/94	0.00	0.50	SL		1.003	DRY	REG	TOTU	3.40	0.34	UG/G	KPA	0.10
140-HV-3679	08/16/94	0.00	0.50	SL		1.079	DRY	REG	TH-228	1.20	0.38	PCI/G	ALPHASPEC	0.11
140-HV-3679	08/16/94	0.00	0.50	SL		1.142	DRY	REG	TH-230	3.80	0.81	PCI/G	ALPHASPEC	0.09
140-HV-3679	08/16/94	0.00	0.50	SL		1.142	DRY	REG	TH-232	1.30	0.37	PCI/G	ALPHASPEC	0.09
140-HV-3681	08/16/94	0.00	0.50	SL		484.7	DRY	REG	RA-226	0.87	0.55	PCI/G	GAMMASPEC	0.35
140-HV-3681	08/16/94	0.00	0.50	SL		484.7	DRY	REG	RA-228	0.89	0.00	PCI/G	GAMMASPEC	0.89
140-HV-3681	08/16/94	0.00	0.50	SL		484.7	DRY	REG	TH-228	0.89	0.00	PCI/G	GAMMASPEC	0.89
140-HV-3681	08/16/94	0.00	0.50	SL		484.7	DRY	REG	TH-232	0.75	0.00	PCI/G	GAMMASPEC	0.75
140-HV-3681	08/16/94	0.00	0.50	SL		484.7	DRY	REG	U-235	1.20	0.00	PCI/G	GAMMASPEC	1.20
140-HV-3681	08/16/94	0.00	0.50	SL		484.7	DRY	REG	U-238	1.70	2.60	PCI/G	GAMMASPEC	2.10
140-HV-3681	08/16/94	0.00	0.50	SL		484.7	DRY	REG	AM-241	0.30	0.00	PCI/G	GAMMASPEC	0.30
140-HV-3681	08/16/94	0.00	0.50	SL		484.7	DRY	REG	K-40	12.50	2.70	PCI/G	GAMMASPEC	2.80
140-HV-3681	08/16/94	0.00	0.50	SL		1.001	DRY	REG	TOTU	3.60	0.36	UG/G	KPA	0.10
140-HV-3681	08/16/94	0.00	0.50	SL		1.082	DRY	REG	TH-228	1.30	0.38	PCI/G	ALPHASPEC	0.08
140-HV-3681	08/16/94	0.00	0.50	SL		1.082	DRY	REG	TH-230	2.20	0.54	PCI/G	ALPHASPEC	0.05
140-HV-3681	08/16/94	0.00	0.50	SL		1.082	DRY	REG	TH-232	1.20	0.36	PCI/G	ALPHASPEC	0.05
140-HV-3682	08/17/94	0.00	0.50	SL		472.7	DRY	REG	RA-226	0.94	0.08	PCI/G	GAMMASPEC	0.36
140-HV-3682	08/17/94	0.00	0.50	SL		472.7	DRY	REG	RA-228	0.69	0.00	PCI/G	GAMMASPEC	0.69
140-HV-3682	08/17/94	0.00	0.50	SL		472.7	DRY	REG	TH-228	0.69	0.00	PCI/G	GAMMASPEC	0.69

Approved by:  
09/20/94

  
Brian C. Eberline

A/Eberline  
A Division of Thermo Terra Tech

Page 2 of 4

Oak Ridge Laboratory • 601 Scarboro Road • Oak Ridge, TN 37830 • (615) 481-0683

## TMA/Eberline Dak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:	
Work Order Number:	9408113
Customer Number:	271
Environmental Category:	RI

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	MDA
140-HV-3682	08/17/94	0.00	0.50	SL		472.7	DRY	REG	TH-232	0.89	0.09	PCI/G	GAMMASPEC	0.40
140-HV-3682	08/17/94	0.00	0.50	SL		472.7	DRY	REG	U-235	0.78	0.00	PCI/G	GAMMASPEC	0.78
140-HV-3682	08/17/94	0.00	0.50	SL		472.7	DRY	REG	U-238	0.72	2.00	PCI/G	GAMMASPEC	2.10
140-HV-3682	08/17/94	0.00	0.50	SL		472.7	DRY	REG	AM-241	0.20	0.00	PCI/G	GAMMASPEC	0.20
140-HV-3682	08/17/94	0.00	0.50	SL		472.7	DRY	REG	K-40	9.50	2.00	PCI/G	GAMMASPEC	2.90
140-HV-3682	08/17/94	0.00	0.50	SL		1.001	DRY	REG	TDTU	3.50	0.35	UG/G	KPA	0.10
140-HV-3682	08/17/94	0.00	0.50	SL		1.011	DRY	REG	TH-228	1.60	0.43	PCI/G	ALPHASPEC	0.09
140-HV-3682	08/17/94	0.00	0.50	SL		1.011	DRY	REG	TH-230	2.60	0.60	PCI/G	ALPHASPEC	0.09
140-HV-3682	08/17/94	0.00	0.50	SL		1.011	DRY	REG	TH-232	1.40	0.40	PCI/G	ALPHASPEC	0.13
140-HV-3684	08/17/94	0.00	0.50	SL		532.1	DRY	REG	RA-226	1.00	0.27	PCI/G	GAMMASPEC	0.32
140-HV-3684	08/17/94	0.00	0.50	SL		532.1	DRY	REG	RA-228	1.10	0.09	PCI/G	GAMMASPEC	0.46
140-HV-3684	08/17/94	0.00	0.50	SL		532.1	DRY	REG	TH-228	1.10	0.09	PCI/G	GAMMASPEC	0.46
140-HV-3684	08/17/94	0.00	0.50	SL		532.1	DRY	REG	TH-232	1.00	0.12	PCI/G	GAMMASPEC	0.36
140-HV-3684	08/17/94	0.00	0.50	SL		532.1	DRY	REG	U-235	1.10	0.00	PCI/G	GAMMASPEC	1.10
140-HV-3684	08/17/94	0.00	0.50	SL		532.1	DRY	REG	U-238	3.20	0.00	PCI/G	GAMMASPEC	3.20
140-HV-3684	08/17/94	0.00	0.50	SL		532.1	DRY	REG	AM-241	0.31	0.00	PCI/G	GAMMASPEC	0.31
140-HV-3684	08/17/94	0.00	0.50	SL		532.1	DRY	REG	K-40	12.50	2.40	PCI/G	GAMMASPEC	2.60
140-HV-3684	08/17/94	0.00	0.50	SL		1.005	DRY	REG	TDTU	3.00	0.30	UG/G	KPA	0.10
140-HV-3684	08/17/94	0.00	0.50	SL		1.231	DRY	REG	TH-228	1.30	0.35	PCI/G	ALPHASPEC	0.04
140-HV-3684	08/17/94	0.00	0.50	SL		1.231	DRY	REG	TH-230	1.80	0.43	PCI/G	ALPHASPEC	0.04
140-HV-3684	08/17/94	0.00	0.50	SL		1.231	DRY	REG	TH-232	1.20	0.33	PCI/G	ALPHASPEC	0.04
140-HV-3686	08/19/94	0.00	0.50	SL		484.9	DRY	REG	RA-226	0.89	0.28	PCI/G	GAMMASPEC	0.35
140-HV-3686	08/19/94	0.00	0.50	SL		484.9	DRY	REG	RA-228	1.20	0.39	PCI/G	GAMMASPEC	0.50
140-HV-3686	08/19/94	0.00	0.50	SL		484.9	DRY	REG	TH-228	1.20	0.39	PCI/G	GAMMASPEC	0.50
140-HV-3686	08/19/94	0.00	0.50	SL		484.9	DRY	REG	TH-232	1.10	0.36	PCI/G	GAMMASPEC	0.39
140-HV-3686	08/19/94	0.00	0.50	SL		484.9	DRY	REG	U-235	0.77	0.00	PCI/G	GAMMASPEC	0.77
140-HV-3686	08/19/94	0.00	0.50	SL		484.9	DRY	REG	U-238	2.50	1.60	PCI/G	GAMMASPEC	2.10
140-HV-3686	08/19/94	0.00	0.50	SL		484.9	DRY	REG	AM-241	0.18	0.12	PCI/G	GAMMASPEC	0.20
140-HV-3686	08/19/94	0.00	0.50	SL		484.9	DRY	REG	K-40	12.40	2.20	PCI/G	GAMMASPEC	2.80
140-HV-3686	08/19/94	0.00	0.50	SL		1.002	DRY	REG	TDTU	4.90	0.49	UG/G	KPA	0.10

Approved by:   
09/20/94

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## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	08/26/94
Work Order Number:	9408113	Date Received	08/26/94
Customer Number:	271	Date Analyzed	09/13/94
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method		MDA
													Method	MDA	
140-HV-3686	08/19/94	0.00	0.50	SL	1.046	DRY		REG	TH-228	1.10	0.32	PCI/G	ALPHASPEC	0.05	
140-HV-3686	08/19/94	0.00	0.50	SL	1.046	DRY		REG	TH-230	2.40	0.55	PCI/G	ALPHASPEC	0.08	
140-HV-3686	08/19/94	0.00	0.50	SL	1.046	DRY		REG	TH-232	1.10	0.33	PCI/G	ALPHASPEC	0.08	
140-HV-3688	08/18/94	0.00	0.50	SL	366.8	DRY		REG	RA-226	0.76	0.00	PCI/G	GAMMASPEC	0.08	
140-HV-3688	08/18/94	0.00	0.50	SL	366.8	DRY		REG	RA-228	1.70	1.30	PCI/G	GAMMASPEC	0.76	
140-HV-3688	08/18/94	0.00	0.50	SL	366.8	DRY		REG	TH-228	1.70	1.30	PCI/G	GAMMASPEC	0.66	
140-HV-3688	08/18/94	0.00	0.50	SL	366.8	DRY		REG	TH-232	1.30	0.75	PCI/G	GAMMASPEC	0.52	
140-HV-3688	08/18/94	0.00	0.50	SL	366.8	DRY		REG	U-235	1.60	0.00	PCI/G	GAMMASPEC	1.60	
140-HV-3688	08/18/94	0.00	0.50	SL	366.8	DRY		REG	U-238	0.23	3.10	PCI/G	GAMMASPEC	2.70	
140-HV-3688	08/18/94	0.00	0.50	SL	366.8	DRY		REG	AM-241	0.40	0.00	PCI/G	GAMMASPEC	0.40	
140-HV-3688	08/18/94	0.00	0.50	SL	366.8	DRY		REG	K-40	13.30	3.20	PCI/G	GAMMASPEC	3.70	
140-HV-3688	08/18/94	0.00	0.50	SL	1.002	DRY		REG	TOTU	3.10	0.31	UG/G	KPA	0.10	
140-HV-3688	08/18/94	0.00	0.50	SL	1.017	DRY		REG	TH-228	0.91	0.32	PCI/G	ALPHASPEC	0.12	
140-HV-3688	08/18/94	0.00	0.50	SL	1.017	DRY		REG	TH-230	7.40	1.50	PCI/G	ALPHASPEC	0.10	
140-HV-3688	08/18/94	0.00	0.50	SL	1.017	DRY		REG	TH-232	1.10	0.36	PCI/G	ALPHASPEC	0.05	
140-HV-3691	08/19/94	0.00	0.50	SL	463.4	DRY		REG	RA-226	0.85	0.08	PCI/G	GAMMASPEC	0.37	
140-HV-3691	08/19/94	0.00	0.50	SL	463.4	DRY		REG	RA-228	0.90	0.62	PCI/G	GAMMASPEC	0.52	
140-HV-3691	08/19/94	0.00	0.50	SL	463.4	DRY		REG	TH-228	0.90	0.62	PCI/G	GAMMASPEC	0.52	
140-HV-3691	08/19/94	0.00	0.50	SL	463.4	DRY		REG	TH-232	0.96	0.81	PCI/G	GAMMASPEC	0.41	
140-HV-3691	08/19/94	0.00	0.50	SL	463.4	DRY		REG	U-235	0.78	0.00	PCI/G	GAMMASPEC	0.78	
140-HV-3691	08/19/94	0.00	0.50	SL	463.4	DRY		REG	U-238	3.30	2.80	PCI/G	GAMMASPEC	2.20	
140-HV-3691	08/19/94	0.00	0.50	SL	463.4	DRY		REG	AM-241	0.20	0.00	PCI/G	GAMMASPEC	0.20	
140-HV-3691	08/19/94	0.00	0.50	SL	463.4	DRY		REG	K-40	14.30	2.30	PCI/G	GAMMASPEC	2.90	
140-HV-3691	08/19/94	0.00	0.50	SL	1.001	DRY		REG	TOTU	3.00	0.30	UG/G	KPA	0.10	
140-HV-3691	08/19/94	0.00	0.50	SL	1.013	DRY		REG	TH-228	1.30	0.40	PCI/G	ALPHASPEC	0.15	
140-HV-3691	08/19/94	0.00	0.50	SL	1.013	DRY		REG	TH-230	3.90	0.90	PCI/G	ALPHASPEC	0.10	
140-HV-3691	08/19/94	0.00	0.50	SL	1.013	DRY		REG	TH-232	1.10	0.37	PCI/G	ALPHASPEC	0.10	

Approved by: M.R.M.  
09/20/94

Bruce 9/20/94

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94-08-11

NORFAS #349

AIRBILL NO. 4115839281	FIELD SAMPLE FORM SITE ACTIVITY SAMPLES							Samplers (print name then sign) ROGER C. HALL Roger C. Hall			
Site Name: HLSS VP		WBS No.: 140			Activity Support (Job) No.: 271						
	Sample ID Sample Grid Point	Sample Type (1)	Sample Time	Date of Sample	Preserved with	Purpose (2)	Depth cm <input checked="" type="checkbox"/> ft <input type="checkbox"/>	Priority (Days)	Analysis Required	Remarks	
4-	140-HV-3679 Grid #31 Prop#3L	SS	8/16/94	1230	NONE	VR 0-0.5	21		TOTAL U, Th-230, Th-232 Ra-226, Ra-228		
5-	140-HV-3681 Grid #33 Prop#3L	SS	8/16/94	1600							
6-	140-HV-3682 Grid #34 Prop#3L	SS	8/17/94	1040							
7-	140-HV-3684 Grid #36 Prop#3L	SS	8/17/94	1200						RECEIVED AUG 26 1994	
8-	140-HV-3686 Grid #38 Prop#3L	SS	8/19/94	1430						MARIE BERLINE Oak Ridge Lab	
9-	140-HV-3688 Grid #40 Prop#3L	SS	8/18/94	1410							
10-	140-HV-3691 Grid #43 Prop#3L	SS	8/19/94	1120							
SAMPLE TYPE (1)			PURPOSE (2)		CHAIN OF CUSTODY RECORD						
Surface Soil	SS	Rad Character	R C		REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME	Recorded by: RC HALL	
Bias Soil	BS	Verification	V R		SHIP FOR ANALYSIS	Roger C. Hall	AIRBORNE	8/25/94	1500	Date: 8/25/94	Time: 1000
Profile Soil	PS	Quality Control	Q C							Total number of samples in this box	14
Sediment Silt	SD	Hot Spot	H S								14
Other	OR	Resample	R S							Total number of samples in this shipment	14
Vegitation	VE	Background	B G								14
Ground Water	GW	Routine	R T							Total number of boxes in this shipment	1
Surface Water	SW	Special	S P								
*This package conforms to the conditions and limitations specified in 49 CFR 173.42 for excepted radioactive material, limited quantity, n.o.s., UN 2916.											
Shipper: TMA 9170 LATTY AVE BERKELEY, MO 63134		Ship to: TMA 601 SCARBORO ROAD OAK RIDGE, TN 37830								Page 2 of 2	
4.109 0692.1											
Shipping Container meets DOT Transferable Criteria YES											
Shipping container dose rate 0.01 mrem/hr.											
Original											

**TMA/EBERLINE OAK RIDGE LABORATORY  
TRACER REPORT**

September 20, 1994

Bechtel Sample ID	Analyte	Tracer	Recovery
140-HV-3679	TH-228	TH-229	66.8 %
140-HV-3679	TH-230	TH-229	66.8 %
140-HV-3679	TH-232	TH-229	66.8 %
140-HV-3681	TH-228	TH-229	70.4 %
140-HV-3681	TH-230	TH-229	70.4 %
140-HV-3681	TH-232	TH-229	70.4 %
140-HV-3682	TH-228	TH-229	68.4 %
140-HV-3682	TH-230	TH-229	68.4 %
140-HV-3682	TH-232	TH-229	68.4 %
140-HV-3684	TH-228	TH-229	75.2 %
140-HV-3684	TH-230	TH-229	75.2 %
140-HV-3684	TH-232	TH-229	75.2 %
140-HV-3686	TH-228	TH-229	82.9 %
140-HV-3686	TH-230	TH-229	82.9 %
140-HV-3686	TH-232	TH-229	82.9 %
140-HV-3688	TH-228	TH-229	62.7 %
140-HV-3688	TH-230	TH-229	62.7 %
140-HV-3688	TH-232	TH-229	62.7 %
140-HV-3691	TH-228	TH-229	58.7 %
140-HV-3691	TH-230	TH-229	58.7 %
140-HV-3691	TH-232	TH-229	58.7 %

**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Post-Remedial Action Soil Sample Results (Data)**

**SAMPLES:**

<b>140-QS-001</b>	<b>140-QS-006</b>
<b>140-QS-002</b>	<b>140-QS-007</b>
<b>140-QS-003</b>	<b>140-QS-015</b>
<b>140-QS-004</b>	<b>140-QS-016</b>
<b>140-QS-005</b>	<b>140-QS-017</b>

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-16324	Sampling Event:	HISCH95
Work Order Number:	E9507001	DATAFUSR Number:	D-22070
Customer Number:	441	Date Received:	07/03/95
Environmental Category:	RI	Date Analyzed:	07/13/95

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Flag	Qualifier Code
140QS001	06/28/95	0.00	0.50	SL		1.009	DRY	REG	RA-226	1.30	0.34	PCI/G	ALPHASPEC	0.11		
140QS001	06/28/95	0.00	0.50	SL		1.059	DRY	REG	RA-228	2.70	0.80	PCI/G	BETAGPC	0.55	U	BLK
140QS001	06/28/95	0.00	0.50	SL		1.007	DRY	REG	TH-228	0.71	0.33	PCI/G	ALPHASPEC	0.17	J	TCR
140QS001	06/28/95	0.00	0.50	SL		1.007	DRY	REG	TH-230	3.00	0.93	PCI/G	ALPHASPEC	0.15	J	TCR
140QS001	06/28/95	0.00	0.50	SL		1.007	DRY	REG	TH-232	0.76	0.34	PCI/G	ALPHASPEC	0.13	J	TCR
140QS001	06/28/95	0.00	0.50	SL		1.026	DRY	REG	U-234	1.10	0.46	PCI/G	ALPHASPEC	0.17	U	BLK
140QS001	06/28/95	0.00	0.50	SL		1.026	DRY	REG	U-235	0.05	0.08	PCI/G	ALPHASPEC	0.13	UJ	LCS
140QS001	06/28/95	0.00	0.50	SL		1.026	DRY	REG	U-238	1.40	0.52	PCI/G	ALPHASPEC	0.11	U	BLK
140QS002	06/28/95	0.00	0.50	SL		1.008	DRY	REG	RA-226	1.10	0.32	PCI/G	ALPHASPEC	0.06		
140QS002	06/28/95	0.00	0.50	SL		1.007	DRY	REG	RA-228	1.60	0.70	PCI/G	BETAGPC	0.49	U	BLK
140QS002	06/28/95	0.00	0.50	SL		1.017	DRY	REG	TH-228	1.50	0.55	PCI/G	ALPHASPEC	0.17	J	TCR
140QS002	06/28/95	0.00	0.50	SL		1.017	DRY	REG	TH-230	1.90	0.65	PCI/G	ALPHASPEC	0.07	J	TCR
140QS002	06/28/95	0.00	0.50	SL		1.017	DRY	REG	TH-232	1.10	0.45	PCI/G	ALPHASPEC	0.07	J	TCR
140QS002	06/28/95	0.00	0.50	SL		1.009	DRY	REG	U-234	1.00	0.40	PCI/G	ALPHASPEC	0.16	U	BLK
140QS002	06/28/95	0.00	0.50	SL		1.009	DRY	REG	U-235	0.05	0.07	PCI/G	ALPHASPEC	0.07	UJ	LCS
140QS002	06/28/95	0.00	0.50	SL		1.009	DRY	REG	U-238	0.98	0.39	PCI/G	ALPHASPEC	0.06	U	BLK
140QS003	06/28/95	0.00	0.50	SL		1.002	DRY	REG	RA-226	1.00	0.31	PCI/G	ALPHASPEC	0.14		
140QS003	06/28/95	0.00	0.50	SL		1.054	DRY	REG	RA-228	4.70	1.10	PCI/G	BETAGPC	0.61	U	BLK
140QS003	06/28/95	0.00	0.50	SL		1.043	DRY	REG	TH-228	1.10	0.45	PCI/G	ALPHASPEC	0.14	J	TCR
140QS003	06/28/95	0.00	0.50	SL		1.043	DRY	REG	TH-230	2.50	0.82	PCI/G	ALPHASPEC	0.14	J	TCR
140QS003	06/28/95	0.00	0.50	SL		1.043	DRY	REG	TH-232	1.20	0.47	PCI/G	ALPHASPEC	0.08	J	TCR
140QS003	06/28/95	0.00	0.50	SL		1.049	DRY	REG	U-234	1.80	0.64	PCI/G	ALPHASPEC	0.10	U	BLK
140QS003	06/28/95	0.00	0.50	SL		1.049	DRY	REG	U-235	0.02	0.06	PCI/G	ALPHASPEC	0.13	UJ	LCS
140QS003	06/28/95	0.00	0.50	SL		1.049	DRY	REG	U-238	1.40	0.51	PCI/G	ALPHASPEC	0.06	U	BLK
140QS004	06/28/95	0.00	0.50	SL		1.007	DRY	REG	RA-226	1.20	0.34	PCI/G	ALPHASPEC	0.14		
140QS004	06/28/95	0.00	0.50	SL		1.023	DRY	REG	RA-228	3.30	0.90	PCI/G	BETAGPC	0.56	U	BLK
140QS004	06/28/95	0.00	0.50	SL		1.029	DRY	REG	TH-228	1.00	0.39	PCI/G	ALPHASPEC	0.13		
140QS004	06/28/95	0.00	0.50	SL		1.029	DRY	REG	TH-230	2.10	0.65	PCI/G	ALPHASPEC	0.06		
140QS004	06/28/95	0.00	0.50	SL		1.029	DRY	REG	TH-232	0.88	0.34	PCI/G	ALPHASPEC	0.06		
140QS004	06/28/95	0.00	0.50	SL		1.033	DRY	REG	U-234	1.40	0.49	PCI/G	ALPHASPEC	0.06	U	BLK

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-16324	Sampling Event:	HISCH95
Work Order Number:	E9507001	DATAFUSR Number:	D-22070
Customer Number:	441	Date Received:	07/03/95
Environmental Category:	RI	Date Analyzed:	07/10/95

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI	Qualifier
													MDA	Flag	Code
140QS004	06/28/95	0.00	0.50	SL		1.033	DRY	REG	U-235	0.10	0.10	PCI/G	ALPHASPEC	0.12	UJ LCS
140QS004	06/28/95	0.00	0.50	SL		1.033	DRY	REG	U-238	1.20	0.45	PCI/G	ALPHASPEC	0.09	U BLK
140QS005	06/28/95	0.00	0.50	SL		1.050	DRY	REG	RA-226	1.40	0.40	PCI/G	ALPHASPEC	0.07	
140QS005	06/28/95	0.00	0.50	SL		1.006	DRY	REG	RA-228	4.80	0.90	PCI/G	BETAGPC	0.42	U BLK
140QS005	06/28/95	0.00	0.50	SL		1.024	DRY	REG	TH-228	1.10	0.38	PCI/G	ALPHASPEC	0.10	
140QS005	06/28/95	0.00	0.50	SL		1.024	DRY	REG	TH-230	4.50	1.10	PCI/G	ALPHASPEC	0.05	
140QS005	06/28/95	0.00	0.50	SL		1.024	DRY	REG	TH-232	1.20	0.40	PCI/G	ALPHASPEC	0.11	
140QS005	06/28/95	0.00	0.50	SL		1.032	DRY	REG	U-234	1.50	0.55	PCI/G	ALPHASPEC	0.10	U BLK
140QS005	06/28/95	0.00	0.50	SL		1.032	DRY	REG	U-235	0.06	0.08	PCI/G	ALPHASPEC	0.08	UJ LCS
140QS005	06/28/95	0.00	0.50	SL		1.032	DRY	REG	U-238	1.60	0.58	PCI/G	ALPHASPEC	0.06	U BLK
140QS006	06/28/95	0.00	0.50	SL		1.029	DRY	REG	RA-226	1.80	0.55	PCI/G	ALPHASPEC	0.24	
140QS006	06/28/95	0.00	0.50	SL		1.039	DRY	REG	RA-228	0.40	0.70	PCI/G	BETAGPC	0.08	UJ EGR
140QS006	06/28/95	0.00	0.50	SL		1.099	DRY	REG	TH-228	1.00	0.34	PCI/G	ALPHASPEC	0.10	
140QS006	06/28/95	0.00	0.50	SL		1.099	DRY	REG	TH-230	1.90	0.54	PCI/G	ALPHASPEC	0.10	U BLK
140QS006	06/28/95	0.00	0.50	SL		1.099	DRY	REG	TH-232	0.99	0.33	PCI/G	ALPHASPEC	0.08	
140QS006	06/28/95	0.00	0.50	SL		1.033	DRY	REG	U-234	1.30	0.55	PCI/G	ALPHASPEC	0.17	J TCR
140QS006	06/28/95	0.00	0.50	SL		1.033	DRY	REG	U-235	0.07	0.10	PCI/G	ALPHASPEC	0.09	UJ LCS
140QS006	06/28/95	0.00	0.50	SL		1.033	DRY	REG	U-238	1.80	0.70	PCI/G	ALPHASPEC	0.07	J TCR
140QS007	06/28/95	0.00	0.50	SL		1.069	DRY	REG	RA-226	1.90	0.52	PCI/G	ALPHASPEC	0.21	
140QS007	06/28/95	0.00	0.50	SL		1.076	DRY	REG	RA-228	0.20	0.70	PCI/G	BETAGPC	0.08	UJ EGR
140QS007	06/28/95	0.00	0.50	SL		1.081	DRY	REG	TH-228	1.20	0.41	PCI/G	ALPHASPEC	0.09	
140QS007	06/28/95	0.00	0.50	SL		1.081	DRY	REG	TH-230	1.70	0.54	PCI/G	ALPHASPEC	0.12	U BLK
140QS007	06/28/95	0.00	0.50	SL		1.081	DRY	REG	TH-232	0.94	0.35	PCI/G	ALPHASPEC	0.11	
140QS007	06/28/95	0.00	0.50	SL		1.040	DRY	REG	U-234	1.30	0.49	PCI/G	ALPHASPEC	0.06	U BLK
140QS007	06/28/95	0.00	0.50	SL		1.040	DRY	REG	U-235	0.14	0.13	PCI/G	ALPHASPEC	0.07	J LCS
140QS007	06/28/95	0.00	0.50	SL		1.040	DRY	REG	U-238	1.50	0.54	PCI/G	ALPHASPEC	0.06	U BLK
140QS015	06/29/95	0.00	0.50	SL		1.023	DRY	REG	RA-226	1.20	0.37	PCI/G	ALPHASPEC	0.12	
140QS015	06/29/95	0.00	0.50	SL		1.067	DRY	REG	RA-228	0.40	0.80	PCI/G	BETAGPC	0.09	UJ EGR
140QS015	06/29/95	0.00	0.50	SL		1.070	DRY	REG	TH-228	1.00	0.39	PCI/G	ALPHASPEC	0.13	
140QS015	06/29/95	0.00	0.50	SL		1.070	DRY	REG	TH-230	3.30	0.93	PCI/G	ALPHASPEC	0.07	

## FLAGGED SAMPLE RESULTS REPRT

TMA/Eberline Number:	E-16324	Sampling Event:	KISSCH95
Work Order Number:	E9507001	DATAFUSR Number:	D-22070
Customer Number:	441	Date Received:	07/03/95
Environmental Category:	RI	Date Analyzed:	07/10/95

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Flag	Qualifier Code
	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
140QS015	06/29/95	0.00	0.50	SL	1.070	DRY	REG	TH-232	1.20	0.44	PCI/G	ALPHASPEC	0.11		
140QS015	06/29/95	0.00	0.50	SL	1.056	DRY	REG	U-234	1.20	0.43	PCI/G	ALPHASPEC	0.11	U	BLK
140QS015	06/29/95	0.00	0.50	SL	1.056	DRY	REG	U-235	0.10	0.11	PCI/G	ALPHASPEC	0.07	J	LCS
140QS015	06/29/95	0.00	0.50	SL	1.056	DRY	REG	U-238	1.40	0.48	PCI/G	ALPHASPEC	0.06	U	BLK
140QS016	06/29/95	0.00	0.50	SL	1.071	DRY	REG	RA-226	1.10	0.32	PCI/G	ALPHASPEC	0.10		
140QS016	06/29/95	0.00	0.50	SL	1.074	DRY	REG	RA-228	0.10	0.50	PCI/G	BETAGPC	0.07	UJ	EGR
140QS016	06/29/95	0.00	0.50	SL	1.029	DRY	REG	TH-228	0.37	0.20	PCI/G	ALPHASPEC	0.13		
140QS016	06/29/95	0.00	0.50	SL	1.029	DRY	REG	TH-230	2.00	0.59	PCI/G	ALPHASPEC	0.10		
140QS016	06/29/95	0.00	0.50	SL	1.029	DRY	REG	TH-232	0.48	0.23	PCI/G	ALPHASPEC	0.06	U	BLK
140QS016	06/29/95	0.00	0.50	SL	1.057	DRY	REG	U-234	1.80	0.63	PCI/G	ALPHASPEC	0.06	U	BLK
140QS016	06/29/95	0.00	0.50	SL	1.057	DRY	REG	U-235	0.11	0.11	PCI/G	ALPHASPEC	0.07	J	LCS
140QS016	06/29/95	0.00	0.50	SL	1.057	DRY	REG	U-238	1.90	0.65	PCI/G	ALPHASPEC	0.12	U	BLK
140QS017	06/30/95	0.00	0.50	SL	1.011	DRY	REG	RA-226	1.60	0.43	PCI/G	ALPHASPEC	0.07		
140QS017	06/30/95	0.00	0.50	SL	1.061	DRY	REG	RA-228	0.30	0.60	PCI/G	BETAGPC	0.07	UJ	EGR
140QS017	06/30/95	0.00	0.50	SL	1.105	DRY	REG	TH-228	0.65	0.27	PCI/G	ALPHASPEC	0.10		
140QS017	06/30/95	0.00	0.50	SL	1.105	DRY	REG	TH-230	3.20	0.87	PCI/G	ALPHASPEC	0.06		
140QS017	06/30/95	0.00	0.50	SL	1.105	DRY	REG	TH-232	0.65	0.27	PCI/G	ALPHASPEC	0.06	U	BLK
140QS017	06/30/95	0.00	0.50	SL	1.182	DRY	REG	U-234	1.10	0.45	PCI/G	ALPHASPEC	0.10	U	BLK
140QS017	06/30/95	0.00	0.50	SL	1.182	DRY	REG	U-235	0.05	0.08	PCI/G	ALPHASPEC	0.07	UJ	LCS
140QS017	06/30/95	0.00	0.50	SL	1.182	DRY	REG	U-238	1.50	0.55	PCI/G	ALPHASPEC	0.06	U	BLK

**TMA/Eberline**

601 Scarboro Rd.  
Oak Ridge, TN 37830  
(615) 481-0683 Fax (615) 483-4621

TMA-OR-3373

August 2, 1995

Mr. Jim McCague  
Bechtel National, Inc.  
P.O. Box 350  
Oak Ridge, TN 37831-0350

**CASE NARRATIVE**  
Work Order #95-07-001-OR  
State of Utah Certificate #E-235

**SAMPLE RECEIPT**

This work order contains ten surface soil samples received 07/03/95. These samples were analyzed for Radium-226/228, Isotopic Thorium and Isotopic Uranium.

<u>CLIENT ID</u>	<u>LAB ID</u>	<u>CLIENT ID</u>	<u>LAB ID</u>
140QS001	95-07-001-04	140QS006	95-07-001-09
140QS002	95-07-001-05	140QS007	95-07-001-10
140QS003	95-07-001-06	140QS015	95-07-001-11
140QS004	95-07-001-07	140QS016	95-07-001-12
140QS005	95-07-001-08	140QS017	95-07-001-13

The file name for these samples is 9507001.TXT.

**ANALYTICAL METHODS**

Radium-226 was analyzed using EPA Method 903.0 modified. Radium-228 was analyzed using EPA Method 904.0 modified. Isotopic Thorium was analyzed using Method EML Th-01 modified. Isotopic Uranium was analyzed using Method EML U-02 modified.

**PROBLEMS OR UNUSUAL CIRCUMSTANCES**

Significant problems were encountered due to the presence of elemental Barium in these samples. Barium excessive within samples causes interference problems. This can cause potential positive biases with Radium-226 and Radium-228. Consideration of these effects should be taken into account during evaluation of results. Initial calibrations, self absorption factors, and tracer recoveries, where applicable, are within specified criteria. No other problems or unusual circumstances were noted during the analytical process.

**TMA**

**Thermo Analytical Inc.**

TMA/Eberline

D-22070

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

  
M. R. McDougall  
Laboratory Manager

Date: 8/2/95

## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	07/03/95
Work Order Number:	9507001	Date Received	07/03/95
Customer Number:	441	Date Analyzed	07/13/95
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	MDA
QCSPIKE	07/03/95	0.00	0.00	W	1		LCST	RA-226	26.50	1.20	PCI	ALPHASPEC	0.13
QCSPIKE	07/03/95	0.00	0.00	W	1		LCSF	RA-226	26.60	2.60	PCI	ALPHASPEC	0.13
QCSPIKE	07/03/95	0.00	0.00	W	1		LCST	RA-228	17.20	0.90	PCI	BETAGPC	0.42
QCSPIKE	07/03/95	0.00	0.00	W	1		LCSF	RA-228	17.40	1.40	PCI	BETAGPC	0.42
QCSPIKE	07/03/95	0.00	0.00	W	1		LCST	TH-228	5.10	0.18	PCI	ALPHASPEC	0.11
QCSPIKE	07/03/95	0.00	0.00	W	1		LCSF	TH-228	5.00	1.10	PCI	ALPHASPEC	0.11
QCSPIKE	07/03/95	0.00	0.00	W	1		LCST	TH-230	5.40	0.11	PCI	ALPHASPEC	0.10
QCSPIKE	07/03/95	0.00	0.00	W	1		LCSF	TH-230	5.10	1.20	PCI	ALPHASPEC	0.10
QCSPIKE	07/03/95	0.00	0.00	W	1		LCST	TH-232	5.10	0.18	PCI	ALPHASPEC	0.09
QCSPIKE	07/03/95	0.00	0.00	W	1		LCSF	TH-232	5.00	1.10	PCI	ALPHASPEC	0.09
QCSPIKE	07/03/95	0.00	0.00	W	1		LCST	U-234	8.50	0.32	PCI	ALPHASPEC	0.12
QCSPIKE	07/03/95	0.00	0.00	W	1		LCSF	U-234	8.90	2.60	PCI	ALPHASPEC	0.12
QCSPIKE	07/03/95	0.00	0.00	W	1		LCST	U-235	0.38	0.01	PCI	ALPHASPEC	0.09
QCSPIKE	07/03/95	0.00	0.00	W	1		LCSF	U-235	0.23	0.19	PCI	ALPHASPEC	0.09
QCSPIKE	07/03/95	0.00	0.00	W	1		LCST	U-238	8.30	0.31	PCI	ALPHASPEC	0.12
QCSPIKE	07/03/95	0.00	0.00	W	1		LCSF	U-238	9.00	2.70	PCI	ALPHASPEC	0.12
QCBLANK	07/03/95	0.00	0.00	W	1		PB	RA-226	0.01	0.04	PCI	ALPHASPEC	0.10
QCBLANK	07/03/95	0.00	0.00	W	1		PB	RA-228	1.00	0.60	PCI	BETAGPC	0.48
QCBLANK	07/03/95	0.00	0.00	W	1		PB	TH-228	0.13	0.11	PCI	ALPHASPEC	0.14
QCBLANK	07/03/95	0.00	0.00	W	1		PB	TH-230	0.39	0.20	PCI	ALPHASPEC	0.10
QCBLANK	07/03/95	0.00	0.00	W	1		PB	TH-232	0.14	0.11	PCI	ALPHASPEC	0.10
QCBLANK	07/03/95	0.00	0.00	W	1		PB	U-234	0.46	0.22	PCI	ALPHASPEC	0.09
QCBLANK	07/03/95	0.00	0.00	W	1		PB	U-235	0.05	0.07	PCI	ALPHASPEC	0.07
QCBLANK	07/03/95	0.00	0.00	W	1		PB	U-238	0.54	0.25	PCI	ALPHASPEC	0.05
140QS001	06/28/95	0.00	0.50	SL	1.013 DRY		REPL	RA-226	1.20	0.35	PCI/G	ALPHASPEC	0.11
140QS001	06/28/95	0.00	0.50	SL	1.052 DRY		REPL	RA-228	3.80	0.90	PCI/G	BETAGPC	0.50
140QS001	06/28/95	0.00	0.50	SL	1.046 DRY		REPL	TH-228	1.20	0.40	PCI/G	ALPHASPEC	0.12
140QS001	06/28/95	0.00	0.50	SL	1.046 DRY		REPL	TH-230	2.70	0.71	PCI/G	ALPHASPEC	0.05
140QS001	06/28/95	0.00	0.50	SL	1.046 DRY		REPL	TH-232	1.10	0.36	PCI/G	ALPHASPEC	0.09
140QS001	06/28/95	0.00	0.50	SL	1.018 DRY		REPL	U-234	1.40	0.51	PCI/G	ALPHASPEC	0.10

Approved by:  
08/02/95

8/3/95

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## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	07/03/95
Work Order Number:	9507001		
Customer Number:	441	Date Analyzed	07/10/95
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth			Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Method	MDA	Analytical			
		Depth	Depth	Matrix						REG	TH-228	RA-226	RA-228	TH-228	TH-230	U-234	U-235	U-238	TH-232
140QS001	06/28/95	0.00	0.50	SL		1.018	DRY		REPL	U-235	0.02	0.06	PCI/G	ALPHASPEC	0.13				
140QS001	06/28/95	0.00	0.50	SL		1.018	DRY		REPL	U-238	1.30	0.48	PCI/G	ALPHASPEC	0.10				
140QS001	06/28/95	0.00	0.50	SL		1.009	DRY		REG	RA-226	1.30	0.34	PCI/G	ALPHASPEC	0.11				
140QS001	06/28/95	0.00	0.50	SL		1.059	DRY		REG	RA-228	2.70	0.80	PCI/G	BETAGPC	0.55				
140QS001	06/28/95	0.00	0.50	SL		1.007	DRY		REG	TH-228	0.71	0.33	PCI/G	ALPHASPEC	0.17				
140QS001	06/28/95	0.00	0.50	SL		1.007	DRY		REG	TH-230	3.00	0.93	PCI/G	ALPHASPEC	0.15				
140QS001	06/28/95	0.00	0.50	SL		1.007	DRY		REG	TH-232	0.76	0.34	PCI/G	ALPHASPEC	0.13				
140QS001	06/28/95	0.00	0.50	SL		1.026	DRY		REG	U-234	1.10	0.46	PCI/G	ALPHASPEC	0.17				
140QS001	06/28/95	0.00	0.50	SL		1.026	DRY		REG	U-235	0.05	0.08	PCI/G	ALPHASPEC	0.13				
140QS001	06/28/95	0.00	0.50	SL		1.026	DRY		REG	U-238	1.40	0.52	PCI/G	ALPHASPEC	0.11				
140QS002	06/28/95	0.00	0.50	SL		1.008	DRY		REG	RA-226	1.10	0.32	PCI/G	ALPHASPEC	0.06				
140QS002	06/28/95	0.00	0.50	SL		1.007	DRY		REG	RA-228	1.60	0.70	PCI/G	BETAGPC	0.49				
140QS002	06/28/95	0.00	0.50	SL		1.017	DRY		REG	TH-228	1.50	0.55	PCI/G	ALPHASPEC	0.17				
140QS002	06/28/95	0.00	0.50	SL		1.017	DRY		REG	TH-230	1.90	0.65	PCI/G	ALPHASPEC	0.07				
140QS002	06/28/95	0.00	0.50	SL		1.017	DRY		REG	TH-232	1.10	0.45	PCI/G	ALPHASPEC	0.07				
140QS002	06/28/95	0.00	0.50	SL		1.009	DRY		REG	U-234	1.00	0.40	PCI/G	ALPHASPEC	0.16				
140QS002	06/28/95	0.00	0.50	SL		1.009	DRY		REG	U-235	0.05	0.07	PCI/G	ALPHASPEC	0.07				
140QS002	06/28/95	0.00	0.50	SL		1.009	DRY		REG	U-238	0.98	0.39	PCI/G	ALPHASPEC	0.06				
140QS003	06/28/95	0.00	0.50	SL		1.002	DRY		REG	RA-226	1.00	0.31	PCI/G	ALPHASPEC	0.14				
140QS003	06/28/95	0.00	0.50	SL		1.054	DRY		REG	RA-228	4.70	1.10	PCI/G	BETAGPC	0.61				
140QS003	06/28/95	0.00	0.50	SL		1.043	DRY		REG	TH-228	1.10	0.45	PCI/G	ALPHASPEC	0.14				
140QS003	06/28/95	0.00	0.50	SL		1.043	DRY		REG	TH-230	2.50	0.82	PCI/G	ALPHASPEC	0.14				
140QS003	06/28/95	0.00	0.50	SL		1.043	DRY		REG	TH-232	1.20	0.47	PCI/G	ALPHASPEC	0.08				
140QS003	06/28/95	0.00	0.50	SL		1.049	DRY		REG	U-234	1.80	0.64	PCI/G	ALPHASPEC	0.10				
140QS003	06/28/95	0.00	0.50	SL		1.049	DRY		REG	U-235	0.02	0.06	PCI/G	ALPHASPEC	0.13				
140QS003	06/28/95	0.00	0.50	SL		1.049	DRY		REG	U-238	1.40	0.51	PCI/G	ALPHASPEC	0.06				
140QS004	06/28/95	0.00	0.50	SL		1.007	DRY		REG	RA-226	1.20	0.34	PCI/G	ALPHASPEC	0.14				
140QS004	06/28/95	0.00	0.50	SL		1.023	DRY		REG	RA-228	3.30	0.90	PCI/G	BETAGPC	0.56				
140QS004	06/28/95	0.00	0.50	SL		1.029	DRY		REG	TH-228	1.00	0.39	PCI/G	ALPHASPEC	0.13				
140QS004	06/28/95	0.00	0.50	SL		1.029	DRY		REG	TH-230	2.10	0.65	PCI/G	ALPHASPEC	0.06				

Approved by:   
08/02/95

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**TMA/Eberline**  
A Division of Thermo Terra Tech

Oak Ridge Laboratory • 601 Scarboro Road • Oak Ridge, TN 37830 • (615) 481-0683

D-22070

## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:	
Work Order Number:	9507001
Date Received	07/03/95
Customer Number:	441
Date Analyzed	07/10/95
Environmental Category:	RI

Sample ID	Date Collected	Top Depth		Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	MDA
		Depth	Bottom Depth											
140QS004	06/28/95	0.00	0.50	SL		1.029	DRY	REG	TH-232	0.88	0.34	PCI/G	ALPHASPEC	0.06
140QS004	06/28/95	0.00	0.50	SL		1.033	DRY	REG	U-234	1.40	0.49	PCI/G	ALPHASPEC	0.06
140QS004	06/28/95	0.00	0.50	SL		1.033	DRY	REG	U-235	0.10	0.10	PCI/G	ALPHASPEC	0.12
140QS004	06/28/95	0.00	0.50	SL		1.033	DRY	REG	U-238	1.20	0.45	PCI/G	ALPHASPEC	0.09
140QS005	06/28/95	0.00	0.50	SL		1.050	DRY	REG	RA-226	1.40	0.40	PCI/G	ALPHASPEC	0.07
140QS005	06/28/95	0.00	0.50	SL		1.006	DRY	REG	RA-228	4.80	0.90	PCI/G	BETAGPC	0.42
140QS005	06/28/95	0.00	0.50	SL		1.024	DRY	REG	TH-228	1.10	0.38	PCI/G	ALPHASPEC	0.10
140QS005	06/28/95	0.00	0.50	SL		1.024	DRY	REG	TH-230	4.50	1.10	PCI/G	ALPHASPEC	0.05
140QS005	06/28/95	0.00	0.50	SL		1.024	DRY	REG	TH-232	1.20	0.40	PCI/G	ALPHASPEC	0.11
140QS005	06/28/95	0.00	0.50	SL		1.032	DRY	REG	U-234	1.50	0.55	PCI/G	ALPHASPEC	0.10
140QS005	06/28/95	0.00	0.50	SL		1.032	DRY	REG	U-235	0.06	0.08	PCI/G	ALPHASPEC	0.08
140QS005	06/28/95	0.00	0.50	SL		1.032	DRY	REG	U-238	1.60	0.58	PCI/G	ALPHASPEC	0.06
140QS006	06/28/95	0.00	0.50	SL		1.029	DRY	REG	RA-226	1.80	0.55	PCI/G	ALPHASPEC	0.24
140QS006	06/28/95	0.00	0.50	SL		1.039	DRY	REG	RA-228	0.40	0.70	PCI/G	BETAGPC	0.08
140QS006	06/28/95	0.00	0.50	SL		1.099	DRY	REG	TH-228	1.00	0.34	PCI/G	ALPHASPEC	0.10
140QS006	06/28/95	0.00	0.50	SL		1.099	DRY	REG	TH-230	1.90	0.54	PCI/G	ALPHASPEC	0.10
140QS006	06/28/95	0.00	0.50	SL		1.099	DRY	REG	TH-232	0.99	0.33	PCI/G	ALPHASPEC	0.08
140QS006	06/28/95	0.00	0.50	SL		1.033	DRY	REG	U-234	1.30	0.55	PCI/G	ALPHASPEC	0.17
140QS006	06/28/95	0.00	0.50	SL		1.033	DRY	REG	U-235	0.07	0.10	PCI/G	ALPHASPEC	0.09
140QS006	06/28/95	0.00	0.50	SL		1.033	DRY	REG	U-238	1.80	0.70	PCI/G	ALPHASPEC	0.07
140QS007	06/28/95	0.00	0.50	SL		1.069	DRY	REG	RA-226	1.90	0.52	PCI/G	ALPHASPEC	0.21
140QS007	06/28/95	0.00	0.50	SL		1.076	DRY	REG	RA-228	0.20	0.70	PCI/G	BETAGPC	0.08
140QS007	06/28/95	0.00	0.50	SL		1.081	DRY	REG	TH-228	1.20	0.41	PCI/G	ALPHASPEC	0.09
140QS007	06/28/95	0.00	0.50	SL		1.081	DRY	REG	TH-230	1.70	0.54	PCI/G	ALPHASPEC	0.12
140QS007	06/28/95	0.00	0.50	SL		1.081	DRY	REG	TH-232	0.94	0.35	PCI/G	ALPHASPEC	0.11
140QS007	06/28/95	0.00	0.50	SL		1.040	DRY	REG	U-234	1.30	0.49	PCI/G	ALPHASPEC	0.06
140QS007	06/28/95	0.00	0.50	SL		1.040	DRY	REG	U-235	0.14	0.13	PCI/G	ALPHASPEC	0.07
140QS007	06/28/95	0.00	0.50	SL		1.040	DRY	REG	U-238	1.50	0.54	PCI/G	ALPHASPEC	0.06
140QS015	06/29/95	0.00	0.50	SL		1.023	DRY	REG	RA-226	1.20	0.37	PCI/G	ALPHASPEC	0.12
140QS015	06/29/95	0.00	0.50	SL		1.067	DRY	REG	RA-228	0.40	0.80	PCI/G	BETAGPC	0.09

Approved by:  
08/02/95

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**TMA/Eberline**  
A Division of Thermo Terra Tech

Oak Ridge Laboratory • 601 Scarboro Road • Oak Ridge, TN 37830 • (615) 481-0683

D-22070

## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	07/03/95
Work Order Number:	9507001	Date Received	07/03/95
Customer Number:	441	Date Analyzed	07/10/95
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth		Bottom Depth		Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	MDA
		Top Depth	Bottom Depth	Matrix	F/UF											
140QS015	06/29/95	0.00	0.50	SL		1.070	DRY	REG		TH-228	1.00	0.39	PCI/G	ALPHASPEC	0.13	
140QS015	06/29/95	0.00	0.50	SL		1.070	DRY	REG		TH-230	3.30	0.93	PCI/G	ALPHASPEC	0.07	
140QS015	06/29/95	0.00	0.50	SL		1.070	DRY	REG		TH-232	1.20	0.44	PCI/G	ALPHASPEC	0.11	
140QS015	06/29/95	0.00	0.50	SL		1.056	DRY	REG		U-234	1.20	0.43	PCI/G	ALPHASPEC	0.11	
140QS015	06/29/95	0.00	0.50	SL		1.056	DRY	REG		U-235	0.10	0.11	PCI/G	ALPHASPEC	0.07	
140QS015	06/29/95	0.00	0.50	SL		1.056	DRY	REG		U-238	1.40	0.48	PCI/G	ALPHASPEC	0.06	
140QS016	06/29/95	0.00	0.50	SL		1.071	DRY	REG		RA-226	1.10	0.32	PCI/G	ALPHASPEC	0.10	
140QS016	06/29/95	0.00	0.50	SL		1.074	DRY	REG		RA-228	0.10	0.50	PCI/G	BETAGPC	0.07	
140QS016	06/29/95	0.00	0.50	SL		1.029	DRY	REG		TH-228	0.37	0.20	PCI/G	ALPHASPEC	0.13	
140QS016	06/29/95	0.00	0.50	SL		1.029	DRY	REG		TH-230	2.00	0.59	PCI/G	ALPHASPEC	0.10	
140QS016	06/29/95	0.00	0.50	SL		1.029	DRY	REG		TH-232	0.48	0.23	PCI/G	ALPHASPEC	0.06	
140QS016	06/29/95	0.00	0.50	SL		1.057	DRY	REG		U-234	1.80	0.63	PCI/G	ALPHASPEC	0.06	
140QS016	06/29/95	0.00	0.50	SL		1.057	DRY	REG		U-235	0.11	0.11	PCI/G	ALPHASPEC	0.07	
140QS016	06/29/95	0.00	0.50	SL		1.057	DRY	REG		U-238	1.90	0.65	PCI/G	ALPHASPEC	0.12	
140QS017	06/30/95	0.00	0.50	SL		1.011	DRY	REG		RA-226	1.60	0.43	PCI/G	ALPHASPEC	0.07	
140QS017	06/30/95	0.00	0.50	SL		1.061	DRY	REG		RA-228	0.30	0.60	PCI/G	BETAGPC	0.07	
140QS017	06/30/95	0.00	0.50	SL		1.105	DRY	REG		TH-228	0.65	0.27	PCI/G	ALPHASPEC	0.10	
140QS017	06/30/95	0.00	0.50	SL		1.105	DRY	REG		TH-230	3.20	0.87	PCI/G	ALPHASPEC	0.06	
140QS017	06/30/95	0.00	0.50	SL		1.105	DRY	REG		TH-232	0.65	0.27	PCI/G	ALPHASPEC	0.06	
140QS017	06/30/95	0.00	0.50	SL		1.182	DRY	REG		U-234	1.10	0.45	PCI/G	ALPHASPEC	0.10	
140QS017	06/30/95	0.00	0.50	SL		1.182	DRY	REG		U-235	0.05	0.08	PCI/G	ALPHASPEC	0.07	
140QS017	06/30/95	0.00	0.50	SL		1.182	DRY	REG		U-238	1.50	0.55	PCI/G	ALPHASPEC	0.06	

Approved by:   
08/02/95

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**TMA/Eberline**  
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D-22070

95-07-001

AIRBILL NO.

Z520071175

# FIELD SAMPLE FORM

## SITE ACTIVITY SAMPLES

Samplers (print name then sign)

M. PHILLIPS

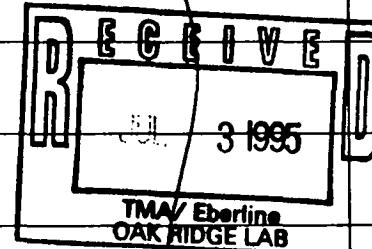
M. Chilly

Site Name: HISS NORPAS # 602

WBS No.: 140

Activity Support (Job) No.: 44

	Sample ID Sample Grid Point	Sample Type (1)	Sample Time	Date of Sample	Preserved with	Purpose (2)	Depth cm ft	Priority (Days)	Analysis Required	Remarks
4-	140QS001 NSE5	SS	0800	6-28-95	NA	VR	0-0.5	7	ISO-U, ISO-TH RA-226, RA 228	QUAKER STATE
5-	140QS002 NSE15		0830							
6-	140QS003 NSE25		0900							
7-	140QS004 NSE35		0930							
8-	140QS005 N15 E5		1000							
9-	140QS006 N15 E15		1030							
10-	140QS007 N15 E25		1100							



## SAMPLE TYPE (1)

Surface Soil

Bias Soil

Profile Soil

Sediment Silt

Other

Vegetation

Ground Water

Surface Water

## PURPOSE (2)

Rad Character

Verification

Quality Control

Hot Spot

Resample

Background

Routine

Special

RC

VR

QC

HS

RS

BG

RT

SP

"This package conforms to the conditions and limitations specified in 49CFR173.421 for excepted radioactive material, limited quantity, n.o.s., UN 2910."

## CHAIN OF CUSTODY RECORD

REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME
ANALYSIS	M. Chilly	AIRBORNE OPERATIONS	6-30-95	1500
analysis submitted	C. Bolen		7/5/95	9:20

Shipper: TMA/CRURLINE  
9170 LATTERY AVE  
BERKELEY, MO, 63134

Ship to: TMA/CRURLINE  
601 SCARROU RD.  
OAK RIDGE, TN 37830  
ATTN. SAMPLE LOG IN

Recorded by: M. Chilly

Date: 6-30-95 Time: 1126

Total number of samples in this box

20

Total number of samples in this shipment

200

Total number of boxes in this shipment

120

Page 1 of 3 01

200701

AIRBILL NO. 2520071175	FIELD SAMPLE FORM SITE ACTIVITY SAMPLES							Samplers (print name then sign) <i>M. Phillips</i> <i>M. Philly</i>		
Site Name: 11155 NORPASH G02		WBS No.: 140			Activity Support (Job) No.: 441					
Sample ID Sample Grid Point	Sample Type (1)	Sample Time	Date of Sample	Preserved with	Purpose (2)	Depth cm ft	Priority (Days)	Analysis Required		Remarks
11- 140QS015 N35 E25	SS	0900 6-24-95	6-24-95	NA	VR	0-0.5	7	T50-U, T50-TH RA-226, RA-228		QUAKER STATE
12- 140QS016 N35 E35		0940	6-24-95							
13- 140QS017 N35 E45		0730	6-30-95							
14- 140QS06-28	OR	1130	6-28-95							
15- 140QS06-29		1020	6-29-95							
16- 140QS06-30		0800	6-30-95							
<b>SAMPLE TYPE (1)</b>		<b>PURPOSE (2)</b>		<b>CHAIN OF CUSTODY RECORD</b>						
Surface Soil	SS	Rad Character	RC	REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME		
Bias Soil	BS	Verification	VR	ANALYSIS	<i>M. Philly</i>	ATRACINE EXPRESS	6-29-95	1500		
Profile Soil	PS	Quality Control	QC	Analysis	<i>M. Philly</i>	C. Bolen	7/3/95	9:20		
Sediment Silt	SD	Hot Spot	HS							
Other	OR	Resample	RS							
Vegetation	VE	Background	BG							
Ground Water	GW	Routine	RT							
Surface Water	SW	Special	SP							
This package conforms to the conditions and limitations specified in 49CFR173.421 for excepted radioactive material, limited quantity, n.o.s., UN 2910.										
Shipper: TMA/ERCRUNI 9170 LATTY AVE BERKELEY, MI 48214		Ship to: TMA/ERCRUNI 601 SCARBORO RD. OAK RIDGE, TN 37830 177N. SAMPLE LOC LN							Page 3 of 3 2070	
Shipping Container meets DOT Transferable Criteria <input checked="" type="checkbox"/>										
Shipping container dose rate <u>0.2</u> mrem/hr.										

**TMA/OAK RIDGE LABORATORY  
TRACER REPORT**

**D-22070**

**8/2/95**

**Work Order # 95-07-001-OR**

<b>BECHTEL SAMPLE ID</b>	<b>ANALYTE</b>	<b>TRACER</b>	<b>RECOVERY</b>
140QS001	RA-226	BA-133	92%
140QS001	TH-228	TH-229	43% ✓
140QS001	TH-230	TH-229	43% ✓
140QS001	TH-232	TH-229	43% ✓
140QS001	U-234	U-232	52%
140QS001	U-235	U-232	52%
140QS001	U-238	U-232	52%
140QS002	RA-226	BA-133	79%
140QS002	TH-228	TH-229	43% ✓
140QS002	TH-230	TH-229	43% ✓
140QS002	TH-232	TH-229	43% ✓
140QS002	U-234	U-232	60%
140QS002	U-235	U-232	60%
140QS002	U-238	U-232	60%
140QS003	RA-226	BA-133	86% ✓
140QS003	TH-228	TH-229	38%
140QS003	TH-230	TH-229	38% ✓
140QS003	TH-232	TH-229	38% ✓
140QS003	U-234	U-232	55%
140QS003	U-235	U-232	55%
140QS003	U-238	U-232	55%
140QS004	RA-226	BA-133	83%
140QS004	TH-228	TH-229	53%
140QS004	TH-230	TH-229	53%
140QS004	TH-232	TH-229	53%
140QS004	U-234	U-232	56%

**TMA/OAK RIDGE LABORATORY**  
**TRACER REPORT**

D-22070

8/2/95

Work Order # 95-07-001-OR

BECHTEL SAMPLE ID	ANALYTE	TRACER	RECOVERY
140QS004	U-235	U-232	56%
140QS004	U-238	U-232	56%
140QS005	RA-226	BA-133	60%
140QS005	TH-228	TH-229	64%
140QS005	TH-230	TH-229	64%
140QS005	TH-232	TH-229	64%
140QS005	U-234	U-232	56%
140QS005	U-235	U-232	56%
140QS005	U-238	U-232	56%
140QS006	RA-226	BA-133	60%
140QS006	TH-228	TH-229	64%
140QS006	TH-230	TH-229	64%
140QS006	TH-232	TH-229	64%
140QS006	U-234	U-232	45% /
140QS006	U-235	U-232	45% /
140QS006	U-238	U-232	45% /
140QS007	RA-226	BA-133	87%
140QS007	TH-228	TH-229	59%
140QS007	TH-230	TH-229	59%
140QS007	TH-232	TH-229	59%
140QS007	U-234	U-232	59%
140QS007	U-235	U-232	59%
140QS007	U-238	U-232	59%
140QS015	RA-226	BA-133	81%
140QS015	TH-228	TH-229	51%
140QS015	TH-230	TH-229	51%

**TMA/OAK RIDGE LABORATORY  
TRACER REPORT**

**D-22070**

**8/2/95**

**Work Order # 95-07-001-OR**

<b>BECHTEL SAMPLE ID</b>	<b>ANALYTE</b>	<b>TRACER</b>	<b>RECOVERY</b>
140QS015	TH-232	TH-229	51%
140QS015	U-234	U-232	64%
140QS015	U-235	U-232	64%
140QS015	U-238	U-232	64%
140QS016	RA-226	BA-133	85%
140QS016	TH-228	TH-229	57%
140QS016	TH-230	TH-229	57%
140QS016	TH-232	TH-229	57%
140QS016	U-234	U-232	57%
140QS016	U-235	U-232	57%
140QS016	U-238	U-232	57%
140QS017	RA-226	BA-133	84%
140QS017	TH-228	TH-229	57%
140QS017	TH-230	TH-229	57%
140QS017	TH-232	TH-229	57%
140QS017	U-234	U-232	51%
140QS017	U-235	U-232	51%
140QS017	U-238	U-232	51%

**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Post-Remedial Action Soil Sample Results (Data)**

**SAMPLES:**

**140-QS-008  
140-QS-009  
140-QS-010  
140-QS-011  
140-QS-012  
140-QS-013  
140-QS-014**

## FLAGGED SAMPLE RESULTS REPRT

TMA/Eberline Number:	E-16325	Sampling Event:	HISSCH95
Work Order Number:	E9507002	DATAFUSR Number:	D-22071
Customer Number:	441	Date Received:	07/03/95
Environmental Category:	RI	Date Analyzed:	07/17/95

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BN1 MDA	Flag	Qualifier Code
	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
140QS008	06/28/95	0.00	0.50	SL	1.003	DRY	REG	RA-226	1.00	0.34	PCI/G	ALPHASPEC	0.19		
140QS008	06/28/95	0.00	0.50	SL	1.003	DRY	REG	RA-228	3.70	1.10	PCI/G	BETAGPC	0.55		
140QS008	06/28/95	0.00	0.50	SL	1.004	DRY	REG	TH-228	0.83	0.32	PCI/G	ALPHASPEC	0.12	U	BLK
140QS008	06/28/95	0.00	0.50	SL	1.004	DRY	REG	TH-230	2.10	0.60	PCI/G	ALPHASPEC	0.05	U	BLK
140QS008	06/28/95	0.00	0.50	SL	1.004	DRY	REG	TH-232	0.85	0.32	PCI/G	ALPHASPEC	0.05		
140QS008	06/28/95	0.00	0.50	SL	1.064	DRY	REG	U-234	1.40	0.50	PCI/G	ALPHASPEC	0.11	U	BLK
140QS008	06/28/95	0.00	0.50	SL	1.064	DRY	REG	U-235	0.10	0.10	PCI/G	ALPHASPEC	0.07		
140QS008	06/28/95	0.00	0.50	SL	1.064	DRY	REG	U-238	1.60	0.55	PCI/G	ALPHASPEC	0.09	U	BLK
140QS009	06/28/95	0.00	0.50	SL	1.009	DRY	REG	RA-226	2.40	0.58	PCI/G	ALPHASPEC	0.29		
140QS009	06/28/95	0.00	0.50	SL	1.009	DRY	REG	RA-228	3.00	1.00	PCI/G	BETAGPC	0.50		
140QS009	06/28/95	0.00	0.50	SL	1.007	DRY	REG	TH-228	1.10	0.39	PCI/G	ALPHASPEC	0.11		
140QS009	06/28/95	0.00	0.50	SL	1.007	DRY	REG	TH-230	8.80	2.20	PCI/G	ALPHASPEC	0.06		
140QS009	06/28/95	0.00	0.50	SL	1.007	DRY	REG	TH-232	1.10	0.40	PCI/G	ALPHASPEC	0.06		
140QS009	06/28/95	0.00	0.50	SL	1.041	DRY	REG	U-234	1.90	0.66	PCI/G	ALPHASPEC	0.06	U	BLK
140QS009	06/28/95	0.00	0.50	SL	1.041	DRY	REG	U-235	0.14	0.13	PCI/G	ALPHASPEC	0.08		
140QS009	06/28/95	0.00	0.50	SL	1.041	DRY	REG	U-238	2.10	0.72	PCI/G	ALPHASPEC	0.06	U	BLK
140QS010	06/28/95	0.00	0.50	SL	1.023	DRY	REG	RA-226	1.10	0.33	PCI/G	ALPHASPEC	0.11		
140QS010	06/28/95	0.00	0.50	SL	1.023	DRY	REG	RA-228	2.90	1.00	PCI/G	BETAGPC	0.53		
140QS010	06/28/95	0.00	0.50	SL	1.010	DRY	REG	TH-228	1.40	0.54	PCI/G	ALPHASPEC	0.17	J	TCR
140QS010	06/28/95	0.00	0.50	SL	1.010	DRY	REG	TH-230	3.50	1.10	PCI/G	ALPHASPEC	0.19	J	TCR
140QS010	06/28/95	0.00	0.50	SL	1.010	DRY	REG	TH-232	1.40	0.54	PCI/G	ALPHASPEC	0.08	J	TCR
140QS010	06/28/95	0.00	0.50	SL	1.059	DRY	REG	U-234	1.40	0.53	PCI/G	ALPHASPEC	0.10	U	BLK
140QS010	06/28/95	0.00	0.50	SL	1.059	DRY	REG	U-235	0.05	0.08	PCI/G	ALPHASPEC	0.13	UJ	EGR
140QS010	06/28/95	0.00	0.50	SL	1.059	DRY	REG	U-238	1.60	0.57	PCI/G	ALPHASPEC	0.12	U	BLK
140QS011	06/28/95	0.00	0.50	SL	1.036	DRY	REG	RA-226	1.40	0.38	PCI/G	ALPHASPEC	0.11		
140QS011	06/28/95	0.00	0.50	SL	1.036	DRY	REG	RA-228	2.20	1.10	PCI/G	BETAGPC	0.59		
140QS011	06/28/95	0.00	0.50	SL	1.095	DRY	REG	TH-228	1.20	0.44	PCI/G	ALPHASPEC	0.11		
140QS011	06/28/95	0.00	0.50	SL	1.095	DRY	REG	TH-230	2.20	0.69	PCI/G	ALPHASPEC	0.06	U	BLK
140QS011	06/28/95	0.00	0.50	SL	1.095	DRY	REG	TH-232	0.99	0.38	PCI/G	ALPHASPEC	0.11		
140QS011	06/28/95	0.00	0.50	SL	1.030	DRY	REG	U-234	2.00	0.66	PCI/G	ALPHASPEC	0.11	U	BLK

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-16325	Sampling Event:	HISCH95
Work Order Number:	E9507002	DATAFUSR Number:	D-22071
Customer Number:	441	Date Received:	07/03/95
Environmental Category:	RI	Date Analyzed:	07/10/95

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Qualifier Flag	Code
	Collected	Depth	Depth	Matrix												
140QS011	06/28/95	0.00	0.50	SL		1.030	DRY	REG	U-235	0.05	0.08	PCI/G	ALPHASPEC	0.12	UJ	EGR
140QS011	06/28/95	0.00	0.50	SL		1.030	DRY	REG	U-238	1.40	0.52	PCI/G	ALPHASPEC	0.06	U	BLK
140QS012	06/28/95	0.00	0.50	SL		1.102	DRY	REG	RA-226	1.50	0.42	PCI/G	ALPHASPEC	0.16		
140QS012	06/28/95	0.00	0.50	SL		1.102	DRY	REG	RA-228	2.40	0.80	PCI/G	BETAGPC	0.43		
140QS012	06/28/95	0.00	0.50	SL		1.022	DRY	REG	TH-228	1.30	0.43	PCI/G	ALPHASPEC	0.14		
140QS012	06/28/95	0.00	0.50	SL		1.022	DRY	REG	TH-230	1.70	0.50	PCI/G	ALPHASPEC	0.06	U	BLK
140QS012	06/28/95	0.00	0.50	SL		1.022	DRY	REG	TH-232	1.10	0.37	PCI/G	ALPHASPEC	0.09		
140QS012	06/28/95	0.00	0.50	SL		1.044	DRY	REG	U-234	1.80	0.62	PCI/G	ALPHASPEC	0.06	U	BLK
140QS012	06/28/95	0.00	0.50	SL		1.044	DRY	REG	U-235	0.03	0.05	PCI/G	ALPHASPEC	0.07	UJ	EGR
140QS012	06/28/95	0.00	0.50	SL		1.044	DRY	REG	U-238	1.80	0.60	PCI/G	ALPHASPEC	0.06	U	BLK
140QS013	06/28/95	0.00	0.50	SL		1.013	DRY	REG	RA-226	1.00	0.34	PCI/G	ALPHASPEC	0.14		
140QS013	06/28/95	0.00	0.50	SL		1.013	DRY	REG	RA-228	2.60	0.90	PCI/G	BETAGPC	0.47		
140QS013	06/28/95	0.00	0.50	SL		1.030	2RY	REG	TH-228	1.10	0.41	PCI/G	ALPHASPEC	0.17		
140QS013	06/28/95	0.00	0.50	SL		1.030	DRY	REG	TH-230	7.50	1.90	PCI/G	ALPHASPEC	0.16		
140QS013	06/28/95	0.00	0.50	SL		1.030	DRY	REG	TH-232	1.00	0.37	PCI/G	ALPHASPEC	0.06		
140QS013	06/28/95	0.00	0.50	SL		1.025	DRY	REG	U-234	1.50	0.57	PCI/G	ALPHASPEC	0.15	U	BLK
140QS013	06/28/95	0.00	0.50	SL		1.025	DRY	REG	U-235	0.06	0.09	PCI/G	ALPHASPEC	0.08	UJ	EGR
140QS013	06/28/95	0.00	0.50	SL		1.025	DRY	REG	U-238	1.90	0.68	PCI/G	ALPHASPEC	0.11	U	BLK
140QS014	06/29/95	0.00	0.50	SL		1.028	DRY	REG	RA-226	1.10	0.35	PCI/G	ALPHASPEC	0.15		
140QS014	06/29/95	0.00	0.50	SL		1.028	DRY	REG	RA-228	10.10	1.40	PCI/G	BETAGPC	0.50		
140QS014	06/29/95	0.00	0.50	SL		1.012	DRY	REG	TH-228	1.10	0.38	PCI/G	ALPHASPEC	0.11		
140QS014	06/29/95	0.00	0.50	SL		1.012	DRY	REG	TH-230	3.40	0.89	PCI/G	ALPHASPEC	0.11		
140QS014	06/29/95	0.00	0.50	SL		1.012	DRY	REG	TH-232	0.75	0.30	PCI/G	ALPHASPEC	0.13		
140QS014	06/29/95	0.00	0.50	SL		1.253	DRY	REG	U-234	1.80	0.61	PCI/G	ALPHASPEC	0.10	U	BLK
140QS014	06/29/95	0.00	0.50	SL		1.253	DRY	REG	U-235	0.05	0.07	PCI/G	ALPHASPEC	0.06	UJ	EGR
140QS014	06/29/95	0.00	0.50	SL		1.253	DRY	REG	U-238	1.90	0.65	PCI/G	ALPHASPEC	0.12	U	BLK

**TMA/Eberline**

601 Scarboro Rd.  
Oak Ridge, TN 37830  
(615) 481-0683 Fax (615) 483-4621

TMA-OR-3374

August 2, 1995

Mr. Jim McCague  
Bechtel National, Inc.  
P.O. Box 350  
Oak Ridge, TN 37831-0350

**CASE NARRATIVE**

Work Order #95-07-002-OR  
State of Utah Certificate #E-235

**SAMPLE RECEIPT**

This work order contains seven surface soil samples received 07/03/95. These samples were analyzed for Radium-226/228, Isotopic Thorium and Isotopic Uranium.

<u>CLIENT ID</u>	<u>LAB ID</u>	<u>CLIENT ID</u>	<u>LAB ID</u>
140QS008	95-07-002-04	140QS012	95-07-002-08
140QS009	95-07-002-05	140QS013	95-07-002-09
140QS010	95-07-002-06	140QS014	95-07-002-10
140QS011	95-07-002-07		

The file name for these samples is 9507002.TXT.

**ANALYTICAL METHODS**

Radium-226 was analyzed using EPA Method 903.0 modified. Radium-228 was analyzed using EPA Method 904.0 modified. Isotopic Thorium was analyzed using Method EML Th-01 modified. Isotopic Uranium was analyzed using Method EML U-02 modified.

**PROBLEMS OR UNUSUAL CIRCUMSTANCES**

Samples demonstrated significant matrix interference effects during the Radium analysis process. Sample # 140QS014 for Radium-228 appears to be biased positive. This is most likely due to matrix interferences which caused poor separation and potential carryover of other radionuclides present within this sample. Initial calibrations, self absorption factors, and tracer recoveries, where applicable, are within specified criteria. No other problems or unusual circumstances were noted during the analytical process.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.



M. R. McDougall,  
Laboratory Manager

Date: 8/21/95

## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	07/03/95
Work Order Number:	9507002		
Customer Number:	441	Date Analyzed	07/17/95
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical	
												Method	MDA
QCSPIKE	07/03/95	0.00	0.00	W	1		LCST	RA-226	26.60	1.20	PCI	ALPHASPEC	0.14
QCSPIKE	07/03/95	0.00	0.00	W	1		LCSF	RA-226	22.80	2.20	PCI	ALPHASPEC	0.14
QCSPIKE	07/03/95	0.00	0.00	W	1		LCST	RA-228	17.20	0.90	PCI	BETAGPC	0.70
QCSPIKE	07/03/95	0.00	0.00	W	1		LCSF	RA-228	19.90	2.10	PCI	BETAGPC	0.70
QCSPIKE	07/03/95	0.00	0.00	W	1		LCST	TH-228	5.10	0.18	PCI	ALPHASPEC	0.16
QCSPIKE	07/03/95	0.00	0.00	W	1		LCSF	TH-228	4.90	1.20	PCI	ALPHASPEC	0.16
QCSPIKE	07/03/95	0.00	0.00	W	1		LCST	TH-230	5.40	0.11	PCI	ALPHASPEC	0.18
QCSPIKE	07/03/95	0.00	0.00	W	1		LCSF	TH-230	5.30	1.30	PCI	ALPHASPEC	0.18
QCSPIKE	07/03/95	0.00	0.00	W	1		LCST	TH-232	5.10	0.18	PCI	ALPHASPEC	0.11
QCSPIKE	07/03/95	0.00	0.00	W	1		LCSF	TH-232	5.20	1.30	PCI	ALPHASPEC	0.11
QCSPIKE	07/03/95	0.00	0.00	W	1		LCST	U-234	8.40	0.32	PCI	ALPHASPEC	0.12
QCSPIKE	07/03/95	0.00	0.00	W	1		LCSF	U-234	7.70	2.20	PCI	ALPHASPEC	0.12
QCSPIKE	07/03/95	0.00	0.00	W	1		LCST	U-235	0.38	0.01	PCI	ALPHASPEC	0.07
QCSPIKE	07/03/95	0.00	0.00	W	1		LCSF	U-235	0.41	0.24	PCI	ALPHASPEC	0.07
QCSPIKE	07/03/95	0.00	0.00	W	1		LCST	U-238	8.20	0.31	PCI	ALPHASPEC	0.14
QCSPIKE	07/03/95	0.00	0.00	W	1		LCSF	U-238	8.40	2.40	PCI	ALPHASPEC	0.14
QCBLANK	07/03/95	0.00	0.00	W	1		PB	RA-226	0.04	0.06	PCI	ALPHASPEC	0.05
QCBLANK	07/03/95	0.00	0.00	W	1		PB	RA-228	0.10	0.60	PCI	BETAGPC	0.46
QCBLANK	07/03/95	0.00	0.00	W	1		PB	TH-228	0.17	0.13	PCI	ALPHASPEC	0.13
QCBLANK	07/03/95	0.00	0.00	W	1		PB	TH-230	0.58	0.50	PCI	ALPHASPEC	0.10
QCBLANK	07/03/95	0.00	0.00	W	1		PB	TH-232	0.11	0.10	PCI	ALPHASPEC	0.06
QCBLANK	07/03/95	0.00	0.00	W	1		PB	U-234	0.60	0.30	PCI	ALPHASPEC	0.07
QCBLANK	07/03/95	0.00	0.00	W	1		PB	U-235	-0.01	0.01	PCI	ALPHASPEC	0.14
QCBLANK	07/03/95	0.00	0.00	W	1		PB	U-238	0.86	0.38	PCI	ALPHASPEC	0.13
140QS008	06/28/95	0.00	0.50	SL	1.006	DRY	REPL	RA-226	1.30	0.38	PCI/G	ALPHASPEC	0.14
140QS008	06/28/95	0.00	0.50	SL	1.006	DRY	REPL	RA-228	2.20	0.90	PCI/G	BETAGPC	0.49
140QS008	06/28/95	0.00	0.50	SL	1.039	DRY	REPL	TH-228	0.99	0.42	PCI/G	ALPHASPEC	0.15
140QS008	06/28/95	0.00	0.50	SL	1.039	DRY	REPL	TH-230	3.10	0.97	PCI/G	ALPHASPEC	0.17
140QS008	06/28/95	0.00	0.50	SL	1.039	DRY	REPL	TH-232	1.40	0.52	PCI/G	ALPHASPEC	0.08
140QS008	06/28/95	0.00	0.50	SL	1.013	DRY	REPL	U-234	2.00	0.71	PCI/G	ALPHASPEC	0.11

Approved by:  
08/02/95  
M.M. Danner  
8/3/95

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D-22071

## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	07/03/95
Work Order Number:	9507002		
Customer Number:	441	Date Analyzed	07/10/95
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth		Bottom Depth		Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method		MDA
		Collected	Depth	Depth	Matrix												
140QS008	06/28/95	0.00	0.50	SL	1.013	DRY	REPL	U-235	0.03	0.06	PCI/G	ALPHASPEC	0.08				
140QS008	06/28/95	0.00	0.50	SL	1.013	DRY	REPL	U-238	2.50	0.83	PCI/G	ALPHASPEC	0.07				
140QS008	06/28/95	0.00	0.50	SL	1.003	DRY	REG	RA-226	1.00	0.34	PCI/G	ALPHASPEC	0.19				
140QS008	06/28/95	0.00	0.50	SL	1.003	DRY	REG	RA-228	3.70	1.10	PCI/G	BETAGPC	0.55				
140QS008	06/28/95	0.00	0.50	SL	1.004	DRY	REG	TH-228	0.83	0.32	PCI/G	ALPHASPEC	0.12				
140QS008	06/28/95	0.00	0.50	SL	1.004	DRY	REG	TH-230	2.10	0.60	PCI/G	ALPHASPEC	0.05				
140QS008	06/28/95	0.00	0.50	SL	1.004	DRY	REG	TH-232	0.85	0.32	PCI/G	ALPHASPEC	0.05				
140QS008	06/28/95	0.00	0.50	SL	1.064	DRY	REG	U-234	1.40	0.50	PCI/G	ALPHASPEC	0.11				
140QS008	06/28/95	0.00	0.50	SL	1.064	DRY	REG	U-235	0.10	0.10	PCI/G	ALPHASPEC	0.07				
140QS008	06/28/95	0.00	0.50	SL	1.064	DRY	REG	U-238	1.60	0.55	PCI/G	ALPHASPEC	0.09				
140QS009	06/28/95	0.00	0.50	SL	1.009	DRY	REG	RA-226	2.40	0.58	PCI/G	ALPHASPEC	0.29				
140QS009	06/28/95	0.00	0.50	SL	1.009	DRY	REG	RA-228	3.00	1.00	PCI/G	BETAGPC	0.50				
140QS009	06/28/95	0.00	0.50	SL	1.007	DRY	REG	TH-228	1.10	0.39	PCI/G	ALPHASPEC	0.11				
140QS009	06/28/95	0.00	0.50	SL	1.007	DRY	REG	TH-230	8.80	2.20	PCI/G	ALPHASPEC	0.06				
140QS009	06/28/95	0.00	0.50	SL	1.007	DRY	REG	TH-232	1.10	0.40	PCI/G	ALPHASPEC	0.06				
140QS009	06/28/95	0.00	0.50	SL	1.041	DRY	REG	U-234	1.90	0.66	PCI/G	ALPHASPEC	0.06				
140QS009	06/28/95	0.00	0.50	SL	1.041	DRY	REG	U-235	0.14	0.13	PCI/G	ALPHASPEC	0.08				
140QS009	06/28/95	0.00	0.50	SL	1.041	DRY	REG	U-238	2.10	0.72	PCI/G	ALPHASPEC	0.06				
140QS010	06/28/95	0.00	0.50	SL	1.023	DRY	REG	RA-226	1.10	0.33	PCI/G	ALPHASPEC	0.11				
140QS010	06/28/95	0.00	0.50	SL	1.023	DRY	REG	RA-228	2.90	1.00	PCI/G	BETAGPC	0.53				
140QS010	06/28/95	0.00	0.50	SL	1.010	DRY	REG	TH-228	1.40	0.54	PCI/G	ALPHASPEC	0.17				
140QS010	06/28/95	0.00	0.50	SL	1.010	DRY	REG	TH-230	3.50	1.10	PCI/G	ALPHASPEC	0.19				
140QS010	06/28/95	0.00	0.50	SL	1.010	DRY	REG	TH-232	1.40	0.54	PCI/G	ALPHASPEC	0.08				
140QS010	06/28/95	0.00	0.50	SL	1.059	DRY	REG	U-234	1.40	0.53	PCI/G	ALPHASPEC	0.10				
140QS010	06/28/95	0.00	0.50	SL	1.059	DRY	REG	U-235	0.05	0.08	PCI/G	ALPHASPEC	0.13				
140QS010	06/28/95	0.00	0.50	SL	1.059	DRY	REG	U-238	1.60	0.57	PCI/G	ALPHASPEC	0.12				
140QS011	06/28/95	0.00	0.50	SL	1.036	DRY	REG	RA-226	1.40	0.38	PCI/G	ALPHASPEC	0.11				
140QS011	06/28/95	0.00	0.50	SL	1.036	DRY	REG	RA-228	2.20	1.10	PCI/G	BETAGPC	0.59				
140QS011	06/28/95	0.00	0.50	SL	1.095	DRY	REG	TH-228	1.20	0.44	PCI/G	ALPHASPEC	0.11				
140QS011	06/28/95	0.00	0.50	SL	1.095	DRY	REG	TH-230	2.20	0.69	PCI/G	ALPHASPEC	0.06				

Approved by:  
08/02/95

M. R. Dugger  
8/3/95

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D-22071

## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	07/03/95
Work Order Number:	9507002	Date Received	07/03/95
Customer Number:	441	Date Analyzed	07/10/95
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/O	Smp_type	Analyte	Analytical				MDA
										Result	Error	Units	Method	
140QS011	06/28/95	0.00	0.50	SL		1.095	ORY	REG	TH-232	0.99	0.38	PCI/G	ALPHASPEC	0.11
140QS011	06/28/95	0.00	0.50	SL		1.030	ORY	REG	U-234	2.00	0.66	PCI/G	ALPHASPEC	0.11
140QS011	06/28/95	0.00	0.50	SL		1.030	ORY	REG	U-235	0.05	0.08	PCI/G	ALPHASPEC	0.12
140QS011	06/28/95	0.00	0.50	SL		1.030	ORY	REG	U-238	1.40	0.52	PCI/G	ALPHASPEC	0.06
140QS012	06/28/95	0.00	0.50	SL		1.102	DRY	REG	RA-226	1.50	0.42	PCI/G	ALPHASPEC	0.16
140QS012	06/28/95	0.00	0.50	SL		1.102	ORY	REG	RA-228	2.40	0.80	PCI/G	BETAGPC	0.43
140QS012	06/28/95	0.00	0.50	SL		1.022	DRY	REG	TH-228	1.30	0.43	PCI/G	ALPHASPEC	0.14
140QS012	06/28/95	0.00	0.50	SL		1.022	ORY	REG	TH-230	1.70	0.50	PCI/G	ALPHASPEC	0.06
140QS012	06/28/95	0.00	0.50	SL		1.022	ORY	REG	TH-232	1.10	0.37	PCI/G	ALPHASPEC	0.09
140QS012	06/28/95	0.00	0.50	SL		1.044	DRY	REG	U-234	1.80	0.62	PCI/G	ALPHASPEC	0.06
140QS012	06/28/95	0.00	0.50	SL		1.044	ORY	REG	U-235	0.03	0.05	PCI/G	ALPHASPEC	0.07
140QS012	06/28/95	0.00	0.50	SL		1.044	ORY	REG	U-238	1.80	0.60	PCI/G	ALPHASPEC	0.06
140QS013	06/28/95	0.00	0.50	SL		1.013	ORY	REG	RA-226	1.00	0.34	PCI/G	ALPHASPEC	0.14
140QS013	06/28/95	0.00	0.50	SL		1.013	ORY	REG	RA-228	2.60	0.90	PCI/G	BETAGPC	0.47
140QS013	06/28/95	0.00	0.50	SL		1.030	DRY	REG	TH-228	1.10	0.41	PCI/G	ALPHASPEC	0.17
140QS013	06/28/95	0.00	0.50	SL		1.030	ORY	REG	TH-230	7.50	1.90	PCI/G	ALPHASPEC	0.16
140QS013	06/28/95	0.00	0.50	SL		1.030	ORY	REG	TH-232	1.00	0.37	PCI/G	ALPHASPEC	0.06
140QS013	06/28/95	0.00	0.50	SL		1.025	DRY	REG	U-234	1.50	0.57	PCI/G	ALPHASPEC	0.15
140QS013	06/28/95	0.00	0.50	SL		1.025	ORY	REG	U-235	0.06	0.09	PCI/G	ALPHASPEC	0.08
140QS013	06/28/95	0.00	0.50	SL		1.025	ORY	REG	U-238	1.90	0.68	PCI/G	ALPHASPEC	0.11
140QS014	06/29/95	0.00	0.50	SL		1.028	DRY	REG	RA-226	1.10	0.35	PCI/G	ALPHASPEC	0.15
140QS014	06/29/95	0.00	0.50	SL		1.028	ORY	REG	RA-228	10.10	1.40	PCI/G	BETAGPC	0.50
140QS014	06/29/95	0.00	0.50	SL		1.012	DRY	REG	TH-228	1.10	0.38	PCI/G	ALPHASPEC	0.11
140QS014	06/29/95	0.00	0.50	SL		1.012	ORY	REG	TH-230	3.40	0.89	PCI/G	ALPHASPEC	0.11
140QS014	06/29/95	0.00	0.50	SL		1.012	ORY	REG	TH-232	0.75	0.30	PCI/G	ALPHASPEC	0.13
140QS014	06/29/95	0.00	0.50	SL		1.253	DRY	REG	U-234	1.80	0.61	PCI/G	ALPHASPEC	0.10
140QS014	06/29/95	0.00	0.50	SL		1.253	ORY	REG	U-235	0.05	0.07	PCI/G	ALPHASPEC	0.06
140QS014	06/29/95	0.00	0.50	SL		1.253	ORY	REG	U-238	1.90	0.65	PCI/G	ALPHASPEC	0.12

Approved by:  
08/02/95

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**TMA/Eberline**  
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D-22071

95-07-032

AIRBILL NO. 2520071175	FIELD SAMPLE FORM SITE ACTIVITY SAMPLES								Samplers (print name then sign) <i>M. PHILLIPS</i> <i>M. Phillips</i>	
Site Name: HISS NOLPAS #602		WBS No.: 140				Activity Support (Job) No.: 441				
Sample ID Sample Grid Point	Sample Type (1)	Sample Time DATE	Date of Sample Time	Preserved with	Purpose (2)	Depth cm ft	Priority (Days)	Analysis Required		Remarks
4- 140QS008 N15 E35	SS	6-28-95	1245	NA	VR	0-0.5	7	Tso-U, Tso-TH RA-226, RA-228		QUAKER STATE
5- 140QS009 N25 E5			1320							
6- 140QS010 N25 E15			1355							
7- 140QS011 N25 E25			1410							
8- 140QS012 N25 E35			1430							
9- 140QS013 N35 E5			1500							
10- 140QS014 N35 E15		6-29-95	0830							
SAMPLE TYPE (1)		PURPOSE (2)		CHAIN OF CUSTODY RECORD						
Surface Soil	SS	Rad Character	RC	REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME		
Bias Soil	BS	Verification	VR	<i>ANALYSIS</i>	<i>M. Phillips</i>	AIRBORNE UNPLS	6-30-95	1500	Recorded by: <i>M. Phillips</i>	
Profile Soil	PS	Quality Control	QC	<i>analysis</i>	<i>Auburn</i>	C. Bolen	7/3/95	9:20	Date: 6-30-95 Time: 1500	
Sediment Silt	SD	Hot Spot	HS						Total number of samples in this box: 20	
Other	OR	Resample	RS						Total number of samples in this shipment: 20	
Vegetation	VE	Background	BG						Total number of boxes in this shipment: 12	
Ground Water	GW	Routine	RT							
Surface Water	SW	Special	SP							
"This package conforms to the conditions and limitations specified in 49CFR173.421 for excepted radioactive material, limited quantity, n.o.s., UN 2910."										
Shipper: <i>TNT/CSCLINE</i> 9100 LAFAYETTE AVE BERKELEY, MI 48134				Ship to: <i>TNT/CSCLINE</i> 601 SCARABEE ROAD OAK RIDGE, TN 37820 ATTN: SAMPLE LOG IN						
Page 2 of 3										

**TMA/OAK RIDGE LABORATORY  
TRACER REPORT**

**D-22071**

**8/2/95**

**Work Order # 95-07-002-OR**

<b>BECHTEL SAMPLE ID</b>	<b>ANALYTE</b>	<b>TRACER</b>	<b>RECOVERY</b>
140QS008	RA-226	BA-133	88%
140QS008	TH-228	TH-229	58%
140QS008	TH-230	TH-229	58%
140QS008	TH-232	TH-229	58%
140QS008	U-234	U-232	57%
140QS008	U-235	U-232	57%
140QS008	U-238	U-232	57%
140QS009	RA-226	BA-133	79%
140QS009	TH-228	TH-229	57%
140QS009	TH-230	TH-229	57%
140QS009	TH-232	TH-229	57%
140QS009	U-234	U-232	50%
140QS009	U-235	U-232	50%
140QS009	U-238	U-232	50%
140QS010	RA-226	BA-133	70%
140QS010	TH-228	TH-229	41% ✓
140QS010	TH-230	TH-229	41% ✓
140QS010	TH-232	TH-229	41% ✓
140QS010	U-234	U-232	50%
140QS010	U-235	U-232	50%
140QS010	U-238	U-232	50%
140QS011	RA-226	BA-133	71%
140QS011	TH-228	TH-229	52%
140QS011	TH-230	TH-229	52%
140QS011	TH-232	TH-229	52%
140QS011	U-234	U-232	55%

**TMA/OAK RIDGE LABORATORY  
TRACER REPORT**

**D-22071**

**8/2/95**

**Work Order # 95-07-002-OR**

<b>BECHTEL SAMPLE ID</b>	<b>ANALYTE</b>	<b>TRACER</b>	<b>RECOVERY</b>
140QS011	U-235	U-232	55%
140QS011	U-238	U-232	55%
140QS012	RA-226	BA-133	82%
140QS012	TH-228	TH-229	68%
140QS012	TH-230	TH-229	68%
140QS012	TH-232	TH-229	68%
140QS012	U-234	U-232	57%
140QS012	U-235	U-232	57%
140QS012	U-238	U-232	57%
140QS013	RA-226	BA-133	80%
140QS013	TH-228	TH-229	66%
140QS013	TH-230	TH-229	66%
140QS013	TH-232	TH-229	66%
140QS013	U-234	U-232	50%
140QS013	U-235	U-232	50%
140QS013	U-238	U-232	50%
140QS014	RA-226	BA-133	81%
140QS014	TH-228	TH-229	62%
140QS014	TH-230	TH-229	62%
140QS014	TH-232	TH-229	62%
140QS014	U-234	U-232	55%
140QS014	U-235	U-232	55%
140QS014	U-238	U-232	55%

## **POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

### **Post-Remedial Action Soil Sample Results (Data)**

#### **SAMPLES:**

<b>140-QS-018</b>	<b>140-QS-026</b>
<b>140-QS-019</b>	<b>140-QS-027</b>
<b>140-QS-020</b>	<b>140-QS-028</b>
<b>140-QS-021</b>	<b>140-QS-029</b>
<b>140-QS-022</b>	<b>140-QS-030</b>
<b>140-QS-023</b>	<b>140-QS-031</b>
<b>140-QS-024</b>	<b>140-QS-032</b>
<b>140-QS-025</b>	

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-16265	Sampling Event:	HIS_CH95
Work Order Number:	E9507012	DATAFUSR Number:	D-21985
Customer Number:	441	Date Received:	07/06/95
Environmental Category:	RI	Date Analyzed:	07/15/95

Sample ID	Date Collected	Top	Bottom	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	MDA	BNI	Qualifier
		Depth	Depth													
140QS018	07/03/95	0.00	0.50	SL		1.035	DRY	REG	RA-226	1.60	0.30	PCI/G	ALPHASPEC	0.07		
140QS018	07/03/95	0.00	0.50	SL		1.035	DRY	REG	RA-228	1.80	1.00	PCI/G	BETAGPC	0.52	U	BLK
140QS018	07/03/95	0.00	0.50	SL		1.019	DRY	REG	TH-228	0.65	0.27	PCI/G	ALPHASPEC	0.12		
140QS018	07/03/95	0.00	0.50	SL		1.019	DRY	REG	TH-230	7.80	1.90	PCI/G	ALPHASPEC	0.11	J	LCS
140QS018	07/03/95	0.00	0.50	SL		1.019	DRY	REG	TH-232	0.53	0.24	PCI/G	ALPHASPEC	0.10		
140QS018	07/03/95	0.00	0.50	SL		1.049	DRY	REG	U-234	1.70	0.60	PCI/G	ALPHASPEC	0.12	U	BLK
140QS018	07/03/95	0.00	0.50	SL		1.049	DRY	REG	U-235	0.16	0.14	PCI/G	ALPHASPEC	0.07		
140QS018	07/03/95	0.00	0.50	SL		1.049	DRY	REG	U-238	2.10	0.70	PCI/G	ALPHASPEC	0.10	U	BLK
140QS019	07/03/95	0.00	0.50	SL		1.019	DRY	REG	RA-226	1.40	0.30	PCI/G	ALPHASPEC	0.07		
140QS019	07/03/95	0.00	0.50	SL		1.019	DRY	REG	RA-228	2.30	0.90	PCI/G	BETAGPC	0.44	U	BLK
140QS019	07/03/95	0.00	0.50	SL		1.011	DRY	REG	TH-228	0.66	0.27	PCI/G	ALPHASPEC	0.12		
140QS019	07/03/95	0.00	0.50	SL		1.011	DRY	REG	TH-230	3.40	0.88	PCI/G	ALPHASPEC	0.05	J	LCS
140QS019	07/03/95	0.00	0.50	SL		1.011	DRY	REG	TH-232	0.71	0.28	PCI/G	ALPHASPEC	0.05		
140QS019	07/03/95	0.00	0.50	SL		1.101	DRY	REG	U-234	1.70	0.54	PCI/G	ALPHASPEC	0.05	U	BLK
140QS019	07/03/95	0.00	0.50	SL		1.101	DRY	REG	U-235	0.07	0.08	PCI/G	ALPHASPEC	0.06	UJ	EGR
140QS019	07/03/95	0.00	0.50	SL		1.101	DRY	REG	U-238	1.80	0.58	PCI/G	ALPHASPEC	0.05	U	BLK
140QS020	07/03/95	0.00	0.50	SL		1.002	DRY	REG	RA-226	1.30	0.30	PCI/G	ALPHASPEC	0.08		
140QS020	07/03/95	0.00	0.50	SL		1.002	DRY	REG	RA-228	1.80	1.00	PCI/G	BETAGPC	0.53	U	BLK
140QS020	07/03/95	0.00	0.50	SL		1.006	DRY	REG	TH-228	0.93	0.35	PCI/G	ALPHASPEC	0.10		
140QS020	07/03/95	0.00	0.50	SL		1.006	DRY	REG	TH-230	2.90	0.80	PCI/G	ALPHASPEC	0.10	J	LCS
140QS020	07/03/95	0.00	0.50	SL		1.006	DRY	REG	TH-232	0.55	0.24	PCI/G	ALPHASPEC	0.06		
140QS020	07/03/95	0.00	0.50	SL		1.069	DRY	REG	U-234	1.70	0.66	PCI/G	ALPHASPEC	0.12	J	TCR
140QS020	07/03/95	0.00	0.50	SL		1.069	DRY	REG	U-235	0.19	0.17	PCI/G	ALPHASPEC	0.15	J	TCR
140QS020	07/03/95	0.00	0.50	SL		1.069	DRY	REG	U-238	1.90	0.71	PCI/G	ALPHASPEC	0.15	J	TCR
140QS021	07/03/95	0.00	0.50	SL		1.052	DRY	REG	RA-226	1.20	0.30	PCI/G	ALPHASPEC	0.07		
140QS021	07/03/95	0.00	0.50	SL		1.052	DRY	REG	RA-228	1.40	0.80	PCI/G	BETAGPC	0.48	U	BLK
140QS021	07/03/95	0.00	0.50	SL		1.053	DRY	REG	TH-228	0.75	0.35	PCI/G	ALPHASPEC	0.17	J	TCR
140QS021	07/03/95	0.00	0.50	SL		1.053	DRY	REG	TH-230	3.60	1.10	PCI/G	ALPHASPEC	0.08	J	LCS
140QS021	07/03/95	0.00	0.50	SL		1.053	DRY	REG	TH-232	1.20	0.48	PCI/G	ALPHASPEC	0.08	J	TCR
140QS021	07/03/95	0.00	0.50	SL		1.022	DRY	REG	U-234	1.40	0.50	PCI/G	ALPHASPEC	0.11	U	BLK

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-16265	Sampling Event:	HIS_CH95
Work Order Number:	E9507012	DATAFUSR Number:	D-21985
Customer Number:	441	Date Received:	07/06/95
Environmental Category:	RI	Date Analyzed:	07/11/95

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Flag	Qualifier Code
140QS021	07/03/95	0.00	0.50	SL		1.022	DRY	REG	U-235	0.07	0.09	PCI/G	ALPHASPEC	0.11	UJ	EGR
140QS021	07/03/95	0.00	0.50	SL		1.022	DRY	REG	U-238	1.60	0.55	PCI/G	ALPHASPEC	0.05	U	BLK
140QS022	07/03/95	0.00	0.50	SL		1.003	DRY	REG	RA-226	1.10	0.30	PCI/G	ALPHASPEC	0.06		
140QS022	07/03/95	0.00	0.50	SL		1.003	DRY	REG	RA-228	1.90	0.80	PCI/G	BETAGPC	0.43	U	BLK
140QS022	07/03/95	0.00	0.50	SL		.9997	DRY	REG	TH-228	0.80	0.40	PCI/G	ALPHASPEC	0.19	J	TCR
140QS022	07/03/95	0.00	0.50	SL		.9997	DRY	REG	TH-230	3.10	1.00	PCI/G	ALPHASPEC	0.10	J	LCS
140QS022	07/03/95	0.00	0.50	SL		.9997	DRY	REG	TH-232	0.75	0.38	PCI/G	ALPHASPEC	0.21	J	TCR
140QS022	07/03/95	0.00	0.50	SL		1.026	DRY	REG	U-234	1.60	0.58	PCI/G	ALPHASPEC	0.07	U	BLK
140QS022	07/03/95	0.00	0.50	SL		1.026	DRY	REG	U-235	0.27	0.20	PCI/G	ALPHASPEC	0.08		
140QS022	07/03/95	0.00	0.50	SL		1.026	DRY	REG	U-238	1.60	0.59	PCI/G	ALPHASPEC	0.07	U	BLK
140QS023	07/05/95	0.00	0.50	SL		1.073	DRY	REG	RA-226	1.10	0.30	PCI/G	ALPHASPEC	0.09		
140QS023	07/05/95	0.00	0.50	SL		1.073	DRY	REG	RA-228	2.90	3.40	PCI/G	BETAGPC	2.12	UJ	EGR
140QS023	07/05/95	0.00	0.50	SL		1.048	DRY	REG	TH-228	0.56	0.34	PCI/G	ALPHASPEC	0.22	J	TCR
140QS023	07/05/95	0.00	0.50	SL		1.048	DRY	REG	TH-230	6.50	2.10	PCI/G	ALPHASPEC	0.22	J	LCS
140QS023	07/05/95	0.00	0.50	SL		1.048	DRY	REG	TH-232	0.52	0.33	PCI/G	ALPHASPEC	0.19	J	TCR
140QS023	07/05/95	0.00	0.50	SL		1.039	DRY	REG	U-234	2.10	0.73	PCI/G	ALPHASPEC	0.14	U	BLK
140QS023	07/05/95	0.00	0.50	SL		1.039	DRY	REG	U-235	0.03	0.06	PCI/P	ALPHASPEC	0.08	UJ	MTH
140QS023	07/05/95	0.00	0.50	SL		1.039	DRY	REG	U-238	2.00	0.67	PCI/G	ALPHASPEC	0.11	U	BLK
140QS024	07/05/95	0.00	0.50	SL		1.003	DRY	REG	RA-226	1.80	0.80	PCI/G	ALPHASPEC	0.29		
140QS024	07/05/95	0.00	0.50	SL		1.003	DRY	REG	RA-228	3.40	2.90	PCI/G	BETAGPC	1.79	U	BLK
140QS024	07/05/95	0.00	0.50	SL		1.003	DRY	REG	TH-228	0.42	0.24	PCI/G	ALPHASPEC	0.17	J	TCR
140QS024	07/05/95	0.00	0.50	SL		1.003	DRY	REG	TH-230	2.20	0.73	PCI/G	ALPHASPEC	0.15	J	LCS
140QS024	07/05/95	0.00	0.50	SL		1.003	DRY	REG	TH-232	0.48	0.26	PCI/G	ALPHASPEC	0.13	J	TCR
140QS024	07/05/95	0.00	0.50	SL		1.086	DRY	REG	U-234	1.90	0.67	PCI/G	ALPHASPEC	0.12	U	BLK
140QS024	07/05/95	0.00	0.50	SL		1.086	DRY	REG	U-235	0.08	0.10	PCI/G	ALPHASPEC	0.07	UJ	EGR
140QS024	07/05/95	0.00	0.50	SL		1.086	DRY	REG	U-238	2.10	0.74	PCI/G	ALPHASPEC	0.15	U	BLK
140QS025	07/05/95	0.00	0.50	SL		1.005	DRY	REG	RA-226	0.80	0.30	PCI/G	ALPHASPEC	0.07		
140QS025	07/05/95	0.00	0.50	SL		1.005	DRY	REG	RA-228	2.10	1.10	PCI/G	BETAGPC	0.65	U	BLK
140QS025	07/05/95	0.00	0.50	SL		1.111	DRY	REG	TH-228	0.51	0.35	PCI/G	ALPHASPEC	0.26	J	TCR
140QS025	07/05/95	0.00	0.50	SL		1.111	DRY	REG	TH-230	3.50	1.40	PCI/G	ALPHASPEC	0.13	J	LCS

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-16265	Sampling Event:	HIS_CH95
Work Order Number:	E9507012	DATAFUSR Number:	D-21985
Customer Number:	441	Date Received:	07/06/95
Environmental Category:	RI	Date Analyzed:	07/11/95

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI Qualifier		
														MDA	Flag	Code
140QS025	07/05/95	0.00	0.50	SL		1.111	DRY	REG	TH-232	1.10	0.56	PCI/G	ALPHASPEC	0.22	J	TCR
140QS025	07/05/95	0.00	0.50	SL		1.053	DRY	REG	U-234	2.60	0.97	PCI/G	ALPHASPEC	0.15	J	TCR
140QS025	07/05/95	0.00	0.50	SL		1.053	DRY	REG	U-235	0.08	0.11	PCI/G	ALPHASPEC	0.11	UJ	EGR
140QS025	07/05/95	0.00	0.50	SL		1.053	DRY	REG	U-238	3.20	1.20	PCI/G	ALPHASPEC	0.17	J	TCR
140QS026	07/05/95	0.00	0.50	SL		1.012	DRY	REG	RA-226	0.70	0.30	PCI/G	ALPHASPEC	0.10		
140QS026	07/05/95	0.00	0.50	SL		1.012	DRY	REG	RA-228	5.00	1.70	PCI/G	BETAGPC	0.85	U	BLK
140QS026	07/05/95	0.00	0.50	SL		1.046	DRY	REG	TH-228	0.43	0.30	PCI/G	ALPHASPEC	0.24	J	TCR
140QS026	07/05/95	0.00	0.50	SL		1.046	DRY	REG	TH-230	1.60	0.70	PCI/G	ALPHASPEC	0.19	J	LCS
140QS026	07/05/95	0.00	0.50	SL		1.046	DRY	REG	TH-232	0.52	0.33	PCI/G	ALPHASPEC	0.11	J	TCR
140QS026	07/05/95	0.00	0.50	SL		1.017	DRY	REG	U-234	1.50	0.50	PCI/G	ALPHASPEC	0.05	U	BLK
140QS026	07/05/95	0.00	0.50	SL		1.017	DRY	REG	U-235	0.02	0.05	PCI/G	ALPHASPEC	0.07	UJ	EGR
140QS026	07/05/95	0.00	0.50	SL		1.017	DRY	REG	U-238	1.90	0.60	PCI/G	ALPHASPEC	0.05	U	BLK
140QS027	07/05/95	0.00	0.50	SL		1.037	DRY	REG	RA-226	1.20	0.30	PCI/G	ALPHASPEC	0.08		
140QS027	07/05/95	0.00	0.50	SL		1.037	DRY	REG	RA-228	1.80	1.00	PCI/G	BETAGPC	0.57	U	BLK
140QS027	07/05/95	0.00	0.50	SL		1.100	DRY	REG	TH-228	0.61	0.34	PCI/G	ALPHASPEC	0.16	J	TCR
140QS027	07/05/95	0.00	0.50	SL		1.100	DRY	REG	TH-230	1.80	0.71	PCI/G	ALPHASPEC	0.09	J	LCS
140QS027	07/05/95	0.00	0.50	SL		1.100	DRY	REG	TH-232	0.58	0.32	PCI/G	ALPHASPEC	0.09	J	TCR
140QS027	07/05/95	0.00	0.50	SL		1.009	DRY	REG	U-234	1.60	0.58	PCI/G	ALPHASPEC	0.07	U	BLK
140QS027	07/05/95	0.00	0.50	SL		1.009	DRY	REG	U-235	0.09	0.11	PCI/G	ALPHASPEC	0.08	UJ	EGR
140QS027	07/05/95	0.00	0.50	SL		1.009	DRY	REG	U-238	2.70	0.89	PCI/G	ALPHASPEC	0.07		
140QS028	07/05/95	0.00	0.50	SL		1.019	DRY	REG	RA-226	1.20	0.30	PCI/G	ALPHASPEC	0.08		
140QS028	07/05/95	0.00	0.50	SL		1.019	DRY	REG	RA-228	1.30	1.00	PCI/G	BETAGPC	0.65	U	BLK
140QS028	07/05/95	0.00	0.50	SL		1.037	DRY	REG	TH-228	0.58	0.29	PCI/G	ALPHASPEC	0.16	J	TCR
140QS028	07/05/95	0.00	0.50	SL		1.037	DRY	REG	TH-230	3.60	1.10	PCI/G	ALPHASPEC	0.07	J	LCS
140QS028	07/05/95	0.00	0.50	SL		1.037	DRY	REG	TH-232	0.57	0.28	PCI/G	ALPHASPEC	0.07	J	TCR
140QS028	07/05/95	0.00	0.50	SL		1.032	DRY	REG	U-234	1.60	0.59	PCI/G	ALPHASPEC	0.13	U	BLK
140QS028	07/05/95	0.00	0.50	SL		1.032	DRY	REG	U-235	0.12	0.13	PCI/G	ALPHASPEC	0.08	UJ	EGR
140QS028	07/05/95	0.00	0.50	SL		1.032	DRY	REG	U-238	1.30	0.51	PCI/G	ALPHASPEC	0.11	U	BLK
140QS029	07/05/95	0.00	0.50	SL		1.018	DRY	REG	RA-226	1.30	0.40	PCI/G	ALPHASPEC	0.10		
140QS029	07/05/95	0.00	0.50	SL		1.018	DRY	REG	RA-228	1.70	1.30	PCI/G	BETAGPC	0.73	U	BLK

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-16265	Sampling Event:	HIS_CH95
Work Order Number:	E9507012	OATAFUSR Number:	0-21985
Customer Number:	441	Date Received:	07/06/95
Environmental Category:	RI	Date Analyzed:	07/11/95

Sample ID	Date Collected	Bottom		Matrix	F/UF	Vol.	W/O	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI		Qualifier
		Top Depth	Bottom Depth											MOA	Flag	
140QS029	07/05/95	0.00	0.50	SL		1.028	ORY	REG	TH-228	0.67	0.38	PCI/G	ALPHASPEC	0.18	J	TCR
140QS029	07/05/95	0.00	0.50	SL		1.028	ORY	REG	TH-230	2.10	0.80	PCI/G	ALPHASPEC	0.11	J	LCS
140QS029	07/05/95	0.00	0.50	SL		1.028	ORY	REG	TH-232	0.47	0.30	PCI/G	ALPHASPEC	0.18	J	TCR
140QS029	07/05/95	0.00	0.50	SL		1.001	ORY	REG	U-234	2.60	1.00	PCI/G	ALPHASPEC	0.17	J	TCR
140QS029	07/05/95	0.00	0.50	SL		1.001	ORY	REG	U-235	0.19	0.20	PCI/G	ALPHASPEC	0.13	UJ	EGR
140QS029	07/05/95	0.00	0.50	SL		1.001	ORY	REG	U-238	2.60	1.10	PCI/G	ALPHASPEC	0.10	J	TCR
140QS030	07/05/95	0.00	0.50	SL		1.004	ORY	REG	RA-226	1.60	0.40	PCI/G	ALPHASPEC	0.11		
140QS030	07/05/95	0.00	0.50	SL		1.004	ORY	REG	RA-228	8.70	1.70	PCI/G	BETAGPC	0.67		
140QS030	07/05/95	0.00	0.50	SL		1.008	ORY	REG	TH-228	0.51	0.27	PCI/G	ALPHASPEC	0.17	J	TCR
140QS030	07/05/95	0.00	0.50	SL		1.008	ORY	REG	TH-230	2.70	0.84	PCI/G	ALPHASPEC	0.13	J	LCS
140QS030	07/05/95	0.00	0.50	SL		1.008	ORY	REG	TH-232	0.80	0.35	PCI/G	ALPHASPEC	0.13	J	TCR
140QS030	07/05/95	0.00	0.50	SL		1.063	ORY	REG	U-234	1.50	0.54	PCI/G	ALPHASPEC	0.10	U	BLK
140QS030	07/05/95	0.00	0.50	SL		1.063	ORY	REG	U-235	0.05	0.08	PCI/G	ALPHASPEC	0.13	UJ	EGR
140QS030	07/05/95	0.00	0.50	SL		1.063	ORY	REG	U-238	1.70	0.58	PCI/G	ALPHASPEC	0.10	U	BLK
140QS031	07/05/95	0.00	0.50	SL		1.026	ORY	REG	RA-226	1.30	0.40	PCI/G	ALPHASPEC	0.12		
140QS031	07/05/95	0.00	0.50	SL		1.026	ORY	REG	RA-228	2.20	1.40	PCI/G	BETAGPC	0.75	U	BLK
140QS031	07/05/95	0.00	0.50	SL		1.157	ORY	REG	TH-228	0.57	0.28	PCI/G	ALPHASPEC	0.17	J	TCR
140QS031	07/05/95	0.00	0.50	SL		1.157	ORY	REG	TH-230	2.20	0.72	PCI/G	ALPHASPEC	0.19	J	LCS
140QS031	07/05/95	0.00	0.50	SL		1.157	ORY	REG	TH-232	0.58	0.28	PCI/G	ALPHASPEC	0.11	J	TCR
140QS031	07/05/95	0.00	0.50	SL		1.007	ORY	REG	U-234	1.20	0.44	PCI/G	ALPHASPEC	0.15	U	BLK
140QS031	07/05/95	0.00	0.50	SL		1.007	ORY	REG	U-235	-0.01	0.01	PCI/G	ALPHASPEC	0.12	UJ	EGR
140QS031	07/05/95	0.00	0.50	SL		1.007	ORY	REG	U-238	1.30	0.48	PCI/G	ALPHASPEC	0.10	U	BLK
140QS032	07/05/95	0.00	0.50	SL		1.010	ORY	REG	RA-226	1.30	0.40	PCI/G	ALPHASPEC	0.90		
140QS032	07/05/95	0.00	0.50	SL		1.010	ORY	REG	RA-228	2.60	1.20	PCI/G	BETAGPC	0.66	U	BLK
140QS032	07/05/95	0.00	0.50	SL		1.049	ORY	REG	TH-228	0.59	0.29	PCI/G	ALPHASPEC	0.16	J	TCR
140QS032	07/05/95	0.00	0.50	SL		1.049	ORY	REG	TH-230	2.20	0.70	PCI/G	ALPHASPEC	0.19	J	LCS
140QS032	07/05/95	0.00	0.50	SL		1.049	ORY	REG	TH-232	0.34	0.21	PCI/G	ALPHASPEC	0.07	J	TCR
140QS032	07/05/95	0.00	0.50	SL		1.029	ORY	REG	U-234	2.40	0.86	PCI/G	ALPHASPEC	0.21	J	TCR
140QS032	07/05/95	0.00	0.50	SL		1.029	ORY	REG	U-235	0.03	0.07	PCI/G	ALPHASPEC	0.09	UJ	EGR
140QS032	07/05/95	0.00	0.50	SL		1.029	ORY	REG	U-238	2.00	0.76	PCI/G	ALPHASPEC	0.07	J	TCR

**TMA****Thermo Analytical Inc.**

D-21995

**TMA/Eberline**

601 Scarboro Rd.

Oak Ridge, TN 37830

(615) 481-0683 Fax (615) 483-4621

TMA-OR-3344

July 26, 1995

Mr. Jim McCague  
Bechtel National, Inc.  
P.O. Box 350  
Oak Ridge, TN 37831-0350

**CASE NARRATIVE**

Work Order #95-07-013-OR  
State of Utah Certificate #E-235

**SAMPLE RECEIPT**

This work order contains four soil samples received 07/06/95. These samples were analyzed for Radium-226/228, Isotopic Thorium and Isotopic Uranium. The QC and eleven other soil samples associated with these samples are reported in Work Order # 95-07-012-OR.

<u>CLIENT ID</u>	<u>LAB ID</u>	<u>CLIENT ID</u>	<u>LAB ID</u>
140QS029	95-07-013-15	140QS031	95-07-013-17
140QS030	95-07-013-16	140QS032	95-07-013-18

The file name for these samples is 9507012.TXT.

**ANALYTICAL METHODS**

Radium-226 was analyzed using EPA Method 903.0 modified. Radium-228 was analyzed using EPA Method 904.0 modified. Isotopic Thorium was analyzed using Method EML Th-01 modified. Isotopic Uranium was analyzed using Method EML U-02 modified.

**PROBLEMS OR UNUSUAL CIRCUMSTANCES**

Results for the laboratory control sample for Uranium-235 demonstrated a slightly low percent recovery. This is due to the deminimus amount of Uranium-235 activity added to the laboratory control sample. Evaluation of Isotopic Uranium results should be determined by results from Uranium-234 and Uranium-238 because they are quantifiable above background. This is standard practice within the radiochemical industry. Initial calibrations, self absorption factors, and tracer recoveries, where applicable, are within specified criteria. No problems or unusual circumstances were noted during the analytical process.

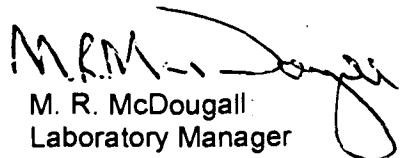
**TMA**

**Thermo Analytical Inc.**  
**TMA/Eberline**

D-21985

**CERTIFICATION OF ACCURACY**

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

  
M. R. McDougall  
Laboratory Manager

Date: 7/26/95

**TMA/Eberline**

601 Scarboro Rd.

Oak Ridge, TN 37830

(615) 481-0683 Fax (615) 483-4621

TMA-OR-3343

July 26, 1995

Mr. Jim McCague  
Bechtel National, Inc.  
P.O. Box 350  
Oak Ridge, TN 37831-0350

**CASE NARRATIVE**

Work Order #95-07-012-OR  
State of Utah Certificate #E-235

**SAMPLE RECEIPT**

This work order contains eleven soil samples received 07/06/95. These samples were analyzed for Radium-226/228, Isotopic Thorium and Isotopic Uranium. Four soil samples associated with these samples are reported in Work Order # 95-07-013-OR.

<u>CLIENT ID</u>	<u>LAB ID</u>	<u>CLIENT ID</u>	<u>LAB ID</u>
140QS018	95-07-012-04	140QS024	95-07-012-10
140QS019	95-07-012-05	140QS025	95-07-012-11
140QS020	95-07-012-06	140QS026	95-07-012-12
140QS021	95-07-012-07	140QS027	95-07-012-13
140QS022	95-07-012-08	140QS028	95-07-012-14
140QS023	95-07-012-09		

The file name for these samples is 9507012.TXT.

**ANALYTICAL METHODS**

Radium-226 was analyzed using EPA Method 903.0 modified. Radium-228 was analyzed using EPA Method 904.0 modified. Isotopic Thorium was analyzed using Method EML Th-01 modified. Isotopic Uranium was analyzed using Method EML U-02 modified.

**PROBLEMS OR UNUSUAL CIRCUMSTANCES**

Results for the laboratory control sample for Uranium-235 demonstrated a slightly low percent recovery. This is due to the deminimus amount of Uranium-235 activity added to the laboratory control sample. Evaluation of Isotopic Uranium results should be determined by results from Uranium-234 and Uranium-238 because they are quantifiable above background. This is standard practice within the radiochemical industry. Initial calibrations, self absorption factors, and tracer recoveries, where applicable, are within specified criteria. No problems or unusual circumstances were noted during the analytical process.

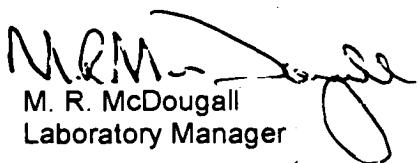
**TMA**

**Thermo Analytical Inc.**  
TMA/Eberline

0-21996

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

  
M. R. McDougall  
Laboratory Manager

Date: 7/26/95

## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	07/06/95
Work Order Number:	9507013		
Customer Number:	441	Date Analyzed	07/15/95
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth		Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Method	Analytical MDA
		Bottom Depth	Matrix											
140QS029	07/05/95	0.00	0.50	SL		1.018	DRY	REG	RA-226	1.30	0.40	PCI/G	ALPHASPEC	0.10
140QS029	07/05/95	0.00	0.50	SL		1.018	DRY	REG	RA-228	1.70	1.30	PCI/G	BETAGPC	0.73
140QS029	07/05/95	0.00	0.50	SL		1.028	DRY	REG	TH-228	0.67	0.38	PCI/G	ALPHASPEC	0.18
140QS029	07/05/95	0.00	0.50	SL		1.028	DRY	REG	TH-230	2.10	0.80	PCI/G	ALPHASPEC	0.11
140QS029	07/05/95	0.00	0.50	SL		1.028	DRY	REG	TH-232	0.47	0.30	PCI/G	ALPHASPEC	0.18
140QS029	07/05/95	0.00	0.50	SL		1.001	DRY	REG	U-234	2.60	1.00	PCI/G	ALPHASPEC	0.17
140QS029	07/05/95	0.00	0.50	SL		1.001	DRY	REG	U-235	0.19	0.20	PCI/G	ALPHASPEC	0.13
140QS029	07/05/95	0.00	0.50	SL		1.001	DRY	REG	U-238	2.60	1.10	PCI/G	ALPHASPEC	0.10
140QS030	07/05/95	0.00	0.50	SL		1.004	DRY	REG	RA-226	1.60	0.40	PCI/G	ALPHASPEC	0.11
140QS030	07/05/95	0.00	0.50	SL		1.004	DRY	REG	RA-228	8.70	1.70	PCI/G	BETAGPC	0.67
140QS030	07/05/95	0.00	0.50	SL		1.008	DRY	REG	TH-228	0.51	0.27	PCI/G	ALPHASPEC	0.17
140QS030	07/05/95	0.00	0.50	SL		1.008	DRY	REG	TH-230	2.70	0.84	PCI/G	ALPHASPEC	0.13
140QS030	07/05/95	0.00	0.50	SL		1.008	DRY	REG	TH-232	0.80	0.35	PCI/G	ALPHASPEC	0.13
140QS030	07/05/95	0.00	0.50	SL		1.063	DRY	REG	U-234	1.50	0.54	PCI/G	ALPHASPEC	0.10
140QS030	07/05/95	0.00	0.50	SL		1.063	DRY	REG	U-235	0.05	0.08	PCI/G	ALPHASPEC	0.13
140QS030	07/05/95	0.00	0.50	SL		1.063	DRY	REG	U-238	1.70	0.58	PCI/G	ALPHASPEC	0.10
140QS031	07/05/95	0.00	0.50	SL		1.026	DRY	REG	RA-226	1.30	0.40	PCI/G	ALPHASPEC	0.12
140QS031	07/05/95	0.00	0.50	SL		1.026	DRY	REG	RA-228	2.20	1.40	PCI/G	BETAGPC	0.75
140QS031	07/05/95	0.00	0.50	SL		1.157	DRY	REG	TH-228	0.57	0.28	PCI/G	ALPHASPEC	0.17
140QS031	07/05/95	0.00	0.50	SL		1.157	DRY	REG	TH-230	2.20	0.72	PCI/G	ALPHASPEC	0.19
140QS031	07/05/95	0.00	0.50	SL		1.157	DRY	REG	TH-232	0.58	0.28	PCI/G	ALPHASPEC	0.11
140QS031	07/05/95	0.00	0.50	SL		1.007	DRY	REG	U-234	1.20	0.44	PCI/G	ALPHASPEC	0.15
140QS031	07/05/95	0.00	0.50	SL		1.007	DRY	REG	U-235	-0.01	0.01	PCI/G	ALPHASPEC	0.12
140QS031	07/05/95	0.00	0.50	SL		1.007	DRY	REG	U-238	1.30	0.48	PCI/G	ALPHASPEC	0.10
140QS032	07/05/95	0.00	0.50	SL		1.010	DRY	REG	RA-226	1.30	0.40	PCI/G	ALPHASPEC	0.90
140QS032	07/05/95	0.00	0.50	SL		1.010	DRY	REG	RA-228	2.60	1.20	PCI/G	BETAGPC	0.66
140QS032	07/05/95	0.00	0.50	SL		1.049	DRY	REG	TH-228	0.59	0.29	PCI/G	ALPHASPEC	0.16
140QS032	07/05/95	0.00	0.50	SL		1.049	DRY	REG	TH-230	2.20	0.70	PCI/G	ALPHASPEC	0.19
140QS032	07/05/95	0.00	0.50	SL		1.049	DRY	REG	TH-232	0.34	0.21	PCI/G	ALPHASPEC	0.07
140QS032	07/05/95	0.00	0.50	SL		1.029	DRY	REG	U-234	2.40	0.86	PCI/G	ALPHASPEC	0.21

Approved by:  
07/26/95

Martin Day  
7/27/95

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TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:	9507013	Date Received	07/06/95
Work Order Number:	9507013	Date Analyzed	07/11/95
Customer Number:	441		
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth		Bottom Depth		Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method		MDA
		Top	Depth	Bottom	Depth										Method	MDA	
140QS032	07/05/95	0.00	0.50	SL		1.029	DRY			REG	U-235	0.03	0.07	PCI/G	ALPHASPEC	0.09	
140QS032	07/05/95	0.00	0.50	SL		1.029	DRY			REG	U-238	2.00	0.76	PCI/G	ALPHASPEC	0.07	

Approved by:  
07/26/95

M.L.M. -  
Martin Day 7/27/95

Page 2 of 2

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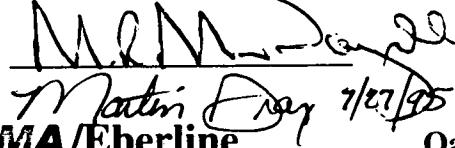
Oak Ridge Laboratory • 601 Scarboro Road • Oak Ridge, TN 37830 • (615) 481-0683

## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	07/06/95
Work Order Number:	9507012	Date Received	07/06/95
Customer Number:	441	Date Analyzed	07/15/95
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method		MDA
												Method	MDA	
QCSPIKE	07/06/95	0.00	0.00	W	1		LCST	RA-226	25.70	1.18	PCI	ALPHASPEC	0.06	
QCSPIKE	07/06/95	0.00	0.00	W	1		LCSF	RA-226	25.90	1.20	PCI	ALPHASPEC	0.06	
QCSPIKE	07/06/95	0.00	0.00	W	1		LCST	RA-228	17.00	0.90	PCI	BETAGPC	0.41	
QCSPIKE	07/06/95	0.00	0.00	W	1		LCSF	RA-228	16.40	1.60	PCI	BETAGPC	0.41	
QCSPIKE	07/06/95	0.00	0.00	W	1		LCST	TH-228	4.90	0.18	PCI	ALPHASPEC	0.15	
QCSPIKE	07/06/95	0.00	0.00	W	1		LCSF	TH-228	5.60	1.40	PCI	ALPHASPEC	0.15	
QCSPIKE	07/06/95	0.00	0.00	W	1		LCST	TH-230	5.40	0.11	PCI	ALPHASPEC	0.13	
QCSPIKE	07/06/95	0.00	0.00	W	1		LCSF	TH-230	6.50	1.60	PCI	ALPHASPEC	0.13	
QCSPIKE	07/06/95	0.00	0.00	W	1		LCST	TH-232	4.90	0.18	PCI	ALPHASPEC	0.11	
QCSPIKE	07/06/95	0.00	0.00	W	1		LCSF	TH-232	5.50	1.40	PCI	ALPHASPEC	0.11	
QCSPIKE	07/06/95	0.00	0.00	W	1		LCST	U-234	8.50	0.32	PCI	ALPHASPEC	0.11	
QCSPIKE	07/06/95	0.00	0.00	W	1		LCSF	U-234	8.70	2.40	PCI	ALPHASPEC	0.11	
QCSPIKE	07/06/95	0.00	0.00	W	1		LCST	U-235	0.39	0.01	PCI	ALPHASPEC	0.07	
QCSPIKE	07/06/95	0.00	0.00	W	1		LCSF	U-235	0.39	0.23	PCI	ALPHASPEC	0.07	
QCSPIKE	07/06/95	0.00	0.00	W	1		LCST	U-238	8.30	0.31	PCI	ALPHASPEC	0.14	
QCSPIKE	07/06/95	0.00	0.00	W	1		LCSF	U-238	8.60	2.40	PCI	ALPHASPEC	0.14	
QCBLANK	07/06/95	0.00	0.00	W	1		PB	RA-226	0.10	0.10	PCI	ALPHASPEC	0.06	
QCBLANK	07/06/95	0.00	0.00	W	1		PB	RA-228	1.50	0.70	PCI	BETAGPC	0.37	
QCBLANK	07/06/95	0.00	0.00	W	1		PB	TH-228	0.07	0.07	PCI	ALPHASPEC	0.10	
QCBLANK	07/06/95	0.00	0.00	W	1		PB	TH-230	0.33	0.16	PCI	ALPHASPEC	0.07	
QCBLANK	07/06/95	0.00	0.00	W	1		PB	TH-232	0.06	0.06	PCI	ALPHASPEC	0.07	
QCBLANK	07/06/95	0.00	0.00	W	1		PB	U-234	0.85	0.34	PCI	ALPHASPEC	0.05	
QCBLANK	07/06/95	0.00	0.00	W	1		PB	U-235	0.04	0.07	PCI	ALPHASPEC	0.11	
QCBLANK	07/06/95	0.00	0.00	W	1		PB	U-238	0.50	0.23	PCI	ALPHASPEC	0.10	
140QS018	07/03/95	0.00	0.50	SL	1.004	DRY	REPL	RA-226	1.10	0.30	PCI/G	ALPHASPEC	0.06	
140QS018	07/03/95	0.00	0.50	SL	1.004	DRY	REPL	RA-228	2.00	0.80	PCI/G	BETAGPC	0.40	
140QS018	07/03/95	0.00	0.50	SL	1.004	DRY	REPL	TH-228	0.49	0.25	PCI/G	ALPHASPEC	0.16	
140QS018	07/03/95	0.00	0.50	SL	1.004	DRY	REPL	TH-230	6.90	1.80	PCI/G	ALPHASPEC	0.07	
140QS018	07/03/95	0.00	0.50	SL	1.004	DRY	REPL	TH-232	0.93	0.37	PCI/G	ALPHASPEC	0.11	
140QS018	07/03/95	0.00	0.50	SL	1.064	DRY	REPL	U-234	1.50	0.52	PCI/G	ALPHASPEC	0.09	

Approved by:  
07/26/95



Martin Day 7/27/95

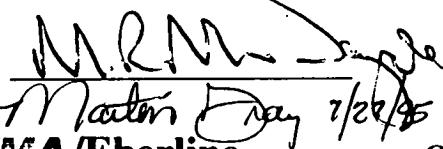
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## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	07/06/95
Work Order Number:	9507012	Date Received	07/06/95
Customer Number:	441	Date Analyzed	07/11/95
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth		Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	MDA
		Depth	Bottom Depth											
140QS018	07/03/95	0.00	0.50	SL		1.064	DRY	REPL	U-235	0.07	0.09	PCI/G	ALPHASPEC	0.07
140QS018	07/03/95	0.00	0.50	SL		1.064	DRY	REPL	U-238	1.80	0.60	PCI/G	ALPHASPEC	0.05
140QS018	07/03/95	0.00	0.50	SL		1.035	DRY	REG	RA-226	1.60	0.30	PCI/G	ALPHASPEC	0.07
140QS018	07/03/95	0.00	0.50	SL		1.035	DRY	REG	RA-228	1.80	1.00	PCI/G	BETAGPC	0.52
140QS018	07/03/95	0.00	0.50	SL		1.019	DRY	REG	TH-228	0.65	0.27	PCI/G	ALPHASPEC	0.12
140QS018	07/03/95	0.00	0.50	SL		1.019	DRY	REG	TH-230	7.80	1.90	PCI/G	ALPHASPEC	0.11
140QS018	07/03/95	0.00	0.50	SL		1.019	DRY	REG	TH-232	0.53	0.24	PCI/G	ALPHASPEC	0.10
140QS018	07/03/95	0.00	0.50	SL		1.049	DRY	REG	U-234	1.70	0.60	PCI/G	ALPHASPEC	0.12
140QS018	07/03/95	0.00	0.50	SL		1.049	DRY	REG	U-235	0.16	0.14	PCI/G	ALPHASPEC	0.07
140QS018	07/03/95	0.00	0.50	SL		1.049	DRY	REG	U-238	2.10	0.70	PCI/G	ALPHASPEC	0.10
140QS019	07/03/95	0.00	0.50	SL		1.019	DRY	REG	RA-226	1.40	0.30	PCI/G	ALPHASPEC	0.07
140QS019	07/03/95	0.00	0.50	SL		1.019	DRY	REG	RA-228	2.30	0.90	PCI/G	BETAGPC	0.44
140QS019	07/03/95	0.00	0.50	SL		1.011	DRY	REG	TH-228	0.66	0.27	PCI/G	ALPHASPEC	0.12
140QS019	07/03/95	0.00	0.50	SL		1.011	DRY	REG	TH-230	3.40	0.88	PCI/G	ALPHASPEC	0.10
140QS019	07/03/95	0.00	0.50	SL		1.011	DRY	REG	TH-232	0.71	0.28	PCI/G	ALPHASPEC	0.05
140QS019	07/03/95	0.00	0.50	SL		1.101	DRY	REG	U-234	1.70	0.54	PCI/G	ALPHASPEC	0.05
140QS019	07/03/95	0.00	0.50	SL		1.101	DRY	REG	U-235	0.07	0.08	PCI/G	ALPHASPEC	0.06
140QS019	07/03/95	0.00	0.50	SL		1.101	DRY	REG	U-238	1.80	0.58	PCI/G	ALPHASPEC	0.05
140QS020	07/03/95	0.00	0.50	SL		1.002	DRY	REG	RA-226	1.30	0.30	PCI/G	ALPHASPEC	0.08
140QS020	07/03/95	0.00	0.50	SL		1.002	DRY	REG	RA-228	1.80	1.00	PCI/G	BETAGPC	0.53
140QS020	07/03/95	0.00	0.50	SL		1.006	DRY	REG	TH-228	0.93	0.35	PCI/G	ALPHASPEC	0.10
140QS020	07/03/95	0.00	0.50	SL		1.006	DRY	REG	TH-230	2.90	0.80	PCI/G	ALPHASPEC	0.10
140QS020	07/03/95	0.00	0.50	SL		1.006	DRY	REG	TH-232	0.55	0.24	PCI/G	ALPHASPEC	0.06
140QS020	07/03/95	0.00	0.50	SL		1.069	DRY	REG	U-234	1.70	0.66	PCI/G	ALPHASPEC	0.12
140QS020	07/03/95	0.00	0.50	SL		1.069	DRY	REG	U-235	0.19	0.17	PCI/G	ALPHASPEC	0.15
140QS020	07/03/95	0.00	0.50	SL		1.069	DRY	REG	U-238	1.90	0.71	PCI/G	ALPHASPEC	0.15
140QS021	07/03/95	0.00	0.50	SL		1.052	DRY	REG	RA-226	1.20	0.30	PCI/G	ALPHASPEC	0.07
140QS021	07/03/95	0.00	0.50	SL		1.052	DRY	REG	RA-228	1.40	0.80	PCI/G	BETAGPC	0.48
140QS021	07/03/95	0.00	0.50	SL		1.053	DRY	REG	TH-228	0.75	0.35	PCI/G	ALPHASPEC	0.17
140QS021	07/03/95	0.00	0.50	SL		1.053	DRY	REG	TH-230	3.60	1.10	PCI/G	ALPHASPEC	0.08

Approved by:  
07/26/95  
Master Day 7/26/95TMA/Eberline  
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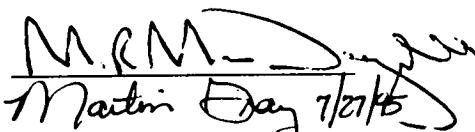
Page 2 of 4

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## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	07/06/95
Work Order Number:	9507012		
Customer Number:	441	Date Analyzed	07/11/95
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth		Bottom Depth		Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method		MDA
		Collected	Depth	Depth	Matrix												
140QS021	07/03/95	0.00	0.50	SL	1.053	DRY	REG	TH-232		1.20	0.48	PCI/G	ALPHASPEC		0.08		
140QS021	07/03/95	0.00	0.50	SL	1.022	DRY	REG	U-234		1.40	0.50	PCI/G	ALPHASPEC		0.11		
140QS021	07/03/95	0.00	0.50	SL	1.022	DRY	REG	U-235		0.07	0.09	PCI/G	ALPHASPEC		0.11		
140QS021	07/03/95	0.00	0.50	SL	1.022	DRY	REG	U-238		1.60	0.55	PCI/G	ALPHASPEC		0.05		
140QS022	07/03/95	0.00	0.50	SL	1.003	DRY	REG	RA-226		1.10	0.30	PCI/G	ALPHASPEC		0.06		
140QS022	07/03/95	0.00	0.50	SL	1.003	DRY	REG	RA-228		1.90	0.80	PCI/G	BETAGPC		0.43		
140QS022	07/03/95	0.00	0.50	SL	.9997	DRY	REG	TH-228		0.80	0.40	PCI/G	ALPHASPEC		0.19		
140QS022	07/03/95	0.00	0.50	SL	.9997	DRY	REG	TH-230		3.10	1.00	PCI/G	ALPHASPEC		0.10		
140QS022	07/03/95	0.00	0.50	SL	.9997	DRY	REG	TH-232		0.75	0.38	PCI/G	ALPHASPEC		0.21		
140QS022	07/03/95	0.00	0.50	SL	1.026	DRY	REG	U-234		1.60	0.58	PCI/G	ALPHASPEC		0.07		
140QS022	07/03/95	0.00	0.50	SL	1.026	DRY	REG	U-235		0.27	0.20	PCI/G	ALPHASPEC		0.08		
140QS022	07/03/95	0.00	0.50	SL	1.026	DRY	REG	U-238		1.60	0.59	PCI/G	ALPHASPEC		0.07		
140QS023	07/05/95	0.00	0.50	SL	1.073	DRY	REG	RA-226		1.10	0.30	PCI/G	ALPHASPEC		0.09		
140QS023	07/05/95	0.00	0.50	SL	1.073	DRY	REG	RA-228		2.90	3.40	PCI/G	BETAGPC		2.12		
140QS023	07/05/95	0.00	0.50	SL	1.048	DRY	REG	TH-228		0.56	0.34	PCI/G	ALPHASPEC		0.22		
140QS023	07/05/95	0.00	0.50	SL	1.048	DRY	REG	TH-230		6.50	2.10	PCI/G	ALPHASPEC		0.22		
140QS023	07/05/95	0.00	0.50	SL	1.048	DRY	REG	TH-232		0.52	0.33	PCI/G	ALPHASPEC		0.19		
140QS023	07/05/95	0.00	0.50	SL	1.039	DRY	REG	U-234		2.10	0.73	PCI/G	ALPHASPEC		0.14		
140QS023	07/05/95	0.00	0.50	SL	1.039	DRY	REG	U-235		0.03	0.06	PCI/P	ALPHASPEC		0.08		
140QS023	07/05/95	0.00	0.50	SL	1.039	DRY	REG	U-238		2.00	0.67	PCI/G	ALPHASPEC		0.11		
140QS024	07/05/95	0.00	0.50	SL	1.003	DRY	REG	RA-226		1.80	0.80	PCI/G	ALPHASPEC		0.29		
140QS024	07/05/95	0.00	0.50	SL	1.003	DRY	REG	RA-228		3.40	2.90	PCI/G	BETAGPC		1.79		
140QS024	07/05/95	0.00	0.50	SL	1.003	DRY	REG	TH-228		0.42	0.24	PCI/G	ALPHASPEC		0.17		
140QS024	07/05/95	0.00	0.50	SL	1.003	DRY	REG	TH-230		2.20	0.73	PCI/G	ALPHASPEC		0.15		
140QS024	07/05/95	0.00	0.50	SL	1.003	DRY	REG	TH-232		0.48	0.26	PCI/G	ALPHASPEC		0.13		
140QS024	07/05/95	0.00	0.50	SL	1.086	DRY	REG	U-234		1.90	0.67	PCI/G	ALPHASPEC		0.12		
140QS024	07/05/95	0.00	0.50	SL	1.086	DRY	REG	U-235		0.08	0.10	PCI/G	ALPHASPEC		0.07		
140QS024	07/05/95	0.00	0.50	SL	1.086	DRY	REG	U-238		2.10	0.74	PCI/G	ALPHASPEC		0.15		
140QS025	07/05/95	0.00	0.50	SL	1.005	DRY	REG	RA-226		0.80	0.30	PCI/G	ALPHASPEC		0.07		
140QS025	07/05/95	0.00	0.50	SL	1.005	DRY	REG	RA-228		2.10	1.10	PCI/G	BETAGPC		0.65		

Approved by:  
07/26/95

Page 3 of 4

## TMA/Eberline Oak Ridge, FUSRAP Radiological Reports

TMA/Eberline Number:		Date Received	07/06/95
Work Order Number:	9507012		
Customer Number:	441	Date Analyzed	07/11/95
Environmental Category:	RI		

Sample ID	Date Collected	Top Depth		Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical	
		Depth'	Depth"										Method	MDA
140QS025	07/05/95	0.00	0.50	SL		1.111	DRY	REG	TH-228	0.51	0.35	PCI/G	ALPHASPEC	0.26
140QS025	07/05/95	0.00	0.50	SL		1.111	DRY	REG	TH-230	3.50	1.40	PCI/G	ALPHASPEC	0.13
140QS025	07/05/95	0.00	0.50	SL		1.111	DRY	REG	TH-232	1.10	0.56	PCI/G	ALPHASPEC	0.22
140QS025	07/05/95	0.00	0.50	SL		1.053	DRY	REG	U-234	2.60	0.97	PCI/G	ALPHASPEC	0.15
140QS025	07/05/95	0.00	0.50	SL		1.053	DRY	REG	U-235	0.08	0.11	PCI/G	ALPHASPEC	0.11
140QS025	07/05/95	0.00	0.50	SL		1.053	DRY	REG	U-238	3.20	1.20	PCI/G	ALPHASPEC	0.17
140QS026	07/05/95	0.00	0.50	SL		1.012	DRY	REG	RA-226	0.70	0.30	PCI/G	ALPHASPEC	0.10
140QS026	07/05/95	0.00	0.50	SL		1.012	DRY	REG	RA-228	5.00	1.70	PCI/G	BETAGPC	0.85
140QS026	07/05/95	0.00	0.50	SL		1.046	DRY	REG	TH-228	0.43	0.30	PCI/G	ALPHASPEC	0.24
140QS026	07/05/95	0.00	0.50	SL		1.046	DRY	REG	TH-230	1.60	0.70	PCI/G	ALPHASPEC	0.19
140QS026	07/05/95	0.00	0.50	SL		1.046	DRY	REG	TH-232	0.52	0.33	PCI/G	ALPHASPEC	0.11
140QS026	07/05/95	0.00	0.50	SL		1.017	DRY	REG	U-234	1.50	0.50	PCI/G	ALPHASPEC	0.05
140QS026	07/05/95	0.00	0.50	SL		1.017	DRY	REG	U-235	0.02	0.05	PCI/G	ALPHASPEC	0.07
140QS026	07/05/95	0.00	0.50	SL		1.017	DRY	REG	U-238	1.90	0.60	PCI/G	ALPHASPEC	0.05
140QS027	07/05/95	0.00	0.50	SL		1.037	DRY	REG	RA-226	1.20	0.30	PCI/G	ALPHASPEC	0.08
140QS027	07/05/95	0.00	0.50	SL		1.037	DRY	REG	RA-228	1.80	1.00	PCI/G	BETAGPC	0.57
140QS027	07/05/95	0.00	0.50	SL		1.100	DRY	REG	TH-228	0.61	0.34	PCI/G	ALPHASPEC	0.16
140QS027	07/05/95	0.00	0.50	SL		1.100	DRY	REG	TH-230	1.80	0.71	PCI/G	ALPHASPEC	0.09
140QS027	07/05/95	0.00	0.50	SL		1.100	DRY	REG	TH-232	0.58	0.32	PCI/G	ALPHASPEC	0.09
140QS027	07/05/95	0.00	0.50	SL		1.009	DRY	REG	U-234	1.60	0.58	PCI/G	ALPHASPEC	0.07
140QS027	07/05/95	0.00	0.50	SL		1.009	DRY	REG	U-235	0.09	0.11	PCI/G	ALPHASPEC	0.08
140QS027	07/05/95	0.00	0.50	SL		1.009	DRY	REG	U-238	2.70	0.89	PCI/G	ALPHASPEC	0.07
140QS028	07/05/95	0.00	0.50	SL		1.019	DRY	REG	RA-226	1.20	0.30	PCI/G	ALPHASPEC	0.08
140QS028	07/05/95	0.00	0.50	SL		1.019	DRY	REG	RA-228	1.30	1.00	PCI/G	BETAGPC	0.65
140QS028	07/05/95	0.00	0.50	SL		1.037	DRY	REG	TH-228	0.58	0.29	PCI/G	ALPHASPEC	0.16
140QS028	07/05/95	0.00	0.50	SL		1.037	DRY	REG	TH-230	3.60	1.10	PCI/G	ALPHASPEC	0.07
140QS028	07/05/95	0.00	0.50	SL		1.037	DRY	REG	TH-232	0.57	0.28	PCI/G	ALPHASPEC	0.07
140QS028	07/05/95	0.00	0.50	SL		1.032	DRY	REG	U-234	1.60	0.59	PCI/G	ALPHASPEC	0.13
140QS028	07/05/95	0.00	0.50	SL		1.032	DRY	REG	U-235	0.12	0.13	PCI/G	ALPHASPEC	0.08
140QS028	07/05/95	0.00	0.50	SL		1.032	DRY	REG	U-238	1.30	0.51	PCI/G	ALPHASPEC	0.11

Approved by:  
07/26/95

Martin Day 7/27/95

Page 4 of 4

95-07-013

AIRBILL NO.

2520071072

# FIELD SAMPLE FORM

## SITE ACTIVITY SAMPLES

Samplers (print name then sign)

M. PHILLIPS

D. W. Williams

J. L. Eberline

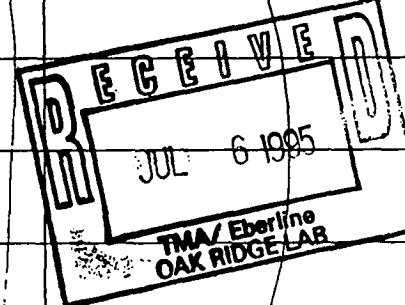
Site Name: 1455

NORPAS #FC002

WBS No.: 140

Activity Support (Job) No.: 441

Sample ID Sample Grid Point	Sample Type (1)	Sample Time	Date of Sample	Preserved with	Purpose (2)	Depth cm ft	Priority (Days)	Analysis Required	Remarks
140Q5023 N55 E05	SS	0650	7-5-95	NA	VR	0-0.5	7	ISO-U, ISO-TH RA-226, RA228	QUAKER STATE
140Q5024 N55 E15		0700							
140Q5025 N55 E25		0730							
140Q5026 N55 E35		0800							
140Q5027 N55 E45		0830							
140Q5028 N65 E5		0900							
140Q5029 N65 E15		0930							



## SAMPLE TYPE (1)

## PURPOSE (2)

Surface Soil	SS	Rad Character	RC
Bias Soil	BS	Verification	VR
Profile Soil	PS	Quality Control	QC
Sediment Silt	SD	Hot Spot	HS
Other	OR	Resample	RS
Vegitation	VE	Background	BG
Ground Water	GW	Routine	RT
Surface Water	SW	Special	SP

This package conforms to the conditions and limitations specified in 49CFR173.421 for excepted radioactive material, limited quantity, n.o.s., UN 2910.

Shipper: TMA/EBERLINE  
9170 L.1774 AVE  
BERKELEY, MO 63134

## CHAIN OF CUSTODY RECORD

REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME
ANALYSIS	J. L. Eberline	M. BORGES CRISTOS	7-5-95	10:00
analysis	Quaker State	C. Dallen	7-6-95	11:00

Recorded by: M. Phillips

Date: 7-5-95 Time: 10:00

Total number of samples in this box

17

Total number of samples in this shipment

17

Total number of boxes in this shipment

1

Ship to: TMA/EBERLINE  
601 SCARBORO ROAD  
OAK RIDGE TN 37830  
ATTN: SAMPLE LOG IN

Page 1 of 2

Shipping Container meets DOT Transferable Criteria

Shipping container dose rate &lt; 0.2 mrem/hr.

Original

95-07-012

95-07-01603

AIRBILL NO.  
252007072

# FIELD SAMPLE COLLECTION FORM

Samplers (print name then sign)

M. Chaffee

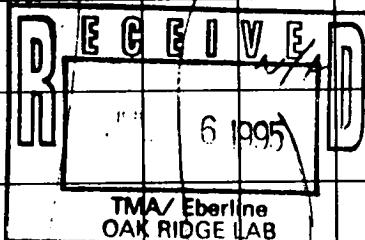
M. PHILLIPS

Site Name: 14155 WAFAS #602

WBS No.: 140

Activity Support (Job) No.: 441

Sample ID Sample Grid Point	Sample Type (1)	Sample Time	Date of Sample	Preserved with	Purpose (2)	Depth cm ft	Priority (Days)	Analysis Required	Remarks
140GXS030 NUSC25	SS	1000	7-5-95	NA	VR	0-05	7	ISO-U, ISO-TH RT-226, RT-228	QUAKER STATE
140GSC31 NUSC35	)	1030							
140GXS032 NUSC45	)	1100							
140GXS0705 RINSATE	OR	1130							RINSATE QUAKER STATE



SAMPLE TYPE (1)	PURPOSE (2)
Surface Soil	SS Rad Character
Bias Soil	BS Verification
Profile Soil	PS Quality Control
Sediment Silt	SD Hot Spot
Other	OR Resample
Vegitation	VE Background
Ground Water	GW Routine
Surface Water	SW Special

"This package conforms to the conditions and limitations specified in 49CFR173.421 for excepted radioactive material, limited quantity, n.o.s., UN 2910."

CHAIN OF CUSTODY RECORD				
REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME
ANALYSIS	M. Chaffee	MEADWARE CARRIES	7-5-95	1600
analysis	Chaffee	C. Chaffee	7/6/95	11:00

Recorded by: M. Chaffee  
Date: 7-5-95 Time: 1600

Total number of samples in this box: 17

Total number of samples in this shipment: 17

Total number of boxes in this shipment: 1

Shipper: TMA/EBERLINE  
1120 LARRY AVE  
BERKELEY, MD 20744

Ship to: TMA/EBERLINE  
1120 LARRY AVE PO BOX  
OAK RIDGE, TN 37830  
ATTN: SAMPLE LOG IN

Page 2 of 2

85-7-012

AIRBILL NO. 2520571072	FIELD SAMPLE COLLECTION FORM							Samplers (print name then sign) <i>M. Clegg</i> <i>M. Phillips</i>		
Site Name: HISS NORVAN #602		WBS No.: 140			Activity Support (Job) No.: 441					
Sample ID Sample Grid Point	Sample Type (1)	Sample Time	Date of Sample	Preserved with	Purpose (2)	Depth cm ft	Priority (Days)	Analysis Required		Remarks
140QS018 N45 E5	SS	1030	7-345	NA	VR	0-0.5 0-0.5	?	ISO-U, ISO-TH PA-226, PA-228		QUAKER STATE
140QS019 N45 E15		1150								
140QS020 N45 E25		1245								
140QS021 N45 E35		1335								
140QS022 N45 E45		1420								
140QS07/03 RINSATE	OR	1530								
	OR			NA						
<b>SAMPLE TYPE (1)</b>		<b>PURPOSE (2)</b>		<b>CHAIN OF CUSTODY RECORD</b>						
Surface Soil	SS	Rad Character	RC	REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME		
Bias Soil	BS	Verification	VR	ANALYSIS	<i>M. Phillips</i>	<i>M. Phillips</i>	7-5-95	1600		
Profile Soil	PS	Quality Control	QC	ANALYSIS	<i>M. Phillips</i>	<i>M. Phillips</i>	7-5-95	1600		
Sediment Silt	SD	Hot Spot	HS	ANALYSIS	<i>M. Phillips</i>	<i>M. Phillips</i>	7-5-95	1600		
Other	OR	Resample	RS	ANALYSIS	<i>M. Phillips</i>	<i>M. Phillips</i>	7-5-95	1600		
Vegetation	VE	Background	BG	ANALYSIS	<i>M. Phillips</i>	<i>M. Phillips</i>	7-5-95	1600		
Ground Water	GW	Routine	RT	ANALYSIS	<i>M. Phillips</i>	<i>M. Phillips</i>	7-5-95	1600		
Surface Water	SW	Special	SP	ANALYSIS	<i>M. Phillips</i>	<i>M. Phillips</i>	7-5-95	1600		
"This package conforms to the conditions and limitations specified in 49CFR173.421 for excepted radioactive material, limited quantity, n.o.s., UN 2910."										
Shipper: TMT/CHURCH 9170 LAFAYETTE AVENUE BERKELEY, MI 48224		Ship to: TMT/CHURCH 601 SCARBOROUGH ROAD CANTERBURY, TN 37330 ATTN. SAMPLER LOG IN							Page 1 of 1	
4.10906921 Shipping Container meets DOT Transferable Criteria ✓ Shipping container dose rate 10.2 mrem/hr										

95-07-012

AIRBILL NO.

252 0071072

# FIELD SAMPLE FORM SITE ACTIVITY SAMPLES

Samplers (print name then sign)

M. PHILLIPS

J. L. HALL

D. HARRIS

J. L. HALL

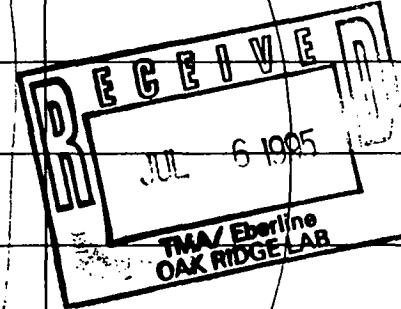
Site Name: 1455

NORPAS #FC002

WBS No.: 140

Activity Support (Job) No.: 441

Sample ID Sample Grid Point	Sample Type (1)	Sample Time	Date of Sample	Preserved with	Purpose (2)	Depth cm ft	Priority (Days)	Analysis Required	Remarks
140Q5023 N55 E05	SS	0650	7-5-95	NA	VR	0-0.5	7	ISO-U, ISO-TH ✓ RA-226, RA228	WATER STATION
140Q5024 ✓ N55 E15		0700							
140Q5025 ✓ N55 E25		0730							
140Q5026 ✓ N55 E35		0800							
140Q5027 ✓ N55 E45		0830							
140Q5028 ✓ N65 E5		0900							
140Q5029 ✓ N65 E15		0930							



## SAMPLE TYPE (1)

## PURPOSE (2)

Surface Soil	SS	Rad Character	RC
Bias Soil	BS	Verification	VR
Profile Soil	PS	Quality Control	QC
Sediment Silt	SD	Hot Spot	HS
Other	OR	Resample	RS
Vegetation	VE	Background	BG
Ground Water	GW	Routine	RT
Surface Water	SW	Special	SP

This package conforms to the conditions and limitations specified in 49CFR173.421 for excepted radioactive material, limited quantity, n.o.s., UN 2910.

## CHAIN OF CUSTODY RECORD

REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME
ANALYSIS	M. Phillips	AIRBORNE CRIMSON	7-5-95	1600
Analysis	Quinton	C. Bolen	7-6-95	1100

Recorded by:

M. Phillips

Date: 7-5-95 Time: 1600

Total number of samples in this box

17

Total number of samples in this shipment

17

Total number of boxes in this shipment

1

Shipper: TMI/EBERLINE  
9170 LATTY AV.  
BERKELEY, MI 48134

Ship to: TMI/EBERLINE  
601 SCARROCK RD #  
OAK RIDGE, TN 37830  
ATTN: SAMPLE LOG IN

Page 1 of 2

D-2-905

**TMA/OAK RIDGE LABORATORY  
TRACER REPORT**

7/26/95

Work Order # 95-07-013-OR

BECHTEL SAMPLE ID	ANALYTE	TRACER	RECOVERY
140QS029	RA-226	BA-133	59%
140QS029	TH-228	TH-229	33%
140QS029	TH-230	TH-229	33%
140QS029	TH-232	TH-229	33%
140QS029	U-234	U-232	36%
140QS029	U-235	U-232	36%
140QS029	U-238	U-232	36%
140QS030	RA-226	BA-133	72%
140QS030	TH-228	TH-229	49%
140QS030	TH-230	TH-229	49%
140QS030	TH-232	TH-229	49%
140QS030	U-234	U-232	58%
140QS030	U-235	U-232	58%
140QS030	U-238	U-232	58%
140QS031	RA-226	BA-133	49%
140QS031	TH-228	TH-229	44%
140QS031	TH-230	TH-229	44%
140QS031	TH-232	TH-229	44%
140QS031	U-234	U-232	59%
140QS031	U-235	U-232	59%
140QS031	U-238	U-232	59%
140QS032	RA-226	BA-133	81%
140QS032	TH-228	TH-229	47%
140QS032	TH-230	TH-229	47%
140QS032	TH-232	TH-229	47%
140QS032	U-234	U-232	45%
140QS032	U-235	U-232	45%
140QS032	U-238	U-232	45%

**TMA/OAK RIDGE LABORATORY**  
**TRACER REPORT**

D - 21986

7/26/95

Work Order # 95-07-012-OR

BECHTEL SAMPLE ID	ANALYTE	TRACER	RECOVERY
140QS018	RA-226	BA-133	89% ✓
140QS018	TH-228	TH-229	57% ✓
140QS018	TH-230	TH-229	57% ✓
140QS018	TH-232	TH-229	57% ✓
140QS018	U-234	U-232	52% ✓
140QS018	U-235	U-232	52% ✓
140QS018	U-238	U-232	52% ✓
140QS019	RA-226	BA-133	81% ✓
140QS019	TH-228	TH-229	61% ✓
140QS019	TH-230	TH-229	61% ✓
140QS019	TH-232	TH-229	61% ✓
140QS019	U-234	U-232	62% ✓
140QS019	U-235	U-232	62% ✓
140QS019	U-238	U-232	62% ✓
140QS020	RA-226	BA-133	74% ✓
140QS020	TH-228	TH-229	55% ✓
140QS020	TH-230	TH-229	55% ✓
140QS020	TH-232	TH-229	55% ✓
140QS020	U-234	U-232	40%
140QS020	U-235	U-232	40%
140QS020	U-238	U-232	40%
140QS021	RA-226	BA-133	87% ✓
140QS021	TH-228	TH-229	40%
140QS021	TH-230	TH-229	40%
140QS021	TH-232	TH-229	40%
140QS021	U-234	U-232	60% ✓

**TMA/OAK RIDGE LABORATORY**  
**TRACER REPORT**

D-21966

7/26/95

Work Order # 95-07-012-OR

BECHTEL SAMPLE ID	ANALYTE	TRACER	RECOVERY
140QS021	U-235	U-232	60% /
140QS021	U-238	U-232	60% /
140QS022	RA-226	BA-133	100% /
140QS022	TH-228	TH-229	35%
140QS022	TH-230	TH-229	35%
140QS022	TH-232	TH-229	35%
140QS022	U-234	U-232	49%
140QS022	U-235	U-232	49%
140QS022	U-238	U-232	49%
140QS023	RA-226	BA-133	30% /
140QS023	TH-228	TH-229	29%
140QS023	TH-230	TH-229	29%
140QS023	TH-232	TH-229	29%
140QS023	U-234	U-232	51% /
140QS023	U-235	U-232	51% /
140QS023	U-238	U-232	51% /
140QS024	RA-226	BA-133	26% /
140QS024	TH-228	TH-229	42%
140QS024	TH-230	TH-229	42%
140QS024	TH-232	TH-229	42%
140QS024	U-234	U-232	54% /
140QS024	U-235	U-232	54% /
140QS024	U-238	U-232	54% /
140QS025	RA-226	BA-133	80% /
140QS025	TH-228	TH-229	24%
140QS025	TH-230	TH-229	24%

**TMA/OAK RIDGE LABORATORY  
TRACER REPORT**

D-2 1986

7/26/95

Work Order # 95-07-012-OR

<b>BECHTEL SAMPLE ID</b>	<b>ANALYTE</b>	<b>TRACER</b>	<b>RECOVERY</b>
140QS025	TH-232	TH-229	24%
140QS025	U-234	U-232	38%
140QS025	U-235	U-232	38%
140QS025	U-238	U-232	38%
140QS026	RA-226	BA-133	58% /
140QS026	TH-228	TH-229	30%
140QS026	TH-230	TH-229	30%
140QS026	TH-232	TH-229	30%
140QS026	U-234	U-232	64% /
140QS026	U-235	U-232	64% /
140QS026	U-238	U-232	64% /
140QS027	RA-226	BA-133	76% /
140QS027	TH-228	TH-229	35%
140QS027	TH-230	TH-229	35%
140QS027	TH-232	TH-229	35%
140QS027	U-234	U-232	53% /
140QS027	U-235	U-232	53% /
140QS027	U-238	U-232	53% /
140QS028	RA-226	BA-133	69% /
140QS028	TH-228	TH-229	43%
140QS028	TH-230	TH-229	43%
140QS028	TH-232	TH-229	43%
140QS028	U-234	U-232	50% /
140QS028	U-235	U-232	50% /
140QS028	U-238	U-232	50% /

**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Post-Remedial Action Soil Sample Results (Data)**

**SAMPLES:**

**140-3L-152**

**140-3L-153**

**140-3L-154**

**140-3L-155**

**140-3L-156**

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-16787	Sampling Event:	HIS_RA95
Work Order Number:	E9509076	DATAFUSR Number:	D-22762
Customer Number:	441	Date Received:	09/15/95
Environmental Category:	RI	Date Analyzed:	09/18/95

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Flag	Qualifier Code
	Collected	Depth	Depth	Matrix												
140-3L-152	09/13/95	0.00	0.50	SL	.5013	DRY		REG	RA-226	1.70	0.71	PCI/G	ALPHASPEC	0.28		
140-3L-152	09/13/95	0.00	0.50	SL	.5068	DRY		REG	TH-228	1.20	0.48	PCI/G	ALPHASPEC	0.17		
140-3L-152	09/13/95	0.00	0.50	SL	.5068	DRY		REG	TH-230	3.20	0.96	PCI/G	ALPHASPEC	0.17		
140-3L-152	09/13/95	0.00	0.50	SL	.5068	DRY		REG	TH-232	1.20	0.50	PCI/G	ALPHASPEC	0.10		
140-3L-152	09/13/95	0.00	0.50	SL	1.015	DRY		REG	U-234	1.20	0.48	PCI/G	ALPHASPEC	0.07	J	TCR
140-3L-152	09/13/95	0.00	0.50	SL	1.015	DRY		REG	U-235	0.06	0.09	PCI/G	ALPHASPEC	0.08	UJ	LCS
140-3L-152	09/13/95	0.00	0.50	SL	1.015	DRY		REG	U-238	1.60	0.59	PCI/G	ALPHASPEC	0.11	J	TCR
140-3L-153	09/13/95	0.00	0.50	SL	.5055	DRY		REG	RA-226	0.76	0.32	PCI/G	ALPHASPEC	0.21		
140-3L-153	09/13/95	0.00	0.50	SL	.5042	DRY		REG	TH-228	1.40	0.52	PCI/G	ALPHASPEC	0.21		
140-3L-153	09/13/95	0.00	0.50	SL	.5042	DRY		REG	TH-230	2.20	0.72	PCI/G	ALPHASPEC	0.16		
140-3L-153	09/13/95	0.00	0.50	SL	.5042	DRY		REG	TH-232	1.10	0.46	PCI/G	ALPHASPEC	0.09		
140-3L-153	09/13/95	0.00	0.50	SL	1.021	DRY		REG	U-234	1.50	0.57	PCI/G	ALPHASPEC	0.07	J	TCR
140-3L-153	09/13/95	0.00	0.50	SL	1.021	DRY		REG	U-235	0.12	0.13	PCI/G	ALPHASPEC	0.14	UJ	LCS
140-3L-153	09/13/95	0.00	0.50	SL	1.021	DRY		REG	U-238	1.20	0.48	PCI/G	ALPHASPEC	0.12	J	TCR
140-3L-154	09/14/95	0.00	0.50	SL	.5093	DRY		REG	RA-226	0.88	0.33	PCI/G	ALPHASPEC	0.14		
140-3L-154	09/14/95	0.00	0.50	SL	.5677	DRY		REG	TH-228	0.69	0.33	PCI/G	ALPHASPEC	0.08		
140-3L-154	09/14/95	0.00	0.50	SL	.5677	DRY		REG	TH-230	6.90	1.70	PCI/G	ALPHASPEC	0.15		
140-3L-154	09/14/95	0.00	0.50	SL	.5677	DRY		REG	TH-232	0.93	0.39	PCI/G	ALPHASPEC	0.14		
140-3L-154	09/14/95	0.00	0.50	SL	1.029	DRY		REG	U-234	1.50	0.62	PCI/G	ALPHASPEC	0.08	J	TCR
140-3L-154	09/14/95	0.00	0.50	SL	1.029	DRY		REG	U-235	0.03	0.08	PCI/G	ALPHASPEC	0.17	UJ	LCS
140-3L-154	09/14/95	0.00	0.50	SL	1.029	DRY		REG	U-238	1.60	0.65	PCI/G	ALPHASPEC	0.14	J	TCR
140-3L-155	09/14/95	0.00	0.50	SL	.5150	DRY		REG	RA-226	1.10	0.39	PCI/G	ALPHASPEC	0.19		
140-3L-155	09/14/95	0.00	0.50	SL	.5099	DRY		REG	TH-228	1.20	0.46	PCI/G	ALPHASPEC	0.17		
140-3L-155	09/14/95	0.00	0.50	SL	.5099	DRY		REG	TH-230	1.70	0.58	PCI/G	ALPHASPEC	0.15		
140-3L-155	09/14/95	0.00	0.50	SL	.5099	DRY		REG	TH-232	0.66	0.32	PCI/G	ALPHASPEC	0.15		
140-3L-155	09/14/95	0.00	0.50	SL	1.037	DRY		REG	U-234	1.50	0.61	PCI/G	ALPHASPEC	0.13	J	TCR
140-3L-155	09/14/95	0.00	0.50	SL	1.037	DRY		REG	U-235	0.07	0.10	PCI/G	ALPHASPEC	0.09	UJ	LCS
140-3L-155	09/14/95	0.00	0.50	SL	1.037	DRY		REG	U-238	1.30	0.54	PCI/G	ALPHASPEC	0.17	J	TCR
140-3L-156	09/14/95	0.00	0.50	SL	.5225	DRY		REG	RA-226	1.40	0.42	PCI/G	ALPHASPEC	0.13		
140-3L-156	09/14/95	0.00	0.50	SL	.5046	DRY		REG	TH-228	1.30	0.52	PCI/G	ALPHASPEC	0.25		

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-16787	Sampling Event:	HIS_RA95
Work Order Number:	E9509076	DATAFUSR Number:	D-22762
Customer Number:	441	Date Received:	09/15/95
Environmental Category:	RI	Date Analyzed:	09/19/95

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Flag	Qualifier Code
140-3L-156	09/14/95	0.00	0.50	SL	.5046	DRY		REG	TH-230	1.40	0.54	PCI/G	ALPHASPEC	0.17		
140-3L-156	09/14/95	0.00	0.50	SL	.5046	DRY		REG	TH-232	1.00	0.45	PCI/G	ALPHASPEC	0.23		
140-3L-156	09/14/95	0.00	0.50	SL	1.029	DRY		REG	U-234	1.50	0.57	PCI/G	ALPHASPEC	0.15	J	TCR
140-3L-156	09/14/95	0.00	0.50	SL	1.029	DRY		REG	U-235	0.03	0.07	PCI/G	ALPHASPEC	0.15	UJ	LCS
140-3L-156	09/14/95	0.00	0.50	SL	1.029	DRY		REG	U-238	1.40	0.54	PCI/G	ALPHASPEC	0.15	J	TCR

**TMA/Eberline**  
601 Scarboro Rd.  
Oak Ridge, TN 37830  
(615) 481-0683 Fax (615) 483-4621

TMA-OR-3530

September 25, 1995

Mr. Jim McCague  
Bechtel National, Inc.  
P.O. Box 350  
Oak Ridge, TN 37831-0350

**CASE NARRATIVE**  
Work Order #95-09-076-OR  
State of Utah Certificate #E-235

**SAMPLE RECEIPT**

This work order contains five soil samples received 09/15/95. These samples were analyzed for Radium-226 and Isotopic Thorium using the C. Sills technique and Isotopic Uranium by Alpha Spectroscopy. The associated rinse blank samples are reported in Work Order # 95-09-077.

<u>CLIENT ID</u>	<u>LAB ID</u>	<u>CLIENT ID</u>	<u>LAB ID</u>
140-3L-152	95-09-076-04	140-3L-155	95-09-076-07
140-3L-153	95-09-076-05	140-3L-156	95-09-076-08
140-3L-154	95-09-076-06		

The file name for these samples is 9509076.TXT.

**ANALYTICAL METHODS**

Radium-226 was analyzed using Method 903.0 modified. Isotopic Thorium was analyzed using Method EML Th-01 modified. Isotopic Uranium was analyzed using Method EML U-02 modified.

**PROBLEMS OR UNUSUAL CIRCUMSTANCES**

Initial calibrations, self absorption factors, and tracer recoveries, where applicable, are within specified criteria. No problems or unusual circumstances were noted during the analytical process.

**CERTIFICATION OF ACCURACY**

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package and electronic data deliverable has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

  
M. R. McDougall  
Laboratory Manager

Date: 9/25/95

TMA/Eberline Number:	
Work Order Number:	9509076
Customer Number:	441
Environmental Cat:	RI

Sample ID	Date Collected	Date Analyzed	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCSPIKE	09/15/95	09/18/95	0.00	0.00	W		1		LCST	RA-226	27.20	1.30	PCI	ALPHASPEC	0.10
QCSPIKE	09/15/95	09/18/95	0.00	0.00	W		1		LCSF	RA-226	22.20	2.20	PCI	ALPHASPEC	0.10
QCSPIKE	09/15/95	09/19/95	0.00	0.00	W		1		LCST	TH-228	5.00	0.18	PCI	ALPHASPEC	0.11
QCSPIKE	09/15/95	09/19/95	0.00	0.00	W		1		LCSF	TH-228	4.90	1.10	PCI	ALPHASPEC	0.11
QCSPIKE	09/15/95	09/19/95	0.00	0.00	W		1		LCST	TH-230	5.50	0.12	PCI	ALPHASPEC	0.09
QCSPIKE	09/15/95	09/19/95	0.00	0.00	W		1		LCSF	TH-230	5.10	1.20	PCI	ALPHASPEC	0.09
QCSPIKE	09/15/95	09/19/95	0.00	0.00	W		1		LCST	TH-232	5.00	0.18	PCI	ALPHASPEC	0.08
QCSPIKE	09/15/95	09/19/95	0.00	0.00	W		1		LCSF	TH-232	4.50	1.10	PCI	ALPHASPEC	0.08
QCSPIKE	09/15/95	09/20/95	0.00	0.00	W		1		LCST	U-234	8.60	0.33	PCI	ALPHASPEC	0.18
QCSPIKE	09/15/95	09/20/95	0.00	0.00	W		1		LCSF	U-234	8.80	2.60	PCI	ALPHASPEC	0.18
QCSPIKE	09/15/95	09/20/95	0.00	0.00	W		1		LCST	U-235	0.39	0.01	PCI	ALPHASPEC	0.09
QCSPIKE	09/15/95	09/20/95	0.00	0.00	W		1		LCSF	U-235	0.25	0.19	PCI	ALPHASPEC	0.09
QCSPIKE	09/15/95	09/20/95	0.00	0.00	W		1		LCST	U-238	8.40	0.32	PCI	ALPHASPEC	0.07
QCSPIKE	09/15/95	09/20/95	0.00	0.00	W		1		LCSF	U-238	9.20	2.80	PCI	ALPHASPEC	0.07
QCBLANK	09/15/95	09/18/95	0.00	0.00	W		1		PB	RA-226	-0.01	0.01	PCI	ALPHASPEC	0.08
QCBLANK	09/15/95	09/19/95	0.00	0.00	W		1		PB	TH-228	-0.01	0.04	PCI	ALPHASPEC	0.13
QCBLANK	09/15/95	09/19/95	0.00	0.00	W		1		PB	TH-230	-0.01	0.01	PCI	ALPHASPEC	0.10
QCBLANK	09/15/95	09/19/95	0.00	0.00	W		1		PB	TH-232	0.05	0.00	PCI	ALPHASPEC	0.05
QCBLANK	09/15/95	09/20/95	0.00	0.00	W		1		PB	U-234	0.39	0.23	PCI	ALPHASPEC	0.07
QCBLANK	09/15/95	09/20/95	0.00	0.00	W		1		PB	U-235	0.02	0.07	PCI	ALPHASPEC	0.18
QCBLANK	09/15/95	09/20/95	0.00	0.00	W		1		PB	U-238	0.33	0.21	PCI	ALPHASPEC	0.07
140-3L-152	09/13/95	09/18/95	0.00	0.50	SL	.5147		DRY	REPL	RA-226	0.72	0.37	PCI/G	ALPHASPEC	0.15
140-3L-152	09/13/95	09/19/95	0.00	0.50	SL	.5019		DRY	REPL	TH-228	1.10	0.46	PCI/G	ALPHASPEC	0.19
140-3L-152	09/13/95	09/19/95	0.00	0.50	SL	.5019		DRY	REPL	TH-230	3.30	0.95	PCI/G	ALPHASPEC	0.09
140-3L-152	09/13/95	09/19/95	0.00	0.50	SL	.5019		DRY	REPL	TH-232	0.99	0.42	PCI/G	ALPHASPEC	0.16
140-3L-152	09/13/95	09/20/95	0.00	0.50	SL	1.014		DRY	REPL	U-234	1.70	0.70	PCI/G	ALPHASPEC	0.09
140-3L-152	09/13/95	09/20/95	0.00	0.50	SL	1.014		DRY	REPL	U-235	0.08	0.11	PCI/G	ALPHASPEC	0.11
140-3L-152	09/13/95	09/20/95	0.00	0.50	SL	1.014		DRY	REPL	U-238	1.20	0.52	PCI/G	ALPHASPEC	0.17
140-3L-152	09/13/95	09/18/95	0.00	0.50	SL	.5013		DRY	REG	RA-226	1.70	0.71	PCI/G	ALPHASPEC	0.28
140-3L-152	09/13/95	09/19/95	0.00	0.50	SL	.5068		DRY	REG	TH-228	1.20	0.48	PCI/G	ALPHASPEC	0.17
140-3L-152	09/13/95	09/19/95	0.00	0.50	SL	.5068		DRY	REG	TH-230	3.20	0.96	PCI/G	ALPHASPEC	0.17
140-3L-152	09/13/95	09/19/95	0.00	0.50	SL	.5068		DRY	REG	TH-232	1.20	0.50	PCI/G	ALPHASPEC	0.10
140-3L-152	09/13/95	09/20/95	0.00	0.50	SL	1.015		DRY	REG	U-234	1.20	0.48	PCI/G	ALPHASPEC	0.07
140-3L-152	09/13/95	09/20/95	0.00	0.50	SL	1.015		DRY	REG	U-235	0.06	0.09	PCI/G	ALPHASPEC	0.05
140-3L-152	09/13/95	09/20/95	0.00	0.50	SL	1.015		DRY	REG	U-238	1.60	0.59	PCI/G	ALPHASPEC	0.11
140-3L-153	09/13/95	09/18/95	0.00	0.50	SL	.5055		DRY	REG	RA-226	0.76	0.32	PCI/G	ALPHASPEC	0.21
140-3L-153	09/13/95	09/19/95	0.00	0.50	SL	.5042		DRY	REG	TH-228	1.40	0.52	PCI/G	ALPHASPEC	0.21

Approved by:

Date: 9/25/95

1762

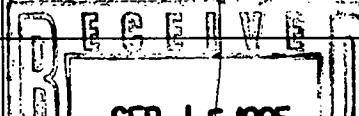
TMA/Eberline Number:			
Work Order Number:	9509076	Date Received:	09/15/95
Customer Number:	441		
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
140-3L-153	09/13/95	09/19/95	0.00	0.50	SL	.5042	DRY	REG	TH-230		2.20	0.72	PCI/G	ALPHASPEC	0.16
140-3L-153	09/13/95	09/19/95	0.00	0.50	SL	.5042	DRY	REG	TH-232		1.10	0.46	PCI/G	ALPHASPEC	0.09
140-3L-153	09/13/95	09/20/95	0.00	0.50	SL	1.021	DRY	REG	U-234		1.50	0.57	PCI/G	ALPHASPEC	0.07
140-3L-153	09/13/95	09/20/95	0.00	0.50	SL	1.021	DRY	REG	U-235		0.12	0.13	PCI/G	ALPHASPEC	0.14
140-3L-153	09/13/95	09/20/95	0.00	0.50	SL	1.021	DRY	REG	U-238		1.20	0.48	PCI/G	ALPHASPEC	0.12
140-3L-154	09/14/95	09/18/95	0.00	0.50	SL	.5093	DRY	REG	RA-226		0.88	0.33	PCI/G	ALPHASPEC	0.14
140-3L-154	09/14/95	09/19/95	0.00	0.50	SL	.5677	DRY	REG	TH-228		0.69	0.33	PCI/G	ALPHASPEC	0.08
140-3L-154	09/14/95	09/19/95	0.00	0.50	SL	.5677	DRY	REG	TH-230		6.90	1.70	PCI/G	ALPHASPEC	0.15
140-3L-154	09/14/95	09/19/95	0.00	0.50	SL	.5677	DRY	REG	TH-232		0.93	0.39	PCI/G	ALPHASPEC	0.14
140-3L-154	09/14/95	09/20/95	0.00	0.50	SL	1.029	DRY	REG	U-234		1.50	0.62	PCI/G	ALPHASPEC	0.08
140-3L-154	09/14/95	09/20/95	0.00	0.50	SL	1.029	DRY	REG	U-235		0.03	0.08	PCI/G	ALPHASPEC	0.17
140-3L-154	09/14/95	09/20/95	0.00	0.50	SL	1.029	DRY	REG	U-238		1.60	0.65	PCI/G	ALPHASPEC	0.14
140-3L-155	09/14/95	09/18/95	0.00	0.50	SL	.5150	DRY	REG	RA-226		1.10	0.39	PCI/G	ALPHASPEC	0.19
140-3L-155	09/14/95	09/19/95	0.00	0.50	SL	.5099	DRY	REG	TH-228		1.20	0.46	PCI/G	ALPHASPEC	0.17
140-3L-155	09/14/95	09/19/95	0.00	0.50	SL	.5099	DRY	REG	TH-230		1.70	0.58	PCI/G	ALPHASPEC	0.15
140-3L-155	09/14/95	09/19/95	0.00	0.50	SL	.5099	DRY	REG	TH-232		0.66	0.32	PCI/G	ALPHASPEC	0.15
140-3L-155	09/14/95	09/20/95	0.00	0.50	SL	1.037	DRY	REG	U-234		1.50	0.61	PCI/G	ALPHASPEC	0.13
140-3L-155	09/14/95	09/20/95	0.00	0.50	SL	1.037	DRY	REG	U-235		0.07	0.10	PCI/G	ALPHASPEC	0.09
140-3L-155	09/14/95	09/20/95	0.00	0.50	SL	1.037	DRY	REG	U-238		1.30	0.54	PCI/G	ALPHASPEC	0.17
140-3L-156	09/14/95	09/18/95	0.00	0.50	SL	.5225	DRY	REG	RA-226		1.40	0.42	PCI/G	ALPHASPEC	0.13
140-3L-156	09/14/95	09/19/95	0.00	0.50	SL	.5046	DRY	REG	TH-228		1.30	0.52	PCI/G	ALPHASPEC	0.25
140-3L-156	09/14/95	09/19/95	0.00	0.50	SL	.5046	DRY	REG	TH-230		1.40	0.54	PCI/G	ALPHASPEC	0.17
140-3L-156	09/14/95	09/19/95	0.00	0.50	SL	.5046	DRY	REG	TH-232		1.00	0.45	PCI/G	ALPHASPEC	0.23
140-3L-156	09/14/95	09/20/95	0.00	0.50	SL	1.029	DRY	REG	U-234		1.50	0.57	PCI/G	ALPHASPEC	0.15
140-3L-156	09/14/95	09/20/95	0.00	0.50	SL	1.029	DRY	REG	U-235		0.03	0.07	PCI/G	ALPHASPEC	0.15
140-3L-156	09/14/95	09/20/95	0.00	0.50	SL	1.029	DRY	REG	U-238		1.40	0.54	PCI/G	ALPHASPEC	0.15

Approved by:

Date: 9/25/95

45-U4-U16

AIRBILL NO. 9054843162	FIELD SAMPLE COLLECTION FORM							Samplers (print name then sign) <i>M. PHILLIPS</i> <i>M. Chilly</i>		
Site Name: HISS V.P. NORIAS #661		WBS No.: 140			Activity Support (Job) No.: 441					
Sample ID Sample Grid Point	Sample Type (1)	Sample Time	Date of Sample	Preserved with	Purpose (2)	Depth cm ft <input checked="" type="checkbox"/>	Priority (Days)	Analysis Required		Remarks
140-3L-152 E104.5-104.5, N5-0	PS	1145	9-13-95	NA		0- 0.5	7	ISO -7H & RA -226 by C. SILLS ISO-U by SPEC		PROPERTY 3L
140-3L-153 E92.5-104.5, NS-0		1600	9-13-95							
140-3L-154 E82.5-E92.5, NS,-5		1345	9-14-95							
140-3L-155 E82.5-92.5, N(-5)-(-15)		1420	9-14-95							
140-3L-156 E76.5-92.5, N(-5)-(-20)		1500	9-14-95							
140-R1-09-13 RINSATE	QC	1400	9-15-95	NITRIL ACID	QC	NA		 <b>SEP 15 1995</b> TMA/ Eberline OAK RIDGE LAB		RINSATE
140-R1-09-14 RINSATE	QC	1600	9-14-95		QC	NA				RINSATE
SAMPLE TYPE (1)		PURPOSE (2)		CHAIN OF CUSTODY RECORD						
Surface Soil Bias Soil Profile Soil Sediment Silt Other Vegetation Ground Water Surface Water	SS BS PS SD OR VE GW SW	Rad Character Verification Quality Control Hot Spot Resample Background Routine Special	RC VR QC HS RS BG RT SP	REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME		
				ANALYSIS	<i>M. Phillips</i>	ABORNE OFFICE	9-14-95	1630		
				ANALYSIS	<i>Airborne</i>	<i>J. Tolson</i>	9-15-95	1100		
<p>This package conforms to the conditions and limitations specified in 49CFR173.421 for excepted radioactive material, limited quantity, n.o.s., UN 2910.</p>									Recorded by: <i>M. Chilly</i> Date: 9-14-95 Time: 1630	
									Total number of samples in this box: 7	
									Total number of samples in this shipment: 7	
									Total number of boxes in this shipment: 1	
Shipper: TNS/HISS 9170 17TH AVE BERKELEY, MO 67134		Ship to: TNS/O.R. 601 SCARBRO RD 10 OAK RIDGE, TN 37830 ATTN: SAMPLE LOG IN							Page 1 of 1 7Q1	
Shipping Container meets DOT Transferable Criteria <input checked="" type="checkbox"/>										
Shipping container dose rate 0.5 mrem/hr.										
Original										

**THERMO NUCLEAR SERVICES/OAK RIDGE LABORATORY**  
**TRACER REPORT**

D-22762

9/24/95

Work Order # 95-09-076-OR

BECHTEL SAMPLE ID	ANALYTE	TRACER	RECOVERY
140-3L-152	RA-226	BA-133	66%
140-3L-152	TH-228	TH-229	63%
140-3L-152	TH-230	TH-229	63%
140-3L-152	TH-232	TH-229	63%
140-3L-152	U-234	U-232	46% ~
140-3L-152	U-235	U-232	46% ~
140-3L-152	U-238	U-232	46% ~
140-3L-153	RA-226	BA-133	77%
140-3L-153	TH-228	TH-229	66%
140-3L-153	TH-230	TH-229	66%
140-3L-153	TH-232	TH-229	66%
140-3L-153	U-234	U-232	49% ~
140-3L-153	U-235	U-232	49% ~
140-3L-153	U-238	U-232	49% ~
140-3L-154	RA-226	BA-133	87%
140-3L-154	TH-228	TH-229	66%
140-3L-154	TH-230	TH-229	66%
140-3L-154	TH-232	TH-229	66%
140-3L-154	U-234	U-232	42% ~
140-3L-154	U-235	U-232	42% ~
140-3L-154	U-238	U-232	42% ~
140-3L-155	RA-226	BA-133	79%
140-3L-155	TH-228	TH-229	75%
140-3L-155	TH-230	TH-229	75%
140-3L-155	TH-232	TH-229	75%
140-3L-155	U-234	U-232	19% ~
140-3L-155	U-235	U-232	49% ~
140-3L-155	U-238	U-232	49% ~

THERMO NUCLEAR SERVICES/OAK RIDGE LABORATORY U-22762  
TRACER REPORT

9/24/95  
Work Order # 95-09-076-OR

BECHTEL SAMPLE ID	ANALYTE	TRACER	RECOVERY
140-3L-156	RA-226	BA-133	89%
140-3L-156	TH-228	TH-229	64%
140-3L-156	TH-230	TH-229	64%
140-3L-156	TH-232	TH-229	64%
140-3L-156	U-234	U-232	46% ~
140-3L-156	U-235	U-232	46% ~
140-3L-156	U-238	U-232	46% ~

**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Post-Remedial Action Soil Sample Results (Data)**

**SAMPLES:**

**140-3L-157  
140-3L-158  
140-3L-159  
140-3L-160  
140-3L-161  
140-3L-162**

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-16895	Sampling Event:	HIS_RA95
Work Order Number:	E9509084	DATAFUSR Number:	D-22922
Customer Number:	441	Date Received:	09/18/95
Environmental Category:	RI	Date Analyzed:	09/20/95

Sample ID	Date Collected	Top Depth		Bottom Depth		Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI Qualifier		
		Top	Depth	Bottom	Depth											Flag	Code	
140-3L-157	09/15/95	0.00	0.50	SL	.5067 DRY	REG	RA-226	1.10	0.41	PCI/G	ALPHASPEC	0.24						
140-3L-157	09/15/95	0.00	0.50	SL	.9285 DRY	REG	TH-228	1.30	0.42	PCI/G	ALPHASPEC	0.09						
140-3L-157	09/15/95	0.00	0.50	SL	.9285 DRY	REG	TH-230	1.80	0.52	PCI/G	ALPHASPEC	0.09	U	BLK				
140-3L-157	09/15/95	0.00	0.50	SL	.9285 DRY	REG	TH-232	1.10	0.37	PCI/G	ALPHASPEC	0.05						
140-3L-157	09/15/95	0.00	0.50	SL	1.020 DRY	REG	U-234	1.70	0.67	PCI/G	ALPHASPEC	0.16	J	TCR				
140-3L-157	09/15/95	0.00	0.50	SL	1.020 DRY	REG	U-235	0.14	0.15	PCI/G	ALPHASPEC	0.17	UJ	LCS				
140-3L-157	09/15/95	0.00	0.50	SL	1.020 DRY	REG	U-238	1.40	0.58	PCI/G	ALPHASPEC	0.08	J	TCR				
140-3L-158	09/15/95	0.00	0.50	SL	.5188 DRY	REG	RA-226	1.20	0.41	PCI/G	ALPHASPEC	0.22						
140-3L-158	09/15/95	0.00	0.50	SL	1.057 DRY	REG	TH-228	0.91	0.32	PCI/G	ALPHASPEC	0.10						
140-3L-158	09/15/95	0.00	0.50	SL	1.057 DRY	REG	TH-230	6.00	1.40	PCI/G	ALPHASPEC	0.08	U	BLK				
140-3L-158	09/15/95	0.00	0.50	SL	1.057 DRY	REG	TH-232	0.92	0.32	PCI/G	ALPHASPEC	0.05	U	BLK				
140-3L-158	09/15/95	0.00	0.50	SL	1.011 DRY	REG	U-234	1.40	0.50	PCI/G	ALPHASPEC	0.06						
140-3L-158	09/15/95	0.00	0.50	SL	1.011 DRY	REG	U-235	0.08	0.10	PCI/G	ALPHASPEC	0.13	UJ	LCS				
140-3L-158	09/15/95	0.00	0.50	SL	1.011 DRY	REG	U-238	1.10	0.44	PCI/G	ALPHASPEC	0.06	U	BLK				
140-3L-159	09/15/95	0.00	0.50	SL	.5063 DRY	REG	RA-226	1.10	0.41	PCI/G	ALPHASPEC	0.18						
140-3L-159	09/15/95	0.00	0.50	SL	.9553 DRY	REG	TH-228	1.20	0.38	PCI/G	ALPHASPEC	0.05						
140-3L-159	09/15/95	0.00	0.50	SL	.9553 DRY	REG	TH-230	2.50	0.68	PCI/G	ALPHASPEC	0.09	U	BLK				
140-3L-159	09/15/95	0.00	0.50	SL	.9553 DRY	REG	TH-232	0.95	0.34	PCI/G	ALPHASPEC	0.09	U	BLK				
140-3L-159	09/15/95	0.00	0.50	SL	1.043 DRY	REG	U-234	1.30	0.46	PCI/G	ALPHASPEC	0.06						
140-3L-159	09/15/95	0.00	0.50	SL	1.043 DRY	REG	U-235	0.19	0.15	PCI/G	ALPHASPEC	0.07	J	LCS				
140-3L-159	09/15/95	0.00	0.50	SL	1.043 DRY	REG	U-238	1.30	0.47	PCI/G	ALPHASPEC	0.06						
140-3L-160	09/16/95	0.00	0.50	SL	.5047 DRY	REG	RA-226	0.95	0.36	PCI/G	ALPHASPEC	0.19						
140-3L-160	09/16/95	0.00	0.50	SL	.9510 DRY	REG	TH-228	0.67	0.27	PCI/G	ALPHASPEC	0.10						
140-3L-160	09/16/95	0.00	0.50	SL	.9510 DRY	REG	TH-230	2.60	0.71	PCI/G	ALPHASPEC	0.08	U	BLK				
140-3L-160	09/16/95	0.00	0.50	SL	.9510 DRY	REG	TH-232	0.88	0.31	PCI/G	ALPHASPEC	0.08	U	BLK				
140-3L-160	09/16/95	0.00	0.50	SL	1.007 DRY	REG	U-234	1.00	0.39	PCI/G	ALPHASPEC	0.06						
140-3L-160	09/16/95	0.00	0.50	SL	1.007 DRY	REG	U-235	0.08	0.09	PCI/G	ALPHASPEC	0.07	J	LCS				
140-3L-160	09/16/95	0.00	0.50	SL	1.007 DRY	REG	U-238	1.30	0.47	PCI/G	ALPHASPEC	0.06						
140-3L-161	09/16/95	0.00	0.50	SL	.4987 DRY	REG	RA-226	1.00	0.39	PCI/G	ALPHASPEC	0.16						
140-3L-161	09/16/95	0.00	0.50	SL	.9913 DRY	REG	TH-228	0.73	0.25	PCI/G	ALPHASPEC	0.10						

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-16895	Sampling Event:	HIS_RA95
Work Order Number:	E9509084	DATAFUSR Number:	D-22922
Customer Number:	441	Date Received:	09/18/95
Environmental Category:	RI	Date Analyzed:	09/20/95

Sample ID	Date Collected	Top Depth			Bottom Depth			F/UF Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	MDA	BNI Flag	Qualifier Code
		Depth	Matrix		Depth	Matrix												
140-3L-161	09/16/95	0.00	0.50	SL	.9913	DRY	REG	TH-230		2.00	0.51	PCI/G	ALPHASPEC	0.07	U	BLK		
140-3L-161	09/16/95	0.00	0.50	SL	.9913	DRY	REG	TH-232		0.70	0.25	PCI/G	ALPHASPEC	0.09	U	BLK		
140-3L-161	09/16/95	0.00	0.50	SL	1.029	DRY	REG	U-234		1.00	0.36	PCI/G	ALPHASPEC	0.08				
140-3L-161	09/16/95	0.00	0.50	SL	1.029	DRY	REG	U-235		0.01	0.05	PCI/G	ALPHASPEC	0.12	UJ	LCS		
140-3L-161	09/16/95	0.00	0.50	SL	1.029	DRY	REG	U-238		0.84	0.32	PCI/G	ALPHASPEC	0.05	U	BLK		
140-3L-162	09/16/95	0.00	0.50	SL	.5111	DRY	REG	RA-226		0.70	0.33	PCI/G	ALPHASPEC	0.24				
140-3L-162	09/16/95	0.00	0.50	SL	.9801	DRY	REG	TH-228		0.81	0.30	PCI/G	ALPHASPEC	0.14				
140-3L-162	09/16/95	0.00	0.50	SL	.9801	DRY	REG	TH-230		4.20	1.00	PCI/G	ALPHASPEC	0.11	U	BLK		
140-3L-162	09/16/95	0.00	0.50	SL	.9801	DRY	REG	TH-232		1.00	0.36	PCI/G	ALPHASPEC	0.11				
140-3L-162	09/16/95	0.00	0.50	SL	1.036	DRY	REG	U-234		1.10	0.48	PCI/G	ALPHASPEC	0.13	J	TCR		
140-3L-162	09/16/95	0.00	0.50	SL	1.036	DRY	REG	U-235		0.06	0.10	PCI/G	ALPHASPEC	0.19	UJ	LCS		
140-3L-162	09/16/95	0.00	0.50	SL	1.036	DRY	REG	U-238		1.50	0.61	PCI/G	ALPHASPEC	0.15	J	TCR		

**TMA****Thermo Analytical Inc.**

D-22922

**TMA/Eberline**

601 Scarboro Rd.

Oak Ridge, TN 37830

(615) 481-0683 Fax (615) 483-4621

TMA-OR-3547

October 4, 1995

Mr. Jim McCague  
Bechtel National, Inc.  
P.O. Box 350  
Oak Ridge, TN 37831-0350

**CASE NARRATIVE**  
Work Order #95-09-084-OR  
State of Utah Certificate #E-235

**SAMPLE RECEIPT**

This work order contains six soil samples received 09/18/95. These samples were analyzed for Radium-226 and Isotopic Thorium using the C. Sills technique, and Isotopic Uranium by Alpha Spectroscopy. The associated rinse blank samples are reported in Work Order # 95-09-086.

<u>CLIENT ID</u>	<u>LAB ID</u>	<u>CLIENT ID</u>	<u>LAB ID</u>
140-3L-157	95-09-084-04	140-3L-160	95-09-084-07
140-3L-158	95-09-084-05	140-3L-161	95-09-084-08
140-3L-159	95-09-084-06	140-3L-162	95-09-084-09

The file name for these samples is 9509084.TXT.

**ANALYTICAL METHODS**

Radium-226 was analyzed using Method 903.0 modified. Isotopic Thorium was analyzed using Method EML Th-01 modified. Isotopic Uranium was analyzed using Method EML U-02 modified.

**SPECIAL PROBLEMS OR UNUSUAL CIRCUMSTANCES**

Results for the Thorium-230 blank demonstrated a false positive. This may be due to the presence of a cross contamination problem. We advised Robin Crabtree and Todd Hart about this problem and sincerely feel that this is the only sample effected within this batch (work order) of samples. We asked if a reanalysis should be done and were instructed to note the problem herein the narrative. We feel that the source of this contamination is from a filtering funnel because we had analyzed samples that contained enriched uranium just prior to these samples. Spectral data for the bland demonstrated enriched uranium characteristics. This also caused the analytical tracer recovery to be approximately 200%. All filtering apparatus was ultrasonic cleaned in a hot nitric acid solution for twelve (12) hours. Post cleaning all filtering apparatus was surveyed and returned to service. No other significant problems were noted during the analysis process.

Initial calibrations, self absorption factors, and tracer recoveries, where applicable, are within specified criteria. No problems or unusual circumstances were noted during the analytical process.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package and electronic data deliverable has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

*Cathy E. Sharp FOR*

M. R. McDougall  
Laboratory Manager

Date: 10/15/95

TMA/Eberline Number:	
Work Order Number:	9509084
Customer Number:	441
Environmental Cat:	RI

Sample ID	Date Collected	Date Analyzed	Top Depth	Bottom Depth	Matrix	F/U/F	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCSPIKE	09/18/95	09/20/95	0.00	0.00	W		1		LCST	RA-226	27.20	1.50	PCI	ALPHASPEC	0.13
QCSPIKE	09/18/95	09/20/95	0.00	0.00	W		1		LCSF	RA-226	23.60	2.50	PCI	ALPHASPEC	0.13
QCSPIKE	09/18/95	09/20/95	0.00	0.00	W		1		LCST	TH-228	5.00	0.18	PCI	ALPHASPEC	0.11
QCSPIKE	09/18/95	09/20/95	0.00	0.00	W		1		LCSF	TH-228	4.50	1.10	PCI	ALPHASPEC	0.11
QCSPIKE	09/18/95	09/20/95	0.00	0.00	W		1		LCST	TH-230	5.20	0.11	PCI	ALPHASPEC	0.09
QCSPIKE	09/18/95	09/20/95	0.00	0.00	W		1		LCSF	TH-230	5.00	1.20	PCI	ALPHASPEC	0.09
QCSPIKE	09/18/95	09/20/95	0.00	0.00	W		1		LCST	TH-232	5.00	0.18	PCI	ALPHASPEC	0.08
QCSPIKE	09/18/95	09/20/95	0.00	0.00	W		1		LCSF	TH-232	4.70	1.10	PCI	ALPHASPEC	0.08
QCSPIKE	09/18/95	09/27/95	0.00	0.00	W		1		LCST	U-234	8.50	0.32	PCI	ALPHASPEC	0.14
QCSPIKE	09/18/95	09/27/95	0.00	0.00	W		1		LCSF	U-234	9.50	3.10	PCI	ALPHASPEC	0.14
QCSPIKE	09/18/95	09/27/95	0.00	0.00	W		1		LCST	U-235	0.39	0.01	PCI	ALPHASPEC	0.23
QCSPIKE	09/18/95	09/27/95	0.00	0.00	W		1		LCSF	U-235	0.47	0.31	PCI	ALPHASPEC	0.23
QCSPIKE	09/18/95	09/27/95	0.00	0.00	W		1		LCST	U-238	8.30	0.32	PCI	ALPHASPEC	0.14
QCSPIKE	09/18/95	09/27/95	0.00	0.00	W		1		LCSF	U-238	9.70	3.10	PCI	ALPHASPEC	0.14
QCBLANK	09/18/95	09/20/95	0.00	0.00	W		1		PB	RA-226	0.02	0.06	PCI	ALPHASPEC	0.15
QCBLANK	09/18/95	09/20/95	0.00	0.00	W		1		PB	TH-228	0.01	0.02	PCI	ALPHASPEC	0.04
QCBLANK	09/18/95	09/20/95	0.00	0.00	W		1		PB	TH-230	2.10	0.38	PCI	ALPHASPEC	0.03
QCBLANK	09/18/95	09/20/95	0.00	0.00	W		1		PB	TH-232	0.20	0.07	PCI	ALPHASPEC	0.01
QCBLANK	09/18/95	09/27/95	0.00	0.00	W		1		PB	U-234	0.17	0.12	PCI	ALPHASPEC	0.09
QCBLANK	09/18/95	09/27/95	0.00	0.00	W		1		PB	U-235	0.02	0.05	PCI	ALPHASPEC	0.06
QCBLANK	09/18/95	09/27/95	0.00	0.00	W		1		PB	U-238	0.25	0.16	PCI	ALPHASPEC	0.12
140-3L-157	09/15/95	09/20/95	0.00	0.50	SL	.5034	DRY	REPL	RA-226	1.30	0.45	PCI/G	ALPHASPEC	0.21	
140-3L-157	09/15/95	09/20/95	0.00	0.50	SL	.9462	DRY	REPL	TH-228	0.92	0.33	PCI/G	ALPHASPEC	0.11	
140-3L-157	09/15/95	09/20/95	0.00	0.50	SL	.9462	DRY	REPL	TH-230	1.90	0.56	PCI/G	ALPHASPEC	0.05	
140-3L-157	09/15/95	09/20/95	0.00	0.50	SL	.9462	DRY	REPL	TH-232	1.10	0.38	PCI/G	ALPHASPEC	0.09	
140-3L-157	09/15/95	09/27/95	0.00	0.50	SL	1.005	DRY	REPL	U-234	1.60	0.57	PCI/G	ALPHASPEC	0.11	
140-3L-157	09/15/95	09/27/95	0.00	0.50	SL	1.005	DRY	REPL	U-235	0.12	0.12	PCI/G	ALPHASPEC	0.08	
140-3L-157	09/15/95	09/27/95	0.00	0.50	SL	1.005	DRY	REPL	U-238	1.20	0.47	PCI/G	ALPHASPEC	0.11	
140-3L-157	09/15/95	09/20/95	0.00	0.50	SL	.5067	DRY	REG	RA-226	1.10	0.41	PCI/G	ALPHASPEC	0.24	
140-3L-157	09/15/95	09/20/95	0.00	0.50	SL	.9285	DRY	REG	TH-228	1.30	0.42	PCI/G	ALPHASPEC	0.09	
140-3L-157	09/15/95	09/20/95	0.00	0.50	SL	.9285	DRY	REG	TH-230	1.80	0.52	PCI/G	ALPHASPEC	0.09	
140-3L-157	09/15/95	09/20/95	0.00	0.50	SL	.9285	DRY	REG	TH-232	1.10	0.37	PCI/G	ALPHASPEC	0.05	
140-3L-157	09/15/95	09/27/95	0.00	0.50	SL	1.020	DRY	REG	U-234	1.70	0.67	PCI/G	ALPHASPEC	0.16	
140-3L-157	09/15/95	09/27/95	0.00	0.50	SL	1.020	DRY	REG	U-235	0.14	0.15	PCI/G	ALPHASPEC	0.17	
140-3L-157	09/15/95	09/27/95	0.00	0.50	SL	1.020	DRY	REG	U-238	1.40	0.58	PCI/G	ALPHASPEC	0.08	
140-3L-158	09/15/95	09/20/95	0.00	0.50	SL	.5188	DRY	REG	RA-226	1.20	0.41	PCI/G	ALPHASPEC	0.22	
140-3L-158	09/15/95	09/20/95	0.00	0.50	SL	1.057	DRY	REG	TH-228	0.91	0.32	PCI/G	ALPHASPEC	0.10	

Approved by:

*Cathy S. Sharp*  
*Bruce Coo* 10/15/95

**TMA/Eberline**  
A Division of Thermo Terra Tech

Oak Ridge Laboratory • 601 Scarboro Road • Oak Ridge, TN 37830 • (615) 481-0683

TMA/Eberline Number:	
Work Order Number:	9509084
Customer Number:	441
Environmental Cat:	RI

Sample ID	Date Collected	Date Analyzed	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
140-3L-158	09/15/95	09/20/95	0.00	0.50	SL		1.057	DRY	REG	TH-230	6.00	1.40	PCI/G	ALPHASPEC	0.08
140-3L-158	09/15/95	09/20/95	0.00	0.50	SL		1.057	DRY	REG	TH-232	0.92	0.32	PCI/G	ALPHASPEC	0.05
140-3L-158	09/15/95	09/27/95	0.00	0.50	SL		1.011	DRY	REG	U-234	1.40	0.50	PCI/G	ALPHASPEC	0.06
140-3L-158	09/15/95	09/27/95	0.00	0.50	SL		1.011	DRY	REG	U-235	0.08	0.10	PCI/G	ALPHASPEC	0.13
140-3L-158	09/15/95	09/27/95	0.00	0.50	SL		1.011	DRY	REG	U-238	1.10	0.44	PCI/G	ALPHASPEC	0.06
140-3L-159	09/15/95	09/20/95	0.00	0.50	SL		.5063	DRY	REG	RA-226	1.10	0.41	PCI/G	ALPHASPEC	0.18
140-3L-159	09/15/95	09/20/95	0.00	0.50	SL		.9553	DRY	REG	TH-228	1.20	0.38	PCI/G	ALPHASPEC	0.05
140-3L-159	09/15/95	09/20/95	0.00	0.50	SL		.9553	DRY	REG	TH-230	2.50	0.68	PCI/G	ALPHASPEC	0.09
140-3L-159	09/15/95	09/20/95	0.00	0.50	SL		.9553	DRY	REG	TH-232	0.95	0.34	PCI/G	ALPHASPEC	0.09
140-3L-159	09/15/95	09/27/95	0.00	0.50	SL		1.043	DRY	REG	U-234	1.30	0.46	PCI/G	ALPHASPEC	0.06
140-3L-159	09/15/95	09/27/95	0.00	0.50	SL		1.043	DRY	REG	U-235	0.19	0.15	PCI/G	ALPHASPEC	0.07
140-3L-159	09/15/95	09/27/95	0.00	0.50	SL		1.043	DRY	REG	U-238	1.30	0.47	PCI/G	ALPHASPEC	0.06
140-3L-160	09/16/95	09/20/95	0.00	0.50	SL		.5047	DRY	REG	RA-226	0.95	0.36	PCI/G	ALPHASPEC	0.19
140-3L-160	09/16/95	09/20/95	0.00	0.50	SL		.9510	DRY	REG	TH-228	0.67	0.27	PCI/G	ALPHASPEC	0.10
140-3L-160	09/16/95	09/20/95	0.00	0.50	SL		.9510	DRY	REG	TH-230	2.60	0.71	PCI/G	ALPHASPEC	0.08
140-3L-160	09/16/95	09/20/95	0.00	0.50	SL		.9510	DRY	REG	TH-232	0.88	0.31	PCI/G	ALPHASPEC	0.08
140-3L-160	09/16/95	09/27/95	0.00	0.50	SL		1.007	DRY	REG	U-234	1.00	0.39	PCI/G	ALPHASPEC	0.06
140-3L-160	09/16/95	09/27/95	0.00	0.50	SL		1.007	DRY	REG	U-235	0.08	0.09	PCI/G	ALPHASPEC	0.07
140-3L-160	09/16/95	09/27/95	0.00	0.50	SL		1.007	DRY	REG	U-238	1.30	0.47	PCI/G	ALPHASPEC	0.06
140-3L-161	09/16/95	09/20/95	0.00	0.50	SL		.4987	DRY	REG	RA-226	1.00	0.39	PCI/G	ALPHASPEC	0.16
140-3L-161	09/16/95	09/20/95	0.00	0.50	SL		.9913	DRY	REG	TH-228	0.73	0.25	PCI/G	ALPHASPEC	0.10
140-3L-161	09/16/95	09/20/95	0.00	0.50	SL		.9913	DRY	REG	TH-230	2.00	0.51	PCI/G	ALPHASPEC	0.07
140-3L-161	09/16/95	09/20/95	0.00	0.50	SL		.9913	DRY	REG	TH-232	0.70	0.25	PCI/G	ALPHASPEC	0.09
140-3L-161	09/16/95	09/27/95	0.00	0.50	SL		1.029	DRY	REG	U-234	1.00	0.36	PCI/G	ALPHASPEC	0.08
140-3L-161	09/16/95	09/27/95	0.00	0.50	SL		1.029	DRY	REG	U-235	0.01	0.05	PCI/G	ALPHASPEC	0.12
140-3L-161	09/16/95	09/27/95	0.00	0.50	SL		1.029	DRY	REG	U-238	0.84	0.32	PCI/G	ALPHASPEC	0.05
140-3L-162	09/16/95	09/20/95	0.00	0.50	SL		.5111	DRY	REG	RA-226	0.70	0.33	PCI/G	ALPHASPEC	0.24
140-3L-162	09/16/95	09/20/95	0.00	0.50	SL		.9801	DRY	REG	TH-228	0.81	0.30	PCI/G	ALPHASPEC	0.14
140-3L-162	09/16/95	09/20/95	0.00	0.50	SL		.9801	DRY	REG	TH-230	4.20	1.00	PCI/G	ALPHASPEC	0.11
140-3L-162	09/16/95	09/20/95	0.00	0.50	SL		.9801	DRY	REG	TH-232	1.00	0.36	PCI/G	ALPHASPEC	0.11
140-3L-162	09/16/95	09/27/95	0.00	0.50	SL		1.036	DRY	REG	U-234	1.10	0.48	PCI/G	ALPHASPEC	0.13
140-3L-162	09/16/95	09/27/95	0.00	0.50	SL		1.036	DRY	REG	U-235	0.06	0.10	PCI/G	ALPHASPEC	0.19
140-3L-162	09/16/95	09/27/95	0.00	0.50	SL		1.036	DRY	REG	U-238	1.50	0.61	PCI/G	ALPHASPEC	0.15

Approved by:

*Catherine E. Sharp*  
Catherine E. Sharp  
10/5/95

95-09-084

AIRBILL NO.  
3910849880

## FIELD SAMPLE COLLECTION FORM

Samplers (print name then sign)

M. PHILLIPS

M. Chaffey

Site Name: M155

WORMAS # 1661

WBS No.: 140

Activity Support (Job) No.: 441

Sample ID Sample Grid Point	Sample Type (1)	Sample Time	Date of Sample	Preserved with	Purpose (2)	Depth cm <input type="checkbox"/> ft <input type="checkbox"/>	Priority (Days)	Analysis Required	Remarks
140-3L-157 N 850' E 1250'	PS	1045	9-15-95	NA	RC	0 - 0.5	7	IBU-TII & LA-226 IBU-L & LA-226 IBU-L & LA-226 LA-226	SL PREPARATION LA-226 ANAL
140-3L-158 N 2.5 E 77.5		1045	9-15-95						
140-3L-159 N 2.5 E 77.5		1530	9-15-95						
140-3L-160 N 2.5 E 67.5		0850	9-16-95						
140-3L-161 N 2.5 E 67.5		1030							
140-3L-162 N 2.5 E 57.5		0900							
140-3L-163 N 2.5 E 57.5	✓	1045	✓	✓	✓	✓	✓	✓	✓

## SAMPLE TYPE (1)

## PURPOSE (2)

Surface Soil	SS	Rad Character	RC
Bias Soil	BS	Verification	VR
Profile Soil	PS	Quality Control	QC
Sediment Silt	SD	Hot Spot	HS
Other	OR	Resample	RS
Vegetation	VE	Background	BG
Ground Water	GW	Routine	RT
Surface Water	SW	Special	SP

This package conforms to the conditions and limitations specified.  
In 49 CFR 173.421 for excepted radioactive material, limited quantity,  
n.o.s., UN 2910.

## CHAIN OF CUSTODY RECORD

REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME
ANALYSIS	M. Chaffey	140-3L-163	9-16-95	1700
ANALYSIS	Fed LX	J. J. Langman	9-18-95	0915

Shipper: TNS/M155

9170 LAFAYETTE RD

BROOKLYN, NY 11215

Ship to: TNS/C.R.

1601 SCHUYLER AVENUE

CARMELWOOD, NY 10523

177A SAMPLE LAB 100

Shipping Container meets DOT Transferable Criteria

Shipping container dose rate 20.5 mrem/hr.

Original

Recorded by: M. Chaffey

Date: 9-16-95 Time: 1700

Total number of samples in this box

7

Total number of samples in this shipment

13

Total number of boxes in this shipment

110

Page 1 of 2

10  
20  
30  
40

**THERMO NUCLEAR SERVICES/OAK RIDGE LABORATORY** - 100-100-2  
**TRACER REPORT**

10/1/95  
 Work Order # 95-09-084-OR

<b>BECHTEL SAMPLE ID</b>	<b>ANALYTE</b>	<b>TRACER</b>	<b>RECOVERY</b>
140-3L-157	RA-226	BA-133	75%
140-3L-157	TH-228	TH-229	63%
140-3L-157	TH-230	TH-229	63%
140-3L-157	TH-232	TH-229	63%
140-3L-157	U-234	U-232	38%
140-3L-157	U-235	U-232	38%
140-3L-157	U-238	U-232	38%
140-3L-158	RA-226	BA-133	73%
140-3L-158	TH-228	TH-229	63%
140-3L-158	TH-230	TH-229	63%
140-3L-158	TH-232	TH-229	63%
140-3L-158	U-234	U-232	52%
140-3L-158	U-235	U-232	52%
140-3L-158	U-238	U-232	52%
140-3L-159	RA-226	BA-133	68%
140-3L-159	TH-228	TH-229	64%
140-3L-159	TH-230	TH-229	64%
140-3L-159	TH-232	TH-229	64%
140-3L-159	U-234	U-232	52%
140-3L-159	U-235	U-232	52%
140-3L-159	U-238	U-232	52%
140-3L-160	RA-226	BA-133	85%
140-3L-160	TH-228	TH-229	70%
140-3L-160	TH-230	TH-229	70%
140-3L-160	TH-232	TH-229	70%
140-3L-160	U-234	U-232	56%
140-3L-160	U-235	U-232	56%
140-3L-160	U-238	U-232	56%

**THERMO NUCLEAR SERVICES/OAK RIDGE LABORATORY**  
**TRACER REPORT**

10/1/95

Work Order # 95-09-084-OR

BECHTEL SAMPLE ID	ANALYTE	TRACER	RECOVERY
140-3L-161	RA-226	BA-133	78%
140-3L-161	TH-228	TH-229	83%
140-3L-161	TH-230	TH-229	83%
140-3L-161	TH-232	TH-229	83%
140-3L-161	U-234	U-232	67%
140-3L-161	U-235	U-232	67%
140-3L-161	U-238	U-232	67%
140-3L-162	RA-226	BA-133	77%
140-3L-162	TH-228	TH-229	68%
140-3L-162	TH-230	TH-229	68%
140-3L-162	TH-232	TH-229	68%
140-3L-162	U-234	U-232	44% -
140-3L-162	U-235	U-232	44% -
140-3L-162	U-238	U-232	44% -

**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Post-Remedial Action Soil Sample Results (Data)**

**SAMPLES:**

**140-3L-163  
140-3L-164  
140-3L-165  
140-3L-166  
140-3L-167**

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-16894	Sampling Event:	HIS_RA95
Work Order Number:	E9509085	DATAUSR Number:	D-22921
Customer Number:	441	Date Received:	09/18/95
Environmental Category:	RI	Date Analyzed:	09/27/95

Sample ID	Date Collected	Top Depth			Bottom Depth			F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Flag	Qualifier Code
		Depth	Matrix		Depth	Matrix													
140-3L-163	09/16/95	0.00	0.50	SL	.5021	DRY	REG	RA-226	1.20	0.42	PCI/G	ALPHASPEC	0.10	J	LCS				
140-3L-163	09/16/95	0.00	0.50	SL	.9882	DRY	REG	TH-228	0.73	0.27	PCI/G	ALPHASPEC	0.13	J	LCS				
140-3L-163	09/16/95	0.00	0.50	SL	.9882	DRY	REG	TH-230	1.80	0.50	PCI/G	ALPHASPEC	0.05	J	LCS				
140-3L-163	09/16/95	0.00	0.50	SL	.9882	DRY	REG	TH-232	0.78	0.28	PCI/G	ALPHASPEC	0.09	J	LCS				
140-3L-163	09/16/95	0.00	0.50	SL	1.016	DRY	REG	U-234	2.00	0.86	PCI/G	ALPHASPEC	0.10	J	TCR				
140-3L-163	09/16/95	0.00	0.50	SL	1.016	DRY	REG	U-235	0.12	0.00	PCI/G	ALPHASPEC	0.12	R	RPL				
140-3L-163	09/16/95	0.00	0.50	SL	1.016	DRY	REG	U-238	1.90	0.81	PCI/G	ALPHASPEC	0.10	J	TCR				
140-3L-164	09/16/95	0.00	0.50	SL	.5141	DRY	REG	RA-226	0.83	0.35	PCI/G	ALPHASPEC	0.16	J	LCS				
140-3L-164	09/16/95	0.00	0.50	SL	.9551	DRY	REG	TH-228	1.10	0.40	PCI/G	ALPHASPEC	0.12	J	LCS				
140-3L-164	09/16/95	0.00	0.50	SL	.9551	DRY	REG	TH-230	3.00	0.82	PCI/G	ALPHASPEC	0.06	J	LCS				
140-3L-164	09/16/95	0.00	0.50	SL	.9551	DRY	REG	TH-232	0.68	0.29	PCI/G	ALPHASPEC	0.10	J	LCS				
140-3L-164	09/16/95	0.00	0.50	SL	1.000	DRY	REG	U-234	1.50	0.66	PCI/G	ALPHASPEC	0.21	J	TCR				
140-3L-164	09/16/95	0.00	0.50	SL	1.000	DRY	REG	U-235	0.08	0.12	PCI/G	ALPHASPEC	0.11	R	RPL				
140-3L-164	09/16/95	0.00	0.50	SL	1.000	DRY	REG	U-238	1.60	0.68	PCI/G	ALPHASPEC	0.09	J	TCR				
140-3L-165	09/16/95	0.00	0.50	SL	.5046	DRY	REG	RA-226	1.20	0.45	PCI/G	ALPHASPEC	0.18	J	LCS				
140-3L-165	09/16/95	0.00	0.50	SL	.9673	DRY	REG	TH-228	1.20	0.39	PCI/G	ALPHASPEC	0.10	J	LCS				
140-3L-165	09/16/95	0.00	0.50	SL	.9673	DRY	REG	TH-230	1.80	0.50	PCI/G	ALPHASPEC	0.09	J	LCS				
140-3L-165	09/16/95	0.00	0.50	SL	.9673	DRY	REG	TH-232	0.75	0.28	PCI/G	ALPHASPEC	0.09	J	LCS				
140-3L-165	09/16/95	0.00	0.50	SL	1.039	DRY	REG	U-234	1.20	0.49	PCI/G	ALPHASPEC	0.12						
140-3L-165	09/16/95	0.00	0.50	SL	1.039	DRY	REG	U-235	0.03	0.07	PCI/G	ALPHASPEC	0.15	R	RPL				
140-3L-165	09/16/95	0.00	0.50	SL	1.039	DRY	REG	U-238	1.10	0.47	PCI/G	ALPHASPEC	0.07	U	BLK				
140-3L-166	09/16/95	0.00	0.50	SL	.5446	DRY	REG	RA-226	0.98	0.39	PCI/G	ALPHASPEC	0.22	J	LCS				
140-3L-166	09/16/95	0.00	0.50	SL	.9533	DRY	REG	TH-228	1.20	0.43	PCI/G	ALPHASPEC	0.13	J	LCS				
140-3L-166	09/16/95	0.00	0.50	SL	.9533	DRY	REG	TH-230	4.30	1.10	PCI/G	ALPHASPEC	0.11	J	LCS				
140-3L-166	09/16/95	0.00	0.50	SL	.9533	DRY	REG	TH-232	1.20	0.43	PCI/G	ALPHASPEC	0.06	J	LCS				
140-3L-166	09/16/95	0.00	0.50	SL	1.120	DRY	REG	U-234	1.40	0.53	PCI/G	ALPHASPEC	0.11						
140-3L-166	09/16/95	0.00	0.50	SL	1.120	DRY	REG	U-235	0.09	0.11	PCI/G	ALPHASPEC	0.08	UJ					
140-3L-166	09/16/95	0.00	0.50	SL	1.120	DRY	REG	U-238	1.10	0.45	PCI/G	ALPHASPEC	0.11	U	BLK				
140-3L-167	09/16/95	0.00	0.50	SL	.5027	DRY	REG	RA-226	1.10	0.41	PCI/G	ALPHASPEC	0.18	J	LCS				
140-3L-167	09/16/95	0.00	0.50	SL	.9887	DRY	REG	TH-228	1.10	0.39	PCI/G	ALPHASPEC	0.14	J	LCS				

added  
to database  
EGK HRE

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-16894	Sampling Event:	HIS_RA95
Work Order Number:	E9509085	DATAUSR Number:	D-22921
Customer Number:	441	Date Received:	09/18/95
Environmental Category:	RI	Date Analyzed:	09/27/95

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Flag	Qualifier Code
140-3L-167	09/16/95	0.00	0.50	SL	.9887	DRY	REG	TH-230	4.80	1.20	PCI/G	ALPHASPEC	0.11	J	LCS
140-3L-167	09/16/95	0.00	0.50	SL	.9887	DRY	REG	TH-232	1.50	0.48	PCI/G	ALPHASPEC	0.06	J	LCS
140-3L-167	09/16/95	0.00	0.50	SL	1.006	DRY	REG	U-234	1.60	0.61	PCI/G	ALPHASPEC	0.17	J	TCR
140-3L-167	09/16/95	0.00	0.50	SL	1.006	DRY	REG	U-235	0.17	0.16	PCI/G	ALPHASPEC	0.16	J	LCS
140-3L-167	09/16/95	0.00	0.50	SL	1.006	DRY	REG	U-238	1.40	0.55	PCI/G	ALPHASPEC	0.17	J	TCR

  
 added to  
 database  
 HRB

**TMA****Thermo Analytical Inc.**

D-22921

**TMA/Eberline**

601 Scarboro Rd.

Oak Ridge, TN 37830

(615) 481-0683 Fax (615) 483-4621

TMA-OR-3546

October 5, 1995

Mr. Jim McCague  
Bechtel National, Inc.  
P.O. Box 350  
Oak Ridge, TN 37831-0350

**CASE NARRATIVE**  
**Work Order #95-09-085-OR**  
**State of Utah Certificate #E-235**

**SAMPLE RECEIPT**

This work order contains five soil samples received 09/18/95. These samples were analyzed for Radium-226 and Isotopic Thorium using the C. Sills technique, and Isotopic Uranium by Alpha Spectroscopy. Associated rinse blank samples are reported in Work Order # 95-09-086. The QC data for Radium-226 and Isotopic Thorium is reported in Work Order # 95-09-084.

<u>CLIENT ID</u>	<u>LAB ID</u>	<u>CLIENT ID</u>	<u>LAB ID</u>
140-3L-163	95-09-085-04	140-3L-166	95-09-085-07
140-3L-164	95-09-085-05	140-3L-167	95-09-085-08
140-3L-165	95-09-085-06		

The file name for these samples is 9509085.TXT.

**ANALYTICAL METHODS**

Radium-226 was analyzed using Method 903.0 modified. Isotopic Thorium was analyzed using Method EML Th-01 modified. Isotopic Uranium was analyzed using Method EML U-02 modified.

**SPECIAL PROBLEMS OR UNUSUAL CIRCUMSTANCES**

Results for the Thorium-230 blank demonstrated a false positive. This may be due to the presence of a cross contamination problem. We advised Robin Crabtree and Todd Hart about this problem and sincerely feel that this is the only sample affected within this batch (work order) of samples. We asked if a reanalysis should be done and were instructed to note the problem herein the narrative. We feel that the source of this contamination is from a filtering funnel because we had analyzed samples that contained enriched uranium just prior to these samples. Spectral data for the blank demonstrated enriched uranium characteristics. This also caused the analytical tracer recovery to be approximately 200%. All filtering apparatus was ultrasonic cleaned in a hot nitric acid solution for twelve (12) hours. Post cleaning, all filtering apparatus was surveyed and returned to service. No other significant problems were noted during the analysis process.

Initial calibrations, self absorption factors, and tracer recoveries, where applicable, are within specified criteria. No problems or unusual circumstances were noted during the analytical process.

**TMA**

**Thermo Analytical Inc.**  
TMA/Eberline

D-22921

**CERTIFICATION OF ACCURACY**

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package and electronic data deliverable has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

*Catheryn McDougall*  
M. R. McDougall  
Laboratory Manager

Date: 10/5/95

92-U4-U85

AIRBILL NO.

3910549880

## FIELD SAMPLE COLLECTION FORM

Samplers (print name then sign)

M. PHILLIPS

J.W. Ch. L.

Site Name: HISS ACARAS #661

WBS No.: J4L

Activity Support (Job) No.: 441

Sample ID Sample Grid Point	Sample Type (1)	Sample Time	Date of Sample	Preserved with	Purpose (2)	Depth cm ft	Priority (Days)	Analysis Required	Remarks
-5 140-3L-164 N 2.5 E 47.5	PS	1330	9-16-95	NA	RC	0- 0-5	7(3)	✓	RE PLANT
-6 140-3L-165 N 2.5 E 47.5		1405							
-7 140-3L-166 N 2.5 E 47.5		1420							
-8 140-3L-167 N 2.5 E 47.5	✓	1330			✓	✓		RECEIVED	✓
140-R1-09-15 R1NSATE	CR	1600	9-18-95	NITRATE ANAL	RC	NA		SEP 18 1995	R1NSATE
140-R1-09-16 R1NSATE	CR	1530	9-16-95		✓	ANAL		TRMA/ Ebarine OAK RIDGE LAB	Air. 416
	✓	✓	✓		✓		✓		✓

## SAMPLE TYPE (1)

## PURPOSE (2)

## CHAIN OF CUSTODY RECORD

Surface Soil	SS	Rad Character	RC
Bias Soil	BS	Verification	VR
Profile Soil	PS	Quality Control	QC
Sediment Silt	SD	Hot Spot	HS
Other	OR	Resample	RS
Vegitation	VE	Background	BG
Ground Water	GW	Routine	RT
Surface Water	SW	Special	SP

"This package conforms to the conditions and limitations specified in 49 CFR 173.421 for excepted radioactive material, limited quantity, n.o.s., UN-2910."

REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME
ANALYSIS	M. Phillips	140-67	9-16-95	1330
Analysis	Fed Ex / C.H. Tammie	140-67	9-18-95	0915

Shipper: TWS/HISS

4170 4777 Ave  
Berkeley, CA 94710

Ship to: TWS/CR

Box 309000 K-403  
4K R100, TW 37421  
ATTN: Director Lab 1A

Recorded by: M. Phillips

Date: 9-16-95 Time: 1330

Total number of samples in this box

16

Total number of samples in this shipment

13

Total number of boxes in this shipment

11

410906921

Shipping Container meets DOT Transferable Criteria ✓

Shipping container dose rate 0.5 mrem/hr.

Original

Page 2 of 2

**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Post-Remedial Action Soil Sample Results (Data)**

**SAMPLES:**

**140-3L-168**

**140-3L-169**

**140-3L-170**

**140-3L-171**

**140-3L-172**

**140-3L-173**

**140-3L-174**

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-17015	Sampling Event:	HIS_RA95
Work Order Number:	E9509112	DATAFUSR Number:	D-23050
Customer Number:	441	Date Received:	09/21/95
Environmental Category:	RI	Date Analyzed:	10/04/95

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI	Qualifier
													MDA	Flag	Code
140-3L-168	09/19/95	0.00	0.50	SL	.5253	DRY		REG	RA-226	1.10	0.46	PCI/G	ALPHASPEC	0.24	
140-3L-168	09/19/95	0.00	0.50	SL	.6296	DRY		REG	TH-228	0.90	0.40	PCI/G	ALPHASPEC	0.20	
140-3L-168	09/19/95	0.00	0.50	SL	.6296	DRY		REG	TH-230	1.70	0.62	PCI/G	ALPHASPEC	0.16	
140-3L-168	09/19/95	0.00	0.50	SL	.6296	DRY		REG	TH-232	1.20	0.49	PCI/G	ALPHASPEC	0.16	
140-3L-168	09/19/95	0.00	0.50	SL	1.001	DRY		REG	U-234	1.40	0.55	PCI/G	ALPHASPEC	0.07	J TCR
140-3L-168	09/19/95	0.00	0.50	SL	1.001	DRY		REG	U-235	0.10	0.12	PCI/G	ALPHASPEC	0.09	J LCS
140-3L-168	09/19/95	0.00	0.50	SL	1.001	DRY		REG	U-238	1.60	0.60	PCI/G	ALPHASPEC	0.07	J TCR
140-6L-169	09/19/95	0.00	0.50	SL	.5084	DRY		REG	RA-226	0.83	0.39	PCI/G	ALPHASPEC	0.27	
140-6L-169	09/19/95	0.00	0.50	SL	.5006	DRY		REG	TH-228	1.40	0.57	PCI/G	ALPHASPEC	0.31	
140-6L-169	09/19/95	0.00	0.50	SL	.5006	DRY		REG	TH-230	3.50	1.10	PCI/G	ALPHASPEC	0.11	
140-6L-169	09/19/95	0.00	0.50	SL	.5006	DRY		REG	TH-232	1.30	0.56	PCI/G	ALPHASPEC	0.11	
140-6L-169	09/19/95	0.00	0.50	SL	1.029	DRY		REG	U-234	1.40	0.56	PCI/G	ALPHASPEC	0.16	J TCR
140-6L-169	09/19/95	0.00	0.50	SL	1.029	DRY		REG	U-235	0.06	0.09	PCI/G	ALPHASPEC	0.09	UJ LCS
140-6L-169	09/19/95	0.00	0.50	SL	1.029	DRY		REG	U-238	1.60	0.61	PCI/G	ALPHASPEC	0.07	J TCR
140-6L-170	09/19/95	0.00	0.50	SL	.5230	DRY		REG	RA-226	1.30	0.54	PCI/G	ALPHASPEC	0.39	
140-6L-170	09/19/95	0.00	0.50	SL	.5038	DRY		REG	TH-228	0.91	0.46	PCI/G	ALPHASPEC	0.25	
140-6L-170	09/19/95	0.00	0.50	SL	.5038	DRY		REG	TH-230	3.30	1.10	PCI/G	ALPHASPEC	0.28	
140-6L-170	09/19/95	0.00	0.50	SL	.5038	DRY		REG	TH-232	1.50	0.61	PCI/G	ALPHASPEC	0.25	
140-6L-170	09/19/95	0.00	0.50	SL	1.029	DRY		REG	U-234	1.20	0.50	PCI/G	ALPHASPEC	0.13	J TCR
140-6L-170	09/19/95	0.00	0.50	SL	1.029	DRY		REG	U-235	0.13	0.15	PCI/G	ALPHASPEC	0.16	UJ LCS
140-6L-170	09/19/95	0.00	0.50	SL	1.029	DRY		REG	U-238	1.10	0.49	PCI/G	ALPHASPEC	0.08	J TCR
140-6L-171	09/19/95	0.00	0.50	SL	.5196	DRY		REG	RA-226	1.80	0.76	PCI/G	ALPHASPEC	0.41	J TCR
140-6L-171	09/19/95	0.00	0.50	SL	.5188	DRY		REG	TH-228	1.20	0.50	PCI/G	ALPHASPEC	0.17	
140-6L-171	09/19/95	0.00	0.50	SL	.5188	DRY		REG	TH-230	3.10	0.95	PCI/G	ALPHASPEC	0.17	
140-6L-171	09/19/95	0.00	0.50	SL	.5188	DRY		REG	TH-232	1.00	0.44	PCI/G	ALPHASPEC	0.10	
140-6L-171	09/19/95	0.00	0.50	SL	1.006	DRY		REG	U-234	1.50	0.69	PCI/G	ALPHASPEC	0.18	J TCR
140-6L-171	09/19/95	0.00	0.50	SL	1.006	DRY		REG	U-235	0.13	0.00	PCI/G	ALPHASPEC	0.13	UJ LCS
140-6L-171	09/19/95	0.00	0.50	SL	1.006	DRY		REG	U-238	2.20	0.94	PCI/G	ALPHASPEC	0.18	J TCR
140-6L-172	09/19/95	0.00	0.50	SL	.5109	DRY		REG	RA-226	1.70	0.54	PCI/G	ALPHASPEC	0.24	
140-6L-172	09/19/95	0.00	0.50	SL	.5025	DRY		REG	TH-228	1.50	0.62	PCI/G	ALPHASPEC	0.26	

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-17015	Sampling Event:	HIS_RA95
Work Order Number:	E9509112	DATAFUSR Number:	D-23050
Customer Number:	441	Date Received:	09/21/95
Environmental Category:	RI	Date Analyzed:	09/25/95

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI	Qualifier
													MDA	Flag	Code
140-6L-172	09/19/95	0.00	0.50	SL	.5025	DRY	REG	TH-230	3.60	1.20	PCI/G	ALPHASPEC	0.22		
140-6L-172	09/19/95	0.00	0.50	SL	.5025	DRY	REG	TH-232	1.30	0.58	PCI/G	ALPHASPEC	0.22		
140-6L-172	09/19/95	0.00	0.50	SL	1.046	DRY	REG	U-234	1.10	0.43	PCI/G	ALPHASPEC	0.13	U	BLK
140-6L-172	09/19/95	0.00	0.50	SL	1.046	DRY	REG	U-235	-0.01	0.01	PCI/G	ALPHASPEC	0.13	UJ	LCS
140-6L-172	09/19/95	0.00	0.50	SL	1.046	DRY	REG	U-238	1.20	0.43	PCI/G	ALPHASPEC	0.13	U	BLK
140-6L-173	09/19/95	0.00	0.50	SL	.5238	DRY	REG	RA-226	1.60	0.51	PCI/G	ALPHASPEC	0.21		
140-6L-173	09/19/95	0.00	0.50	SL	.5077	DRY	REG	TH-228	1.30	0.55	PCI/G	ALPHASPEC	0.27		
140-6L-173	09/19/95	0.00	0.50	SL	.5077	DRY	REG	TH-230	3.70	1.10	PCI/G	ALPHASPEC	0.27		
140-6L-173	09/19/95	0.00	0.50	SL	.5077	DRY	REG	TH-232	1.00	0.48	PCI/G	ALPHASPEC	0.29		
140-6L-173	09/19/95	0.00	0.50	SL	1.001	DRY	REG	U-234	1.20	0.46	PCI/G	ALPHASPEC	0.13	U	BLK
140-6L-173	09/19/95	0.00	0.50	SL	1.001	DRY	REG	U-235	0.56	0.29	PCI/G	ALPHASPEC	0.08	J	LCS
140-6L-173	09/19/95	0.00	0.50	SL	1.001	DRY	REG	U-238	1.20	0.46	PCI/G	ALPHASPEC	0.13	U	BLK
140-6L-174	09/19/95	0.00	0.50	SL	.5032	DRY	REG	RA-226	1.50	0.55	PCI/G	ALPHASPEC	0.23		
140-6L-174	09/19/95	0.00	0.50	SL	.5257	DRY	REG	TH-228	0.96	0.45	PCI/G	ALPHASPEC	0.22		
140-6L-174	09/19/95	0.00	0.50	SL	.5257	DRY	REG	TH-230	3.80	1.10	PCI/G	ALPHASPEC	0.19		
140-6L-174	09/19/95	0.00	0.50	SL	.5257	DRY	REG	TH-232	1.20	0.52	PCI/G	ALPHASPEC	0.19		
140-6L-174	09/19/95	0.00	0.50	SL	1.008	DRY	REG	U-234	2.20	0.70	PCI/G	ALPHASPEC	0.11		
140-6L-174	09/19/95	0.00	0.50	SL	1.008	DRY	REG	U-235	0.34	0.20	PCI/G	ALPHASPEC	0.07	J	LCS
140-6L-174	09/19/95	0.00	0.50	SL	1.008	DRY	REG	U-238	1.60	0.55	PCI/G	ALPHASPEC	0.10	U	BLK

**TMA/Eberline**

601 Scarboro Rd.  
Oak Ridge, TN 37830  
(615) 481-0683 Fax (615) 483-4621

TMA-OR-3598

October 16, 1995

Mr. Jim McCague  
Bechtel National, Inc.  
P.O. Box 350  
Oak Ridge, TN 37831-0350

**CASE NARRATIVE**  
Work Order #95-09-112-OR  
State of Utah Certificate #E-235

**SAMPLE RECEIPT**

This work order contains seven soil samples received 09/21/95. These samples were analyzed for Radium-226 and Isotopic Thorium using the C. Sill technique, and Isotopic Uranium by Alpha Spectroscopy.

<u>CLIENT ID</u>	<u>LAB ID</u>	<u>CLIENT ID</u>	<u>LAB ID</u>
140-3L-168	95-09-112-04	140-6L-172	95-09-112-08
140-6L-169	95-09-112-05	140-6L-173	95-09-112-09
140-6L-170	95-09-112-06	140-6L-174	95-09-112-10
140-6L-171	95-09-112-07		

The file name for these samples is 9509112.TXT.

**ANALYTICAL METHODS**

Radium-226 was analyzed using EPA Method 903.0 modified. Isotopic Thorium was analyzed using Method EML Th-01 modified. Isotopic Uranium was analyzed using Method EML U-02 modified.

**PROBLEMS OR UNUSUAL CIRCUMSTANCES**

Initial calibrations, self absorption factors, and tracer recoveries, where applicable, are within specified criteria. No problems or unusual circumstances were noted during the analytical process.

**CERTIFICATION OF ACCURACY**

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package and electronic data deliverable has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

  
M. R. McDougall  
Laboratory Manager  
Date: 10/16/95

TMA/Eberline Number:

Work Order Number: 9509112

Date Received: 09/21/95

Customer Number: 441

Environmental Cat: RI

Sample ID	Date Collected	Date Analyzed	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCSPIKE	09/21/95	10/04/95	0.00	0.00	W		1		LCST	RA-226	27.70	1.50	PCI	ALPHASPEC	0.12
QCSPIKE	09/21/95	10/04/95	0.00	0.00	W		1		LCSF	RA-226	25.60	2.50	PCI	ALPHASPEC	0.12
QCSPIKE	09/21/95	09/25/95	0.00	0.00	W		1		LCST	TH-228	5.10	0.18	PCI	ALPHASPEC	0.08
QCSPIKE	09/21/95	09/25/95	0.00	0.00	W		1		LCSF	TH-228	4.50	1.00	PCI	ALPHASPEC	0.08
QCSPIKE	09/21/95	09/25/95	0.00	0.00	W		1		LCST	TH-230	5.50	0.12	PCI	ALPHASPEC	0.09
QCSPIKE	09/21/95	09/25/95	0.00	0.00	W		1		LCSF	TH-230	5.60	1.20	PCI	ALPHASPEC	0.09
QCSPIKE	09/21/95	09/25/95	0.00	0.00	W		1		LCST	TH-232	5.10	0.18	PCI	ALPHASPEC	0.04
QCSPIKE	09/21/95	09/25/95	0.00	0.00	W		1		LCSF	TH-232	4.30	0.99	PCI	ALPHASPEC	0.04
QCSPIKE	09/21/95	09/25/95	0.00	0.00	W		1		LCST	U-234	8.60	0.33	PCI	ALPHASPEC	0.14
QCSPIKE	09/21/95	09/25/95	0.00	0.00	W		1		LCSF	U-234	9.30	2.80	PCI	ALPHASPEC	0.14
QCSPIKE	09/21/95	09/25/95	0.00	0.00	W		1		LCST	U-235	0.39	0.01	PCI	ALPHASPEC	0.20
QCSPIKE	09/21/95	09/25/95	0.00	0.00	W		1		LCSF	U-235	0.76	0.38	PCI	ALPHASPEC	0.20
QCSPIKE	09/21/95	09/25/95	0.00	0.00	W		1		LCST	U-238	8.40	0.32	PCI	ALPHASPEC	0.07
QCSPIKE	09/21/95	09/25/95	0.00	0.00	W		1		LCSF	U-238	9.90	2.90	PCI	ALPHASPEC	0.07
QCBLANK	09/21/95	10/04/95	0.00	0.00	W		1		PB	RA-226	0.04	0.05	PCI	ALPHASPEC	0.05
QCBLANK	09/21/95	09/25/95	0.00	0.00	W		1		PB	TH-228	0.08	0.09	PCI	ALPHASPEC	0.13
QCBLANK	09/21/95	09/25/95	0.00	0.00	W		1		PB	TH-230	0.32	0.18	PCI	ALPHASPEC	0.12
QCBLANK	09/21/95	09/25/95	0.00	0.00	W		1		PB	TH-232	0.10	0.10	PCI	ALPHASPEC	0.12
QCBLANK	09/21/95	09/25/95	0.00	0.00	W		1		PB	U-234	0.35	0.20	PCI	ALPHASPEC	0.12
QCBLANK	09/21/95	09/25/95	0.00	0.00	W		1		PB	U-235	0.05	0.08	PCI	ALPHASPEC	0.13
QCBLANK	09/21/95	09/25/95	0.00	0.00	W		1		PB	U-238	0.34	0.20	PCI	ALPHASPEC	0.15
140-3L-168	09/19/95	10/04/95	0.00	0.50	SL	.5027		DRY	REPL	RA-226	1.20	0.41	PCI/G	ALPHASPEC	0.18
140-3L-168	09/19/95	09/25/95	0.00	0.50	SL	.5313		DRY	REPL	TH-228	0.92	0.44	PCI/G	ALPHASPEC	0.22
140-3L-168	09/19/95	09/25/95	0.00	0.50	SL	.5313		DRY	REPL	TH-230	3.00	0.96	PCI/G	ALPHASPEC	0.27
140-3L-168	09/19/95	09/25/95	0.00	0.50	SL	.5313		DRY	REPL	TH-232	1.10	0.49	PCI/G	ALPHASPEC	0.28
140-3L-168	09/19/95	09/25/95	0.00	0.50	SL	1.051		DRY	REPL	U-234	1.10	0.47	PCI/G	ALPHASPEC	0.13
140-3L-168	09/19/95	09/25/95	0.00	0.50	SL	1.051		DRY	REPL	U-235	0.17	0.17	PCI/G	ALPHASPEC	0.16
140-3L-168	09/19/95	09/25/95	0.00	0.50	SL	1.051		DRY	REPL	U-238	1.40	0.56	PCI/G	ALPHASPEC	0.13
140-3L-168	09/19/95	10/04/95	0.00	0.50	SL	.5253		DRY	REG	RA-226	1.10	0.46	PCI/G	ALPHASPEC	0.24
140-3L-168	09/19/95	09/25/95	0.00	0.50	SL	.6296		DRY	REG	TH-228	0.90	0.40	PCI/G	ALPHASPEC	0.20
140-3L-168	09/19/95	09/25/95	0.00	0.50	SL	.6296		DRY	REG	TH-230	1.70	0.62	PCI/G	ALPHASPEC	0.16
140-3L-168	09/19/95	09/25/95	0.00	0.50	SL	.6296		DRY	REG	TH-232	1.20	0.49	PCI/G	ALPHASPEC	0.16
140-3L-168	09/19/95	09/25/95	0.00	0.50	SL	1.001		DRY	REG	U-234	1.40	0.55	PCI/G	ALPHASPEC	0.07
140-3L-168	09/19/95	09/25/95	0.00	0.50	SL	1.001		DRY	REG	U-235	0.10	0.12	PCI/G	ALPHASPEC	0.09
140-3L-168	09/19/95	09/25/95	0.00	0.50	SL	1.001		DRY	REG	U-238	1.60	0.60	PCI/G	ALPHASPEC	0.07
140-6L-169	09/19/95	10/04/95	0.00	0.50	SL	.5084		DRY	REG	RA-226	0.83	0.39	PCI/G	ALPHASPEC	0.27
140-6L-169	09/19/95	09/25/95	0.00	0.50	SL	.5006		DRY	REG	TH-228	1.40	0.57	PCI/G	ALPHASPEC	0.31

Approved by:

Date: 10/16/95

Thermo Nuclear Services  
Oak Ridge, TN 37830  
(615) 481-0683

FUSRAP Radiological Reports  
Printed: 10/16/95  
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TMA/Eberline Number:

Work Order Number: 9509112

Date Received: 09/21/95

Customer Number: 441

Environmental Cat.: RI

Sample ID	Date Collected	Date Analyzed	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
140-6L-169	09/19/95	09/25/95	0.00	0.50	SL		.5006	DRY	REG	TH-230	3.50	1.10	PCI/G	ALPHASPEC	0.11
140-6L-169	09/19/95	09/25/95	0.00	0.50	SL		.5006	DRY	REG	TH-232	1.30	0.56	PCI/G	ALPHASPEC	0.11
140-6L-169	09/19/95	09/25/95	0.00	0.50	SL		1.029	DRY	REG	U-234	1.40	0.56	PCI/G	ALPHASPEC	0.16
140-6L-169	09/19/95	09/25/95	0.00	0.50	SL		1.029	DRY	REG	U-235	0.06	0.09	PCI/G	ALPHASPEC	0.09
140-6L-169	09/19/95	09/25/95	0.00	0.50	SL		1.029	DRY	REG	U-238	1.60	0.61	PCI/G	ALPHASPEC	0.07
140-6L-170	09/19/95	10/04/95	0.00	0.50	SL		.5230	DRY	REG	RA-226	1.30	0.54	PCI/G	ALPHASPEC	0.39
140-6L-170	09/19/95	09/25/95	0.00	0.50	SL		.5038	DRY	REG	TH-228	0.91	0.46	PCI/G	ALPHASPEC	0.25
140-6L-170	09/19/95	09/25/95	0.00	0.50	SL		.5038	DRY	REG	TH-230	3.30	1.10	PCI/G	ALPHASPEC	0.28
140-6L-170	09/19/95	09/25/95	0.00	0.50	SL		.5038	DRY	REG	TH-232	1.50	0.61	PCI/G	ALPHASPEC	0.25
140-6L-170	09/19/95	09/25/95	0.00	0.50	SL		1.029	DRY	REG	U-234	1.20	0.50	PCI/G	ALPHASPEC	0.13
140-6L-170	09/19/95	09/25/95	0.00	0.50	SL		1.029	DRY	REG	U-235	0.13	0.15	PCI/G	ALPHASPEC	0.16
140-6L-170	09/19/95	09/25/95	0.00	0.50	SL		1.029	DRY	REG	U-238	1.10	0.49	PCI/G	ALPHASPEC	0.08
140-6L-171	09/19/95	10/04/95	0.00	0.50	SL		.5196	DRY	REG	RA-226	1.80	0.76	PCI/G	ALPHASPEC	0.41
140-6L-171	09/19/95	09/25/95	0.00	0.50	SL		.5188	DRY	REG	TH-228	1.20	0.50	PCI/G	ALPHASPEC	0.17
140-6L-171	09/19/95	09/25/95	0.00	0.50	SL		.5188	DRY	REG	TH-230	3.10	0.95	PCI/G	ALPHASPEC	0.17
140-6L-171	09/19/95	09/25/95	0.00	0.50	SL		.5188	DRY	REG	TH-232	1.00	0.44	PCI/G	ALPHASPEC	0.10
140-6L-171	09/19/95	09/25/95	0.00	0.50	SL		1.006	DRY	REG	U-234	1.50	0.69	PCI/G	ALPHASPEC	0.18
140-6L-171	09/19/95	09/25/95	0.00	0.50	SL		1.006	DRY	REG	U-235	0.13	0.00	PCI/G	ALPHASPEC	0.13
140-6L-171	09/19/95	09/25/95	0.00	0.50	SL		1.006	DRY	REG	U-238	2.20	0.94	PCI/G	ALPHASPEC	0.18
140-6L-172	09/19/95	10/04/95	0.00	0.50	SL		.5109	DRY	REG	RA-226	1.70	0.54	PCI/G	ALPHASPEC	0.24
140-6L-172	09/19/95	09/25/95	0.00	0.50	SL		.5025	DRY	REG	TH-228	1.50	0.62	PCI/G	ALPHASPEC	0.26
140-6L-172	09/19/95	09/25/95	0.00	0.50	SL		.5025	DRY	REG	TH-230	3.60	1.20	PCI/G	ALPHASPEC	0.22
140-6L-172	09/19/95	09/25/95	0.00	0.50	SL		.5025	DRY	REG	TH-232	1.30	0.58	PCI/G	ALPHASPEC	0.22
140-6L-172	09/19/95	09/25/95	0.00	0.50	SL		1.046	DRY	REG	U-234	1.10	0.43	PCI/G	ALPHASPEC	0.13
140-6L-172	09/19/95	09/25/95	0.00	0.50	SL		1.046	DRY	REG	U-235	-0.01	0.01	PCI/G	ALPHASPEC	0.13
140-6L-172	09/19/95	09/25/95	0.00	0.50	SL		1.046	DRY	REG	U-238	1.20	0.43	PCI/G	ALPHASPEC	0.13
140-6L-173	09/19/95	10/04/95	0.00	0.50	SL		.5238	DRY	REG	RA-226	1.60	0.51	PCI/G	ALPHASPEC	0.21
140-6L-173	09/19/95	09/25/95	0.00	0.50	SL		.5077	DRY	REG	TH-228	1.30	0.55	PCI/G	ALPHASPEC	0.27
140-6L-173	09/19/95	09/25/95	0.00	0.50	SL		.5077	DRY	REG	TH-230	3.70	1.10	PCI/G	ALPHASPEC	0.27
140-6L-173	09/19/95	09/25/95	0.00	0.50	SL		.5077	DRY	REG	TH-232	1.00	0.48	PCI/G	ALPHASPEC	0.29
140-6L-173	09/19/95	09/25/95	0.00	0.50	SL		1.001	DRY	REG	U-234	1.20	0.46	PCI/G	ALPHASPEC	0.13
140-6L-173	09/19/95	09/25/95	0.00	0.50	SL		1.001	DRY	REG	U-235	0.56	0.29	PCI/G	ALPHASPEC	0.08
140-6L-173	09/19/95	09/25/95	0.00	0.50	SL		1.001	DRY	REG	U-238	1.20	0.46	PCI/G	ALPHASPEC	0.13
140-6L-174	09/19/95	10/04/95	0.00	0.50	SL		.5032	DRY	REG	RA-226	1.50	0.55	PCI/G	ALPHASPEC	0.23
140-6L-174	09/19/95	09/25/95	0.00	0.50	SL		.5257	DRY	REG	TH-228	0.96	0.45	PCI/G	ALPHASPEC	0.22
140-6L-174	09/19/95	09/25/95	0.00	0.50	SL		.5257	DRY	REG	TH-230	3.80	1.10	PCI/G	ALPHASPEC	0.19
140-6L-174	09/19/95	09/25/95	0.00	0.50	SL		.5257	DRY	REG	TH-232	1.20	0.52	PCI/G	ALPHASPEC	0.19

Approved by: M. R. M. Daniel Date: 10/16/95

**TMA/Eberline**

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3050  
3050

Thermo Nuclear Services  
Oak Ridge, TN 37830  
(615) 481-0683

FUSRAP Radiological Reports  
Printed: 10/16/95  
Page 3 of 3

TMA/Eberline Number:

Work Order Number: 9509112

Date Received: 09/21/95

Customer Number: 441

Environmental Cat: RI

Sample ID	Date Collected	Date Analyzed	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
140-6L-174	09/19/95	09/25/95	0.00	0.50	SL		1.008	DRY	REG	U-234	2.20	0.70	PCI/G	ALPHASPEC	0.11
140-6L-174	09/19/95	09/25/95	0.00	0.50	SL		1.008	DRY	REG	U-235	0.34	0.20	PCI/G	ALPHASPEC	0.07
140-6L-174	09/19/95	09/25/95	0.00	0.50	SL		1.008	DRY	REG	U-238	1.60	0.55	PCI/G	ALPHASPEC	0.10

Approved by:

M.R.M.  
B.L. 10/17/95

Date: 10/16/95

**TMA/Eberline**  
A Division of Thermo Terra Tech

Oak Ridge Laboratory • 601 Scarboro Road • Oak Ridge, TN 37830 • (615) 481-0683

95-09-112

AIRBILL NO.  
9054837466

## FIELD SAMPLE COLLECTION FORM

Samplers (print name then sign)

M. PHILLIPS

Ron SCARBOROUGH

m. Phillips

Ron Scarborough

Site Name: HISS NORFAS #661

WBS No.: 140

Activity Support (Job) No.: 441

Sample ID Sample Grid Point	Sample Type (1)	Sample Time	Date of Sample	Preserved with	Purpose (2)	Depth cm <input type="checkbox"/> ft <input checked="" type="checkbox"/>	Priority (Days)	Analysis Required	Remarks
140-3L-168 NA	PS	0900	9-19-95	NA	RC	0- 0.5	7	TSO-TH & PA-226 57 C. SILLS TSO-U 47 or spec	ISOLATED AREA S.G. OF RAILROAD TRACKS PROPERTY 3L
140-6L-169 N289, E 310		1335	1335						PROPERTY 6L
140-6L-170 N289, E 320		1340							
140-6L-171 N289, E 330		1405							
140-6L-172 N289, E 340		1415							
140-6L-173 N289, E 350		1430							
140-6L-174 N299, E 310	✓	1500	✓	✓	✓	✓	✓		

SAMPLE TYPE (1)	PURPOSE (2)
Surface Soil SS	Rad Character
Bias Soil BS	Verification
Profile Soil PS	Quality Control
Sediment Silt SD	Hot Spot
Other OR	Resample
Vegetation VE	Background
Ground Water GW	Routine
Surface Water SW	Special

"This package conforms to the conditions and limitations specified in 49CFR173.421 for excepted radioactive material, limited quantity, D.O.S. UN 2040."

CHAIN OF CUSTODY RECORD				
REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME
ANALYSIS	m. Phillips	ALBUQUERQUE LABS	9-20-95	1600
Analysis	Airborne	Jak Twangar	9-21-95	0930

Recorded by: m. Phillips  
Date: 9-20-95 Time: 1600Total number of samples  
in this box

7

Total number of samples  
in this shipment

17

Total number of boxes  
in this shipment

1

Shipper: TNS/HISS  
9170 LARRY AVE  
BERKELEY, MI 48134Ship to: TNS/U.R.  
601 SCARROU RUN  
OAK RIDGE, TN 37830  
ATTN: SAMPLE LOC IN

Page 1 of 3

**THERMO NUCLEAR SERVICES/OAK RIDGE LABORATORY**  
**TRACER REPORT**

6-2 3057

10/16/95  
 Work Order # 95-09-112-OR

BECHTEL SAMPLE ID	ANALYTE	TRACER	RECOVERY
140-3L-168	RA-226	BA-133	62%
140-3L-168	TH-228	TH-229	59%
140-3L-168	TH-230	TH-229	59%
140-3L-168	TH-232	TH-229	59%
140-3L-168	U-234	U-232	(42%)
140-3L-168	U-235	U-232	(42%)
140-3L-168	U-238	U-232	(42%)
140-6L-169	RA-226	BA-133	60%
140-6L-169	TH-228	TH-229	53%
140-6L-169	TH-230	TH-229	53%
140-6L-169	TH-232	TH-229	53%
140-6L-169	U-234	U-232	(48%)
140-6L-169	U-235	U-232	(48%)
140-6L-169	U-238	U-232	(48%)
140-6L-170	RA-226	BA-133	50%
140-6L-170	TH-228	TH-229	55%
140-6L-170	TH-230	TH-229	55%
140-6L-170	TH-232	TH-229	55%
140-6L-170	U-234	U-232	(47%)
140-6L-170	U-235	U-232	(47%)
140-6L-170	U-238	U-232	(47%)
140-6L-171	RA-226	BA-133	(38%)
140-6L-171	TH-228	TH-229	70%
140-6L-171	TH-230	TH-229	70%
140-6L-171	TH-232	TH-229	70%
140-6L-171	U-234	U-232	(37%)
140-6L-171	U-235	U-232	(37%)
140-6L-171	U-238	U-232	(37%)

S-2 3057

**THERMO NUCLEAR SERVICES/OAK RIDGE LABORATORY**  
**TRACER REPORT**

10/16/95  
Work Order # 95-09-112-OR

BECHTEL SAMPLE ID	ANALYTE	TRACER	RECOVERY
140-6I -172	RA-226	BA-133	70%
140-6L-172	TH-228	TH-229	59%
140-6L-172	TH-230	TH-229	59%
140-6L-172	TH-232	TH-229	59%
140-6L-172	U-234	U-232	55%
140-6L-172	U-235	U-232	55%
140-6L-172	U-238	U-232	55%
140-6L-173	RA-226	BA-133	80%
140-6L-173	TH-228	TH-229	56%
140-6L-173	TH-230	TH-229	56%
140-6L-173	TH-232	TH-229	56%
140-6L-173	U-234	U-232	56%
140-6L-173	U-235	U-232	56%
140-6L-173	U-238	U-232	56%
140-6L-174	RA-226	BA-133	65%
140-6L-174	TH-228	TH-229	62%
140-6L-174	TH-230	TH-229	62%
140-6L-174	TH-232	TH-229	62%
140-6L-174	U-234	U-232	64%
140-6L-174	U-235	U-232	64%
140-6L-174	U-238	U-232	64%

**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Post-Remedial Action Soil Sample Results (Data)**

**SAMPLES:**

**140-3L-175  
140-3L-176  
140-3L-177  
140-3L-178  
140-3L-179  
140-3L-180  
140-3L-182**

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-16892	Sampling Event:	HIS_RA95
Work Order Number:	E9509113	DATAFUSR Number:	D-22919
Customer Number:	441	Date Received:	09/21/95
Environmental Category:	RI	Date Analyzed:	09/27/95

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Flag	Qualifier Code
140-6L-175	09/19/95	0.00	0.50	SL	1.002	DRY	REG	RA-226	0.81	0.22	PCI/G	ALPHASPEC	0.09		
140-6L-175	09/19/95	0.00	0.50	SL	.9522	DRY	REG	TH-228	1.10	0.40	PCI/G	ALPHASPEC	0.17		
140-6L-175	09/19/95	0.00	0.50	SL	.9522	DRY	REG	TH-230	3.10	0.84	PCI/G	ALPHASPEC	0.12		
140-6L-175	09/19/95	0.00	0.50	SL	.9522	DRY	REG	TH-232	1.20	0.41	PCI/G	ALPHASPEC	0.10		
140-6L-175	09/19/95	0.00	0.50	SL	1.001	DRY	REG	U-234	0.99	0.36	PCI/G	ALPHASPEC	0.10	U	BLK
140-6L-175	09/19/95	0.00	0.50	SL	1.001	DRY	REG	U-235	0.06	0.08	PCI/G	ALPHASPEC	0.10	UJ	EGR
140-6L-175	09/19/95	0.00	0.50	SL	1.001	DRY	REG	U-238	1.20	0.42	PCI/G	ALPHASPEC	0.05		
140-6L-176	09/19/95	0.00	0.50	SL	1.001	DRY	REG	RA-226	1.10	0.28	PCI/G	ALPHASPEC	0.08		
140-6L-176	09/19/95	0.00	0.50	SL	.9373	DRY	REG	TH-228	0.97	0.34	PCI/G	ALPHASPEC	0.12		
140-6L-176	09/19/95	0.00	0.50	SL	.9373	DRY	REG	TH-230	3.40	0.85	PCI/G	ALPHASPEC	0.05		
140-6L-176	09/19/95	0.00	0.50	SL	.9373	DRY	REG	TH-232	0.94	0.33	PCI/G	ALPHASPEC	0.05		
140-6L-176	09/19/95	0.00	0.50	SL	1.029	DRY	REG	U-234	1.10	0.44	PCI/G	ALPHASPEC	0.07	J	TCR
140-6L-176	09/19/95	0.00	0.50	SL	1.029	DRY	REG	U-235	-0.01	0.01	PCI/G	ALPHASPEC	0.15	UJ	EGR
140-6L-176	09/19/95	0.00	0.50	SL	1.029	DRY	REG	U-238	1.30	0.51	PCI/G	ALPHASPEC	0.07	J	TCR
140-6L-177	09/19/95	0.00	0.50	SL	1.001	DRY	REG	RA-226	1.50	0.34	PCI/G	ALPHASPEC	0.05		
140-6L-177	09/19/95	0.00	0.50	SL	1.005	DRY	REG	TH-228	1.10	0.39	PCI/G	ALPHASPEC	0.13		
140-6L-177	09/19/95	0.00	0.50	SL	1.005	DRY	REG	TH-230	4.20	1.10	PCI/G	ALPHASPEC	0.06		
140-6L-177	09/19/95	0.00	0.50	SL	1.005	DRY	REG	TH-232	0.99	0.36	PCI/G	ALPHASPEC	0.10		
140-6L-177	09/19/95	0.00	0.50	SL	1.010	DRY	REG	U-234	1.20	0.46	PCI/G	ALPHASPEC	0.06	U	BLK
140-6L-177	09/19/95	0.00	0.50	SL	1.010	DRY	REG	U-235	0.60	0.08	PCI/G	ALPHASPEC	0.08		
140-6L-177	09/19/95	0.00	0.50	SL	1.010	DRY	REG	U-238	1.10	0.42	PCI/G	ALPHASPEC	0.06		
140-6L-178	09/20/95	0.00	0.50	SL	1.001	DRY	REG	RA-226	0.84	0.25	PCI/G	ALPHASPEC	0.04		
140-6L-178	09/20/95	0.00	0.50	SL	.9816	DRY	REG	TH-228	1.20	0.41	PCI/G	ALPHASPEC	0.12		
140-6L-178	09/20/95	0.00	0.50	SL	.9816	DRY	REG	TH-230	3.80	1.00	PCI/G	ALPHASPEC	0.06		
140-6L-178	09/20/95	0.00	0.50	SL	.9816	DRY	REG	TH-232	1.30	0.44	PCI/G	ALPHASPEC	0.06		
140-6L-178	09/20/95	0.00	0.50	SL	1.002	DRY	REG	U-234	1.20	0.45	PCI/G	ALPHASPEC	0.06	U	BLK
140-6L-178	09/20/95	0.00	0.50	SL	1.002	DRY	REG	U-235	0.03	0.05	PCI/G	ALPHASPEC	0.07	UJ	EGR
140-6L-178	09/20/95	0.00	0.50	SL	1.002	DRY	REG	U-238	1.30	0.47	PCI/G	ALPHASPEC	0.06		
140-6L-179	09/20/95	0.00	0.50	SL	1.000	DRY	REG	RA-226	1.10	0.27	PCI/G	ALPHASPEC	0.10		
140-6L-179	09/20/95	0.00	0.50	SL	.9454	DRY	REG	TH-228	1.40	0.45	PCI/G	ALPHASPEC	0.11		

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-16892	Sampling Event:	HIS_RA95
Work Order Number:	E9509113	DATAFUSR Number:	D-22919
Customer Number:	441	Date Received:	09/21/95
Environmental Category:	RI	Date Analyzed:	09/25/95

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Flag	Qualifier Code
	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
140-6L-179	09/20/95	0.00	0.50	SL	.9454	DRY	REG	TH-230	3.40	0.90	PCI/G	ALPHASPEC	0.14		
140-6L-179	09/20/95	0.00	0.50	SL	.9454	DRY	REG	TH-232	1.00	0.36	PCI/G	ALPHASPEC	0.10		
140-6L-179	09/20/95	0.00	0.50	SL	1.024	DRY	REG	U-234	2.10	0.74	PCI/G	ALPHASPEC	0.12	J	TCR
140-6L-179	09/20/95	0.00	0.50	SL	1.024	DRY	REG	U-235	0.27	0.20	PCI/G	ALPHASPEC	0.17	J	TCR
140-6L-179	09/20/95	0.00	0.50	SL	1.024	DRY	REG	U-238	1.20	0.48	PCI/G	ALPHASPEC	0.07	J	TCR
140-6L-180	09/20/95	0.00	0.50	SL	1.001	DRY	REG	RA-226	1.40	0.31	PCI/G	ALPHASPEC	0.10		
140-6L-180	09/20/95	0.00	0.50	SL	.9909	DRY	REG	TH-228	1.90	0.58	PCI/G	ALPHASPEC	0.15		
140-6L-180	09/20/95	0.00	0.50	SL	.9909	DRY	REG	TH-230	5.80	1.40	PCI/G	ALPHASPEC	0.06		
140-6L-180	09/20/95	0.00	0.50	SL	.9909	DRY	REG	TH-232	1.60	0.51	PCI/G	ALPHASPEC	0.14		
140-6L-180	09/20/95	0.00	0.50	SL	1.007	DRY	REG	U-234	1.00	0.42	PCI/G	ALPHASPEC	0.11	U	BLK
140-6L-180	09/20/95	0.00	0.50	SL	1.007	DRY	REG	U-235	0.02	0.06	PCI/G	ALPHASPEC	0.16	UJ	EGR
140-6L-180	09/20/95	0.00	0.50	SL	1.007	DRY	REG	U-238	1.30	0.50	PCI/G	ALPHASPEC	0.13		
140-6L-181	09/20/95	0.00	0.50	SL	.9999	DRY	REG	RA-226	1.50	0.33	PCI/G	ALPHASPEC	0.10		
140-6L-181	09/20/95	0.00	0.50	SL	.9317	DRY	REG	TH-228	1.30	0.46	PCI/G	ALPHASPEC	0.12		
140-6L-181	09/20/95	0.00	0.50	SL	.9317	DRY	REG	TH-230	4.90	1.30	PCI/G	ALPHASPEC	0.11		
140-6L-181	09/20/95	0.00	0.50	SL	.9317	DRY	REG	TH-232	1.30	0.46	PCI/G	ALPHASPEC	0.11		
140-6L-181	09/20/95	0.00	0.50	SL	1.007	DRY	REG	U-234	1.00	0.37	PCI/G	ALPHASPEC	0.08	U	BLK
140-6L-181	09/20/95	0.00	0.50	SL	1.007	DRY	REG	U-235	0.08	0.09	PCI/G	ALPHASPEC	0.10	UJ	EGR
140-6L-181	09/20/95	0.00	0.50	SL	1.007	DRY	REG	U-238	1.30	0.43	PCI/G	ALPHASPEC	0.08		
140-6L-182	09/20/95	0.00	0.50	SL	1.001	DRY	REG	RA-226	1.30	0.31	PCI/G	ALPHASPEC	0.08		
140-6L-182	09/20/95	0.00	0.50	SL	.9542	DRY	REG	TH-228	2.30	0.71	PCI/G	ALPHASPEC	0.18		
140-6L-182	09/20/95	0.00	0.50	SL	.9542	DRY	REG	TH-230	7.30	1.70	PCI/G	ALPHASPEC	0.09		
140-6L-182	09/20/95	0.00	0.50	SL	.9542	DRY	REG	TH-232	2.10	0.68	PCI/G	ALPHASPEC	0.16		
140-6L-182	09/20/95	0.00	0.50	SL	1.001	DRY	REG	U-234	1.50	0.56	PCI/G	ALPHASPEC	0.07	J	TCR
140-6L-182	09/20/95	0.00	0.50	SL	1.001	DRY	REG	U-235	0.15	0.15	PCI/G	ALPHASPEC	0.14	J	TCR
140-6L-182	09/20/95	0.00	0.50	SL	1.001	DRY	REG	U-238	1.50	0.56	PCI/G	ALPHASPEC	0.12	J	TCR

**TMA/Eberline**

601 Scarboro Rd.  
Oak Ridge, TN 37830  
(615) 481-0683 Fax (615) 483-4621

TMA-OR-3548

October 4, 1995

Mr. Jim McCague  
Bechtel National, Inc.  
P.O. Box 350  
Oak Ridge, TN 37831-0350

**CASE NARRATIVE**  
Work Order #95-09-113-OR  
State of Utah Certificate #E-235

**SAMPLE RECEIPT**

This work order contains eight soil samples received 09/21/95. These samples were analyzed for Radium-226 and Isotopic Thorium using the C. Sills technique, and Isotopic Uranium by Alpha Spectroscopy. The associated rinse blank samples are reported in Work Order # 95-09-114.

<u>CLIENT ID</u>	<u>LAB ID</u>	<u>CLIENT ID</u>	<u>LAB ID</u>
140-6L-175	95-09-113-04	140-6L-179	95-09-113-08
140-6L-176	95-09-113-05	140-6L-180	95-09-113-09
140-6L-177	95-09-113-06	140-6L-181	95-09-113-10
140-6L-178	95-09-113-07	140-6L-182	95-09-113-11

The file name for these samples is 9509113.TXT.

**ANALYTICAL METHODS**

Radium-226 was analyzed using Method 903.0 modified. Isotopic Thorium was analyzed using Method EML Th-01 modified. Isotopic Uranium was analyzed using Method EML U-02 modified.

**PROBLEMS OR UNUSUAL CIRCUMSTANCES**

Initial calibrations, self absorption factors, and tracer recoveries, where applicable, are within specified criteria. No problems or unusual circumstances were noted during the analytical process.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package and electronic data deliverable has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

*Cathryn E. Sharp FOR*

M. R. McDougall  
Laboratory Manager

Date: 10/4/95

TMA/Eberline Number:	
Work Order Number:	9509113
Customer Number:	441
Environmental Cat:	RI

Sample ID	Date Collected	Date Analyzed	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCSPIKE	09/21/95	09/27/95	0.00	0.00	W	1			LCST	RA-226	25.20	1.20	PCI	ALPHASPEC	0.12
QCSPIKE	09/21/95	09/27/95	0.00	0.00	W	1			LCSF	RA-226	20.20	2.10	PCI	ALPHASPEC	0.12
QCSPIKE	09/21/95	09/25/95	0.00	0.00	W	1			LCST	TH-228	5.00	0.18	PCI	ALPHASPEC	0.11
QCSPIKE	09/21/95	09/25/95	0.00	0.00	W	1			LCSF	TH-228	4.40	1.10	PCI	ALPHASPEC	0.11
QCSPIKE	09/21/95	09/25/95	0.00	0.00	W	1			LCST	TH-230	5.20	0.11	PCI	ALPHASPEC	0.08
QCSPIKE	09/21/95	09/25/95	0.00	0.00	W	1			LCSF	TH-230	5.20	1.20	PCI	ALPHASPEC	0.08
QCSPIKE	09/21/95	09/25/95	0.00	0.00	W	1			LCST	TH-232	5.00	0.18	PCI	ALPHASPEC	0.09
QCSPIKE	09/21/95	09/25/95	0.00	0.00	W	1			LCSF	TH-232	4.90	1.20	PCI	ALPHASPEC	0.09
QCSPIKE	09/21/95	09/26/95	0.00	0.00	W	1			LCST	U-234	8.60	0.33	PCI	ALPHASPEC	0.10
QCSPIKE	09/21/95	09/26/95	0.00	0.00	W	1			LCSF	U-234	8.50	2.40	PCI	ALPHASPEC	0.10
QCSPIKE	09/21/95	09/26/95	0.00	0.00	W	1			LCST	U-235	0.39	0.01	PCI	ALPHASPEC	0.15
QCSPIKE	09/21/95	09/26/95	0.00	0.00	W	1			LCSF	U-235	0.37	0.22	PCI	ALPHASPEC	0.15
QCSPIKE	09/21/95	09/26/95	0.00	0.00	W	1			LCST	U-238	8.40	0.32	PCI	ALPHASPEC	0.11
QCSPIKE	09/21/95	09/26/95	0.00	0.00	W	1			LCSF	U-238	8.80	2.50	PCI	ALPHASPEC	0.11
QCBLANK	09/21/95	09/27/95	0.00	0.00	W	1			PB	RA-226	0.04	0.06	PCI	ALPHASPEC	0.11
QCBLANK	09/21/95	09/25/95	0.00	0.00	W	1			PB	TH-228	0.04	0.07	PCI	ALPHASPEC	0.13
QCBLANK	09/21/95	09/25/95	0.00	0.00	W	1			PB	TH-230	0.07	0.08	PCI	ALPHASPEC	0.10
QCBLANK	09/21/95	09/25/95	0.00	0.00	W	1			PB	TH-232	0.05	0.07	PCI	ALPHASPEC	0.10
QCBLANK	09/21/95	09/26/95	0.00	0.00	W	1			PB	U-234	0.43	0.22	PCI	ALPHASPEC	0.10
QCBLANK	09/21/95	09/26/95	0.00	0.00	W	1			PB	U-235	0.03	0.05	PCI	ALPHASPEC	0.07
QCBLANK	09/21/95	09/26/95	0.00	0.00	W	1			PB	U-238	0.14	0.12	PCI	ALPHASPEC	0.14
140-6L-175	09/19/95	09/27/95	0.00	0.50	SL	1.001	DRY	REPL	RA-226		1.00	0.26	PCI/G	ALPHASPEC	0.07
140-6L-175	09/19/95	09/25/95	0.00	0.50	SL	.9921	DRY	REPL	TH-228		0.93	0.30	PCI/G	ALPHASPEC	0.07
140-6L-175	09/19/95	09/25/95	0.00	0.50	SL	.9921	DRY	REPL	TH-230		1.90	0.51	PCI/G	ALPHASPEC	0.04
140-6L-175	09/19/95	09/25/95	0.00	0.50	SL	.9921	DRY	REPL	TH-232		0.92	0.30	PCI/G	ALPHASPEC	0.04
140-6L-175	09/19/95	09/26/95	0.00	0.50	SL	1.007	DRY	REPL	U-234		1.30	0.51	PCI/G	ALPHASPEC	0.11
140-6L-175	09/19/95	09/26/95	0.00	0.50	SL	1.007	DRY	REPL	U-235		0.08	0.00	PCI/G	ALPHASPEC	0.08
140-6L-175	09/19/95	09/26/95	0.00	0.50	SL	1.007	DRY	REPL	U-238		1.60	0.58	PCI/G	ALPHASPEC	0.11
140-6L-175	09/19/95	09/27/95	0.00	0.50	SL	1.002	DRY	REG	RA-226		0.81	0.22	PCI/G	ALPHASPEC	0.09
140-6L-175	09/19/95	09/25/95	0.00	0.50	SL	.9522	DRY	REG	TH-228		1.10	0.40	PCI/G	ALPHASPEC	0.17
140-6L-175	09/19/95	09/25/95	0.00	0.50	SL	.9522	DRY	REG	TH-230		3.10	0.84	PCI/G	ALPHASPEC	0.12
140-6L-175	09/19/95	09/25/95	0.00	0.50	SL	.9522	DRY	REG	TH-232		1.20	0.41	PCI/G	ALPHASPEC	0.10
140-6L-175	09/19/95	09/26/95	0.00	0.50	SL	1.001	DRY	REG	U-234		0.99	0.36	PCI/G	ALPHASPEC	0.10
140-6L-175	09/19/95	09/26/95	0.00	0.50	SL	1.001	DRY	REG	U-235		0.06	0.08	PCI/G	ALPHASPEC	0.10
140-6L-175	09/19/95	09/26/95	0.00	0.50	SL	1.001	DRY	REG	U-238		1.20	0.42	PCI/G	ALPHASPEC	0.05
140-6L-176	09/19/95	09/27/95	0.00	0.50	SL	1.001	DRY	REG	RA-226		1.10	0.28	PCI/G	ALPHASPEC	0.08
140-6L-176	09/19/95	09/25/95	0.00	0.50	SL	.9373	DRY	REG	TH-228		0.97	0.34	PCI/G	ALPHASPEC	0.12

Approved by: Cathleen G. Sharp Date: 10/4/95  
Bruce C. 195795

TMA/Eberline Number:	
Work Order Number:	9509113
Customer Number:	441
Environmental Cat:	EI

Sample ID	Date Collected	Date Analyzed	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
140-6L-176	09/19/95	09/25/95	0.00	0.50	SL	.9373	DRY	REG	TH-230		3.40	0.85	PCI/G	ALPHASPEC	0.05
140-6L-176	09/19/95	09/25/95	0.00	0.50	SL	.9373	DRY	REG	TH-232		0.94	0.33	PCI/G	ALPHASPEC	0.05
140-6L-176	09/19/95	09/26/95	0.00	0.50	SL	1.029	DRY	REG	U-234		1.10	0.44	PCI/G	ALPHASPEC	0.07
140-6L-176	09/19/95	09/26/95	0.00	0.50	SL	1.029	DRY	REG	U-235		-0.01	0.01	PCI/G	ALPHASPEC	0.15
140-6L-176	09/19/95	09/26/95	0.00	0.50	SL	1.029	DRY	REG	U-238		1.30	0.51	PCI/G	ALPHASPEC	0.07
140-6L-177	09/19/95	09/27/95	0.00	0.50	SL	1.001	DRY	REG	RA-226		1.50	0.34	PCI/G	ALPHASPEC	0.05
140-6L-177	09/19/95	09/25/95	0.00	0.50	SL	1.005	DRY	REG	TH-228		1.10	0.39	PCI/G	ALPHASPEC	0.13
140-6L-177	09/19/95	09/25/95	0.00	0.50	SL	1.005	DRY	REG	TH-230		4.20	1.10	PCI/G	ALPHASPEC	0.06
140-6L-177	09/19/95	09/25/95	0.00	0.50	SL	1.005	DRY	REG	TH-232		0.99	0.36	PCI/G	ALPHASPEC	0.10
140-6L-177	09/19/95	09/26/95	0.00	0.50	SL	1.010	DRY	REG	U-234		1.20	0.46	PCI/G	ALPHASPEC	0.06
140-6L-177	09/19/95	09/26/95	0.00	0.50	SL	1.010	DRY	REG	U-235		0.60	0.08	PCI/G	ALPHASPEC	0.08
140-6L-177	09/19/95	09/26/95	0.00	0.50	SL	1.010	DRY	REG	U-238		1.10	0.42	PCI/G	ALPHASPEC	0.06
140-6L-178	09/20/95	09/27/95	0.00	0.50	SL	1.001	DRY	REG	RA-226		0.84	0.25	PCI/G	ALPHASPEC	0.04
140-6L-178	09/20/95	09/25/95	0.00	0.50	SL	.9816	DRY	REG	TH-228		1.20	0.41	PCI/G	ALPHASPEC	0.12
140-6L-178	09/20/95	09/25/95	0.00	0.50	SL	.9816	DRY	REG	TH-230		3.80	1.00	PCI/G	ALPHASPEC	0.06
140-6L-178	09/20/95	09/25/95	0.00	0.50	SL	.9816	DRY	REG	TH-232		1.30	0.44	PCI/G	ALPHASPEC	0.06
140-6L-178	09/20/95	09/26/95	0.00	0.50	SL	1.002	DRY	REG	U-234		1.20	0.45	PCI/G	ALPHASPEC	0.06
140-6L-178	09/20/95	09/26/95	0.00	0.50	SL	1.002	DRY	REG	U-235		0.03	0.05	PCI/G	ALPHASPEC	0.07
140-6L-178	09/20/95	09/26/95	0.00	0.50	SL	1.002	DRY	REG	U-238		1.30	0.47	PCI/G	ALPHASPEC	0.06
140-6L-179	09/20/95	09/27/95	0.00	0.50	SL	1.000	DRY	REG	RA-226		1.10	0.27	PCI/G	ALPHASPEC	0.10
140-6L-179	09/20/95	09/25/95	0.00	0.50	SL	.9454	DRY	REG	TH-228		1.40	0.45	PCI/G	ALPHASPEC	0.11
140-6L-179	09/20/95	09/25/95	0.00	0.50	SL	.9454	DRY	REG	TH-230		3.40	0.90	PCI/G	ALPHASPEC	0.14
140-6L-179	09/20/95	09/25/95	0.00	0.50	SL	.9454	DRY	REG	TH-232		1.00	0.36	PCI/G	ALPHASPEC	0.10
140-6L-179	09/20/95	09/26/95	0.00	0.50	SL	1.024	DRY	REG	U-234		2.10	0.74	PCI/G	ALPHASPEC	0.12
140-6L-179	09/20/95	09/26/95	0.00	0.50	SL	1.024	DRY	REG	U-235		0.27	0.20	PCI/G	ALPHASPEC	0.17
140-6L-179	09/20/95	09/26/95	0.00	0.50	SL	1.024	DRY	REG	U-238		1.20	0.48	PCI/G	ALPHASPEC	0.07
140-6L-180	09/20/95	09/27/95	0.00	0.50	SL	1.001	DRY	REG	RA-226		1.40	0.31	PCI/G	ALPHASPEC	0.10
140-6L-180	09/20/95	09/25/95	0.00	0.50	SL	.9909	DRY	REG	TH-228		1.90	0.58	PCI/G	ALPHASPEC	0.15
140-6L-180	09/20/95	09/25/95	0.00	0.50	SL	.9909	DRY	REG	TH-230		5.80	1.40	PCI/G	ALPHASPEC	0.06
140-6L-180	09/20/95	09/25/95	0.00	0.50	SL	.9909	DRY	REG	TH-232		1.60	0.51	PCI/G	ALPHASPEC	0.14
140-6L-180	09/20/95	09/26/95	0.00	0.50	SL	1.007	DRY	REG	U-234		1.00	0.42	PCI/G	ALPHASPEC	0.11
140-6L-180	09/20/95	09/26/95	0.00	0.50	SL	1.007	DRY	REG	U-235		0.02	0.06	PCI/G	ALPHASPEC	0.16
140-6L-180	09/20/95	09/26/95	0.00	0.50	SL	1.007	DRY	REG	U-238		1.30	0.50	PCI/G	ALPHASPEC	0.13
140-6L-181	09/20/95	09/27/95	0.00	0.50	SL	.9999	DRY	REG	RA-226		1.50	0.33	PCI/G	ALPHASPEC	0.10
140-6L-181	09/20/95	09/25/95	0.00	0.50	SL	.9317	DRY	REG	TH-228		1.30	0.46	PCI/G	ALPHASPEC	0.12
140-6L-181	09/20/95	09/25/95	0.00	0.50	SL	.9317	DRY	REG	TH-230		4.90	1.30	PCI/G	ALPHASPEC	0.11
140-6L-181	09/20/95	09/25/95	0.00	0.50	SL	.9317	DRY	REG	TH-232		1.30	0.46	PCI/G	ALPHASPEC	0.11

Approved by: Cathy G. Sharp Date: 10/4/95  
Susan Cook 10/5/95

Thermo Nuclear Services  
Oak Ridge, TN 37830  
(615) 481-0683

FUSRAP Radiological Reports  
Printed: 10/4/95  
Page 3 of 3

TMA/Eberline Number:	
Work Order Number:	9509113
Customer Number:	441
Environmental Cat:	RI

Sample ID	Date Collected	Date Analyzed	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
140-6L-181	09/20/95	09/26/95	0.00	0.50	SL		1.007	DRY	REG	U-234	1.00	0.37	PCI/G	ALPHASPEC	0.08
140-6L-181	09/20/95	09/26/95	0.00	0.50	SL		1.007	DRY	REG	U-235	0.08	0.09	PCI/G	ALPHASPEC	0.10
140-6L-181	09/20/95	09/26/95	0.00	0.50	SL		1.007	DRY	REG	U-238	1.30	0.43	PCI/G	ALPHASPEC	0.08
140-6L-182	09/20/95	09/27/95	0.00	0.50	SL		1.001	DRY	REG	RA-226	1.30	0.31	PCI/G	ALPHASPEC	0.08
140-6L-182	09/20/95	09/25/95	0.00	0.50	SL		.9542	DRY	REG	TH-228	2.30	0.71	PCI/G	ALPHASPEC	0.18
140-6L-182	09/20/95	09/25/95	0.00	0.50	SL		.9542	DRY	REG	TH-230	7.30	1.70	PCI/G	ALPHASPEC	0.09
140-6L-182	09/20/95	09/25/95	0.00	0.50	SL		.9542	DRY	REG	TH-232	2.10	0.68	PCI/G	ALPHASPEC	0.16
140-6L-182	09/20/95	09/26/95	0.00	0.50	SL		1.001	DRY	REG	U-234	1.50	0.56	PCI/G	ALPHASPEC	0.07
140-6L-182	09/20/95	09/26/95	0.00	0.50	SL		1.001	DRY	REG	U-235	0.15	0.15	PCI/G	ALPHASPEC	0.14
140-6L-182	09/20/95	09/26/95	0.00	0.50	SL		1.001	DRY	REG	U-238	1.50	0.56	PCI/G	ALPHASPEC	0.12

Approved by: Cathay E. Sharp  
*Under Con 10/5/95*

Date: 10/4/95

**TMA/Eberline**  
A Division of Thermo Terra Tech

Oak Ridge Laboratory • 601 Scarboro Road • Oak Ridge, TN 37830 • (615) 481-0683

95-09-113

AIRBILL NO.

905 4837466

Samplers (print name then sign)

Mr. PHILLIPS

Ron SCARBOROUGH

Mr. Shultz

Ron Scarborough

## FIELD SAMPLE COLLECTION FORM

Site Name: HISS NORFAS # 661

WBS No.: 140

Activity Support (Job) No.: 441

	Sample ID Sample Grid Point	Sample Type (1)	Sample Time	Date of Sample	Preserved with	Purpose (2)	Depth cm <input type="checkbox"/> ft <input checked="" type="checkbox"/>	Priority (Days)	Analysis Required	Remarks
4	140-6L-175 N309, E315	PS	1520	9-19-95	NA	RC	0 - 0.5	7	ISO-71 & RA-226 ISO-37 C. SILLS ISO-37 ≈ SPEC	PROPERTY 6L
-5	140-6L-176 N309, E335		1600	9-19-95						
-6	140-6L-177 N309, E345		1630	9-19-95						
-7	140-6L-178 N299, E320		0800	9-20-95						
-8	140-6L-179 N299, E330		0830	9-20-95						
-9	140-6L-180 N299, E335		0805	9-20-95						
-10	140-6L-181 N299, E345		0800	9-20-95			✓	✓		

SAMPLE TYPE (1)	PURPOSE (2)
Surface Soil	SS
Bias Soil	BS
Profile Soil	PS
Sediment Silt	SD
Other	OR
Vegetation	VE
Ground Water	GW
Surface Water	SW
Rad Character	RC
Verification	VR
Quality Control	QC
Hot Spot	HS
Resample	RS
Background	BG
Routine	RT
Special	SP

This package conforms to the conditions and limitations specified in 40CFR170.421 for excepted radioactive material, limited quantity, D.O.S., UN 2910.

CHAIN OF CUSTODY RECORD				
REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME
ANALYSIS	M. Shultz	AIRBORNE EXPRESS	9-21-95	1600
ANALYSIS	Airbarry	J.P. Tawangne	9-21-95	0930

Recorded by: Mr. Shultz  
Date: 9-21-95 Time: 1600

Total number of samples in this box 7

Total number of samples in this shipment 17

Total number of boxes in this shipment 1

Shipper: TNS/HISS  
9170 LATTICE AVE  
BERKELEY, MO 63134

Ship to: TNS/J.R.  
601 SCARABEE ROAD  
OAK RIDGE, TN 37830  
ATTN: SAMPLE LOGIN

Page 2 of 3

95-09-113

AIRBILL NO.

# **FIELD SAMPLE COLLECTION FORM**

9054837466

Site Name: HISS NORFAS # 66

WBS No.: 140

Activity Support (Job) No.: 441

**Samplers (print name then sign)**

M. PHILLIPS M. Chilly  
RON SCARBOROUGH Ron Scarborough

\*This package conforms to the conditions and limitations specified in 49CFR173.421 for excepted radioactive material, limited quantity n.o.s., UN 2910.\*

Shipper: TNS/HISS

9170 LATTY AVE  
BURLINGTON, MO 63134

Ship to: TNS/C.O.

601 SCARBOROUGH ROAD  
OAK RIDGE TN 37380  
ATTN: SNARLE LOC IN

Shipping Container meets DOT Transferable Criteria

Shipping container dose rate 20.5 mrem/hr

## Original

**THERMO NUCLEAR SERVICES/OAK RIDGE LABORATORY** - 22319  
**TRACER REPORT**

10/1/95

Work Order # 95-09-113-OR

<b>BECHTEL SAMPLE ID</b>	<b>ANALYTE</b>	<b>TRACER</b>	<b>RECOVERY</b>
140-6L-175	RA-226	BA-133	96%
140-6L-175	TH-228	TH-229	53%
140-6L-175	TH-230	TH-229	53%
140-6L-175	TH-232	TH-229	53%
140-6L-175	U-234	U-232	62%
140-6L-175	U-235	U-232	62%
140-6L-175	U-238	U-232	62%
140-6L-176	RA-226	BA-133	80%
140-6L-176	TH-228	TH-229	66%
140-6L-176	TH-230	TH-229	66%
140-6L-176	TH-232	TH-229	66%
140-6L-176	U-234	U-232	43%
140-6L-176	U-235	U-232	43%
140-6L-176	U-238	U-232	43%
140-6L-177	RA-226	BA-133	81%
140-6L-177	TH-228	TH-229	53%
140-6L-177	TH-230	TH-229	53%
140-6L-177	TH-232	TH-229	53%
140-6L-177	U-234	U-232	50%
140-6L-177	U-235	U-232	50%
140-6L-177	U-238	U-232	50%
140-6L-178	RA-226	BA-133	80%
140-6L-178	TH-228	TH-229	57%
140-6L-178	TH-230	TH-229	57%
140-6L-178	TH-232	TH-229	57%
140-6L-178	U-234	U-232	53%
140-6L-178	U-235	U-232	53%
140-6L-178	U-238	U-232	53%

**THERMO NUCLEAR SERVICES/OAK RIDGE LABORATORY** - 22015  
**TRACER REPORT**

10/1/95  
 Work Order # 95-09-113-OR

<b>BECHTEL SAMPLE ID</b>	<b>ANALYTE</b>	<b>TRACER</b>	<b>RECOVERY</b>
140-6L-179	RA-226	BA-133	100%
140-6L-179	TH-228	TH-229	63%
140-6L-179	TH-230	TH-229	63%
140-6L-179	TH-232	TH-229	63%
140-6L-179	U-234	U-232	(48%)
140-6L-179	U-235	U-232	(48%)
140-6L-179	U-238	U-232	(48%)
140-6L-180	RA-226	BA-133	92%
140-6L-180	TH-228	TH-229	57%
140-6L-180	TH-230	TH-229	57%
140-6L-180	TH-232	TH-229	57%
140-6L-180	U-234	U-232	52%
140-6L-180	U-235	U-232	52%
140-6L-180	U-238	U-232	52%
140-6L-181	RA-226	BA-133	92%
140-6L-181	TH-228	TH-229	60%
140-6L-181	TH-230	TH-229	60%
140-6L-181	TH-232	TH-229	60%
140-6L-181	U-234	U-232	72%
140-6L-181	U-235	U-232	72%
140-6L-181	U-238	U-232	72%
140-6L-182	RA-226	BA-133	81%
140-6L-182	TH-228	TH-229	69%
140-6L-182	TH-230	TH-229	69%
140-6L-182	TH-232	TH-229	69%
140-6L-182	U-234	U-232	(49%)
140-6L-182	U-235	U-232	(49%)
140-6L-182	U-238	U-232	(49%)

## **POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

### **Post-Remedial Action Soil Sample Results (Data)**

#### **SAMPLES:**

**140-3L-184**

**140-3L-185**

**140-3L-186**

**140-3L-187**

**140-3L-188**

**140-3L-189**

**140-3L-190**

**140-3L-191**

**140-3L-192**

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-17006	Sampling Event:	HIS_RA95
Work Order Number:	E9509124	DATAFUSR Number:	D-23049
Customer Number:	441	Date Received:	09/25/95
Environmental Category:	RI	Date Analyzed:	09/29/95

Sample ID	Date Collected	Top Depth		Bottom Depth		Matrix	F/UF Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI	Qualifier
		Depth	Depth	Matrix	Result										MDA	Flag
140-3L-184	09/21/95	0.00	0.50	SL	.9768 DRY	REG	RA-226	0.94	0.26	PCI/G	ALPHASPEC	0.10				
140-3L-184	09/21/95	0.00	0.50	SL	.5015 DRY	REG	TH-228	1.40	0.55	PCI/G	ALPHASPEC	0.28				
140-3L-184	09/21/95	0.00	0.50	SL	.5015 DRY	REG	TH-230	2.50	0.79	PCI/G	ALPHASPEC	0.10				
140-3L-184	09/21/95	0.00	0.50	SL	.5015 DRY	REG	TH-232	1.60	0.58	PCI/G	ALPHASPEC	0.10				
140-3L-184	09/21/95	0.00	0.50	SL	1.003 DRY	REG	U-234	0.88	0.40	PCI/G	ALPHASPEC	0.08	J	TCR		
140-3L-184	09/21/95	0.00	0.50	SL	1.003 DRY	REG	U-235	0.14	0.15	PCI/G	ALPHASPEC	0.09	J	LCS		
140-3L-184	09/21/95	0.00	0.50	SL	1.003 DRY	REG	U-238	1.40	0.55	PCI/G	ALPHASPEC	0.08	J	TCR		
140-3L-185	09/21/95	0.00	0.50	SL	.9775 DRY	REG	RA-226	1.30	0.34	PCI/G	ALPHASPEC	0.10				
140-3L-185	09/21/95	0.00	0.50	SL	.5018 DRY	REG	TH-228	1.40	0.55	PCI/G	ALPHASPEC	0.21				
140-3L-185	09/21/95	0.00	0.50	SL	.5018 DRY	REG	TH-230	2.00	0.69	PCI/G	ALPHASPEC	0.24				
140-3L-185	09/21/95	0.00	0.50	SL	.5018 DRY	REG	TH-232	1.00	0.46	PCI/G	ALPHASPEC	0.21				
140-3L-185	09/21/95	0.00	0.50	SL	1.005 DRY	REG	U-234	1.40	0.59	PCI/G	ALPHASPEC	0.18	J	TCR		
140-3L-185	09/21/95	0.00	0.50	SL	1.005 DRY	REG	U-235	0.10	0.00	PCI/G	ALPHASPEC	0.10	UJ	LCS		
140-3L-185	09/21/95	0.00	0.50	SL	1.005 DRY	REG	U-238	1.50	0.60	PCI/G	ALPHASPEC	0.08	J	TCR		
140-3L-186	09/21/95	0.00	0.50	SL	1.027 DRY	REG	RA-226	1.00	0.26	PCI/G	ALPHASPEC	0.18				
140-3L-186	09/21/95	0.00	0.50	SL	.5045 DRY	REG	TH-228	1.80	0.74	PCI/G	ALPHASPEC	0.23				
140-3L-186	09/21/95	0.00	0.50	SL	.5045 DRY	REG	TH-230	2.30	0.88	PCI/G	ALPHASPEC	0.23				
140-3L-186	09/21/95	0.00	0.50	SL	.5045 DRY	REG	TH-232	1.00	0.52	PCI/G	ALPHASPEC	0.13				
140-3L-186	09/21/95	0.00	0.50	SL	1.006 DRY	REG	U-234	1.20	0.55	PCI/G	ALPHASPEC	0.16	J	TCR		
140-3L-186	09/21/95	0.00	0.50	SL	1.006 DRY	REG	U-235	0.08	0.12	PCI/G	ALPHASPEC	0.19	UJ	LCS		
140-3L-186	09/21/95	0.00	0.50	SL	1.006 DRY	REG	U-238	0.77	0.40	PCI/G	ALPHASPEC	0.09	J	TCR		
140-3L-187	09/22/95	0.00	0.50	SL	.5013 DRY	REG	RA-226	1.30	0.42	PCI/G	ALPHASPEC	0.18				
140-3L-187	09/22/95	0.00	0.50	SL	.5034 DRY	REG	TH-228	0.93	0.44	PCI/G	ALPHASPEC	0.22				
140-3L-187	09/22/95	0.00	0.50	SL	.5034 DRY	REG	TH-230	1.60	0.61	PCI/G	ALPHASPEC	0.19				
140-3L-187	09/22/95	0.00	0.50	SL	.5034 DRY	REG	TH-232	1.20	0.51	PCI/G	ALPHASPEC	0.19				
140-3L-187	09/22/95	0.00	0.50	SL	1.035 DRY	REG	U-234	1.30	0.53	PCI/G	ALPHASPEC	0.13	J	TCR		
140-3L-187	09/22/95	0.00	0.50	SL	1.035 DRY	REG	U-235	0.10	0.12	PCI/G	ALPHASPEC	0.09	J	LCS		
140-3L-187	09/22/95	0.00	0.50	SL	1.035 DRY	REG	U-238	0.94	0.42	PCI/G	ALPHASPEC	0.13	J	TCR		
140-3L-188	09/22/95	0.00	0.50	SL	.9520 DRY	REG	RA-226	1.30	0.33	PCI/G	ALPHASPEC	0.13				
140-3L-188	09/22/95	0.00	0.50	SL	.5263 DRY	REG	TH-228	0.98	0.40	PCI/G	ALPHASPEC	0.19				

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-17006	Sampling Event:	HIS_RA95
Work Order Number:	E9509124	DATAUSR Number:	D-23049
Customer Number:	441	Date Received:	09/25/95
Environmental Category:	RI	Date Analyzed:	09/27/95

Sample ID	Date Collected	Top Depth			F/UF Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI	Qualifier Code
		Depth	Matrix	Bottom									MDA	Flag
140-3L-188	09/22/95	0.00	0.50	SL	.5263	DRY	REG	TH-230	1.20	0.45	PCI/G	ALPHASPEC	0.19	
140-3L-188	09/22/95	0.00	0.50	SL	.5263	DRY	REG	TH-232	1.00	0.41	PCI/G	ALPHASPEC	0.20	
140-3L-188	09/22/95	0.00	0.50	SL	1.006	DRY	REG	U-234	1.20	0.46	PCI/G	ALPHASPEC	0.14	U BLK
140-3L-188	09/22/95	0.00	0.50	SL	1.006	DRY	REG	U-235	0.02	0.06	PCI/G	ALPHASPEC	0.13	UJ LCS
140-3L-188	09/22/95	0.00	0.50	SL	1.006	DRY	REG	U-238	0.81	0.34	PCI/G	ALPHASPEC	0.14	U BLK
140-3L-189	09/22/95	0.00	0.50	SL	.9203	DRY	REG	RA-226	1.20	0.31	PCI/G	ALPHASPEC	0.11	
140-3L-189	09/22/95	0.00	0.50	SL	.5007	DRY	REG	TH-228	0.58	0.31	PCI/G	ALPHASPEC	0.19	
140-3L-189	09/22/95	0.00	0.50	SL	.5007	DRY	REG	TH-230	1.80	0.60	PCI/G	ALPHASPEC	0.16	
140-3L-189	09/22/95	0.00	0.50	SL	.5007	DRY	REG	TH-232	0.75	0.35	PCI/G	ALPHASPEC	0.16	
140-3L-189	09/22/95	0.00	0.50	SL	1.014	DRY	REG	U-234	1.40	0.49	PCI/G	ALPHASPEC	0.12	U BLK
140-3L-189	09/22/95	0.00	0.50	SL	1.014	DRY	REG	U-235	0.03	0.06	PCI/G	ALPHASPEC	0.08	UJ LCS
140-3L-189	09/22/95	0.00	0.50	SL	1.014	DRY	REG	U-238	1.20	0.45	PCI/G	ALPHASPEC	0.12	U BLK
140-6L-190	09/22/95	0.00	0.50	SL	.9359	DRY	REG	RA-226	1.30	0.33	PCI/G	ALPHASPEC	0.12	
140-6L-190	09/22/95	0.00	0.50	SL	.5026	DRY	REG	TH-228	0.94	0.44	PCI/G	ALPHASPEC	0.25	
140-6L-190	09/22/95	0.00	0.50	SL	.5026	DRY	REG	TH-230	3.60	1.10	PCI/G	ALPHASPEC	0.19	
140-6L-190	09/22/95	0.00	0.50	SL	.5026	DRY	REG	TH-232	0.53	0.32	PCI/G	ALPHASPEC	0.19	
140-6L-190	09/22/95	0.00	0.50	SL	1.017	DRY	REG	U-234	1.30	0.47	PCI/G	ALPHASPEC	0.12	U BLK
140-6L-190	09/22/95	0.00	0.50	SL	1.017	DRY	REG	U-235	0.17	0.14	PCI/G	ALPHASPEC	0.08	J LCS
140-6L-190	09/22/95	0.00	0.50	SL	1.017	DRY	REG	U-23B	1.60	0.55	PCI/G	ALPHASPEC	0.10	
140-6L-191	09/22/95	0.00	0.50	SL	.9396	DRY	REG	RA-226	1.10	0.28	PCI/G	ALPHASPEC	0.08	
140-6L-191	09/22/95	0.00	0.50	SL	.5429	DRY	REG	TH-228	0.87	0.41	PCI/G	ALPHASPEC	0.21	
140-6L-191	09/22/95	0.00	0.50	SL	.5429	DRY	REG	TH-230	2.80	0.87	PCI/G	ALPHASPEC	0.10	
140-6L-191	09/22/95	0.00	0.50	SL	.5429	DRY	REG	TH-232	1.20	0.49	PCI/G	ALPHASPEC	0.10	
140-6L-191	09/22/95	0.00	0.50	SL	1.026	DRY	REG	U-234	1.90	0.80	PCI/G	ALPHASPEC	0.17	J TCR
140-6L-191	09/22/95	0.00	0.50	SL	1.026	DRY	REG	U-235	0.05	0.09	PCI/G	ALPHASPEC	0.12	UJ LCS
140-6L-191	09/22/95	0.00	0.50	SL	1.026	DRY	REG	U-238	1.50	0.68	PCI/G	ALPHASPEC	0.10	J TCR
140-6L-192	09/22/95	0.00	0.50	SL	.9743	DRY	REG	RA-226	1.10	0.41	PCI/G	ALPHASPEC	0.17	J TCR
140-6L-192	09/22/95	0.00	0.50	SL	.5039	DRY	REG	TH-228	1.50	0.60	PCI/G	ALPHASPEC	0.23	
140-6L-192	09/22/95	0.00	0.50	SL	.5039	DRY	REG	TH-230	3.40	1.00	PCI/G	ALPHASPEC	0.11	
140-6L-192	09/22/95	0.00	0.50	SL	.5039	DRY	REG	TH-232	1.40	0.57	PCI/G	ALPHASPEC	0.11	

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-17006	Sampling Event:	HIS_RA95
Work Order Number:	E9509124	DATAFUSR Number:	D-23049
Customer Number:	441	Date Received:	09/25/95
Environmental Category:	RI	Date Analyzed:	09/28/95

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Flag	Qualifier Code
	140-6L-192	09/22/95	0.00	0.50	SL	1.023	DRY		REG	U-234	1.20	0.44	PCI/G	ALPHASPEC	0.06	U
140-6L-192	09/22/95	0.00	0.50	SL	1.023	DRY		REG	U-235	0.05	0.08	PCI/G	ALPHASPEC	0.13	UJ	LCS
140-6L-192	09/22/95	0.00	0.50	SL	1.023	DRY		REG	U-238	1.10	0.43	PCI/G	ALPHASPEC	0.06	U	BLK

**TMA/Eberline**

601 Scarboro Rd.  
Oak Ridge, TN 37830  
(615) 481-0683 Fax (615) 483-4621

TMA-OR-3575

October 13, 1995

Mr. Jim McCague  
Bechtel National, Inc.  
P.O. Box 350  
Oak Ridge, TN 37831-0350

**CASE NARRATIVE**  
Work Order #95-09-124-OR  
State of Utah Certificate #E-235

**SAMPLE RECEIPT**

This work order contains nine soil samples received 09/25/95. These samples were analyzed for Radium-226 and Isotopic Thorium using the C. Sill technique and Isotopic Uranium by Alpha Spectroscopy.

<u>CLIENT ID</u>	<u>LAB ID</u>	<u>CLIENT ID</u>	<u>LAB ID</u>
140-3L-184	95-09-124-04	140-3L-189	95-09-124-09
140-3L-185	95-09-124-05	140-6L-190	95-09-124-10
140-3L-186	95-09-124-06	140-6L-191	95-09-124-11
140-3L-187	95-09-124-07	140-6L-192	95-09-124-12
140-3L-188	95-09-124-08		

The file name for these samples is 9509124.TXT.

**ANALYTICAL METHODS**

Radium-226 was analyzed using EPA Method 903.0 modified. Isotopic Thorium was analyzed using Method EML Th-01 modified. Isotopic Uranium was analyzed using Method EML U-02 modified.

**PROBLEMS OR UNUSUAL CIRCUMSTANCES**

Initial calibrations, self absorption factors, and tracer recoveries, where applicable, are within specified criteria. No problems or unusual circumstances were noted during the analytical process.

**TMA**

**Thermo Analytical Inc.**

**TMA/Eberline**

8-23049

**CERTIFICATION OF ACCURACY**

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package and electronic data deliverable has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

  
M. R. McDougall  
Laboratory Manager

Date: 10/13/95

TMA/Eberline Number:

Work Order Number: 9509124

Date Received: 09/25/95

Customer Number: 441

Environmental Cat: RI

Sample ID	Date Collected	Date Analyzed	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCSPIKE	09/25/95	09/29/95	0.00	0.00	W	1			LCST	RA-226	27.20	1.50	PCI	ALPHASPEC	0.11
QCSPIKE	09/25/95	09/29/95	0.00	0.00	W	1			LCSF	RA-226	24.60	2.40	PCI	ALPHASPEC	0.11
QCSPIKE	09/25/95	09/27/95	0.00	0.00	W	1			LCST	TH-228	5.10	0.18	PCI	ALPHASPEC	0.11
QCSPIKE	09/25/95	09/27/95	0.00	0.00	W	1			LCSF	TH-228	4.80	1.20	PCI	ALPHASPEC	0.11
QCSPIKE	09/25/95	09/27/95	0.00	0.00	W	1			LCST	TH-230	5.60	0.12	PCI	ALPHASPEC	0.10
QCSPIKE	09/25/95	09/27/95	0.00	0.00	W	1			LCSF	TH-230	5.90	1.40	PCI	ALPHASPEC	0.10
QCSPIKE	09/25/95	09/27/95	0.00	0.00	W	1			LCST	TH-232	5.10	0.18	PCI	ALPHASPEC	0.10
QCSPIKE	09/25/95	09/27/95	0.00	0.00	W	1			LCSF	TH-232	4.70	1.20	PCI	ALPHASPEC	0.10
QCSPIKE	09/25/95	09/28/95	0.00	0.00	W	1			LCST	U-234	8.60	0.33	PCI	ALPHASPEC	0.12
QCSPIKE	09/25/95	09/28/95	0.00	0.00	W	1			LCSF	U-234	7.10	2.00	PCI	ALPHASPEC	0.12
QCSPIKE	09/25/95	09/28/95	0.00	0.00	W	1			LCST	U-235	0.39	0.01	PCI	ALPHASPEC	0.17
QCSPIKE	09/25/95	09/28/95	0.00	0.00	W	1			LCSF	U-235	0.30	0.20	PCI	ALPHASPEC	0.17
QCSPIKE	09/25/95	09/28/95	0.00	0.00	W	1			LCST	U-238	8.30	0.32	PCI	ALPHASPEC	0.06
QCSPIKE	09/25/95	09/28/95	0.00	0.00	W	1			LCSF	U-238	7.50	2.10	PCI	ALPHASPEC	0.06
QCBLANK	09/25/95	09/29/95	0.00	0.00	W	1			PB	RA-226	0.01	0.04	PCI	ALPHASPEC	0.11
QCBLANK	09/25/95	09/27/95	0.00	0.00	W	1			PB	TH-228	0.06	0.07	PCI	ALPHASPEC	0.09
QCBLANK	09/25/95	09/27/95	0.00	0.00	W	1			PB	TH-230	0.07	0.08	PCI	ALPHASPEC	0.11
QCBLANK	09/25/95	09/27/95	0.00	0.00	W	1			PB	TH-232	0.01	0.04	PCI	ALPHASPEC	0.12
QCBLANK	09/25/95	09/28/95	0.00	0.00	W	1			PB	U-234	0.50	0.31	PCI	ALPHASPEC	0.19
QCBLANK	09/25/95	09/28/95	0.00	0.00	W	1			PB	U-235	0.04	0.09	PCI	ALPHASPEC	0.20
QCBLANK	09/25/95	09/28/95	0.00	0.00	W	1			PB	U-238	0.28	0.22	PCI	ALPHASPEC	0.22
140-3L-184	09/21/95	09/29/95	0.00	0.50	SL	.9337		DRY	REPL	RA-226	1.20	0.44	PCI/G	ALPHASPEC	0.17
140-3L-184	09/21/95	09/27/95	0.00	0.50	SL	.5035		DRY	REPL	TH-228	1.00	0.47	PCI/G	ALPHASPEC	0.24
140-3L-184	09/21/95	09/27/95	0.00	0.50	SL	.5035		DRY	REPL	TH-230	2.00	0.70	PCI/G	ALPHASPEC	0.19
140-3L-184	09/21/95	09/27/95	0.00	0.50	SL	.5035		DRY	REPL	TH-232	1.40	0.57	PCI/G	ALPHASPEC	0.19
140-3L-184	09/21/95	09/28/95	0.00	0.50	SL	1.007		DRY	REPL	U-234	1.60	0.65	PCI/G	ALPHASPEC	0.14
140-3L-184	09/21/95	09/28/95	0.00	0.50	SL	1.007		DRY	REPL	U-235	0.07	0.11	PCI/G	ALPHASPEC	0.18
140-3L-184	09/21/95	09/28/95	0.00	0.50	SL	1.007		DRY	REPL	U-238	1.30	0.57	PCI/G	ALPHASPEC	0.14
140-3L-184	09/21/95	09/29/95	0.00	0.50	SL	.9768		DRY	REG	RA-226	0.94	0.26	PCI/G	ALPHASPEC	0.10
140-3L-184	09/21/95	09/27/95	0.00	0.50	SL	.5015		DRY	REG	TH-228	1.40	0.55	PCI/G	ALPHASPEC	0.28
140-3L-184	09/21/95	09/27/95	0.00	0.50	SL	.5015		DRY	REG	TH-230	2.50	0.79	PCI/G	ALPHASPEC	0.10
140-3L-184	09/21/95	09/27/95	0.00	0.50	SL	.5015		DRY	REG	TH-232	1.60	0.58	PCI/G	ALPHASPEC	0.10
140-3L-184	09/21/95	09/28/95	0.00	0.50	SL	1.003		DRY	REG	U-234	0.88	0.40	PCI/G	ALPHASPEC	0.08
140-3L-184	09/21/95	09/28/95	0.00	0.50	SL	1.003		DRY	REG	U-235	0.14	0.15	PCI/G	ALPHASPEC	0.09
140-3L-184	09/21/95	09/28/95	0.00	0.50	SL	1.003		DRY	REG	U-238	1.40	0.55	PCI/G	ALPHASPEC	0.08
140-3L-185	09/21/95	09/29/95	0.00	0.50	SL	.9775		DRY	REG	RA-226	1.30	0.34	PCI/G	ALPHASPEC	0.10
140-3L-185	09/21/95	09/27/95	0.00	0.50	SL	.5018		DRY	REG	TH-228	1.40	0.55	PCI/G	ALPHASPEC	0.21

Approved by:

Bruce L. Eberline  
10/11/95

Date: 10/11/95

TMA/Eberline Number:

Work Order Number: 9509124

Date Received: 09/25/95

Customer Number: 441

Environmental Cat: RI

Sample ID	Date Collected	Date Analyzed	Top Depth	Bottom Depth	Matrix	F/U/F	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
140-3L-185	09/21/95	09/27/95	0.00	0.50	SL		.5018	DRY	REG	TH-230	2.00	0.69	PCI/G	ALPHASPEC	0.24
140-3L-185	09/21/95	09/27/95	0.00	0.50	SL		.5018	DRY	REG	TH-232	1.00	0.46	PCI/G	ALPHASPEC	0.21
140-3L-185	09/21/95	09/28/95	0.00	0.50	SL		1.005	DRY	REG	U-234	1.40	0.59	PCI/G	ALPHASPEC	0.18
140-3L-185	09/21/95	09/28/95	0.00	0.50	SL		1.005	DRY	REG	U-235	0.10	0.00	PCI/G	ALPHASPEC	0.10
140-3L-185	09/21/95	09/28/95	0.00	0.50	SL		1.005	DRY	REG	U-238	1.50	0.60	PCI/G	ALPHASPEC	0.08
140-3L-186	09/21/95	09/29/95	0.00	0.50	SL		1.027	DRY	REG	RA-226	1.00	0.26	PCI/G	ALPHASPEC	0.18
140-3L-186	09/21/95	09/27/95	0.00	0.50	SL		.5045	DRY	REG	TH-228	1.80	0.74	PCI/G	ALPHASPEC	0.23
140-3L-186	09/21/95	09/27/95	0.00	0.50	SL		.5045	DRY	REG	TH-230	2.30	0.88	PCI/G	ALPHASPEC	0.23
140-3L-186	09/21/95	09/27/95	0.00	0.50	SL		.5045	DRY	REG	TH-232	1.00	0.52	PCI/G	ALPHASPEC	0.13
140-3L-186	09/21/95	09/28/95	0.00	0.50	SL		1.006	DRY	REG	U-234	1.20	0.55	PCI/G	ALPHASPEC	0.16
140-3L-186	09/21/95	09/28/95	0.00	0.50	SL		1.006	DRY	REG	U-235	0.08	0.12	PCI/G	ALPHASPEC	0.19
140-3L-186	09/21/95	09/28/95	0.00	0.50	SL		1.006	DRY	REG	U-238	0.77	0.40	PCI/G	ALPHASPEC	0.09
140-3L-187	09/22/95	09/29/95	0.00	0.50	SL		.5013	DRY	REG	RA-226	1.30	0.42	PCI/G	ALPHASPEC	0.18
140-3L-187	09/22/95	09/27/95	0.00	0.50	SL		.5034	DRY	REG	TH-228	0.93	0.44	PCI/G	ALPHASPEC	0.22
140-3L-187	09/22/95	09/27/95	0.00	0.50	SL		.5034	DRY	REG	TH-230	1.60	0.61	PCI/G	ALPHASPEC	0.19
140-3L-187	09/22/95	09/27/95	0.00	0.50	SL		.5034	DRY	REG	TH-232	1.20	0.51	PCI/G	ALPHASPEC	0.19
140-3L-187	09/22/95	09/28/95	0.00	0.50	SL		1.035	DRY	REG	U-234	1.30	0.53	PCI/G	ALPHASPEC	0.13
140-3L-187	09/22/95	09/28/95	0.00	0.50	SL		1.035	DRY	REG	U-235	0.10	0.12	PCI/G	ALPHASPEC	0.09
140-3L-187	09/22/95	09/28/95	0.00	0.50	SL		1.035	DRY	REG	U-238	0.94	0.42	PCI/G	ALPHASPEC	0.13
140-3L-188	09/22/95	09/29/95	0.00	0.50	SL		.9520	DRY	REG	RA-226	1.30	0.33	PCI/G	ALPHASPEC	0.13
140-3L-188	09/22/95	09/27/95	0.00	0.50	SL		.5263	DRY	REG	TH-228	0.98	0.40	PCI/G	ALPHASPEC	0.19
140-3L-188	09/22/95	09/27/95	0.00	0.50	SL		.5263	DRY	REG	TH-230	1.20	0.45	PCI/G	ALPHASPEC	0.19
140-3L-188	09/22/95	09/27/95	0.00	0.50	SL		.5263	DRY	REG	TH-232	1.00	0.41	PCI/G	ALPHASPEC	0.20
140-3L-188	09/22/95	09/28/95	0.00	0.50	SL		1.006	DRY	REG	U-234	1.20	0.46	PCI/G	ALPHASPEC	0.14
140-3L-188	09/22/95	09/28/95	0.00	0.50	SL		1.006	DRY	REG	U-235	0.02	0.06	PCI/G	ALPHASPEC	0.13
140-3L-188	09/22/95	09/28/95	0.00	0.50	SL		1.006	DRY	REG	U-238	0.81	0.34	PCI/G	ALPHASPEC	0.14
140-3L-189	09/22/95	09/29/95	0.00	0.50	SL		.9203	DRY	REG	RA-226	1.20	0.31	PCI/G	ALPHASPEC	0.11
140-3L-189	09/22/95	09/27/95	0.00	0.50	SL		.5007	DRY	REG	TH-228	0.58	0.31	PCI/G	ALPHASPEC	0.19
140-3L-189	09/22/95	09/27/95	0.00	0.50	SL		.5007	DRY	REG	TH-230	1.80	0.60	PCI/G	ALPHASPEC	0.16
140-3L-189	09/22/95	09/27/95	0.00	0.50	SL		.5007	DRY	REG	TH-232	0.75	0.35	PCI/G	ALPHASPEC	0.16
140-3L-189	09/22/95	09/28/95	0.00	0.50	SL		1.014	DRY	REG	U-234	1.40	0.49	PCI/G	ALPHASPEC	0.12
140-3L-189	09/22/95	09/28/95	0.00	0.50	SL		1.014	DRY	REG	U-235	0.03	0.06	PCI/G	ALPHASPEC	0.08
140-3L-189	09/22/95	09/28/95	0.00	0.50	SL		1.014	DRY	REG	U-238	1.20	0.45	PCI/G	ALPHASPEC	0.12
140-6L-190	09/22/95	09/29/95	0.00	0.50	SL		.9359	DRY	REG	RA-226	1.30	0.33	PCI/G	ALPHASPEC	0.12
140-6L-190	09/22/95	09/27/95	0.00	0.50	SL		.5026	DRY	REG	TH-228	0.94	0.44	PCI/G	ALPHASPEC	0.25
140-6L-190	09/22/95	09/27/95	0.00	0.50	SL		.5026	DRY	REG	TH-230	3.60	1.10	PCI/G	ALPHASPEC	0.19
140-6L-190	09/22/95	09/27/95	0.00	0.50	SL		.5026	DRY	REG	TH-232	0.53	0.32	PCI/G	ALPHASPEC	0.19

Approved by:

Bruce L. Eberline  
9/16/95

Date: 10/13/95

Thermo Nuclear Services  
Oak Ridge, TN 37830  
(615) 481-0683

FUSRAP Radiological Reports  
Printed: 10/13/95  
Page 3 of 3

TMA/Eberline Number:

Work Order Number: 9509124

Date Received: 09/25/95

Customer Number: 441

Environmental Cat: RI

Sample ID	Date Collected	Date Analyzed	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
140-6L-190	09/22/95	09/28/95	0.00	0.50	SL		1.017	DRY	REG	U-234	1.30	0.47	PCI/G	ALPHASPEC	0.12
140-6L-190	09/22/95	09/28/95	0.00	0.50	SL		1.017	DRY	REG	U-235	0.17	0.14	PCI/G	ALPHASPEC	0.08
140-6L-190	09/22/95	09/28/95	0.00	0.50	SL		1.017	DRY	REG	U-238	1.60	0.55	PCI/G	ALPHASPEC	0.10
140-6L-191	09/22/95	09/29/95	0.00	0.50	SL		.9396	DRY	REG	RA-226	1.10	0.28	PCI/G	ALPHASPEC	0.08
140-6L-191	09/22/95	09/27/95	0.00	0.50	SL		.5429	DRY	REG	TH-228	0.87	0.41	PCI/G	ALPHASPEC	0.21
140-6L-191	09/22/95	09/27/95	0.00	0.50	SL		.5429	DRY	REG	TH-230	2.80	0.87	PCI/G	ALPHASPEC	0.10
140-6L-191	09/22/95	09/27/95	0.00	0.50	SL		.5429	DRY	REG	TH-232	1.20	0.49	PCI/G	ALPHASPEC	0.10
140-6L-191	09/22/95	09/28/95	0.00	0.50	SL		1.026	DRY	REG	U-234	1.90	0.80	PCI/G	ALPHASPEC	0.17
140-6L-191	09/22/95	09/28/95	0.00	0.50	SL		1.026	DRY	REG	U-235	0.05	0.09	PCI/G	ALPHASPEC	0.12
140-6L-191	09/22/95	09/28/95	0.00	0.50	SL		1.026	DRY	REG	U-238	1.50	0.68	PCI/G	ALPHASPEC	0.10
140-6L-192	09/22/95	09/29/95	0.00	0.50	SL		.9743	DRY	REG	RA-226	1.10	0.41	PCI/G	ALPHASPEC	0.17
140-6L-192	09/22/95	09/27/95	0.00	0.50	SL		.5039	DRY	REG	TH-228	1.50	0.60	PCI/G	ALPHASPEC	0.23
140-6L-192	09/22/95	09/27/95	0.00	0.50	SL		.5039	DRY	REG	TH-230	3.40	1.00	PCI/G	ALPHASPEC	0.11
140-6L-192	09/22/95	09/27/95	0.00	0.50	SL		.5039	DRY	REG	TH-232	1.40	0.57	PCI/G	ALPHASPEC	0.11
140-6L-192	09/22/95	09/28/95	0.00	0.50	SL		1.023	DRY	REG	U-234	1.20	0.44	PCI/G	ALPHASPEC	0.06
140-6L-192	09/22/95	09/28/95	0.00	0.50	SL		1.023	DRY	REG	U-235	0.05	0.08	PCI/G	ALPHASPEC	0.13
140-6L-192	09/22/95	09/28/95	0.00	0.50	SL		1.023	DRY	REG	U-238	1.10	0.43	PCI/G	ALPHASPEC	0.06

Approved by:



Date: 10/13/95

**TMA/Eberline**  
A Division of Thermo Terra Tech

Oak Ridge Laboratory • 601 Scarboro Road • Oak Ridge, TN 37830 • (615) 481-0683

113049

95-09-124

AIRBILL NO.	FIELD SAMPLE COLLECTION FORM							Samplers (print name then sign)			
9054837562								M. Phillips	M. Chilly		
Site Name: 11155 NORFAS #661		WBS No.: 140			Activity Support (Job) No.: 441						
Line No.	Sample ID Sample Grid Point	Sample Type (1)	Sample Time	Date of Sample	Preserved with	Purpose (2)	Depth cm <input type="checkbox"/> ft <input checked="" type="checkbox"/>	Priority (Days)	Analysis Required		Remarks
-1	140-3L-184 N534, E549	PS	1333	9-21-95	NA	RC	0- 0.5	2	ISO-TII & CA-226 by C. SILLS ISO-U by a spec		PROPERTY 3L MAY CONTAIN OIL
-5	140-3L-185 N524 E549		1410								
-6	140-3L-186 N504 E549		1505								
-7	140-3L-187 N484 E549		0745	9-22-95					REF ID: E93115		
-8	140-3L-188 N464 E549		0830						REF ID: E93116 SEP 25 1995		
-9	140-3L-189 N444 E549		0910						TMI/ EBR-1 OAK RIDGE LAU		
-10	140-6L-190 N311 E280		1005								PROPERTY 6L
SAMPLE TYPE (1)				PURPOSE (2)				CHAIN OF CUSTODY RECORD			
Surface Soil	SS	Rad Character	RC	REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME			
Bias Soil	BS	Verification	VR	ANALYSIS	M. Chilly	ANALYST CH-0033	9-22-95	1600			
Profile Soil	PS	Quality Control	QC	Analysis	N. Arbene	J. P. Tanguay	9-25-95	0700			
Sediment Silt	SD	Hot Spot	HS								
Other	OR	Resample	RS								
Vegetation	VE	Background	BG								
Ground Water	GW	Routine	RT								
Surface Water	SW	Special	SP								
This package conforms to the conditions and limitations specified in 40 CFR 173.421 for excepted radioactive material, limited quantity, do. 101, UN 2910.											
Shipper: TNS/HIS 910 LATTY AVE BERKELEY, MO 63134				Ship to: TNS/ O.R. 601 SCARFORD ROAD OAK RIDGE, TN 37830 A 7PM SAMPLE LAB IN				Page 1 of 2			
Shipping Container meets DOT Transferable Criteria <input checked="" type="checkbox"/>											
Shipping container dose rate <input checked="" type="checkbox"/> mrem/hr.											

95-09-124

**THERMO NUCLEAR SERVICES/OAK RIDGE LABORATORY**  
**TRACER REPORT**

P - 2 3049

10/8/95  
 Work Order # 95-09-124-OR

BECHTEL SAMPLE ID	ANALYTE	TRACER	RECOVERY
140-3L-184	RA-226	BA-133	81%
140-3L-184	TH-228	TH-229	60%
140-3L-184	TH-230	TH-229	60%
140-3L-184	TH-232	TH-229	60%
140-3L-184	U-234	U-232	40%
140-3L-184	U-235	U-232	40%
140-3L-184	U-238	U-232	40%
140-3L-185	RA-226	BA-133	66%
140-3L-185	TH-228	TH-229	64%
140-3L-185	TH-230	TH-229	64%
140-3L-185	TH-232	TH-229	64%
140-3L-185	U-234	U-232	42%
140-3L-185	U-235	U-232	42%
140-3L-185	U-238	U-232	42%
140-3L-186	RA-226	BA-133	84%
140-3L-186	TH-228	TH-229	54%
140-3L-186	TH-230	TH-229	54%
140-3L-186	TH-232	TH-229	54%
140-3L-186	U-234	U-232	40%
140-3L-186	U-235	U-232	40%
140-3L-186	U-238	U-232	40%
140-3L-187	RA-226	BA-133	88%
140-3L-187	TH-228	TH-229	68%
140-3L-187	TH-230	TH-229	68%
140-3L-187	TH-232	TH-229	68%
140-3L-187	U-234	U-232	49%
140-3L-187	U-235	U-232	49%
140-3L-187	U-238	U-232	49%

**THERMO NUCLEAR SERVICES/OAK RIDGE LABORATORY**  
**TRACER REPORT**

10/8/95

Work Order # 95-09-124-OR

8-23049

BECHTEL SAMPLE ID	ANALYTE	TRACER	RECOVERY
140-3L-188	RA-226	BA-133	78%
140-3L-188	TH-228	TH-229	63%
140-3L-188	TH-230	TH-229	63%
140-3L-188	TH-232	TH-229	63%
140-3L-188	U-234	U-232	55%
140-3L-188	U-235	U-232	55%
140-3L-188	U-238	U-232	55%
140-3L-189	RA-226	BA-133	82%
140-3L-189	TH-228	TH-229	77%
140-3L-189	TH-230	TH-229	77%
140-3L-189	TH-232	TH-229	77%
140-3L-189	U-234	U-232	58%
140-3L-189	U-235	U-232	58%
140-3L-189	U-238	U-232	58%
140-6L-190	RA-226	BA-133	81%
140-6L-190	TH-228	TH-229	65%
140-6L-190	TH-230	TH-229	65%
140-6L-190	TH-232	TH-229	65%
140-6L-190	U-234	U-232	59%
140-6L-190	U-235	U-232	59%
140-6L-190	U-238	U-232	59%
140-6L-191	RA-226	BA-133	83%
140-6L-191	TH-228	TH-229	69%
140-6L-191	TH-230	TH-229	69%
140-6L-191	TH-232	TH-229	69%
140-6L-191	U-234	U-232	38%
140-6L-191	U-235	U-232	38%
140-6L-191	U-238	U-232	38%

**THERMO NUCLEAR SERVICES/OAK RIDGE LABORATORY  
TRACER REPORT**

6-23049

10/8/95

Work Order # 95-09-124-OR

BECHTEL SAMPLE ID	ANALYTE	TRACER	RECOVERY
140-6L-192	RA-226	BA-133	41%
140-6L-192	TH-228	TH-229	62%
140-6L-192	TH-230	TH-229	62%
140-6L-192	TH-232	TH-229	62%
140-6L-192	U-234	U-232	56%
140-6L-192	U-235	U-232	56%
140-6L-192	U-238	U-232	56%

**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Post-Remedial Action Soil Sample Results (Data)**

**SAMPLES:**

<b>140-3L-194</b>	<b>140-3L-199</b>
<b>140-3L-195</b>	<b>140-3L-213</b>
<b>140-3L-196</b>	<b>140-3L-214</b>
<b>140-3L-197</b>	<b>140-3L-215</b>
<b>140-3L-198</b>	<b>140-3L-216</b>

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-17463	Sampling Event:	HIS_RA95
Work Order Number:	E9510039	DATAFUSR Number:	D-23580
Customer Number:	441	Date Received:	10/10/95
Environmental Category:	RI	Date Analyzed:	11/07/95

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	MDA	BNI Flag	Qualifier Code
140-3L-194	10/06/95	0.00	0.50	SL		1.003	DRY	REG	RA-226	1.70	0.51	PCI/G	ALPHASPEC	0.17	J	TCR
140-3L-194	10/06/95	0.00	0.50	SL		.5055	DRY	REG	TH-228	0.83	0.38	PCI/G	ALPHASPEC	0.16		
140-3L-194	10/06/95	0.00	0.50	SL		.5055	DRY	REG	TH-230	3.90	1.10	PCI/G	ALPHASPEC	0.19		
140-3L-194	10/06/95	0.00	0.50	SL		.5055	DRY	REG	TH-232	0.53	0.30	PCI/G	ALPHASPEC	0.21		
140-3L-194	10/06/95	0.00	0.50	SL		1.009	DRY	REG	U-234	1.60	0.57	PCI/G	ALPHASPEC	0.15	J	TCR
140-3L-194	10/06/95	0.00	0.50	SL		1.009	DRY	REG	U-235	0.03	0.06	PCI/G	ALPHASPEC	0.08	UJ	EGR
140-3L-194	10/06/95	0.00	0.50	SL		1.009	DRY	REG	U-238	1.40	0.52	PCI/G	ALPHASPEC	0.13	J	TCR
140-3L-195	10/06/95	0.00	0.50	SL		1.004	DRY	REG	RA-226	1.30	0.41	PCI/G	ALPHASPEC	0.08		
140-3L-195	10/06/95	0.00	0.50	SL		.5181	DRY	REG	TH-228	1.10	0.47	PCI/G	ALPHASPEC	0.18		
140-3L-195	10/06/95	0.00	0.50	SL		.5181	DRY	REG	TH-230	3.60	1.10	PCI/G	ALPHASPEC	0.23		
140-3L-195	10/06/95	0.00	0.50	SL		.5181	DRY	REG	TH-232	0.91	0.42	PCI/G	ALPHASPEC	0.18		
140-3L-195	10/06/95	0.00	0.50	SL		1.006	DRY	REG	U-234	1.20	0.46	PCI/G	ALPHASPEC	0.12		
140-3L-195	10/06/95	0.00	0.50	SL		1.006	DRY	REG	U-235	0.07	0.00	PCI/G	ALPHASPEC	0.07	UJ	ERR
140-3L-195	10/06/95	0.00	0.50	SL		1.006	DRY	REG	U-238	1.30	0.48	PCI/G	ALPHASPEC	0.06		
140-3L-196	10/06/95	0.00	0.50	SL		1.015	DRY	REG	RA-226	2.20	0.62	PCI/G	ALPHASPEC	0.21		
140-3L-196	10/06/95	0.00	0.50	SL		.5044	DRY	REG	TH-228	0.84	0.37	PCI/G	ALPHASPEC	0.19		
140-3L-196	10/06/95	0.00	0.50	SL		.5044	DRY	REG	TH-230	3.40	0.93	PCI/G	ALPHASPEC	0.15		
140-3L-196	10/06/95	0.00	0.50	SL		.5044	DRY	REG	TH-232	1.00	0.40	PCI/G	ALPHASPEC	0.15		
140-3L-196	10/06/95	0.00	0.50	SL		1.013	DRY	REG	U-234	1.40	0.48	PCI/G	ALPHASPEC	0.09		
140-3L-196	10/06/95	0.00	0.50	SL		1.013	DRY	REG	U-235	0.10	0.10	PCI/G	ALPHASPEC	0.07		
140-3L-196	10/06/95	0.00	0.50	SL		1.013	DRY	REG	U-238	1.20	0.42	PCI/G	ALPHASPEC	0.09		
140-3L-197	10/06/95	0.00	0.50	SL		1.008	DRY	REG	RA-226	1.10	0.32	PCI/G	ALPHASPEC	0.16		
140-3L-197	10/06/95	0.00	0.50	SL		.5037	DRY	REG	TH-228	0.95	0.45	PCI/G	ALPHASPEC	0.29		
140-3L-197	10/06/95	0.00	0.50	SL		.5037	DRY	REG	TH-230	6.50	1.70	PCI/G	ALPHASPEC	0.11		
140-3L-197	10/06/95	0.00	0.50	SL		.5037	DRY	REG	TH-232	1.30	0.52	PCI/G	ALPHASPEC	0.11		
140-3L-197	10/06/95	0.00	0.50	SL		1.005	DRY	REG	U-234	1.40	0.51	PCI/G	ALPHASPEC	0.10		
140-3L-197	10/06/95	0.00	0.50	SL		1.005	DRY	REG	U-235	0.16	0.14	PCI/G	ALPHASPEC	0.13		
140-3L-197	10/06/95	0.00	0.50	SL		1.005	DRY	REG	U-238	1.70	0.59	PCI/G	ALPHASPEC	0.06		
140-3L-198	10/06/95	0.00	0.50	SL		1.051	DRY	REG	RA-226	1.70	0.57	PCI/G	ALPHASPEC	0.27		
140-3L-198	10/06/95	0.00	0.50	SL		.5112	DRY	REG	TH-228	0.51	0.30	PCI/G	ALPHASPEC	0.18		

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-17463	Sampling Event:	HIS_RA95
Work Order Number:	E9510039	DATAFUSR Number:	D-23580
Customer Number:	441	Date Received:	10/10/95
Environmental Category:	RI	Date Analyzed:	10/13/95

Sample ID	Date Collected	Top Depth		Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	MDA	BNI Flag	Qualifier Code
		Depth	Bottom Depth													
140-3L-198	10/06/95	0.00	0.50	SL	.5112	DRY	REG	TH-230	6.60	1.70	PCI/G	ALPHASPEC	0.11			
140-3L-198	10/06/95	0.00	0.50	SL	.5112	DRY	REG	TH-232	0.70	0.36	PCI/G	ALPHASPEC	0.18			
140-3L-198	10/06/95	0.00	0.50	SL	1.001	DRY	REG	U-234	0.99	0.37	PCI/G	ALPHASPEC	0.09			
140-3L-198	10/06/95	0.00	0.50	SL	1.001	DRY	REG	U-235	0.07	0.09	PCI/G	ALPHASPEC	0.11	UJ	EGR	
140-3L-198	10/06/95	0.00	0.50	SL	1.001	DRY	REG	U-238	1.10	0.41	PCI/G	ALPHASPEC	0.09			
140-3L-199	10/06/95	0.00	0.50	SL	1.086	DRY	REG	RA-226	0.82	0.25	PCI/G	ALPHASPEC	0.13			
140-3L-199	10/06/95	0.00	0.50	SL	.5062	DRY	REG	TH-228	1.10	0.48	PCI/G	ALPHASPEC	0.21			
140-3L-199	10/06/95	0.00	0.50	SL	.5062	DRY	REG	TH-230	3.60	1.00	PCI/G	ALPHASPEC	0.18			
140-3L-199	10/06/95	0.00	0.50	SL	.5062	DRY	REG	TH-232	0.40	0.27	PCI/G	ALPHASPEC	0.23			
140-3L-199	10/06/95	0.00	0.50	SL	1.023	DRY	REG	U-234	1.50	0.55	PCI/G	ALPHASPEC	0.15			
140-3L-199	10/06/95	0.00	0.50	SL	1.023	DRY	REG	U-235	0.21	0.17	PCI/G	ALPHASPEC	0.08			
140-3L-199	10/06/95	0.00	0.50	SL	1.023	DRY	REG	U-238	1.80	0.64	PCI/G	ALPHASPEC	0.11			
140-3L-213	10/09/95	0.00	0.50	SL	1.009	DRY	REG	RA-226	0.65	0.21	PCI/G	ALPHASPEC	0.08			
140-3L-213	10/09/95	0.00	0.50	SL	.5054	DRY	REG	TH-228	0.59	0.32	PCI/G	ALPHASPEC	0.19			
140-3L-213	10/09/95	0.00	0.50	SL	.5054	DRY	REG	TH-230	1.90	0.64	PCI/G	ALPHASPEC	0.10			
140-3L-213	10/09/95	0.00	0.50	SL	.5054	DRY	REG	TH-232	0.49	0.28	PCI/G	ALPHASPEC	0.09			
140-3L-213	10/09/95	0.00	0.50	SL	1.055	DRY	REG	U-234	2.20	0.81	PCI/G	ALPHASPEC	0.13	J	TCR	
140-3L-213	10/09/95	0.00	0.50	SL	1.055	DRY	REG	U-235	0.10	0.12	PCI/G	ALPHASPEC	0.09	UJ	EGR	
140-3L-213	10/09/95	0.00	0.50	SL	1.055	DRY	REG	U-238	1.60	0.65	PCI/G	ALPHASPEC	0.08	J	TCR	
140-3L-214	10/09/95	0.00	0.50	SL	.5086	DRY	REG	RA-226	4.50	1.50	PCI/G	ALPHASPEC	0.75			
140-3L-214	10/09/95	0.00	0.50	SL	.5115	DRY	REG	TH-228	0.80	0.38	PCI/G	ALPHASPEC	0.27			
140-3L-214	10/09/95	0.00	0.50	SL	.5115	DRY	REG	TH-230	4.00	1.10	PCI/G	ALPHASPEC	0.16			
140-3L-214	10/09/95	0.00	0.50	SL	.5115	DRY	REG	TH-232	0.76	0.36	PCI/G	ALPHASPEC	0.09			
140-3L-214	10/09/95	0.00	0.50	SL	1.093	DRY	REG	U-234	1.20	0.42	PCI/G	ALPHASPEC	0.10			
140-3L-214	10/09/95	0.00	0.50	SL	1.093	DRY	REG	U-235	0.07	0.08	PCI/G	ALPHASPEC	0.06	UJ	EGR	
140-3L-214	10/09/95	0.00	0.50	SL	1.093	DRY	REG	U-238	0.99	0.37	PCI/G	ALPHASPEC	0.09			
140-3L-215	10/09/95	0.00	0.50	SL	1.019	DRY	REG	RA-226	0.81	0.39	PCI/G	ALPHASPEC	0.33			
140-3L-215	10/09/95	0.00	0.50	SL	0.525	DRY	REG	TH-228	0.54	0.28	PCI/G	ALPHASPEC	0.17			
140-3L-215	10/09/95	0.00	0.50	SL	0.525	DRY	REG	TH-230	1.90	0.62	PCI/G	ALPHASPEC	0.15			
140-3L-215	10/09/95	0.00	0.50	SL	0.525	DRY	REG	TH-232	0.51	0.27	PCI/G	ALPHASPEC	0.09			

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-17463	Sampling Event:	HIS_RA95
Work Order Number:	E9510039	DATAFUSR Number:	D-23580
Customer Number:	441	Date Received:	10/10/95
Environmental Category:	RI	Date Analyzed:	10/12/95

Sample ID	Date Collected	Top Depth		Bottom Depth		Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Flag	Qualifier Code
		Top Depth	Bottom Depth	Matrix	F/UF													
140-3L-215	10/09/95	0.00	0.50	SL	1.005	DRY	REG	U-234		1.40	0.49	PCI/G	ALPHASPEC	0.11				
140-3L-215	10/09/95	0.00	0.50	SL	1.005	DRY	REG	U-235		0.13	0.12	PCI/G	ALPHASPEC	0.07				
140-3L-215	10/09/95	0.00	0.50	SL	1.005	DRY	REG	U-238		1.10	0.40	PCI/G	ALPHASPEC	0.06				
140-3L-216	10/09/95	0.00	0.50	SL	1.011	DRY	REG	RA-226		1.00	0.39	PCI/G	ALPHASPEC	0.26				
140-3L-216	10/09/95	0.00	0.50	SL	.5042	DRY	REG	TH-228		0.27	0.21	PCI/G	ALPHASPEC	0.19				
140-3L-216	10/09/95	0.00	0.50	SL	.5042	DRY	REG	TH-230		1.80	0.60	PCI/G	ALPHASPEC	0.16				
140-3L-216	10/09/95	0.00	0.50	SL	.5042	DRY	REG	TH-232		0.56	0.30	PCI/G	ALPHASPEC	0.09				
140-3L-216	10/09/95	0.00	0.50	SL	1.047	DRY	REG	U-234		1.20	0.44	PCI/G	ALPHASPEC	0.12				
140-3L-216	10/09/95	0.00	0.50	SL	1.047	DRY	REG	U-235		0.02	0.05	PCI/G	ALPHASPEC	0.07	UJ		EGR	
140-3L-216	10/09/95	0.00	0.50	SL	1.047	DRY	REG	U-238		1.10	0.40	PCI/G	ALPHASPEC	0.05				

0-23580  
**Thermo NUtech**

601 Scarboro Road  
Oak Ridge, TN 37830  
(423)481-0683 • FAX(423)483-4621

TNU-OR-3754

November 29, 1995

Mr. Jim McCague  
Bechtel National, Inc.  
P.O. Box 350  
Oak Ridge, TN 37831-0350

CASE NARRATIVE  
Work Order #95-10-039-OR  
State of Utah Certificate #E-235

SAMPLE RECEIPT

This work order contains ten soil samples received 10/10/95. These samples were analyzed for Radium-226 and Isotopic Thorium using the C. Sill's technique, and Isotopic Uranium by Alpha Spectroscopy.

<u>CLIENT ID</u>	<u>LAB ID</u>	<u>CLIENT ID</u>	<u>LAB ID</u>
140-3L-194	95-10-039-04	140-3L-199	95-10-039-09
140-3L-195	95-10-039-05	140-3L-213	95-10-039-10
140-3L-196	95-10-039-06	140-3L-214	95-10-039-11
140-3L-197	95-10-039-07	140-3L-215	95-10-039-12
140-3L-198	95-10-039-08	140-3L-216	95-10-039-13

The file name for these samples is 9510039.TXT.

ANALYTICAL METHODS

Radium-226 was analyzed using EPA Method 903.0 modified. Isotopic Thorium was analyzed using Method EML Th-01 modified. Isotopic Uranium was analyzed using Method EML U-02 modified.

PROBLEMS OR UNUSUAL CIRCUMSTANCES

Initial calibrations, self absorption factors, and tracer recoveries, where applicable, are within specified criteria. No problems or unusual circumstances were noted during the analytical process.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package and electronic data deliverable has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

  
M. R. McDougall  
Laboratory Manager

Date: 11/29/95

<b>ThermoNUtech No:</b>	
<b>Work Order Number:</b> 9510039	<b>Date Received:</b> 10/10/95
<b>Customer Number:</b> 441	
<b>Environmental Cat:</b> RI	

Sample ID	Date Collected	Date Analyzed	Top Depth	Bottom Depth	Matrix	F/U/F	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCSPIKE	10/10/95	11/07/95	0.00	0.00	W	1			LCST	RA-226	27.20	1.30	PCI	ALPHASPEC	0.23
QCSPIKE	10/10/95	11/07/95	0.00	0.00	W	1			LCSF	RA-226	29.90	3.20	PCI	ALPHASPEC	0.23
QCSPIKE	10/10/95	10/13/95	0.00	0.00	W	1			LCST	TH-228	5.10	0.18	PCI	ALPHASPEC	0.14
QCSPIKE	10/10/95	10/13/95	0.00	0.00	W	1			LCSF	TH-228	5.70	1.37	PCI	ALPHASPEC	0.14
QCSPIKE	10/10/95	10/13/95	0.00	0.00	W	1			LCST	TH-230	5.60	0.12	PCI	ALPHASPEC	0.10
QCSPIKE	10/10/95	10/13/95	0.00	0.00	W	1			LCSF	TH-230	6.14	1.46	PCI	ALPHASPEC	0.10
QCSPIKE	10/10/95	10/13/95	0.00	0.00	W	1			LCST	TH-232	5.10	0.18	PCI	ALPHASPEC	0.11
QCSPIKE	10/10/95	10/13/95	0.00	0.00	W	1			LCSF	TH-232	5.62	1.35	PCI	ALPHASPEC	0.11
QCSPIKE	10/10/95	10/12/95	0.00	0.00	W	1			LCST	U-234	8.60	0.33	PCI	ALPHASPEC	0.11
QCSPIKE	10/10/95	10/12/95	0.00	0.00	W	1			LCSF	U-234	9.30	2.50	PCI	ALPHASPEC	0.11
QCSPIKE	10/10/95	10/12/95	0.00	0.00	W	1			LCST	U-235	0.39	0.01	PCI	ALPHASPEC	0.15
QCSPIKE	10/10/95	10/12/95	0.00	0.00	W	1			LCSF	U-235	0.36	0.22	PCI	ALPHASPEC	0.15
QCSPIKE	10/10/95	10/12/95	0.00	0.00	W	1			LCST	U-238	8.40	0.32	PCI	ALPHASPEC	0.12
QCSPIKE	10/10/95	10/12/95	0.00	0.00	W	1			LCSF	U-238	9.20	2.50	PCI	ALPHASPEC	0.12
QCBLANK	10/10/95	11/07/95	0.00	0.00	W	1			PB	RA-226	0.04	0.08	PCI	ALPHASPEC	0.31
QCBLANK	10/10/95	10/13/95	0.00	0.00	W	1			PB	TH-228	-0.02	0.02	PCI	ALPHASPEC	0.16
QCBLANK	10/10/95	10/13/95	0.00	0.00	W	1			PB	TH-230	0.11	0.11	PCI	ALPHASPEC	0.11
QCBLANK	10/10/95	10/13/95	0.00	0.00	W	1			PB	TH-232	-0.02	0.02	PCI	ALPHASPEC	0.15
QCBLANK	10/10/95	10/12/95	0.00	0.00	W	1			PB	U-234	0.12	0.11	PCI	ALPHASPEC	0.11
QCBLANK	10/10/95	10/12/95	0.00	0.00	W	1			PB	U-235	-0.01	0.01	PCI	ALPHASPEC	0.14
QCBLANK	10/10/95	10/12/95	0.00	0.00	W	1			PB	U-238	0.10	0.10	PCI	ALPHASPEC	0.09
140-3L-194	10/06/95	11/07/95	0.00	0.50	SL	1.012	DRY	REPL	RA-226		1.20	0.40	PCI/G	ALPHASPEC	0.20
140-3L-194	10/06/95	10/13/95	0.00	0.50	SL	.5034	DRY	REPL	TH-228		0.66	0.32	PCI/G	ALPHASPEC	0.09
140-3L-194	10/06/95	10/13/95	0.00	0.50	SL	.5034	DRY	REPL	TH-230		3.80	1.00	PCI/G	ALPHASPEC	0.09
140-3L-194	10/06/95	10/13/95	0.00	0.50	SL	.5034	DRY	REPL	TH-232		0.78	0.36	PCI/G	ALPHASPEC	0.09
140-3L-194	10/06/95	10/12/95	0.00	0.50	SL	1.024	DRY	REPL	U-234		1.30	0.47	PCI/G	ALPHASPEC	0.06
140-3L-194	10/06/95	10/12/95	0.00	0.50	SL	1.024	DRY	REPL	U-235		0.06	0.08	PCI/G	ALPHASPEC	0.07
140-3L-194	10/06/95	10/12/95	0.00	0.50	SL	1.024	DRY	REPL	U-238		1.30	0.49	PCI/G	ALPHASPEC	0.06
140-3L-194	10/06/95	11/07/95	0.00	0.50	SL	1.003	DRY	REG	RA-226		1.70	0.51	PCI/G	ALPHASPEC	0.17
140-3L-194	10/06/95	10/13/95	0.00	0.50	SL	.5055	DRY	REG	TH-228		0.83	0.38	PCI/G	ALPHASPEC	0.16
140-3L-194	10/06/95	10/13/95	0.00	0.50	SL	.5055	DRY	REG	TH-230		3.90	1.10	PCI/G	ALPHASPEC	0.19
140-3L-194	10/06/95	10/13/95	0.00	0.50	SL	.5055	DRY	REG	TH-232		0.53	0.30	PCI/G	ALPHASPEC	0.21
140-3L-194	10/06/95	10/12/95	0.00	0.50	SL	1.009	DRY	REG	U-234		1.60	0.57	PCI/G	ALPHASPEC	0.15
140-3L-194	10/06/95	10/12/95	0.00	0.50	SL	1.009	DRY	REG	U-235		0.03	0.06	PCI/G	ALPHASPEC	0.08
140-3L-194	10/06/95	10/12/95	0.00	0.50	SL	1.009	DRY	REG	U-238		1.40	0.52	PCI/G	ALPHASPEC	0.13
140-3L-195	10/06/95	11/07/95	0.00	0.50	SL	1.004	DRY	REG	RA-226		1.30	0.41	PCI/G	ALPHASPEC	0.08
140-3L-195	10/06/95	10/13/95	0.00	0.50	SL	.5181	DRY	REG	TH-228		1.10	0.47	PCI/G	ALPHASPEC	0.18

Approved by:

Date: 11/29/95

Thermo NUtech

SUBSIDIARY OF THERMO REMEDIATION, A THERMO ELECTRON COMPANY

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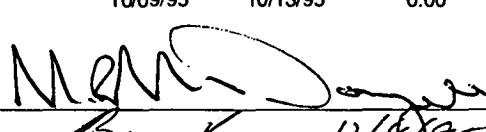
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FUSRAP Radiological Reports  
Printed: 11/29/95  
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ThermoNUtech No:	
Work Order Number:	9510039
Customer Number:	441
Environmental Cat:	RI

Sample ID	Date Collected	Date Analyzed	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Sample Type	Analyts	Result	Error	Units	Analytical Method	MDA
140-3L-195	10/06/95	10/13/95	0.00	0.50	SL	.5181	DRY	REG	TH-230		3.60	1.10	PCI/G	ALPHASPEC	0.23
140-3L-195	10/06/95	10/13/95	0.00	0.50	SL	.5181	DRY	REG	TH-232		0.91	0.42	PCI/G	ALPHASPEC	0.18
140-3L-195	10/06/95	10/12/95	0.00	0.50	SL	1.006	DRY	REG	U-234		1.20	0.46	PCI/G	ALPHASPEC	0.12
140-3L-195	10/06/95	10/12/95	0.00	0.50	SL	1.006	DRY	REG	U-235		0.07	0.00	PCI/G	ALPHASPEC	0.07
140-3L-195	10/06/95	10/12/95	0.00	0.50	SL	1.006	DRY	REG	U-238		1.30	0.48	PCI/G	ALPHASPEC	0.06
140-3L-196	10/06/95	11/07/95	0.00	0.50	SL	1.015	DRY	REG	RA-226		2.20	0.62	PCI/G	ALPHASPEC	0.21
140-3L-196	10/06/95	10/13/95	0.00	0.50	SL	.5044	DRY	REG	TH-228		0.84	0.37	PCI/G	ALPHASPEC	0.19
140-3L-196	10/06/95	10/13/95	0.00	0.50	SL	.5044	DRY	REG	TH-230		3.40	0.93	PCI/G	ALPHASPEC	0.15
140-3L-196	10/06/95	10/13/95	0.00	0.50	SL	.5044	DRY	REG	TH-232		1.00	0.40	PCI/G	ALPHASPEC	0.15
140-3L-196	10/06/95	10/12/95	0.00	0.50	SL	1.013	DRY	REG	U-234		1.40	0.48	PCI/G	ALPHASPEC	0.09
140-3L-196	10/06/95	10/12/95	0.00	0.50	SL	1.013	DRY	REG	U-235		0.10	0.10	PCI/G	ALPHASPEC	0.07
140-3L-196	10/06/95	10/12/95	0.00	0.50	SL	1.013	DRY	REG	U-238		1.20	0.42	PCI/G	ALPHASPEC	0.09
140-3L-197	10/06/95	11/07/95	0.00	0.50	SL	1.008	DRY	REG	RA-226		1.10	0.32	PCI/G	ALPHASPEC	0.16
140-3L-197	10/06/95	10/13/95	0.00	0.50	SL	.5037	DRY	REG	TH-228		0.95	0.45	PCI/G	ALPHASPEC	0.29
140-3L-197	10/06/95	10/13/95	0.00	0.50	SL	.5037	DRY	REG	TH-230		6.50	1.70	PCI/G	ALPHASPEC	0.11
140-3L-197	10/06/95	10/13/95	0.00	0.50	SL	.5037	DRY	REG	TH-232		1.30	0.52	PCI/G	ALPHASPEC	0.11
140-3L-197	10/06/95	10/12/95	0.00	0.50	SL	1.005	DRY	REG	U-234		1.40	0.51	PCI/G	ALPHASPEC	0.10
140-3L-197	10/06/95	10/12/95	0.00	0.50	SL	1.005	DRY	REG	U-235		0.16	0.14	PCI/G	ALPHASPEC	0.13
140-3L-197	10/06/95	10/12/95	0.00	0.50	SL	1.005	DRY	REG	U-238		1.70	0.59	PCI/G	ALPHASPEC	0.06
140-3L-198	10/06/95	11/07/95	0.00	0.50	SL	1.051	DRY	REG	RA-226		1.70	0.57	PCI/G	ALPHASPEC	0.27
140-3L-198	10/06/95	10/13/95	0.00	0.50	SL	.5112	DRY	REG	TH-228		0.51	0.30	PCI/G	ALPHASPEC	0.18
140-3L-198	10/06/95	10/13/95	0.00	0.50	SL	.5112	DRY	REG	TH-230		6.60	1.70	PCI/G	ALPHASPEC	0.11
140-3L-198	10/06/95	10/13/95	0.00	0.50	SL	.5112	DRY	REG	TH-232		0.70	0.36	PCI/G	ALPHASPEC	0.18
140-3L-198	10/06/95	10/12/95	0.00	0.50	SL	1.001	DRY	REG	U-234		0.99	0.37	PCI/G	ALPHASPEC	0.09
140-3L-198	10/06/95	10/12/95	0.00	0.50	SL	1.001	DRY	REG	U-235		0.07	0.09	PCI/G	ALPHASPEC	0.11
140-3L-198	10/06/95	10/12/95	0.00	0.50	SL	1.001	DRY	REG	U-238		1.10	0.41	PCI/G	ALPHASPEC	0.09
140-3L-199	10/06/95	11/07/95	0.00	0.50	SL	1.086	DRY	REG	RA-226		0.82	0.25	PCI/G	ALPHASPEC	0.13
140-3L-199	10/06/95	10/13/95	0.00	0.50	SL	.5062	DRY	REG	TH-228		1.10	0.48	PCI/G	ALPHASPEC	0.21
140-3L-199	10/06/95	10/13/95	0.00	0.50	SL	.5062	DRY	REG	TH-230		3.60	1.00	PCI/G	ALPHASPEC	0.18
140-3L-199	10/06/95	10/13/95	0.00	0.50	SL	.5062	DRY	REG	TH-232		0.40	0.27	PCI/G	ALPHASPEC	0.23
140-3L-199	10/06/95	10/12/95	0.00	0.50	SL	1.023	DRY	REG	U-234		1.50	0.55	PCI/G	ALPHASPEC	0.15
140-3L-199	10/06/95	10/12/95	0.00	0.50	SL	1.023	DRY	REG	U-235		0.21	0.17	PCI/G	ALPHASPEC	0.08
140-3L-199	10/06/95	10/12/95	0.00	0.50	SL	1.023	DRY	REG	U-238		1.80	0.64	PCI/G	ALPHASPEC	0.11
140-3L-213	10/09/95	11/07/95	0.00	0.50	SL	1.009	DRY	REG	RA-226		0.65	0.21	PCI/G	ALPHASPEC	0.08
140-3L-213	10/09/95	10/13/95	0.00	0.50	SL	.5054	DRY	REG	TH-228		0.59	0.32	PCI/G	ALPHASPEC	0.19
140-3L-213	10/09/95	10/13/95	0.00	0.50	SL	.5054	DRY	REG	TH-230		1.90	0.64	PCI/G	ALPHASPEC	0.10
140-3L-213	10/09/95	10/13/95	0.00	0.50	SL	.5054	DRY	REG	TH-232		0.49	0.28	PCI/G	ALPHASPEC	0.09

Approved by:



Date: 11/29/95

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Oak Ridge, TN 37830  
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FUSRAP Radiological Reports  
Printed: 11/29/95  
Page 3 of 3

ThermoNUtech No:	
Work Order Number:	9510039
Customer Number:	441
Environmental Cat:	RI

Sample ID	Date Collected	Date Analyzed	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
140-3L-213	10/09/95	10/12/95	0.00	0.50	SL		1.055	DRY	REG	U-234	2.20	0.81	PCI/G	ALPHASPEC	0.13
140-3L-213	10/09/95	10/12/95	0.00	0.50	SL		1.055	DRY	REG	U-235	0.10	0.12	PCI/G	ALPHASPEC	0.09
140-3L-213	10/09/95	10/12/95	0.00	0.50	SL		1.055	DRY	REG	U-238	1.60	0.65	PCI/G	ALPHASPEC	0.08
140-3L-214	10/09/95	11/07/95	0.00	0.50	SL		.5086	DRY	REG	RA-226	4.50	1.50	PCI/G	ALPHASPEC	0.75
140-3L-214	10/09/95	10/13/95	0.00	0.50	SL		.5115	DRY	REG	TH-228	0.80	0.38	PCI/G	ALPHASPEC	0.27
140-3L-214	10/09/95	10/13/95	0.00	0.50	SL		.5115	DRY	REG	TH-230	4.00	1.10	PCI/G	ALPHASPEC	0.16
140-3L-214	10/09/95	10/13/95	0.00	0.50	SL		.5115	DRY	REG	TH-232	0.76	0.36	PCI/G	ALPHASPEC	0.09
140-3L-214	10/09/95	10/12/95	0.00	0.50	SL		1.093	DRY	REG	U-234	1.20	0.42	PCI/G	ALPHASPEC	0.10
140-3L-214	10/09/95	10/12/95	0.00	0.50	SL		1.093	DRY	REG	U-235	0.07	0.08	PCI/G	ALPHASPEC	0.06
140-3L-214	10/09/95	10/12/95	0.00	0.50	SL		1.093	DRY	REG	U-238	0.99	0.37	PCI/G	ALPHASPEC	0.09
140-3L-215	10/09/95	11/07/95	0.00	0.50	SL		1.019	DRY	REG	RA-226	0.81	0.39	PCI/G	ALPHASPEC	0.33
140-3L-215	10/09/95	10/13/95	0.00	0.50	SL		0.525	DRY	REG	TH-228	0.54	0.28	PCI/G	ALPHASPEC	0.17
140-3L-215	10/09/95	10/13/95	0.00	0.50	SL		0.525	DRY	REG	TH-230	1.90	0.62	PCI/G	ALPHASPEC	0.15
140-3L-215	10/09/95	10/13/95	0.00	0.50	SL		0.525	DRY	REG	TH-232	0.51	0.27	PCI/G	ALPHASPEC	0.09
140-3L-215	10/09/95	10/12/95	0.00	0.50	SL		1.005	DRY	REG	U-234	1.40	0.49	PCI/G	ALPHASPEC	0.11
140-3L-215	10/09/95	10/12/95	0.00	0.50	SL		1.005	DRY	REG	U-235	0.13	0.12	PCI/G	ALPHASPEC	0.07
140-3L-215	10/09/95	10/12/95	0.00	0.50	SL		1.005	DRY	REG	U-238	1.10	0.40	PCI/G	ALPHASPEC	0.06
140-3L-216	10/09/95	11/07/95	0.00	0.50	SL		1.011	DRY	REG	RA-226	1.00	0.39	PCI/G	ALPHASPEC	0.26
140-3L-216	10/09/95	10/13/95	0.00	0.50	SL		.5042	DRY	REG	TH-228	0.27	0.21	PCI/G	ALPHASPEC	0.19
140-3L-216	10/09/95	10/13/95	0.00	0.50	SL		.5042	DRY	REG	TH-230	1.80	0.60	PCI/G	ALPHASPEC	0.16
140-3L-216	10/09/95	10/13/95	0.00	0.50	SL		.5042	DRY	REG	TH-232	0.56	0.30	PCI/G	ALPHASPEC	0.09
140-3L-216	10/09/95	10/12/95	0.00	0.50	SL		1.047	DRY	REG	U-234	1.20	0.44	PCI/G	ALPHASPEC	0.12
140-3L-216	10/09/95	10/12/95	0.00	0.50	SL		1.047	DRY	REG	U-235	0.02	0.05	PCI/G	ALPHASPEC	0.07
140-3L-216	10/09/95	10/12/95	0.00	0.50	SL		1.047	DRY	REG	U-238	1.10	0.40	PCI/G	ALPHASPEC	0.05

Approved by:

M. R. M. - gde  
Bona 12/4/95

Date: 11-29-95

Thermo NUtech

SUBSIDIARY OF THERMO REMEDIATION, A THERMO ELECTRON COMPANY

601 Scarboro Road, Oak Ridge, TN 37830      423/481-0683, FAX 423/483-4621

95-10-039

AIRBILL NO.

9054841165

Samplers (print name then sign)

M. PHILLIPS

M. Phillips

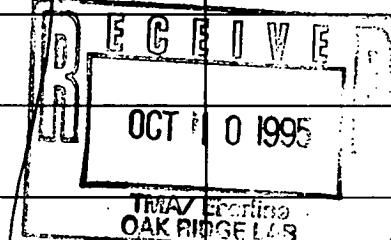
## FIELD SAMPLE COLLECTION FORM

Site Name: HISS NORPAS #661

WBS No.: 140

Activity Support (Job) No.: 44

Sample ID Sample Grid Point	Sample Type (1)	Sample Time	Date of Sample	Preserved with	Purpose (2)	Depth cm ft	Priority (Days)	Analysis Required	Remarks
140-3L-194 N5 E45	PS	0730	10-6-95	NA	VR	0- 0.5	2	ISO-TH & RA-226 b7 C. SILVS ISO-U b7 or spec	STOCK PILOT AREA @ 3L (QUAKER STATE)
140-3L-195 N15 E45		0810							
140-3L-196 N25 E45		0850							
140-3L-197 N40 E50		0935							
140-3L-198 N5 E55		1015							
140-3L-199 N15 E55		1110							
140-3L-213 N25 E55		1025	10-9-95						



## SAMPLE TYPE (1)

Surface Soil

SS

## PURPOSE (2)

Rad Character

RC

Bias Soil

BS

Verification

VR

Profile Soil

PS

Quality Control

QC

Sediment Silt

SD

Hot Spot

HS

Other

OR

Resample

RS

Vegetation

VE

Background

BG

Ground Water

GW

Routine

RT

Surface Water

SW

Special

SP

This package conforms to the conditions and limitations specified  
in 49CFR173.421 for excepted radioactive material, limited quantity,  
and UN2910.

Shipper: TNS/HISS  
9170 LNTTY AVE  
BERKELEY, MO 63134

## CHAIN OF CUSTODY RECORD

REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME
ANALYSIS	M. Phillips	AIRBORNE EXPRESS	10-9-95	1800
ANALYSIS	Airborne	J.L. Tawagana	10-10-95	0945

Recorded by: M. Phillips

Date: 10-9-95 Time: 1400

Total number of samples  
in this box

7

Total number of samples  
in this shipment

10

Total number of boxes  
in this shipment

1

Ship to: TNS/O.R.  
601 SCARBORO ROAD  
OAK RIDGE, TN 37830  
A77N. SAMPLE LOG-IN

Page 1 of 2

Shipping Container meets DOT Transferable Criteria ✓

Shipping container dose rate 20.5 mrem/hr.

Original

95-10-039

AIRBILL NO.

905484 1165

Samplers (print name then sign)

M. PHILLIPS

M. Phillips

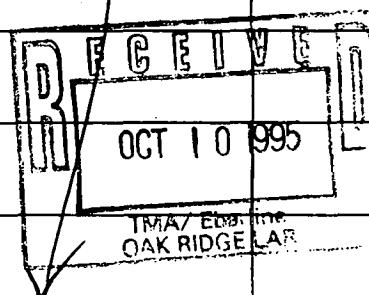
## FIELD SAMPLE COLLECTION FORM

Site Name: HISS NORPAS FF 6661

WBS No.: 140

Activity Support (Job) No.: 441

Sample ID Sample Grid Point	Sample Type (1)	Sample Time	Date of Sample	Preserved with	Purpose (2)	Depth cm <input type="checkbox"/> ft <input checked="" type="checkbox"/>	Priority (Days)	Analysis Required	Remarks
140-3L-214 N5 E65	PS	1140	10-9-95	NA	VR	0- 0.5	2	T50-TH & RT-226 57 C. SILLS T50-U by a spec	STOCKPILE AREA @ 3L (COUNTER STATION)
140-3L-215 N15 E65		1350							
140-3L-216 N25 E65		1430							



SAMPLE TYPE (1)	PURPOSE (2)	CHAIN OF CUSTODY RECORD					Recorded by: M. Phillips		
Surface Soil SS	Rad Character RC	REASON ANALYSIS	RELINQUISHED BY M. Phillips	RECEIVED BY AIRBORNE EXPOS	DATE 10-9-95	TIME 1800	Date: 10-9-95 Time: 1440		
Blas Soil BS	Verification VR	ANALYSIS	Airborne / D. T. Tammie		10-10	945	Total number of samples in this box: 3		
Profile Soil PS	Quality Control QC						Total number of samples in this shipment: 10		
Sediment Silt SD	Hot Spot HS						Total number of boxes in this shipment: 1		
Other OR	Resample RS								
Vegitation VE	Background BG								
Ground Water GW	Routine RT								
Surface Water SW	Special SP								
This package conforms to the conditions and limitations specified in 49CFR173.421 for excepted radioactive material, limited quantity, n.o.s., UN 2910."									
Shipper: TNS/HISS 9170 LATTEY AVE BERKELEY, MO 67134				Ship to: TNS/O.R. 601 SCARROU ROAD OAK RIDGE, TN 37830 ATTN: SAMPLE LOG IN				Page 2 of 2	

410900821

Shipping Container meets DOT Transferable Criteria 

Shipping container dose rate 20.5 mrem/hr.

Original

**THERMO NUtech/OAK RIDGE LABORATORY  
TRACER REPORT**

11/27/95  
Work Order # 95-10-039-OR

BECHTEL SAMPLE ID	ANALYTE	TRACER	RECOVERY
140-3L-194	RA-226	BA-133	23%
140-3L-194	TH-228	TH-229	66%
140-3L-194	TH-230	TH-229	66%
140-3L-194	TH-232	TH-229	66%
140-3L-194	U-234	U-232	47%
140-3L-194	U-235	U-232	47%
140-3L-194	U-238	U-232	47%
140-3L-195	RA-226	BA-133	100%
140-3L-195	TH-228	TH-229	58%
140-3L-195	TH-230	TH-229	58%
140-3L-195	TH-232	TH-229	58%
140-3L-195	U-234	U-232	52%
140-3L-195	U-235	U-232	52%
140-3L-195	U-238	U-232	52%
140-3L-196	RA-226	BA-133	93%
140-3L-196	TH-228	TH-229	74%
140-3L-196	TH-230	TH-229	74%
140-3L-196	TH-232	TH-229	74%
140-3L-196	U-234	U-232	56%
140-3L-196	U-235	U-232	56%
140-3L-196	U-238	U-232	56%
140-3L-197	RA-226	BA-133	99%
140-3L-197	TH-228	TH-229	61%
140-3L-197	TH-230	TH-229	61%
140-3L-197	TH-232	TH-229	61%
140-3L-197	U-234	U-232	55%
140-3L-197	U-235	U-232	55%
140-3L-197	U-238	U-232	55%

**THERMO NUTECH/OAK RIDGE LABORATORY**  
**TRACER REPORT**

0-23580

11/27/95  
 Work Order # 95-10-039-OR

BECHTEL SAMPLE ID	ANALYTE	TRACER	RECOVERY
140-3L-198	RA-226	BA-133	92%
140-3L-198	TH-228	TH-229	64%
140-3L-198	TH-230	TH-229	64%
140-3L-198	TH-232	TH-229	64%
140-3L-198	U-234	U-232	65%
140-3L-198	U-235	U-232	65%
140-3L-198	U-238	U-232	65%
140-3L-199	RA-226	BA-133	65%
140-3L-199	TH-228	TH-229	66%
140-3L-199	TH-230	TH-229	66%
140-3L-199	TH-232	TH-229	66%
140-3L-199	U-234	U-232	52%
140-3L-199	U-235	U-232	52%
140-3L-199	U-238	U-232	52%
140-3L-213	RA-226	BA-133	81%
140-3L-213	TH-228	TH-229	74%
140-3L-213	TH-230	TH-229	74%
140-3L-213	TH-232	TH-229	74%
140-3L-213	U-234	U-232	44%
140-3L-213	U-235	U-232	44%
140-3L-213	U-238	U-232	44%
140-3L-214	RA-226	BA-133	72%
140-3L-214	TH-228	TH-229	69%
140-3L-214	TH-230	TH-229	69%
140-3L-214	TH-232	TH-229	69%
140-3L-214	U-234	U-232	58%
140-3L-214	U-235	U-232	58%
140-3L-214	U-238	U-232	58%

**THERMO NUTECH/OAK RIDGE LABORATORY  
TRACER REPORT**

0-23580

11/27/95  
Work Order # 95-10-039-OR

BECHTEL SAMPLE ID	ANALYTE	TRACER	RECOVERY
140-3L-215	RA-226	BA-133	94%
140-3L-215	TH-228	TH-229	76%
140-3L-215	TH-230	TH-229	76%
140-3L-215	TH-232	TH-229	76%
140-3L-215	U-234	U-232	61%
140-3L-215	U-235	U-232	61%
140-3L-215	U-238	U-232	61%
140-3L-216	RA-226	BA-133	93%
140-3L-216	TH-228	TH-229	73%
140-3L-216	TH-230	TH-229	73%
140-3L-216	TH-232	TH-229	73%
140-3L-216	U-234	U-232	61%
140-3L-216	U-235	U-232	61%
140-3L-216	U-238	U-232	61%

**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Post-Remedial Action Soil Sample Results (Data)**

**SAMPLES:**

**140-3L-217**

**140-3L-218**

**140-3L-219**

## FLAGGED SAMPLE RESULTS REPORT

TMA/Eberline Number:	E-17163	Sampling Event:	HIS_RA95
Work Order Number:	E9510046	DATAFUSR Number:	D-23244
Customer Number:	441	Date Received:	10/11/95
Environmental Category:	RI	Date Analyzed:	10/16/95

Sample ID	Date Collected	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Smp_type	Analyte	Result	Error	Units	Analytical Method	BNI MDA	Qualifier Flag	Code
140-3L-217	10/10/95	0.00	0.50	SL	.9957	DRY	REG	RA-226	0.90	0.26	PCI/G	ALPHASPEC	0.12			
140-3L-217	10/10/95	0.00	0.50	SL	.5043	DRY	REG	TH-228	0.77	0.35	PCI/G	ALPHASPEC	0.18			
140-3L-217	10/10/95	0.00	0.50	SL	.5043	DRY	REG	TH-230	1.80	0.61	PCI/G	ALPHASPEC	0.09			
140-3L-217	10/10/95	0.00	0.50	SL	.5043	DRY	REG	TH-232	0.52	0.28	PCI/G	ALPHASPEC	0.09			
140-3L-217	10/10/95	0.00	0.50	SL	1.026	DRY	REG	U-234	1.30	0.49	PCI/G	ALPHASPEC	0.14	J	TCR	
140-3L-217	10/10/95	0.00	0.50	SL	1.026	DRY	REG	U-235	0.12	0.12	PCI/G	ALPHASPEC	0.08	J	LCS	
140-3L-217	10/10/95	0.00	0.50	SL	1.026	DRY	REG	U-238	1.40	0.52	PCI/G	ALPHASPEC	0.13	J	TCR	
140-3L-218	10/10/95	0.00	0.50	SL	1.028	DRY	REG	RA-226	1.30	0.46	PCI/G	ALPHASPEC	0.22			
140-3L-218	10/10/95	0.00	0.50	SL	.4996	DRY	REG	TH-228	0.49	0.28	PCI/G	ALPHASPEC	0.26			
140-3L-218	10/10/95	0.00	0.50	SL	.4996	DRY	REG	TH-230	2.10	0.67	PCI/G	ALPHASPEC	0.15			
140-3L-218	10/10/95	0.00	0.50	SL	.4996	DRY	REG	TH-232	0.83	0.37	PCI/G	ALPHASPEC	0.09			
140-3L-218	10/10/95	0.00	0.50	SL	1.030	DRY	REG	U-234	0.69	0.29	PCI/G	ALPHASPEC	0.10	U	BLK	
140-3L-218	10/10/95	0.00	0.50	SL	1.030	DRY	REG	U-235	0.09	0.10	PCI/G	ALPHASPEC	0.06	J	LCS	
140-3L-218	10/10/95	0.00	0.50	SL	1.030	DRY	REG	U-238	1.10	0.39	PCI/G	ALPHASPEC	0.05	U	BLK	
140-3L-219	10/10/95	0.00	0.50	SL	.9566	DRY	REG	RA-226	1.00	0.30	PCI/G	ALPHASPEC	0.09			
140-3L-219	10/10/95	0.00	0.50	SL	.4994	DRY	REG	TH-228	0.68	0.33	PCI/G	ALPHASPEC	0.19			
140-3L-219	10/10/95	0.00	0.50	SL	.4994	DRY	REG	TH-230	1.70	0.59	PCI/G	ALPHASPEC	0.16			
140-3L-219	10/10/95	0.00	0.50	SL	.4994	DRY	REG	TH-232	0.45	0.26	PCI/G	ALPHASPEC	0.09			
140-3L-219	10/10/95	0.00	0.50	SL	1.010	DRY	REG	U-234	1.70	0.62	PCI/G	ALPHASPEC	0.12	J	TCR	
140-3L-219	10/10/95	0.00	0.50	SL	1.010	DRY	REG	U-235	0.19	0.16	PCI/G	ALPHASPEC	0.08	J	LCS	
140-3L-219	10/10/95	0.00	0.50	SL	1.010	DRY	REG	U-238	1.20	0.48	PCI/G	ALPHASPEC	0.12	J	TCR	

**TMA/Eberline**

601 Scarboro Rd.  
Oak Ridge, TN 37830  
(615) 481-0683 Fax (615) 483-4621

TMA-OR-3640

October 27, 1995

Mr. Jim McCague  
Bechtel National, Inc.  
P.O. Box 350  
Oak Ridge, TN 37831-0350

**CASE NARRATIVE**  
Work Order #95-10-046-OR  
State of Utah Certificate #E-235

**SAMPLE RECEIPT**

This work order contains three soil samples received 10/11/95. These samples were analyzed for Radium-226 and Isotopic Thorium using the C. Sill technique and Isotopic Uranium by Alpha Spectroscopy.

<u>CLIENT ID</u>	<u>LAB ID</u>
140-3L-217	95-10-046-04
140-3L-218	95-10-046-05
140-3L-219	95-10-046-06

The file name for these samples is 9510046.TXT.

**ANALYTICAL METHODS**

Radium-226 was analyzed using EPA Method 903.0 modified. Isotopic Thorium was analyzed using Method EML Th-01 modified. Isotopic Uranium was analyzed using Method EML U-02 modified.

**PROBLEMS OR UNUSUAL CIRCUMSTANCES**

Initial calibrations, self absorption factors, and tracer recoveries, where applicable, are within specified criteria. No problems or unusual circumstances were noted during the analytical process.

**CERTIFICATION OF ACCURACY**

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package and electronic data deliverable has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

  
M. R. McDougall  
Laboratory Manager

Date: 10/27/95

TMA/Eberline Number:	
Work Order Number:	9510046
Customer Number:	441
Environmental Cat:	RI

Sample ID	Date Collected	Date Analyzed	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCSPIKE	10/11/95	10/16/95	0.00	0.00	W	1			LCST	RA-226	31.30	1.40	PCI	ALPHASPEC	0.15
QCSPIKE	10/11/95	10/16/95	0.00	0.00	W	1			LCSF	RA-226	27.10	2.70	PCI	ALPHASPEC	0.15
QCSPIKE	10/11/95	10/13/95	0.00	0.00	W	1			LCST	TH-228	5.20	0.19	PCI	ALPHASPEC	0.13
QCSPIKE	10/11/95	10/13/95	0.00	0.00	W	1			LCSF	TH-228	5.50	1.30	PCI	ALPHASPEC	0.13
QCSPIKE	10/11/95	10/13/95	0.00	0.00	W	1			LCST	TH-230	5.60	0.12	PCI	ALPHASPEC	0.05
QCSPIKE	10/11/95	10/13/95	0.00	0.00	W	1			LCSF	TH-230	6.20	1.50	PCI	ALPHASPEC	0.05
QCSPIKE	10/11/95	10/13/95	0.00	0.00	W	1			LCST	TH-232	5.20	0.19	PCI	ALPHASPEC	0.05
QCSPIKE	10/11/95	10/13/95	0.00	0.00	W	1			LCSF	TH-232	5.70	1.40	PCI	ALPHASPEC	0.05
QCSPIKE	10/11/95	10/13/95	0.00	0.00	W	1			LCST	U-234	8.60	0.33	PCI	ALPHASPEC	0.14
QCSPIKE	10/11/95	10/13/95	0.00	0.00	W	1			LCSF	U-234	9.80	2.90	PCI	ALPHASPEC	0.14
QCSPIKE	10/11/95	10/13/95	0.00	0.00	W	1			LCST	U-235	0.39	0.01	PCI	ALPHASPEC	0.19
QCSPIKE	10/11/95	10/13/95	0.00	0.00	W	1			LCSF	U-235	0.61	0.33	PCI	ALPHASPEC	0.19
QCSPIKE	10/11/95	10/13/95	0.00	0.00	W	1			LCST	U-238	8.40	0.32	PCI	ALPHASPEC	0.12
QCSPIKE	10/11/95	10/13/95	0.00	0.00	W	1			LCSF	U-238	9.80	2.90	PCI	ALPHASPEC	0.12
QCBLANK	10/11/95	10/16/95	0.00	0.00	W	1			PB	RA-226	0.11	0.09	PCI	ALPHASPEC	0.12
QCBLANK	10/11/95	10/13/95	0.00	0.00	W	1			PB	TH-228	0.01	0.03	PCI	ALPHASPEC	0.07
QCBLANK	10/11/95	10/13/95	0.00	0.00	W	1			PB	TH-230	0.08	0.07	PCI	ALPHASPEC	0.04
QCBLANK	10/11/95	10/13/95	0.00	0.00	W	1			PB	TH-232	-0.01	0.01	PCI	ALPHASPEC	0.07
QCBLANK	10/11/95	10/13/95	0.00	0.00	W	1			PB	U-234	0.20	0.14	PCI	ALPHASPEC	0.11
QCBLANK	10/11/95	10/13/95	0.00	0.00	W	1			PB	U-235	0.04	0.07	PCI	ALPHASPEC	0.14
QCBLANK	10/11/95	10/13/95	0.00	0.00	W	1			PB	U-238	0.33	0.18	PCI	ALPHASPEC	0.10
140-3L-217	10/10/95	10/16/95	0.00	0.50	SL	.9321		DRY	REPL	RA-226	0.91	0.28	PCI/G	ALPHASPEC	0.11
140-3L-217	10/10/95	10/13/95	0.00	0.50	SL	.5015		DRY	REPL	TH-228	0.61	0.33	PCI/G	ALPHASPEC	0.20
140-3L-217	10/10/95	10/13/95	0.00	0.50	SL	.5015		DRY	REPL	TH-230	2.20	0.72	PCI/G	ALPHASPEC	0.17
140-3L-217	10/10/95	10/13/95	0.00	0.50	SL	.5015		DRY	REPL	TH-232	0.57	0.32	PCI/G	ALPHASPEC	0.22
140-3L-217	10/10/95	10/13/95	0.00	0.50	SL	1.012		DRY	REPL	U-234	1.60	0.57	PCI/G	ALPHASPEC	0.07
140-3L-217	10/10/95	10/13/95	0.00	0.50	SL	1.012		DRY	REPL	U-235	0.15	0.14	PCI/G	ALPHASPEC	0.08
140-3L-217	10/10/95	10/13/95	0.00	0.50	SL	1.012		DRY	REPL	U-238	1.40	0.52	PCI/G	ALPHASPEC	0.07
140-3L-217	10/10/95	10/16/95	0.00	0.50	SL	.9957		DRY	REG	RA-226	0.90	0.26	PCI/G	ALPHASPEC	0.12
140-3L-217	10/10/95	10/13/95	0.00	0.50	SL	.5043		DRY	REG	TH-228	0.77	0.35	PCI/G	ALPHASPEC	0.18
140-3L-217	10/10/95	10/13/95	0.00	0.50	SL	.5043		DRY	REG	TH-230	1.80	0.61	PCI/G	ALPHASPEC	0.09
140-3L-217	10/10/95	10/13/95	0.00	0.50	SL	.5043		DRY	REG	TH-232	0.52	0.28	PCI/G	ALPHASPEC	0.09
140-3L-217	10/10/95	10/13/95	0.00	0.50	SL	1.026		DRY	REG	U-234	1.30	0.49	PCI/G	ALPHASPEC	0.14
140-3L-217	10/10/95	10/13/95	0.00	0.50	SL	1.026		DRY	REG	U-235	0.12	0.12	PCI/G	ALPHASPEC	0.08
140-3L-217	10/10/95	10/13/95	0.00	0.50	SL	1.026		DRY	REG	U-238	1.40	0.52	PCI/G	ALPHASPEC	0.13
140-3L-218	10/10/95	10/16/95	0.00	0.50	SL	1.028		DRY	REG	RA-226	1.30	0.46	PCI/G	ALPHASPEC	0.22
140-3L-218	10/10/95	10/13/95	0.00	0.50	SL	.4996		DRY	REG	TH-228	0.49	0.28	PCI/G	ALPHASPEC	0.26

Approved by:

10/31/95

Date: 10/27/95

023211

Thermo Nuclear Services  
Oak Ridge, TN 37830  
(615) 481-0683

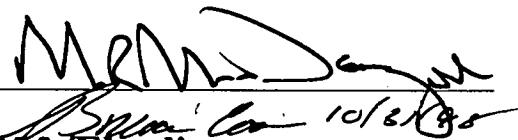
FUSRAP Radiological Reports  
Printed: 10/27/95  
Page 2 of 2

TMA/Eberline Number:	
Work Order Number:	9510046
Customer Number:	441
Environmental Cat:	RI

Date Received: 10/11/95

Sample ID	Date Collected	Date Analyzed	Top Depth	Bottom Depth	Matrix	F/UF	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
140-3L-218	10/10/95	10/13/95	0.00	0.50	SL	.4996	DRY	REG	TH-230		2.10	0.67	PCI/G	ALPHASPEC	0.15
140-3L-218	10/10/95	10/13/95	0.00	0.50	SL	.4996	DRY	REG	TH-232		0.83	0.37	PCI/G	ALPHASPEC	0.09
140-3L-218	10/10/95	10/13/95	0.00	0.50	SL	1.030	DRY	REG	U-234		0.69	0.29	PCI/G	ALPHASPEC	0.10
140-3L-218	10/10/95	10/13/95	0.00	0.50	SL	1.030	DRY	REG	U-235		0.09	0.10	PCI/G	ALPHASPEC	0.06
140-3L-218	10/10/95	10/13/95	0.00	0.50	SL	1.030	DRY	REG	U-238		1.10	0.39	PCI/G	ALPHASPEC	0.05
140-3L-219	10/10/95	10/16/95	0.00	0.50	SL	.9566	DRY	REG	RA-226		1.00	0.30	PCI/G	ALPHASPEC	0.09
140-3L-219	10/10/95	10/13/95	0.00	0.50	SL	.4994	DRY	REG	TH-228		0.68	0.33	PCI/G	ALPHASPEC	0.19
140-3L-219	10/10/95	10/13/95	0.00	0.50	SL	.4994	DRY	REG	TH-230		1.70	0.59	PCI/G	ALPHASPEC	0.16
140-3L-219	10/10/95	10/13/95	0.00	0.50	SL	.4994	DRY	REG	TH-232		0.45	0.26	PCI/G	ALPHASPEC	0.09
140-3L-219	10/10/95	10/13/95	0.00	0.50	SL	1.010	DRY	REG	U-234		1.70	0.62	PCI/G	ALPHASPEC	0.12
140-3L-219	10/10/95	10/13/95	0.00	0.50	SL	1.010	DRY	REG	U-235		0.19	0.16	PCI/G	ALPHASPEC	0.08
140-3L-219	10/10/95	10/13/95	0.00	0.50	SL	1.010	DRY	REG	U-238		1.20	0.48	PCI/G	ALPHASPEC	0.12

Approved by:



Date: 10/27/95

**TMA/Eberline**  
A Division of Thermo Terra Tech

Oak Ridge Laboratory • 601 Scarboro Road • Oak Ridge, TN 37830 • (615) 481-0683

D-23244

95-100046

0-23244

**THERMO NUCLEAR SERVICES/OAK RIDGE LABORATORY  
TRACER REPORT**

10/26/95

Work Order # 95-10-046-OR

BECHTEL SAMPLE ID	ANALYTE	TRACER	RECOVERY
140-3L-217	RA-226	BA-133	80%
140-3L-217	TH-228	TH-229	80%
140-3L-217	TH-230	TH-229	80%
140-3L-217	TH-232	TH-229	80%
140-3L-217	U-234	U-232	48% ✓ ↗
140-3L-217	U-235	U-232	48% ✓
140-3L-217	U-238	U-232	48% ✓ ↘
140-3L-218	RA-226	BA-133	100%
140-3L-218	TH-228	TH-229	74%
140-3L-218	TH-230	TH-229	74%
140-3L-218	TH-232	TH-229	74%
140-3L-218	U-234	U-232	60%
140-3L-218	U-235	U-232	60%
140-3L-218	U-238	U-232	60%
140-3L-219	RA-226	BA-133	81%
140-3L-219	TH-228	TH-229	75%
140-3L-219	TH-230	TH-229	75%
140-3L-219	TH-232	TH-229	75%
140-3L-219	U-234	U-232	46%
140-3L-219	U-235	U-232	46%
140-3L-219	U-238	U-232	46%

**POST-REMEDIAL ACTION SUMMARY**

**ST. LOUIS, MISSOURI**

**LATTY AVENUE VICINITY PROPERTIES**

**3L AND 6L**

**Independent Verification Reports**

**ORISE**  
OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

December 29, 1995

W. Alexander Williams, Ph.D  
EM-421  
Cloverleaf Building  
U. S. Department of Energy  
Washington, D.C. 20874-1290

**SUBJECT: VERIFICATION SURVEY OF LATTY AVENUE PROPERTY 3, ST. LOUIS AIRPORT SITE VICINITY PROPERTIES, HAZELWOOD, MISSOURI**

Dear Dr. Williams:

The Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education has completed the verification activities for the subject property. This was one of the two St. Louis Airport Site (SLAPS) Vicinity Properties that were remediated by Bechtel National, Inc. (BNI) during the period June through September 1995.

Enclosed is an interim letter report describing the procedures and results of the verification survey. ESSAP will provide draft reports for each property for review and comment following the issuance of BNI's post-remedial action report. Please contact me at (423) 576-5073 or William L. (Jack) Beck at (423) 576-5031 should you have any questions.

Sincerely,



Timothy J. Vitkus  
Environmental Project Leader  
Environmental Survey and  
Site Assessment Program

TJV:kew

Attachment

cc:    J. Wagoner, DOE/HQ  
      D. Adler, DOE/ORO  
      G. Palau, BNI  
      W. Beck, ORISE/ESSAP  
      File/387

**VERIFICATION SURVEY  
OF  
LATTY AVENUE VICINITY PROPERTY NUMBER 3  
ST. LOUIS AIRPORT SITE VICINITY PROPERTIES  
ST. LOUIS, MISSOURI**

**INTRODUCTION AND SITE HISTORY**

The St. Louis Airport Property Site (SLAPS) was acquired by the Manhattan Engineer District (MED) and operated from 1946 to 1966. The site was used for storage of waste materials that were generated during uranium processing from 1942 until the late 1950s at the Mallinckrodt facility, located in downtown St. Louis. These processing wastes, which included pitchblende raffinate residues, radium-bearing residues, and barium sulfate cake, were purchased by Continental Mining and Milling Company of Chicago (CMMC) in 1966 and, subsequently transported to 9200 Latty Avenue for storage under an Atomic Energy Commission (AEC), predecessor agency to the U.S. Department of Energy (DOE), license. During transit, some of the materials spilled onto the haul roads (including Latty Avenue) and contiguous properties, primarily collecting in drainage ditches. Redistribution of the contaminated materials probably occurred as a result of flooding, surface runoff, and road and utility line activities. The waste residues, stored at the Latty Avenue site, were eventually dried and shipped by rail to a mill site in Colorado.

Pursuant to specific direction in the 1984 Energy and Waste Appropriations Act, remedial action at the Latty Avenue site was assigned to the DOE, and DOE began investigating the site and nearby properties. Oak Ridge National Laboratory (ORNL) performed a radiological survey of the haul roads in 1985. This survey identified areas with elevated gamma exposure rates and/or Th-230 concentrations in soil (ORNL 1986). As a result, the haul roads were designated in 1986 for remedial action under the Formerly Utilized Sites Remedial Action Program (FUSRAP).

FUSRAP was created in 1974 to identify, investigate, and cleanup or control sites where contamination above today's guidelines remains from the early years of the Nation's atomic energy program. Bechtel National, Inc. (BNI) is the project management contractor for FUSRAP.

BNI performed site characterization activities during the period 1986 to 1989, in order to delineate contamination boundaries, the results of which are provided in the St. Louis Sites characterization reports (BNI 1990). Six properties, located along Latty Avenue, designated as Latty Avenue Vicinity Properties Numbers 1 through 6, were included in this characterization survey. Because the railroad used for shipping wastes borders the Latty Avenue Vicinity Property Number 3 (VP 3L), it is probable that some contaminated residues spilled from the rail cars onto the property. BNI recently completed remediation of VP 3L. Remedial activities included excavation of soil from the north and south ends of the warehouse, as well as along the railroad spur on the east side of the property, and the removal of a contaminated soil pile. Previously, the property owner had conducted remedial activities on portions of the property to remove soil contaminated with oil. Some of the excavated soil was also contaminated with radioactive material, specifically Th-230, and had been stockpiled.

It is the policy of the DOE to perform independent verification of remedial actions conducted under FUSRAP. The Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education (ORISE) has been designated as the independent verification contractor (IVC) for the St. Louis sites.

## SITE DESCRIPTION

SLAPS is located north of the Lambert-St. Louis International Airport in St. Louis County, Missouri approximately 24 kilometers (km [15 miles]) west of downtown St. Louis. VP 3L is located approximately 1 km northeast of SLAPS and 200 meters (m) east of the Latty Avenue storage site (Figures 1 and 2). VP 3L consists of a large warehouse building with an asphalt driveway and parking area on the west and north side of the property, and open land in the southern section (Figure 3). The property is bordered by Latty Avenue on the north, by the Norfolk and Western Railroad property to the south and east, and Latty Avenue Vicinity Property Number 2 to the west. A chain link fence remains in place along the west and south borders. Two oil-contaminated soil piles remain on the site (Figure 5). A below-grade excavation

(footprint), where the soil stockpile formerly existed, is located in the southern end of the property.

## **OBJECTIVES**

The objectives of the verification process were to ensure that the survey, sample analysis, and supporting documentation provided by BNI give an accurate and complete description of the radiological condition of the remediated vicinity property and confirm that both generic and site-specific DOE guidelines for release to unrestricted use have been met.

## **DOCUMENT REVIEW**

ESSAP reviewed BNI's field data results and supporting documentation concerning site remediation activities. Information was evaluated to assure that areas identified as exceeding site guidelines had undergone decontamination and that residual radioactive material and exposure rate levels satisfied the established guidelines.

## **SURVEY PROCEDURES**

On three occasions between July 11 and October 12, 1995, ESSAP personnel visited the VP 3L site and performed visual inspections and independent measurements and sampling of remediated areas in accordance with the SLAPS vicinity property survey plan previously submitted to and approved by the DOE (ORISE 1994). Verification activities included gamma surface scans, exposure rate measurements, and surface soil sampling.

## **REFERENCE GRID**

Measurement and sampling locations in the radiation/oil contaminated soil pile area were referenced to a 10 m × 10 m grid established by BNI. Measurement and sampling locations in

north and east remediated areas were referenced to BNI designated sampling units, each having an area of approximately 100 m<sup>2</sup>.

### **SURFACE SCANS**

Surface scans for gamma activity were conducted over 100 percent of the remediated areas using NaI scintillation detectors coupled to ratemeters with audible indicators.

### **EXPOSURE RATE MEASUREMENTS**

Exposure rate measurements were performed at each soil sampling location at 1 m above the surface using a microrem meter (Figures 4, 5, and 6). Background exposure rate measurements, performed during previous SLAPS vicinity property surveys, were used for comparison (Figure 7).

### **SOIL SAMPLING**

Soil samples were collected at the center and at four locations equidistant from the center and corners of ten grid blocks or sampling units, including four grid blocks beneath the former contaminated soil pile (Figures 4 through 6). One additional sample was collected, based on surface scan results, in grid block 160 (location F on Figure 6) on the north end of the warehouse. Background soil samples, collected during previous SLAPS vicinity property surveys, were used for comparison of results (Figure 7).

### **SAMPLE ANALYSIS AND DATA INTERPRETATION**

Samples and data were returned to ORISE's ESSAP laboratory in Oak Ridge, Tennessee for analysis and interpretation. Soil samples were initially analyzed by solid state gamma spectrometry. The primary radionuclide of interest was Th-230, however, spectra were also reviewed for uranium, Ra-226, and Th-232, and any other identifiable photopeaks. After gamma

spectrometry analyses were completed, the five samples collected from individual grid blocks were composited for isotopic thorium analysis by alpha spectrometry. Analytical results for soil were reported in units of picocuries per gram (pCi/g). Exposure rates were reported in microroentgens per hour ( $\mu$ R/h).

## FINDINGS AND RESULTS

### SURFACE SCANS

Surface scans identified areas of elevated direct gamma radiation in grid 160 on the north end of the property in an area immediately adjacent to Latty Avenue.

### EXPOSURE RATES

Exposure rates for the remediated portions of VP 3L are summarized in Table 1. Exposure rates at 1 m above the surface ranged from 4 to 10  $\mu$ R/h. Area background exposure rates ranged from 9 to 10  $\mu$ R/h (Table 2).

### RADIONUCLIDE CONCENTRATIONS IN SOIL

Radionuclide concentrations in soil samples are summarized in Table 1. The radionuclide concentration ranges in the individual samples analyzed by gamma spectrometry are as follows: Ra-226, 0.8 to 3.3 pCi/g; Th-230, less than 2.7 to 116.9 pCi/g; Th-232, 0.4 to 1.2 pCi/g; and U-238, 0.6 to 3.3 pCi/g. The Th-230 and Th-232 activity levels, determined by alpha spectrometry in composite samples from each grid block, ranged from 1.71 to 22.52 pCi/g and 0.69 to 1.22, respectively. Background concentrations, presented in Table 2, were: 0.7 to 1.0 pCi/g for Ra-226, 1.31 pCi/g for Th-230 (determined from alpha spectrometry analysis on the composite sample), 1.0 to 1.1 pCi/g for Th-232, and 0.9 to 1.3 pCi/g for U-238.

## COMPARISON OF RESULTS WITH GUIDELINES

Verification survey results were compared to the generic and site-specific DOE guidelines (DOE 1990a; DOE 1990b). The applicable soil guidelines for SLAPS Vicinity Properties are those for Ra-226, Th-230, Th-232, and U-238 which are:

<u>Radionuclide</u>	<u>Soil Concentration Above Background</u>
Ra-226, Th-230, Th-232	5 pCi/g averaged over the first 15 cm of soil below the surface;
	15 pCi/g, averaged over 15 cm thick layers of soil greater than 15 cm below the surface.
U-238	50 pCi/g

Radionuclide concentrations in individual soil samples collected from the ten grid blocks or sampling units were below the guidelines for Ra-226, Th-232, and U-238. All samples were collected from areas that were 15 cm or greater in depth prior to excavation. The area is to be backfilled to original grade; therefore, the subsurface guidelines are applicable. One sample, collected from grid block 2, point C (Figure 4), exceeds the 15 pCi/g subsurface Th-230 guideline with a Th-230 concentration of 17.4 pCi/g. However, the soil concentration guidelines permit averaging soil concentrations over an area of 100 m<sup>2</sup>. The average Th-230 concentration including the contiguous area was 7.44 pCi/g, which satisfies the guideline. The soil sample collected from sampling unit 152, point E, on the northeast side of the property also exceeded the 15 pCi/g guideline, with a Th-230 activity concentration of 116.9 pCi/g. The composite sample, representing the five samples collected from the 100 m<sup>2</sup> area, also exceeded the guideline with an activity of 22.52 pCi/g. Because scan sensitivities are not adequate to detect Th-230 at the guideline levels, a conclusion could not be reached in the field as to the total area of the hot spot.

ESSAP notified BNI of the presence of the hot spot following sample analysis and requested that additional samples be collected to permit bounding the area of the hot spot. BNI collected and analyzed four-five point composite samples from a 16 m<sup>2</sup> area, with each composite representing a 4 m<sup>2</sup> area. The Th-230 concentration in these samples ranged from 1.88 to 5.13 pCi/g and indicate that the hot spot was contained in an area measuring less than 1 m<sup>2</sup> and therefore satisfies both the hot spot criteria (defined as the guideline value times  $100/A^{1/2}$ , where A equals the area of the hot spot in m<sup>2</sup>) and the 100 m<sup>2</sup> average guideline. The Th-230 levels in all other samples satisfied the guideline.

The exposure rate guideline is 20 µR/h above background (DOE 1990a). All verification exposure rate measurements were below the guideline level.

## SUMMARY

Between July 11 and October 12, 1995, the Environmental Survey and Site Assessment Program of the Oak Ridge Institute for Science and Education performed verification activities for Latty Avenue Vicinity Property Number 3. Verification activities included document and data reviews, gamma surface scans, exposure rate measurements, and soil sampling.

The results of the verification survey support BNI's conclusion that the radiological conditions of the property satisfy the requirements for release to unrestricted use.

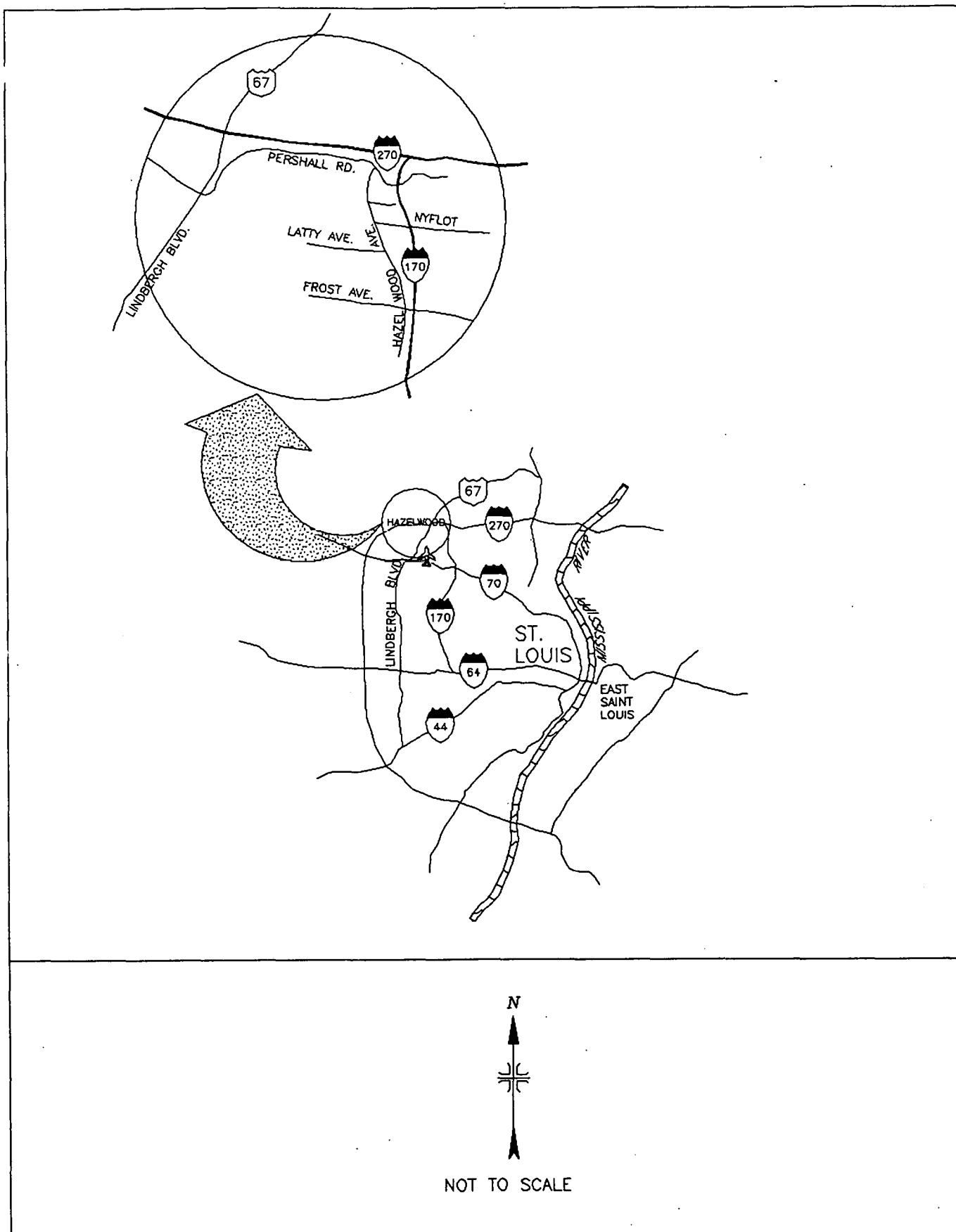


FIGURE 1: St. Louis, Missouri Area – Location of Haul Roads

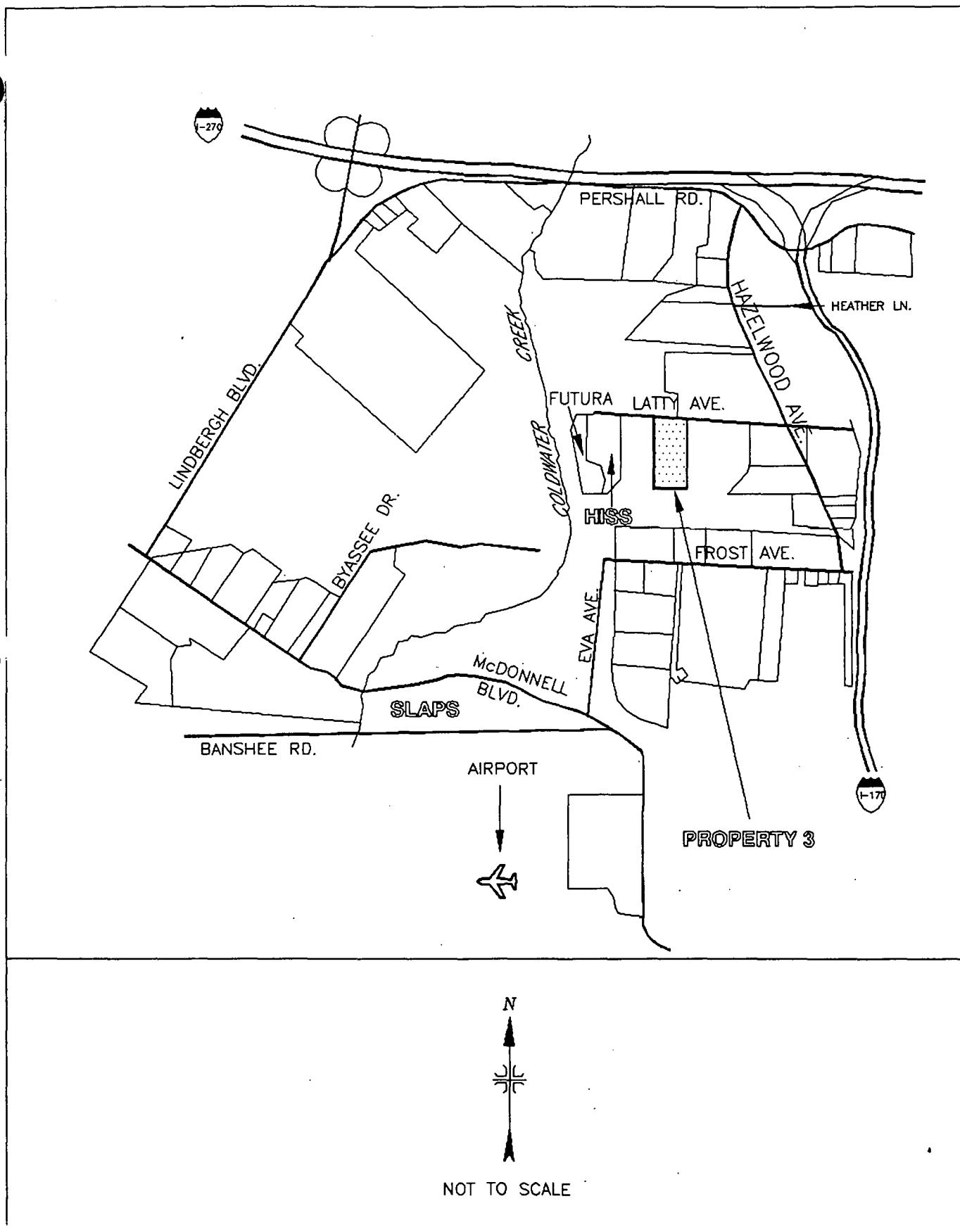


FIGURE 2: Location of Latty Avenue Vicinity Property Number 3

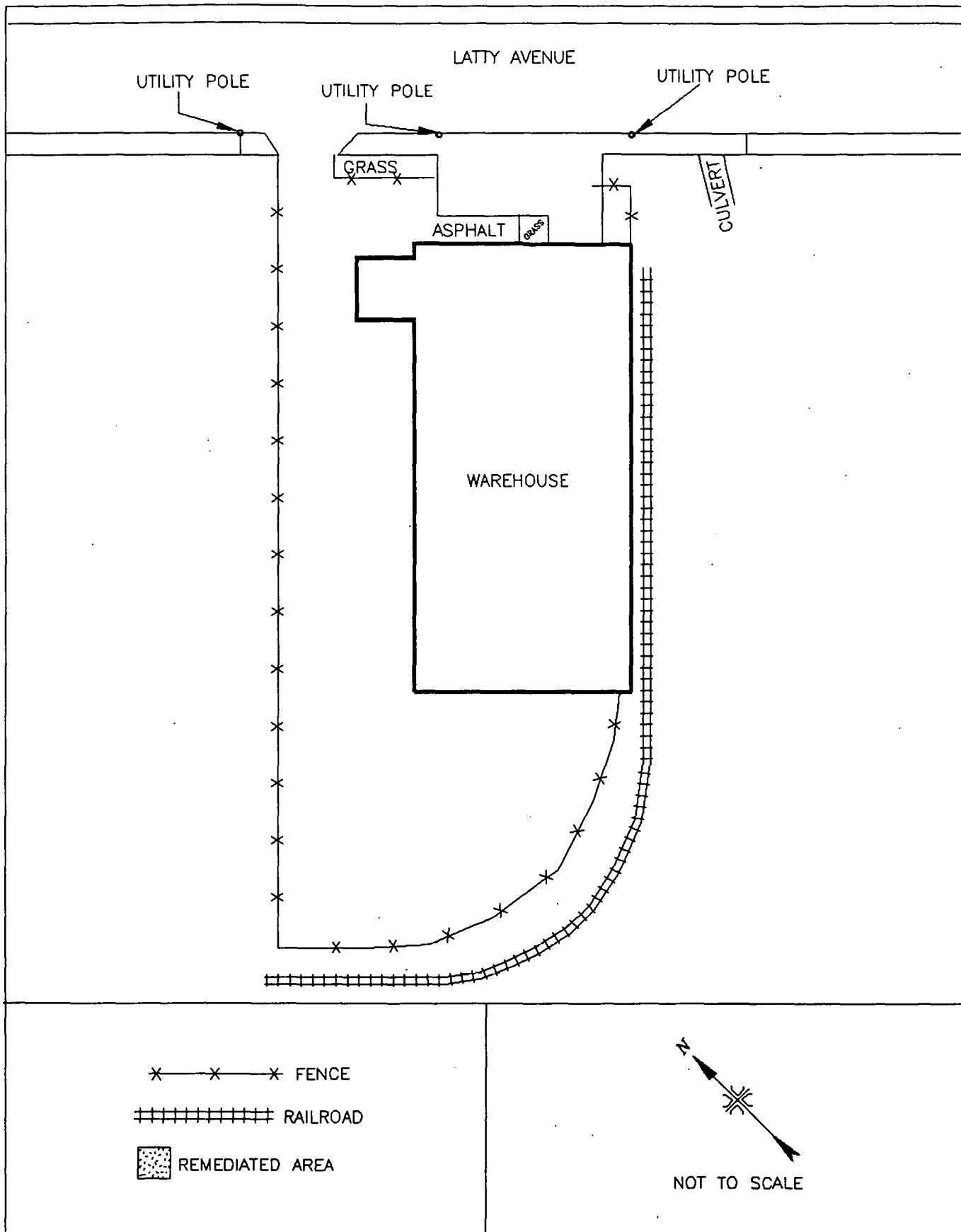


FIGURE 3: Plot Plan of Latty Avenue Vicinity Property 3

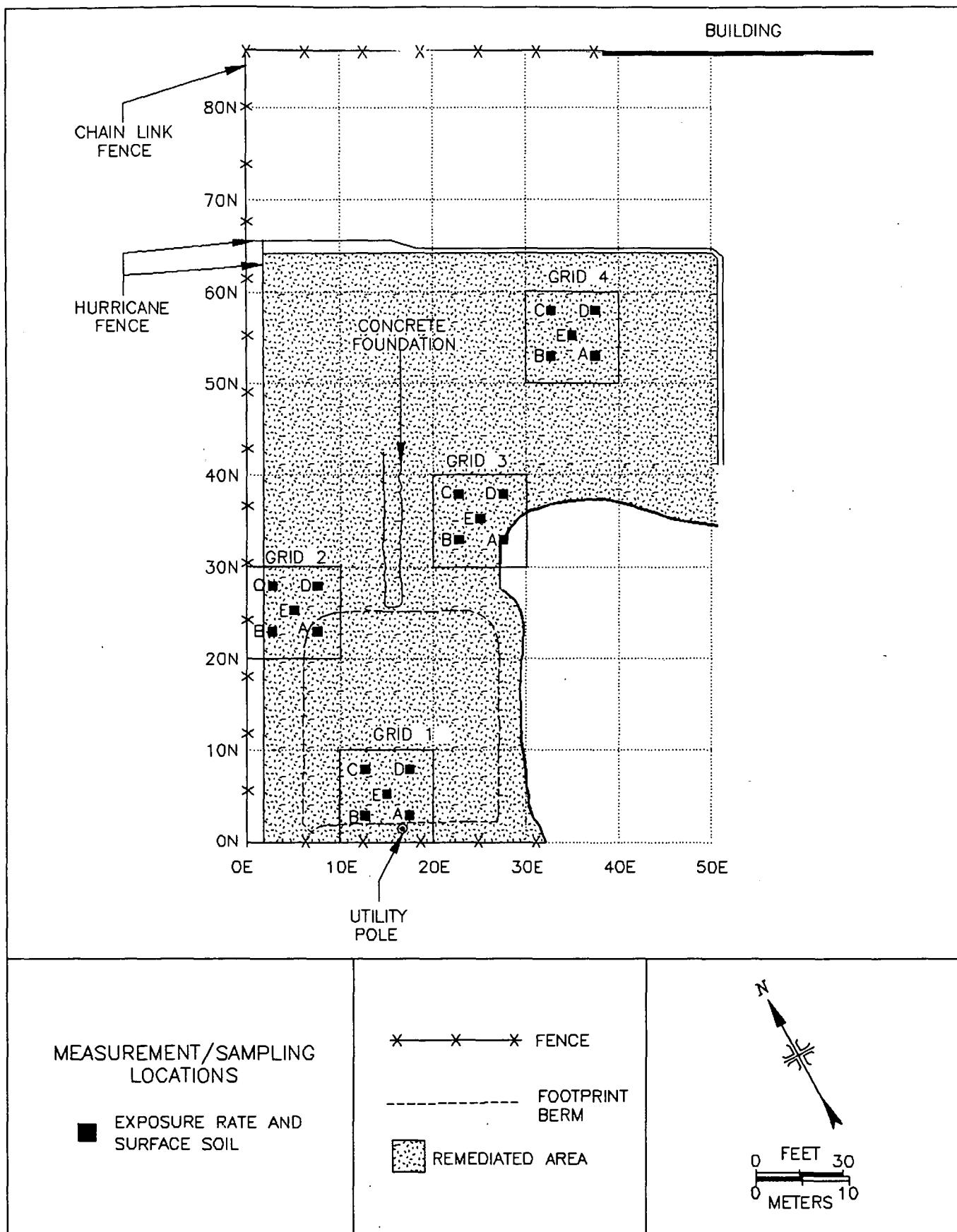


FIGURE 4: Latty Avenue Vicinity Property Number 3, Radiation/Oil Contaminated Soil Pile Area — Measurement and Sampling Locations

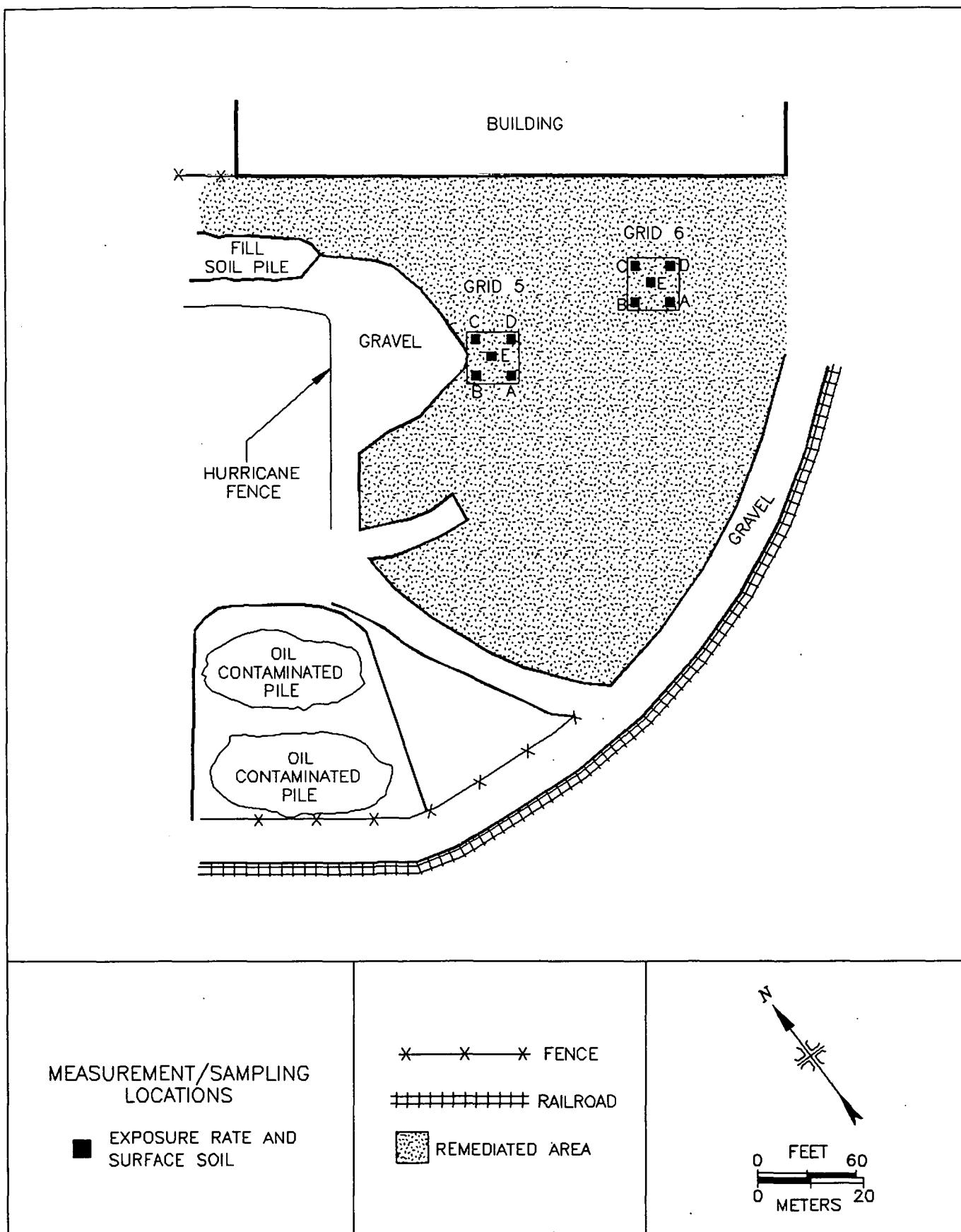


FIGURE 5: Latty Avenue Vicinity Property Number 3, Previously Remediated Area – Measurement and Sampling Locations

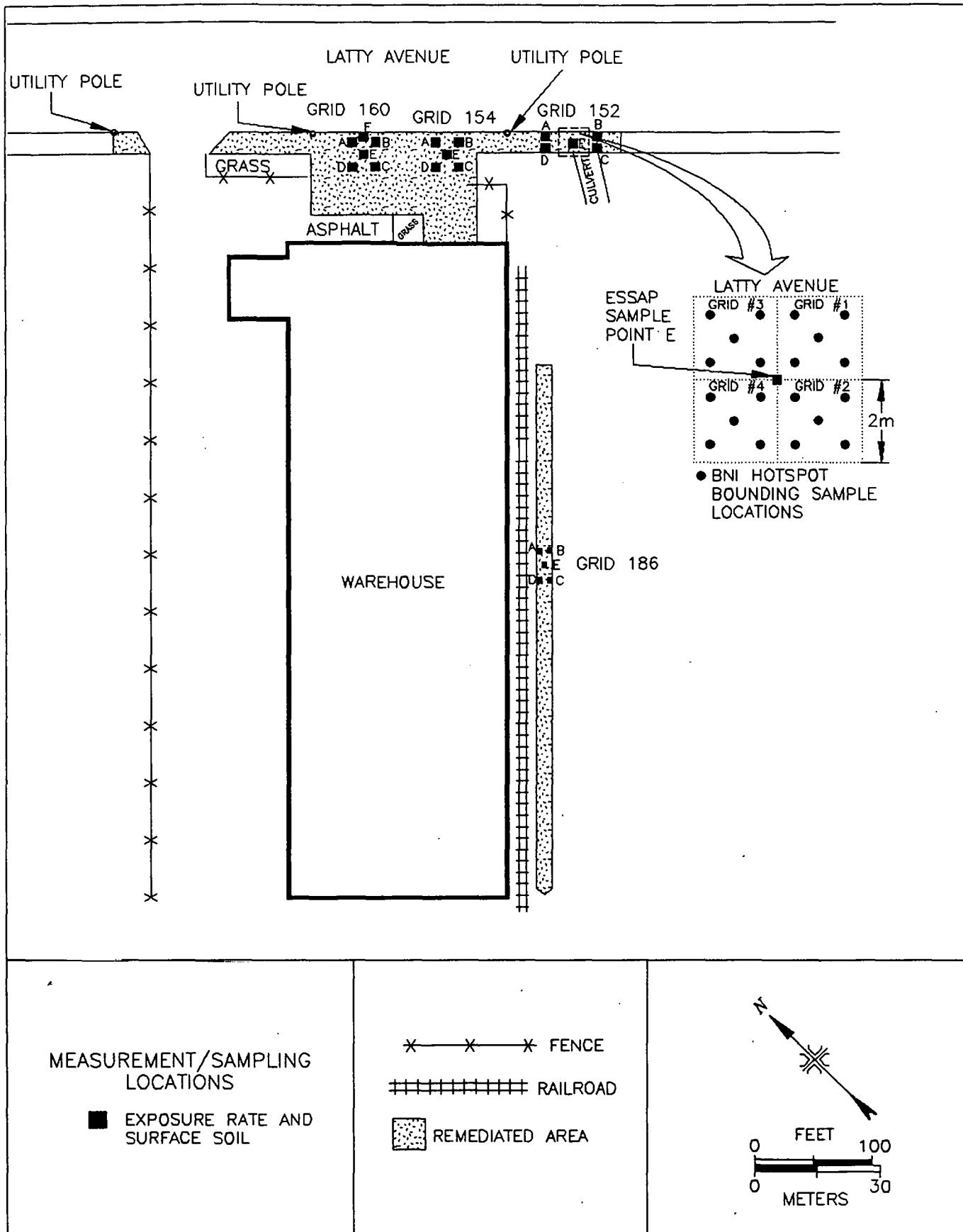


FIGURE 6: Latty Avenue Vicinity Property Number 3 – Measurement and Sampling Locations

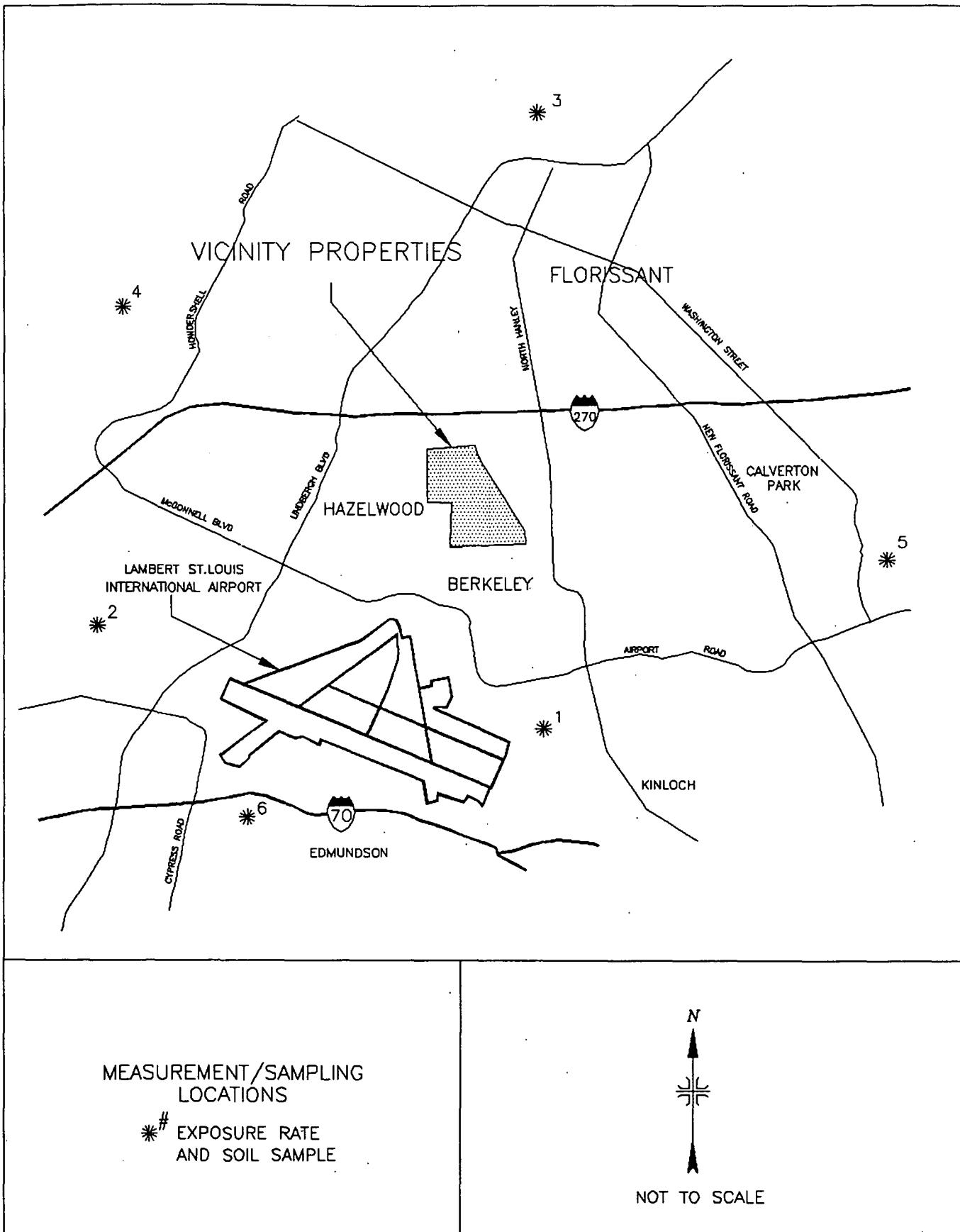


FIGURE 7: Hazelwood and Berkeley, Missouri Area Background Measurement and Sampling Locations

TABLE 1

**EXPOSURE RATES AND RADIONUCLIDE CONCENTRATIONS IN SOIL  
LATTY AVENUE PROPERTY NUMBER 3  
ST. LOUIS AIRPORT SITE VICINITY PROPERTIES  
ST. LOUIS, MISSOURI**

Location <sup>a</sup>	Exposure Rates at 1 m ( $\mu\text{R/h}$ )	Radionuclide Concentration (pCi/g)			
		Ra-226	Th-230	Th-232	U-238
<b>GRID 1<sup>c</sup></b>					
A	8	0.8 ± 0.1 <sup>c</sup>	<4.0	1.0 ± 0.1	1.1 ± 0.3
B	10	0.8 ± 0.1	<3.0	0.9 ± 0.1	1.1 ± 0.3
C	8	1.1 ± 0.1	<2.9	1.1 ± 0.1	1.0 ± 0.3
D	5	0.8 ± 0.1	<4.1	1.1 ± 0.1	0.9 ± 0.3
E	7	0.8 ± 0.1	<3.2	1.1 ± 0.1	1.2 ± 0.3
COMPOSITE <sup>d</sup>	NA <sup>e</sup>	---	1.71 ± 0.27	1.22 ± 0.21	---
<b>GRID 2<sup>b</sup></b>					
A	10	0.9 ± 0.1	<4.3	0.9 ± 0.1	1.1 ± 0.3
B	9	1.1 ± 0.1	15.0 ± 2.9	1.0 ± 0.1	1.2 ± 0.3
C	9	1.1 ± 0.1	17.4 ± 3.2	0.9 ± 0.1	1.4 ± 0.3
D	6	1.1 ± 0.1	<3.2	1.1 ± 0.1	0.8 ± 0.3
E	8	1.0 ± 0.1	2.4 ± 2.3	0.8 ± 0.1	0.9 ± 0.3
COMPOSITE	NA	---	7.44 ± 0.73	1.00 ± 0.17	---
<b>GRID 3<sup>b</sup></b>					
A	6	0.8 ± 0.1	<3.7	0.8 ± 0.1	1.1 ± 0.3
B	6	0.9 ± 0.1	<3.2	1.0 ± 0.1	0.8 ± 0.3
C	7	1.1 ± 0.1	3.1 ± 2.0	0.6 ± 0.1	0.9 ± 0.2
D	7	0.9 ± 0.1	<3.4	0.7 ± 0.1	0.9 ± 0.3
E	7	1.0 ± 0.1	<3.1	1.1 ± 0.1	1.1 ± 0.3
COMPOSITE	NA	---	2.22 ± 0.34	1.04 ± 0.20	---

TABLE 1 (Continued)

**EXPOSURE RATES AND RADIONUCLIDE CONCENTRATIONS IN SOIL**  
**LATTY AVENUE PROPERTY NUMBER 3**  
**ST. LOUIS AIRPORT SITE VICINITY PROPERTIES**  
**ST. LOUIS, MISSOURI**

Location <sup>a</sup>	Exposure Rates at 1 m ( $\mu$ R/h)	Radionuclide Concentration (pCi/g)			
		Ra-226	Th-230	Th-232	U-238
<b>GRID 4<sup>b</sup></b>					
A	7	0.9 $\pm$ 0.1	2.4 $\pm$ 1.8	0.6 $\pm$ 0.1	0.6 $\pm$ 0.2
B	5	0.9 $\pm$ 0.1	<3.6	0.7 $\pm$ 0.1	0.9 $\pm$ 0.3
C	4	0.8 $\pm$ 0.1	<2.7	0.6 $\pm$ 0.1	0.8 $\pm$ 0.3
D	7	0.9 $\pm$ 0.1	2.2 $\pm$ 1.8	0.7 $\pm$ 0.1	1.0 $\pm$ 0.3
E	9	0.9 $\pm$ 0.1	<3.6	0.7 $\pm$ 0.1	0.8 $\pm$ 0.2
COMPOSITE	NA	---	3.19 $\pm$ 0.42	1.01 $\pm$ 0.20	---
<b>GRID 5<sup>b</sup></b>					
A	6	1.3 $\pm$ 0.1	<3.5	1.0 $\pm$ 0.1	1.1 $\pm$ 0.3
B	8	1.1 $\pm$ 0.1	<2.9	1.0 $\pm$ 0.1	1.0 $\pm$ 0.3
C	7	1.0 $\pm$ 0.1	<4.1	1.0 $\pm$ 0.1	0.9 $\pm$ 0.3
D	6	1.1 $\pm$ 0.1	<3.4	1.1 $\pm$ 0.1	0.8 $\pm$ 0.2
E	6	1.1 $\pm$ 0.1	<2.9	1.1 $\pm$ 0.1	0.9 $\pm$ 0.3
COMPOSITE	NA	---	2.63 $\pm$ 0.38	0.91 $\pm$ 0.19	---
<b>GRID 6<sup>b</sup></b>					
A	9	1.0 $\pm$ 0.1	<4.2	1.1 $\pm$ 0.1	1.2 $\pm$ 0.4
B	8	1.0 $\pm$ 0.1	<2.8	0.7 $\pm$ 0.1	0.9 $\pm$ 0.3
C	9	1.1 $\pm$ 0.1	<2.9	1.0 $\pm$ 0.1	0.9 $\pm$ 0.2
D	8	1.1 $\pm$ 0.1	<4.2	1.2 $\pm$ 0.1	0.9 $\pm$ 0.3
E	8	1.1 $\pm$ 0.1	<3.3	1.0 $\pm$ 0.1	1.0 $\pm$ 0.3
COMPOSITE	NA	---	2.33 $\pm$ 0.33	1.16 $\pm$ 0.21	---

TABLE 1 (Continued)

EXPOSURE RATES AND RADIONUCLIDE CONCENTRATIONS IN SOIL  
LATTY AVENUE PROPERTY NUMBER 3  
ST. LOUIS AIRPORT SITE VICINITY PROPERTIES  
ST. LOUIS, MISSOURI

Location <sup>a</sup>	Exposure Rates at 1 m ( $\mu\text{R/h}$ )	Radionuclide Concentration (pCi/g)			
		Ra-226	Th-230	Th-232	U-238
<b>GRID 152<sup>c</sup></b>					
A	6	1.2 $\pm$ 0.0	8.3 $\pm$ 3.3	1.0 $\pm$ 0.1	1.4 $\pm$ 0.3
B	6	1.0 $\pm$ 0.1	<4.5	1.0 $\pm$ 0.1	1.4 $\pm$ 0.4
C	5	1.1 $\pm$ 0.0	3.9 $\pm$ 1.7	0.9 $\pm$ 0.1	1.1 $\pm$ 0.3
D	6	1.1 $\pm$ 0.0	<3.3	1.1 $\pm$ 0.1	1.2 $\pm$ 0.3
E	6	3.3 $\pm$ 0.1	116.9 $\pm$ 4.7 <sup>b</sup>	0.9 $\pm$ 0.1	3.3 $\pm$ 0.3
COMPOSITE	NA	---	22.52 $\pm$ 1.97 <sup>b</sup>	1.14 $\pm$ 0.19	---
<b>GRID 154<sup>c</sup></b>					
A	7	0.9 $\pm$ 0.0	<4.2	1.0 $\pm$ 0.1	1.9 $\pm$ 0.4
B	6	0.9 $\pm$ 0.0	<3.4	1.0 $\pm$ 0.1	0.9 $\pm$ 0.4
C	6	1.3 $\pm$ 0.0	8.2 $\pm$ 2.7	0.5 $\pm$ 0.1	1.4 $\pm$ 0.3
D	5	1.0 $\pm$ 0.0	3.0 $\pm$ 2.2	0.4 $\pm$ 0.1	1.5 $\pm$ 0.3
E	6	1.0 $\pm$ 0.0	5.0 $\pm$ 2.6	0.7 $\pm$ 0.1	1.1 $\pm$ 0.3
COMPOSITE	NA	---	4.34 $\pm$ 0.49	0.69 $\pm$ 0.14	---
<b>GRID 160<sup>c</sup></b>					
A	6	0.9 $\pm$ 0.0	2.2 $\pm$ 1.5	1.0 $\pm$ 0.1	1.3 $\pm$ 0.3
B	5	0.9 $\pm$ 0.0	<3.9	0.9 $\pm$ 0.1	1.0 $\pm$ 0.3
C	6	1.2 $\pm$ 0.0	3.9 $\pm$ 2.6	0.6 $\pm$ 0.1	1.3 $\pm$ 0.3
D	4	1.0 $\pm$ 0.0	9.4 $\pm$ 2.6	0.5 $\pm$ 0.1	1.2 $\pm$ 0.3
E	6	0.9 $\pm$ 0.0	5.4 $\pm$ 2.3	1.0 $\pm$ 0.1	1.1 $\pm$ 0.3
F	6	1.2 $\pm$ 0.0	<3.3	1.0 $\pm$ 0.1	1.3 $\pm$ 0.3
COMPOSITE	NA	---	3.31 $\pm$ 0.41	0.89 $\pm$ 0.17	---

TABLE 1 (Continued)

EXPOSURE RATES AND RADIONUCLIDE CONCENTRATIONS IN SOIL  
LATTY AVENUE PROPERTY NUMBER 3  
ST. LOUIS AIRPORT SITE VICINITY PROPERTIES  
ST. LOUIS, MISSOURI

Location <sup>a</sup>	Exposure Rates at 1 m ( $\mu\text{R/h}$ )	Radionuclide Concentration (pCi/g)			
		Ra-226	Th-230	Th-232	U-238
<b>GRID 186<sup>b</sup></b>					
A	5	0.8 $\pm$ 0.0	<2.7	0.6 $\pm$ 0.1	0.8 $\pm$ 0.3
B	5	0.9 $\pm$ 0.0	<3.9	1.0 $\pm$ 0.1	1.0 $\pm$ 0.2
C	6	0.9 $\pm$ 0.0	<2.6	0.9 $\pm$ 0.1	0.8 $\pm$ 0.3
D	6	0.8 $\pm$ 0.0	<3.3	0.5 $\pm$ 0.1	0.8 $\pm$ 0.3
E	5	0.9 $\pm$ 0.0	<2.8	1.0 $\pm$ 0.1	0.8 $\pm$ 0.2

<sup>a</sup>Refer to Figures 4-6.

<sup>b</sup>ORISE grid identification numbers.

<sup>c</sup>Uncertainties represent the 95% confidence level, based only on counting statistics.

<sup>d</sup>Composite sample analyzed by alpha spectrometry.

<sup>e</sup>NA = not applicable

<sup>f</sup>--- = analysis not performed.

<sup>g</sup>BNI grid identification numbers.

<sup>h</sup>Additional BNI sampling showed contamination confined to an area  $\leq 1 \text{ m}^2$ . Weighted grid block average=

$$5.0 \left[ 1 - \frac{1}{100} \right] + 116.9 \left[ \frac{1}{100} \right] = 6.1 \text{ pCi/g}$$

TABLE 2

**BACKGROUND EXPOSURE RATES  
AND RADIONUCLIDE CONCENTRATIONS IN SOIL SAMPLES  
ST. LOUIS AIRPORT SITE VICINITY PROPERTIES  
HAZELWOOD AND BERKELEY, MISSOURI**

Sample No.	Location <sup>a</sup>	Exposure Rates at 1 m ( $\mu$ R/h)	Radionuclide Concentration (pCi/g)			
			Ra-226	Th-230	Th-232	U-238
1	School Access Road and Harmond Road	10	1.0 $\pm$ 0.1 <sup>b</sup>	1.31 $\pm$ 0.2 <sup>c</sup>	1.1 $\pm$ 0.1	1.1 $\pm$ 0.5
2	Fee Fee Road and Duncombe Drive	10	0.7 $\pm$ 0.1		1.0 $\pm$ 0.1	0.9 $\pm$ 0.5
3	St. Ferdinand Park at St. Pierre Street	9	0.9 $\pm$ 0.1		1.1 $\pm$ 0.1	1.3 $\pm$ 0.4
4	White Birch Park	9	0.8 $\pm$ 0.1		1.1 $\pm$ 0.1	1.1 $\pm$ 0.4
5	Robert Superior Park	9	0.9 $\pm$ 0.1		1.1 $\pm$ 0.1	1.2 $\pm$ 0.4
6	St. Ann Park at St. Ambrose Lane	9	0.8 $\pm$ 0.1		1.0 $\pm$ 0.1	0.9 $\pm$ 0.3

<sup>a</sup>Refer to Figure 4.

<sup>b</sup>Uncertainties represent the 95% confidence level, based only on counting statistics.

<sup>c</sup>Composite of samples 1 through 6. Alpha spectrometry results.

## **REFERENCES**

Bechtel National, Inc. (BNI). Radiological Characterization Report for FUSRAP Properties in the St. Louis, Missouri Area, Volumes I-III. Oak Ridge, TN; March 1990.

U. S. Department of Energy (DOE). Radiation Protection of the Public and the Environment. Washington, DC: DOE Order 5400.5; February 1990a.

DOE Memorandum from J. Fiore to L. Price, "Uranium Cleanup Guidelines for St. Louis, MO, FUSRAP Sites," November 6, 1990b.

Oak Ridge National Laboratory (ORNL). Results of the Radiation Measurements Taken at Transportation Routes (1M004) in Hazelwood, Missouri. Oak Ridge, TN; December 1986.

Oak Ridge Institute for Science and Education (ORISE). Proposed Verification Survey Plan for the St. Louis Airport Site Vicinity Properties, St. Louis, Missouri. Oak Ridge, TN; October 19, 1994.

**O R I S E**  
OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

December 20, 1995

Dec 21 1995

W. Alexander Williams, Ph.D  
U. S. Department of Energy  
EM-421  
Cloverleaf Building  
Washington, D.C. 20585-0002

**SUBJECT: VERIFICATION SURVEY OF LATTY AVENUE PROPERTY 6, ST. LOUIS AIRPORT SITE VICINITY PROPERTIES, HAZELWOOD, MISSOURI**

Dear Dr. Williams:

The Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education has completed the verification activities for the subject property. This was one of the two St. Louis Airport Site (SLAPS) Vicinity Properties that were remediated by Bechtel National, Inc. (BNI) during the period June through September 1995.

Enclosed is an interim letter report describing the procedures and results of the verification survey. ESSAP will provide draft reports for each property for review and comment following the issuance of BNI's post-remedial action report. Please contact me at (423) 576-5073 or William L. (Jack) Beck at (423) 576-5031 should you have any questions.

Sincerely,

Timothy J. Vitkus  
Environmental Project Leader  
Environmental Survey and  
Site Assessment Program

TJV:tsf

Enclosure

cc:    J. Wagoner, DOE/HQ  
      D. Adler, DOE/ORO  
      G. Palau, BNI  
      W. Beck, ORISE/ESSAP  
      File/387

**VERIFICATION SURVEY  
OF  
LATTY AVENUE VICINITY PROPERTY NUMBER 6  
ST. LOUIS AIRPORT SITE VICINITY PROPERTIES  
ST. LOUIS, MISSOURI**

**INTRODUCTION AND SITE HISTORY**

The St. Louis Airport Property Site (SLAPS) was acquired by the Manhattan Engineer District (MED) and operated from 1946 to 1966. The site was used for storage of waste materials that were generated during uranium processing from 1942 until the late 1950s at the Mallinckrodt facility, located in downtown St. Louis. These processing wastes, which included pitchblende raffinate residues, radium-bearing residues, and barium sulfate cake, were purchased by Continental Mining and Milling Company of Chicago (CMMC) in 1966 and, subsequently transported to 9200 Latty Avenue for storage under an Atomic Energy Commission (AEC), predecessor agency to the U.S. Department of Energy (DOE), license. During transit, some of the materials spilled onto the haul roads (including Latty Avenue) and contiguous properties, primarily collecting in drainage ditches. Redistribution of the contaminated materials probably occurred as a result of flooding, surface runoff, and road and utility line activities. The waste residues, stored at the Latty Avenue site, were eventually dried and shipped by rail to a mill site in Colorado.

Pursuant to specific direction in the 1984 Energy and Waste Appropriations Act, remedial action at the Latty Avenue site was assigned to the DOE, and DOE began investigating the site and nearby properties. Oak Ridge National Laboratory (ORNL) performed a radiological survey of the haul roads in 1985. This survey identified areas with elevated gamma exposure rates and/or Th-230 concentrations in soil (ORNL 1986). As a result, the haul roads were designated in 1986 for remedial action under the Formerly Utilized Sites Remedial Action Program (FUSRAP).

FUSRAP was created in 1974 to identify, investigate, and cleanup or control sites where contamination above today's guidelines remains from the early years of the Nation's atomic energy program. Bechtel National, Inc. (BNI) is the project management contractor for FUSRAP.

BNI performed site characterization activities during the period 1986 to 1989, in order to delineate contamination boundaries, the results of which are provided in the St. Louis Sites characterization reports (BNI 1990). Six properties, located along Latty Avenue, designated as Latty Avenue Vicinity Properties Numbers 1 through 6, were included in this characterization survey. Because the railroad used for shipping wastes borders the Latty Avenue Vicinity Property Number 6 (VP 6L), it is probable that some contaminated residues also spilled from the rail cars onto the property. BNI recently completed remedial actions of VP 6L. Remedial activities included excavation of soil from areas on both the north and south side of the railroad tracks that border the north end of the property and an additional area near the center of the property.

It is the policy of the DOE to perform independent verification of remedial actions conducted under FUSRAP. The Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education (ORISE) has been designated as the independent verification contractor (TVC) for the St. Louis sites.

### SITE DESCRIPTION

SLAPS is located north of the Lambert-St. Louis International Airport in St. Louis County, Missouri approximately 24 kilometers (km [15 miles]) west of downtown St. Louis. VP 6L is located approximately 1 km northeast of SLAPS and 30 meters (m) southeast of the DOE's Hazelwood Interim Storage Site (Figures 1 and 2). The property is bordered by Seeger Industrial Drive to the south and by the Norfolk and Western Railroad property to the north and west.

### OBJECTIVES

The objectives of the verification process were to ensure that the survey, sample analysis, and supporting documentation provided by BNI give an accurate and complete description of the radiological condition of the remediated vicinity property and confirm that both generic and site-specific DOE guidelines for release to unrestricted use have been met.

## DOCUMENT REVIEW

ESSAP reviewed BNI's field data results and supporting documentation concerning site remediation activities. Information was evaluated to assure that areas identified as exceeding site guidelines had undergone decontamination and that residual radioactive material and exposure rate levels satisfied the established guidelines.

## SURVEY PROCEDURES

On September 28, 27 and October 12, 1995, ESSAP personnel visited VP 6L and performed visual inspections and independent measurements and sampling of remediated areas in accordance with the SLAPS Vicinity Property survey plan previously submitted to and approved by the DOE (ORISE 1994). Verification activities included gamma surface scans, exposure rate measurements, and surface soil sampling.

## REFERENCE SYSTEM

Measurement and sampling locations were referenced to the approximately 100 m<sup>2</sup> sampling units designated by BNI or to prominent site features.

## SURFACE SCANS

Surface scans for gamma activity were conducted over approximately 50 percent of the unremediated portions and 100 percent of the remediated areas of VP 6L using NaI scintillation detectors coupled to ratemeters with audible indicators.

## EXPOSURE RATE MEASUREMENTS

Exposure rate measurements were performed at 20 locations (Figure 3). Background exposure rate measurements, performed during previous SLAPS vicinity property surveys, were used for data comparison (Figure 4). Exposure rates were measured at 1 m above the surface using either a microrem meter or a pressurized ionization chamber.

## SOIL SAMPLING

Soil samples were collected at the center and at four locations equidistant from the center and grid block corners in three of the excavated areas 100 m<sup>2</sup> sampling units (two of which were selected based on surface scan results and third was randomly selected) and at an additional five locations in adjacent unremediated areas (Figure 3). Background soil samples, collected during previous SLAPS vicinity property surveys, were used for comparison of results (Figure 4).

## SAMPLE ANALYSIS AND DATA INTERPRETATION

Samples and data were returned to ORISE's ESSAP laboratory in Oak Ridge, Tennessee for analysis and interpretation. Soil samples were initially analyzed by solid state gamma spectrometry. The primary radionuclide of interest was Th-230, however, spectra were also reviewed for uranium, Ra-226, and Th-232, and any other identifiable photopeaks. After gamma spectrometry analyses were completed, the five samples collected from individual sampling units were composited for isotopic thorium analysis by alpha spectrometry. Analytical results for soil samples were reported in units of picocuries per gram (pCi/g). Exposure rates were reported in microroentgens per hour ( $\mu$ R/h).

## FINDINGS AND RESULTS

### SURFACE SCANS

Surface scans identified gamma radiation levels within two sampling units that were approximately 1.5 times ambient area background. As a result, these sampling units were specifically included in the verification sampling.

### EXPOSURE RATES

Exposure rates for VP 6L are summarized in Table 1. Exposure rates at 1 m above the surface ranged from 5 to 12  $\mu\text{R}/\text{h}$ . Area background exposure rates ranged from 9 to 10  $\mu\text{R}/\text{h}$  (Table 2).

### RADIONUCLIDE CONCENTRATIONS IN SOIL

Radionuclide concentrations in soil samples are summarized in Table 1. The radionuclide concentration ranges in the individual samples analyzed by gamma spectrometry are as follows: Ra-226, 0.9 to 1.4 pCi/g; Th-230, less than 2.7 to 14.0 pCi/g; Th-232, 0.9 to 1.2 pCi/g; and U-238, 0.5 to 1.5 pCi/g. The Th-230 activity level, determined by alpha spectrometry in composite samples from sampling units 174 and 180, were 3.44 and 6.03 pCi/g, respectively. Background concentrations, presented in Table 2, were: 0.7 to 1.0 pCi/g for Ra-226, 1.31 pCi/g for Th-230 (determined from alpha spectrometry analysis on the composite sample), 1.0 to 1.1 pCi/g for Th-232, and 0.9 to 1.3 pCi/g for U-238.

## COMPARISON OF RESULTS WITH GUIDELINES

Verification survey results were compared to the generic and site-specific DOE guidelines (DOE 1990a; DOE 1990b). The applicable soil guidelines for SLAPS vicinity properties are those for Ra-226, Th-230, Th-232, and U-238 which are:

<u>Radionuclide</u>	<u>Soil Concentration Above Background</u>
Ra-226, Th-230, Th-232	5 pCi/g averaged over the first 15 cm of soil below the surface;
	15 pCi/g, averaged over 15 cm thick layers of soil greater than 15 cm below the surface.
U-238	50 pCi/g

Radionuclide concentrations in individual soil samples were below the surface guidelines for Ra-226 and Th-232, and the site-specific U-238 guideline. Seven individual samples and the average activity in one sample unit exceeded the surface guideline of 5 pCi/g for Th-230. These samples were collected from areas that were greater than 15 cm below the surface prior to excavation and have since been backfilled and restored to original grade. Both individual sample activity levels and average activity levels were less than 15 pCi/g and therefore satisfy the subsurface Th-230 guideline.

The exposure rate guideline is 20  $\mu$ R/h above background (DOE 1990a). All verification exposure rate measurements were below the guideline level.

## SUMMARY

Between September 27 and October 12, 1995, the Environmental Survey and Site Assessment Program of the Oak Ridge Institute for Science and Education performed verification activities on portions of the Latty Avenue Vicinity Property Number 6. Verification activities included document and post-remedial action data review, gamma surface scans, soil sampling, and exposure rate measurements.

The results of the verification survey indicate that Latty Avenue Vicinity Property Number 6 has been adequately remediated and that residual radionuclide concentrations in soil and exposure rate levels satisfy the DOE guidelines for release to unrestricted use.

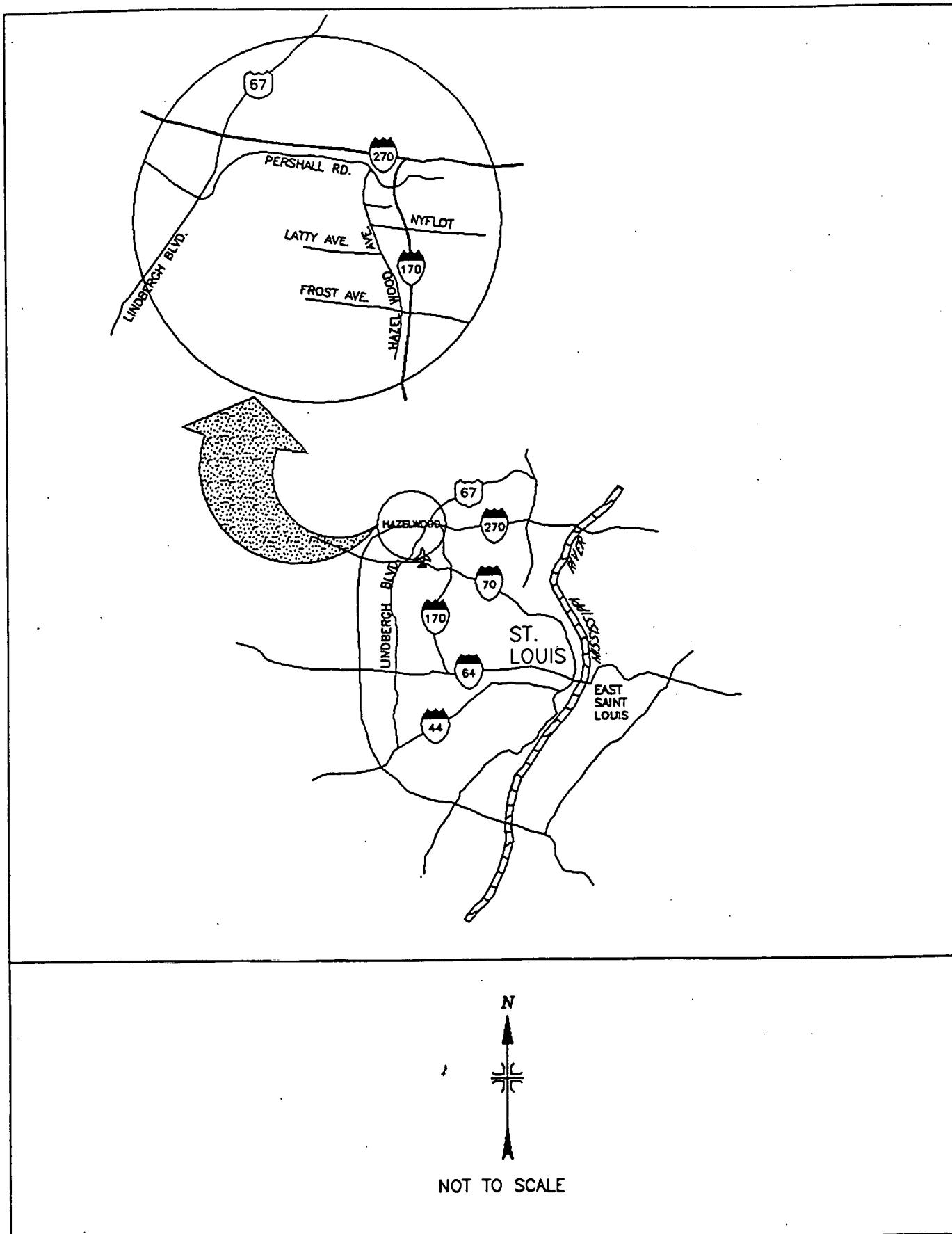


FIGURE 1: St. Louis, Missouri Area — Location of Haul Roads

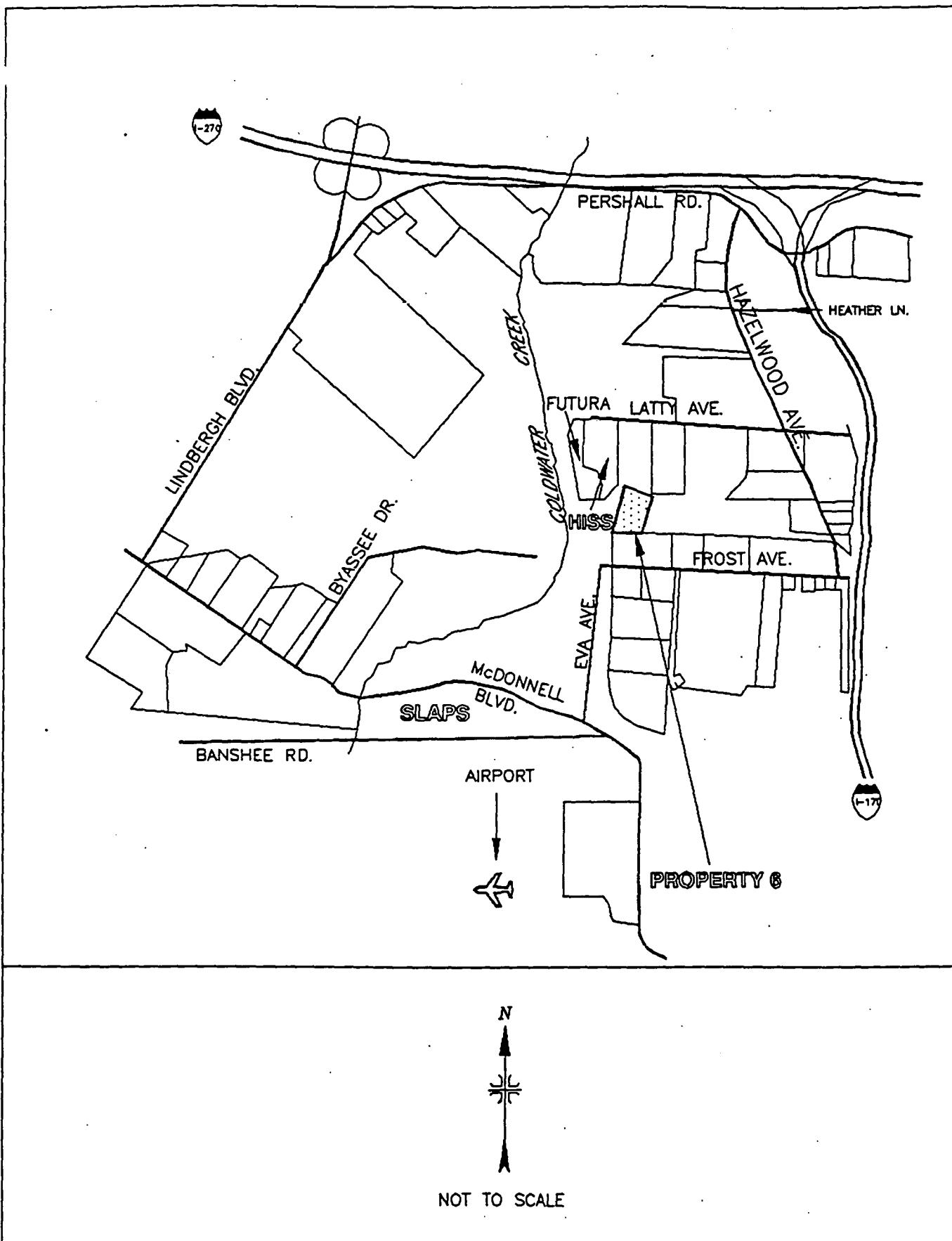
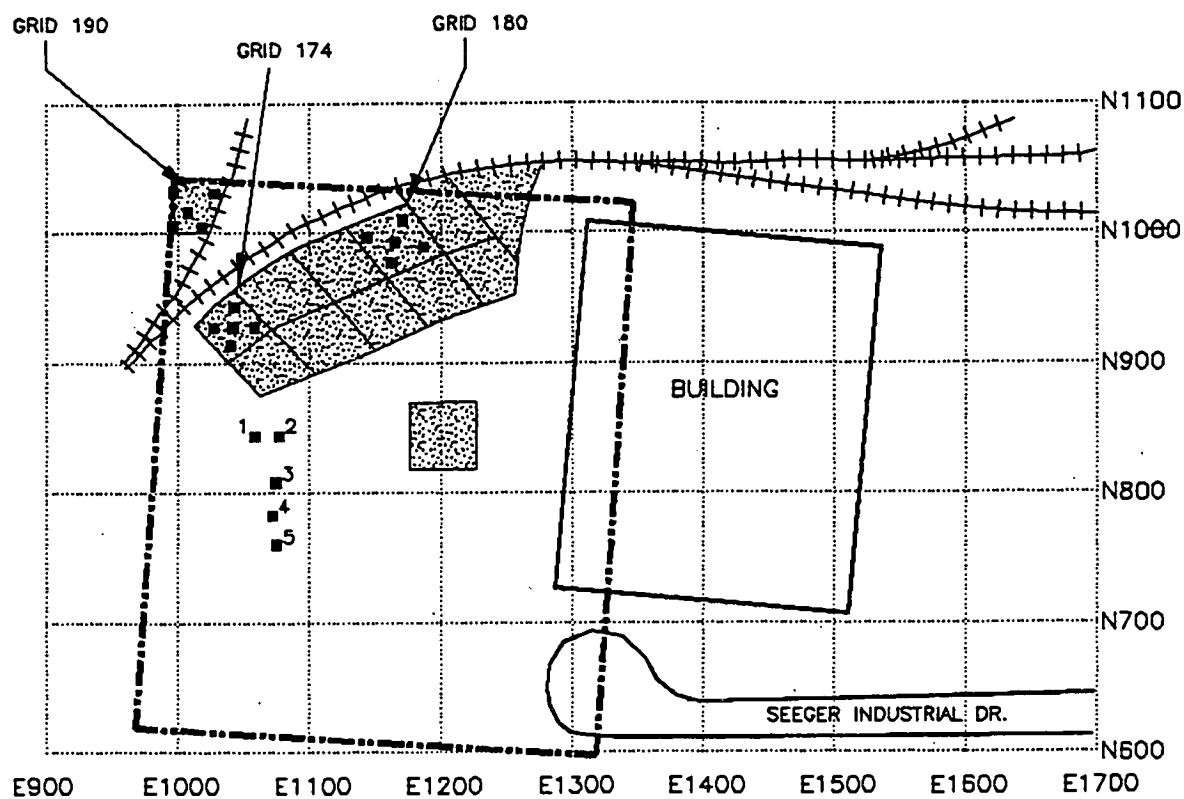


FIGURE 2: Location of SLAPS Latty Avenue Vicinity Property Number 6



MEASUREMENT/SAMPLING LOCATIONS

■ EXPOSURE RATE AND SURFACE SOIL

— PROPERTY BOUNDARY

||||| RAILROAD

██████ EXCAVATED AREA

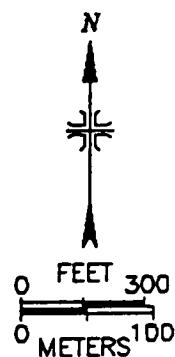


FIGURE 3: Latty Avenue Vicinity Property Number 6 – Exposure Rate Measurement and Sampling Locations

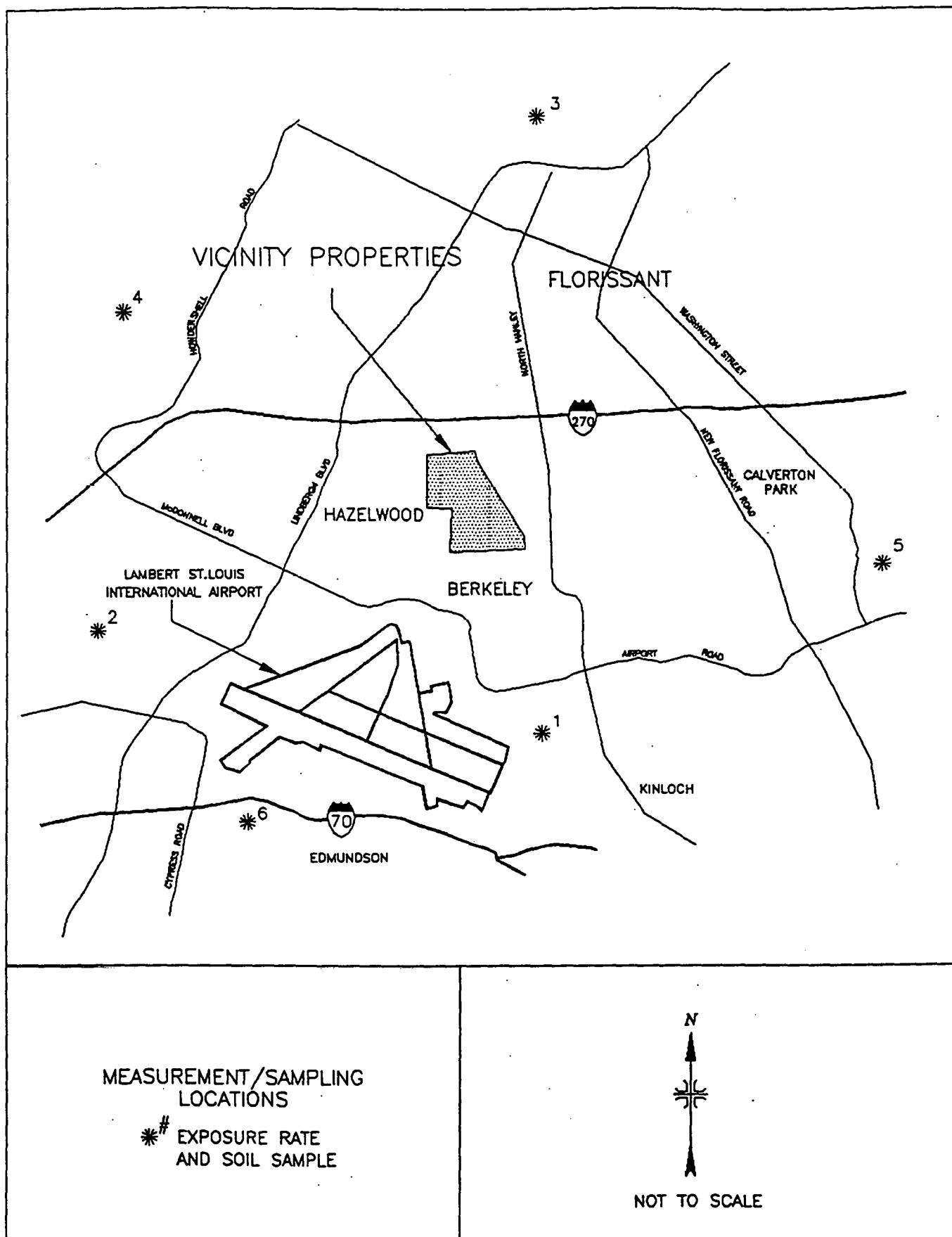


FIGURE 4: Hazelwood and Berkeley, Missouri Area Background Measurement and Sampling Locations

TABLE 1

**EXPOSURE RATES AND RADIONUCLIDE CONCENTRATIONS IN SOIL  
LATTY AVENUE VICINITY PROPERTY NUMBER 6  
ST. LOUIS AIRPORT SITE VICINITY PROPERTIES  
ST. LOUIS, MISSOURI**

Location <sup>a</sup>	Exposure Rate at 1 m ( $\mu$ R/h)	Radionuclide Concentration (pCi/g)			
		Ra-226	Th-230	Th-232	U-238
1	6	1.0 ± 0.1 <sup>b</sup>	<3.0	1.0 ± 0.1	1.1 ± 0.3
2	5	0.9 ± 0.1	3.7 ± 2.4	1.0 ± 0.1	1.0 ± 0.3
3	6	1.0 ± 0.1	<3.4	1.0 ± 0.1	1.4 ± 0.4
4	5	0.9 ± 0.1	3.7 ± 2.3	0.9 ± 0.1	1.0 ± 0.3
5	5	0.9 ± 0.1	<4.1	1.0 ± 0.1	1.2 ± 0.3
<b>GRID 190<sup>c</sup></b>					
A	10	1.1 ± 0.1	6.7 ± 2.8	1.0 ± 0.1	1.2 ± 0.3
B	11	0.9 ± 0.1	<2.7	1.1 ± 0.1	1.2 ± 0.3
C	12	0.9 ± 0.1	2.6 ± 2.0	0.9 ± 0.1	1.0 ± 0.2
D	12	1.1 ± 0.1	6.0 ± 2.7	1.0 ± 0.1	0.9 ± 0.2
E	10	1.1 ± 0.1	<3.6	1.2 ± 0.1	1.2 ± 0.4
<b>GRID 174<sup>c</sup></b>					
A	6	1.1 ± 0.1	<3.3	1.1 ± 0.1	1.3 ± 0.4
B	6	1.2 ± 0.1	<2.9	1.2 ± 0.1	0.9 ± 0.3
C	6	1.0 ± 0.1	6.4 ± 2.8	1.1 ± 0.1	1.1 ± 0.3
D	8	1.2 ± 0.1	6.5 ± 2.8	1.1 ± 0.1	1.0 ± 0.3
E	6	1.1 ± 0.1	3.9 ± 2.2	1.1 ± 0.1	1.0 ± 0.3
<b>COMPOSITE<sup>d</sup></b>	<b>NA<sup>e</sup></b>	— <sup>f</sup>	<b>3.44 ± 0.46</b>	<b>1.12 ± 0.22</b>	—

TABLE 1 (continued)

**EXPOSURE RATES AND RADIONUCLIDE CONCENTRATIONS IN SOIL  
LATTY AVENUE VICINITY PROPERTY NUMBER 6  
ST. LOUIS AIRPORT SITE VICINITY PROPERTIES  
ST. LOUIS, MISSOURI**

Location <sup>a</sup>	Exposure Rate at 1 m ( $\mu$ R/h)	Radionuclide Concentration (pCi/g)			
		Ra-226	Th-230	Th-232	U-238
<b>GRID 180<sup>c</sup></b>					
A	6	1.2 $\pm$ 0.1	5.7 $\pm$ 2.8	1.1 $\pm$ 0.1	0.5 $\pm$ 0.3
B	6	1.4 $\pm$ 0.1	4.9 $\pm$ 2.6	1.1 $\pm$ 0.1	0.9 $\pm$ 0.3
C	7	1.2 $\pm$ 0.1	7.3 $\pm$ 2.5	1.1 $\pm$ 0.1	0.8 $\pm$ 0.3
D	6	1.1 $\pm$ 0.1	4.4 $\pm$ 2.5	1.1 $\pm$ 0.1	1.0 $\pm$ 0.3
E	7	1.3 $\pm$ 0.1	14.0 $\pm$ 3.3	1.0 $\pm$ 0.1	1.5 $\pm$ 0.4
COMPOSITE <sup>d</sup>	NA	—	6.03 $\pm$ 0.70	0.89 $\pm$ 0.19	—

<sup>a</sup>Refer to Figure 3.

<sup>b</sup>Uncertainties represent the 95% confidence level, based only on counting statistics.

<sup>c</sup>BNI grid identification numbers.

<sup>d</sup>Composite sample analyzed by alpha spectrometry.

NA = Not Applicable

— = analysis not performed

TABLE 2

**BACKGROUND EXPOSURE RATES  
AND RADIONUCLIDE CONCENTRATIONS IN SOIL SAMPLES  
ST. LOUIS AIRPORT SITE VICINITY PROPERTIES  
HAZELWOOD AND BERKELEY, MISSOURI**

Sample No.	Location <sup>a</sup>	Exposure Rate at 1 m ( $\mu$ r/h)	Radionuclide Concentration (pCi/g)			
			Ra-226	Th-230	Th-232	U-238
1	School Access Road and Harmond Road	10	1.0 $\pm$ 0.1 <sup>b</sup>	1.31 $\pm$ 0.2 <sup>c</sup>	1.1 $\pm$ 0.1	1.1 $\pm$ 0.5
2	Fee Fee Road and Duncombe Drive	10	0.7 $\pm$ 0.1		1.0 $\pm$ 0.1	0.9 $\pm$ 0.5
3	St. Ferdinand Park at St. Pierre Street	9	0.9 $\pm$ 0.1		1.1 $\pm$ 0.1	1.3 $\pm$ 0.4
4	White Birch Park	9	0.8 $\pm$ 0.1		1.1 $\pm$ 0.1	1.1 $\pm$ 0.4
5	Robert Superior Park	9	0.9 $\pm$ 0.1		1.1 $\pm$ 0.1	1.2 $\pm$ 0.4
6	St. Ann Park at St. Ambrose Lane	9	0.8 $\pm$ 0.1		1.0 $\pm$ 0.1	0.9 $\pm$ 0.3

<sup>a</sup>Refer to Figure 4.

<sup>b</sup>Uncertainties represent the 95% confidence level, based only on counting statistics.

<sup>c</sup>Composite of samples 1 through 6. Alpha spectrometry results.

## REFERENCES

Bechtel National, Inc. (BNI). Radiological Characterization Report for FUSRAP Properties in the St. Louis, Missouri Area, Volumes I-III. Oak Ridge, TN; March 1990.

U. S. Department of Energy (DOE). Radiation Protection of the Public and the Environment. Washington, DC: DOE Order 5400.5; February 1990a.

DOE Memorandum from J. Fiore to L. Price, "Uranium Cleanup Guidelines for St. Louis, MO, FUSRAP Sites," November 6, 1990b.

Oak Ridge National Laboratory (ORNL). Results of the Radiation Measurements Taken at Transportation Routes (1M004) in Hazelwood, Missouri. Oak Ridge, TN; December 1986.

Oak Ridge Institute for Science and Education (ORISE). Proposed Verification Survey Plan for the St. Louis Airport Site Vicinity Properties, St. Louis, Missouri. Oak Ridge, TN; October 19, 1994.