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Justification for Class III Permit Modification February 2004, SWMU 9, Burial Site/Open Dump, Operable Unit 1334

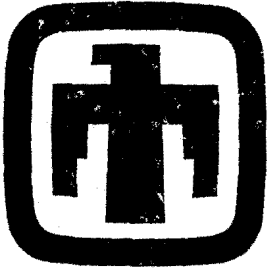
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Justification for Class III Permit Modification

February 2004

SWMU 9
Burial Site/Open Dump
Operable Unit 1334

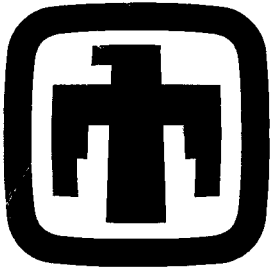
NFA Originally Submitted September 2000

Supplemental Risk Document Submitted October 2003

Environmental
Restoration
Project



United States Department of Energy
Albuquerque Operations Office



SCANNED

Sandia National Laboratories

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Burial Site/Open Dump
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Environmental
Restoration
Project



United States Department of Energy
Albuquerque Operations Office

NFA

**PROPOSAL FOR
NO FURTHER ACTION
ENVIRONMENTAL RESTORATION SITE 9
OPERABLE UNIT 1334**

Prepared by
Sandia National Laboratories/New Mexico
Environmental Restoration Project
Albuquerque, New Mexico

Prepared for the
U.S. Department of Energy

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- 10-E Risk Screening Assessment

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10.0 SOLID WASTE MANAGEMENT UNIT 9, BURIAL SITE/OPEN DUMP

10.1 Summary

Sandia National Laboratories/New Mexico (SNL/NM) is proposing a risk-based no further action (NFA) decision for Environmental Restoration (ER) Solid Waste Management Unit (SWMU) 9, Burial Site/Open Dump, Operable Unit (OU) 1334 on Kirtland Air Force Base (KAFB). SWMU 9 is an inactive site located within the former Area Z explosives testing area. Review and analysis of all relevant data for SWMU 9 indicate that concentrations of constituents of concern (COCs) at this site are less than applicable risk assessment action levels. Thus, SWMU 9 is proposed for an NFA decision based upon confirmatory sampling data demonstrating that COCs that may have been released into the environment pose an acceptable level of risk. The risk is based upon the current and projected land use, as set forth by Criterion 5. Criterion 5 states, "The SWMU/AOC [area of concern] has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use" (NMED March 1998).

10.2 Site Description and Operational History

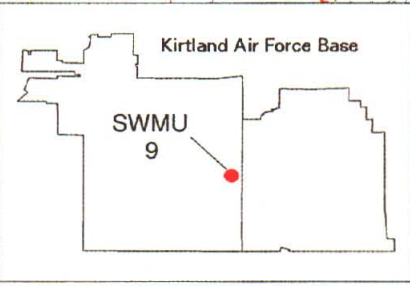
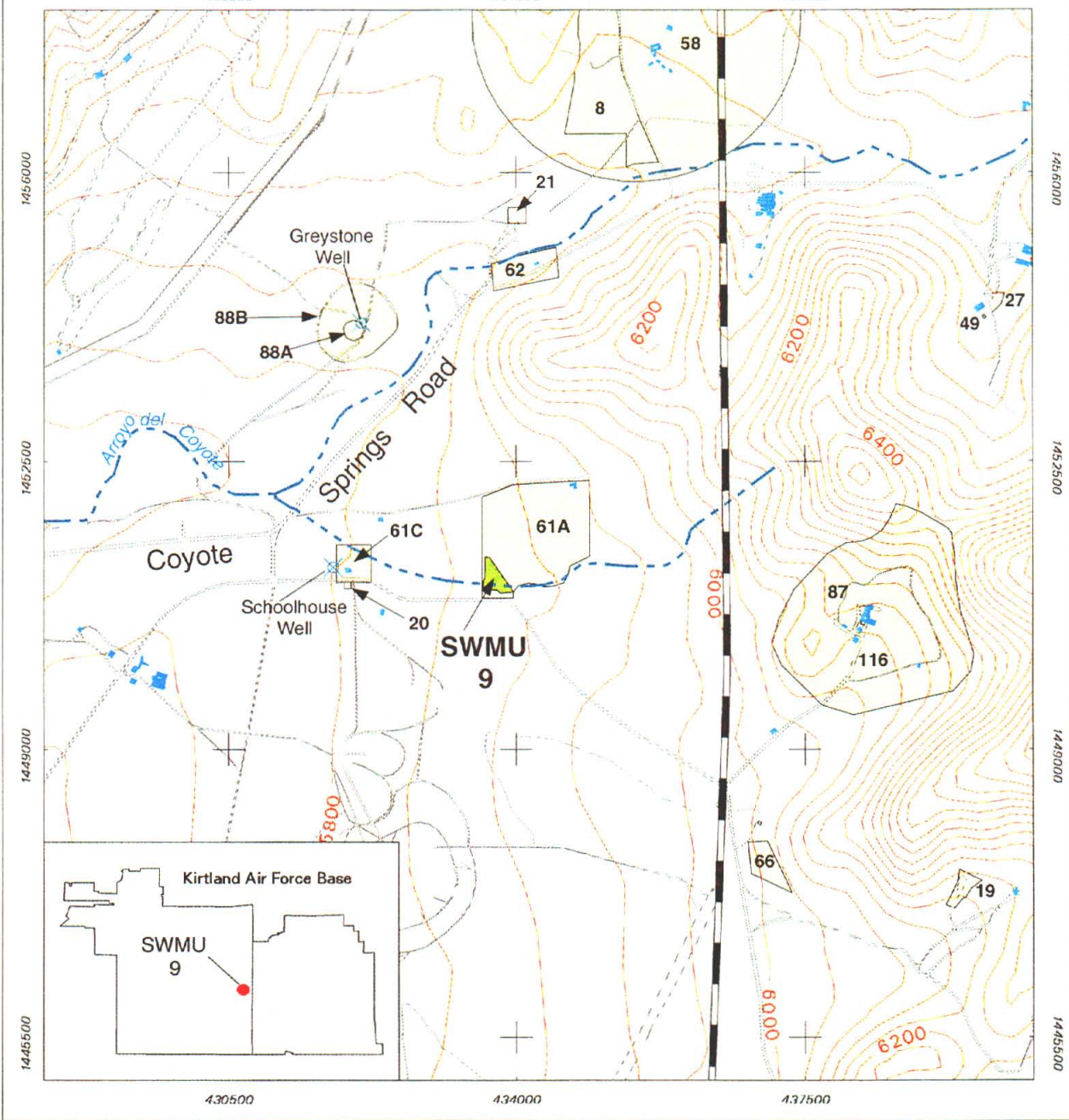
10.2.1 Site Description

SWMU 9 is located in OU 1334, which is known as the Central Coyote Test Area, and occupies 1.86 acres of land permitted to the U.S. Department of Energy (DOE) and SNL/NM and is controlled by the U.S. Air Force (USAF) (SNL/NM April 1994). SWMU 9 is an inactive site located on the north side of the KAFB Explosive Ordnance Disposal (EOD) Range approximately 1,800 feet east of the Schoolhouse Building, SWMU 61C (Figure 10.2.1-1), where an unnamed dirt road branches off to the north from Demolition Range Road and crosses an arroyo (Figure 10.2.1-2). SWMU 9 forms the southwest corner of adjacent SWMU 61A and encompasses features on the north and south arroyo banks as well as in the arroyo channel (Figure 10.2.1-3). The mean elevation of the site is 5,845 feet above mean sea level (amsl) (SNL/NM April 1994).









The original description of ER SWMU 9 included three "debris mounds" of which only the largest, Mound 1 (Figure 10.2.1-4a), was later determined to be a true soil-covered debris burial mound. Mound 1 was approximately 175 feet long and up to 8 feet high above the surrounding grade. The other two "mounds" were simply debris, dumped as either a discrete pile in the arroyo channel (Mound 2, Figure 10.2.1-4b) or as debris scattered along the south bank of the arroyo channel (Mound 3). Mound 2 debris consisted of a tangled mass of barbed wire, empty paint cans, ceramic electrical insulators, mortar shell storage cases, a military bomb rack, vehicle parts, a shrapnel-riddled iron plate, pieces of wood and metal, and building rubble (cinder blocks and glazed masonry tiles). Mound 3 debris consisted of wooden crate remnants, empty paint cans, expended smoke grenades, an empty 55-gallon (gal) drum containing a grate that appears to have been used as a grill, and other miscellaneous solid waste.

A burial pit containing radioactively contaminated materials was discovered during a voluntary corrective measure (VCM) conducted at the SWMU between 1996 and 1998. The burial pit was located about 30 feet northeast of the south end of Mound 1, was about 30 feet in diameter, and

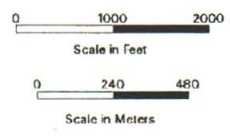
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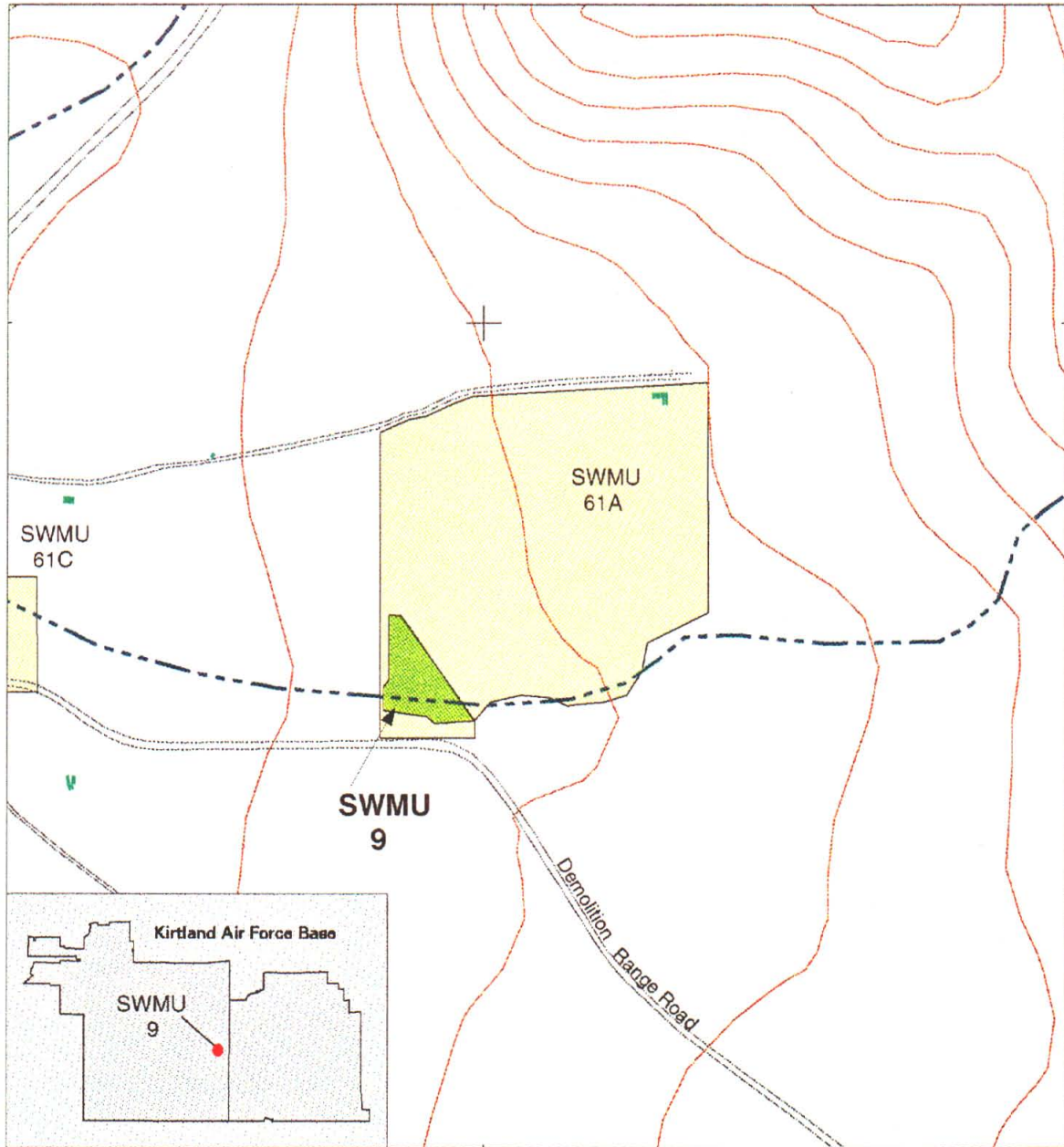
Legend

-  Monitoring Well
-  KAFB Boundary
-  Road
-  40 Foot Contour
-  Drainage
-  SWMU 9
-  Other SWMU Site
-  Building








**Figure 10.2.1-1
Location of SWMU 9
Burial Site / Open Dump**



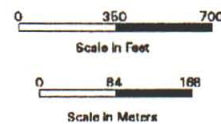
Sandia National Laboratories, New Mexico
Environmental Geographic Information System



Legend

-  KAFB Boundary
-  Road
-  40 Foot Contour
-  Drainage
-  SWMU 9
-  Other SWMU Site
-  Building

**Figure 10.2.1-2
Location of SWMU 9
Burial Site / Open Dump**



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Environmental Geographic Information System

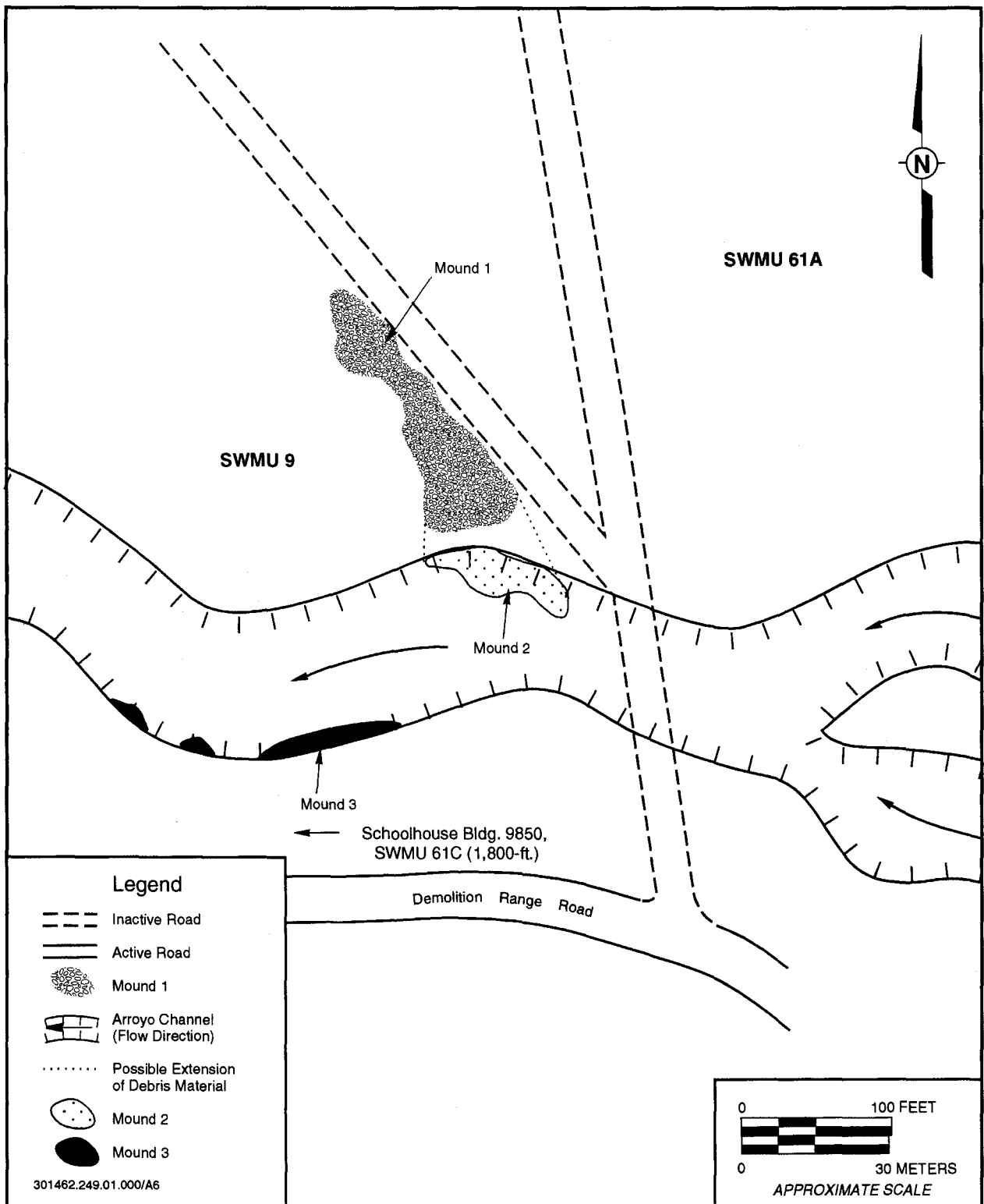


Figure 10.2.1-3
 General Location Map Showing Mounds at SWMU Site 9, Burial Site/Open Dump

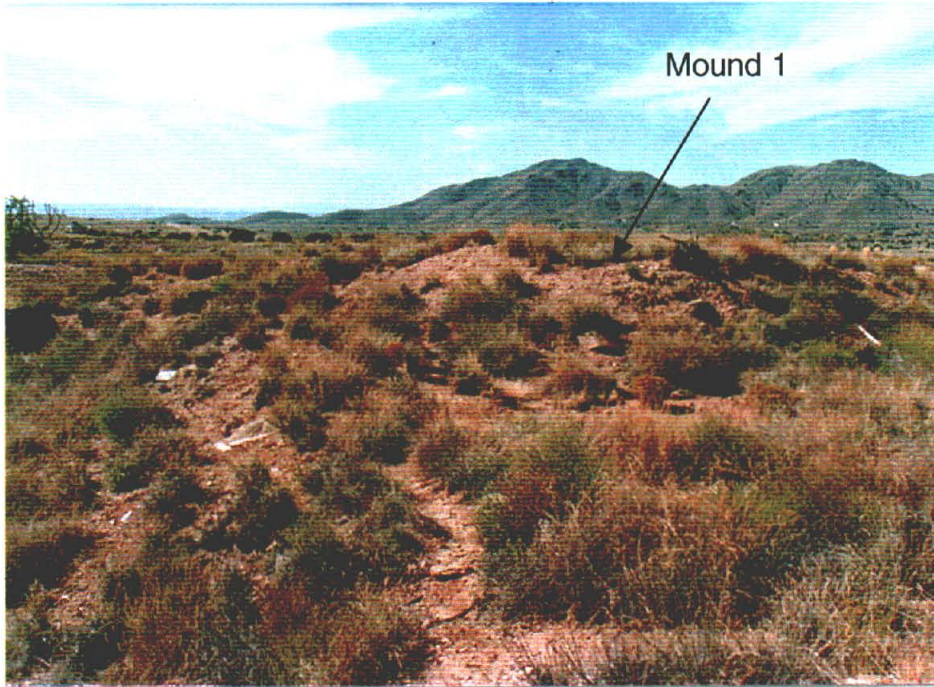


Figure 10.2.1-4a. SWMU 9 Burial Site / Open Dump. View to northwest of Mound 1 prior to excavation.

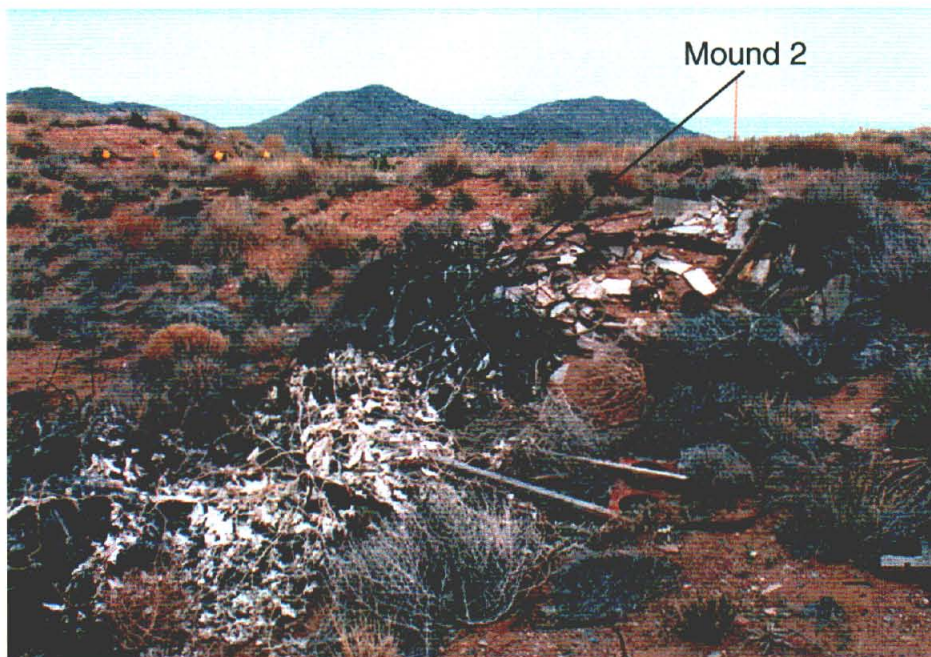


Figure 10.2.1-4b. View of debris pile originally described as Mound 2 in arroyo channel at south end of Mound 1. View to northeast.

had debris buried to a depth of about 4 feet. The VCM and burial pit are discussed in more detail in Section 10.4.5.2.

SWMU 9 is on the Arroyo del Coyote alluvial fan that is composed of Pleistocene-age, poorly to moderately sorted sediments ranging in size from clay to boulders (SNL/NM March 1995, IT May 1994). These deposits contain relatively impermeable carbonate-rich horizons and impermeable carbonate-cemented horizons that inhibit vertical groundwater flow (SNL/NM March 1995). Based upon the drilling record for the Schoolhouse Well, located approximately 2,000 feet west of SWMU 9 (Figure 10.2.1-1), the alluvial fan deposits are less than 100 feet thick and unconformably overlie the Madera Formation (SNL/NM March 1995). The Madera Formation consists of predominantly clastic limestone that contains fossiliferous, cherty limestone units with some interbedded shale, siltstone, sandstone, and pebble conglomerate (Myers and McKay 1970). To the west of SWMU 9 is the Coyote Fault, which forms the eastern margin of the Hubbell structural bench and exhibits down-to-the-west displacement. The fault is expressed geomorphically as linear range-front facets, and, as evidenced by the coincidence of Coyote Springs with the Coyote Fault (0.5 miles north of SWMU 9), probably influences groundwater pathways from the Manzanita Mountains to the alluvium (SNL/NM March 1995). The Schoolhouse Well is completed in the Madera Formation, and the depth to groundwater is approximately 95 feet below ground surface (bgs) (SNL/NM March 1997). The direction of groundwater flow in the vicinity of SWMU 9 is generally west-northwest (SNL/NM March 1997).

SWMU 9 lies along an unnamed arroyo that is a tributary to the Arroyo del Coyote (Figure 10.2.1-1). The unnamed arroyo drains a small watershed with headwaters in the western face of the Manzanita Mountains and joins Arroyo del Coyote approximately 2,800 feet northwest of the site. Arroyo del Coyote ultimately drains into Tijeras Arroyo, several miles northwest of the site.

10.2.2 Operational History

SWMU 9 is located in the former Area Z explosives testing area of the Coyote Test Field. Prior to its use by SNL/NM, this area was the setting for early homesteads, agriculture, ranching, and recreational activities. In 1957, in an agreement with the Atomic Energy Commission, the Armed Forces Special Weapons Project was granted the use of Areas X, Y, and Z (Figure 10.2.2-1). Area Z was designated as a test area for up to 250-pound high explosives (HE) tests. (SNL/NM September 1966).

The earliest air photos of the area in 1951 show the first evidence of manmade features at SWMU 9 (USGS 1951). In a 1967 photo (USGS 1967), activity has commenced at adjacent SWMU 61A and an access road between the two sites is present. A 1971 air photo (USGS 1971) shows a mound similar to the undisturbed Mound 1. No further activities are evident in subsequent 1975 and 1991 air photos (USGS 1975, 1991) indicating the sites were apparently abandoned between 1971 and 1975.

For a detailed discussion regarding the local setting at SWMU 9, refer to the "RCRA [Resource Conservation and Recovery Act] Facility Investigation [RFI] Work Plan for OU 1334, Central Coyote Test Area" (SNL/NM October 1994).

No documents or references related to operational activities at SWMU 9 were discovered during the initial phases of the site investigation. The debris, particularly that exposed in Mound 1, was

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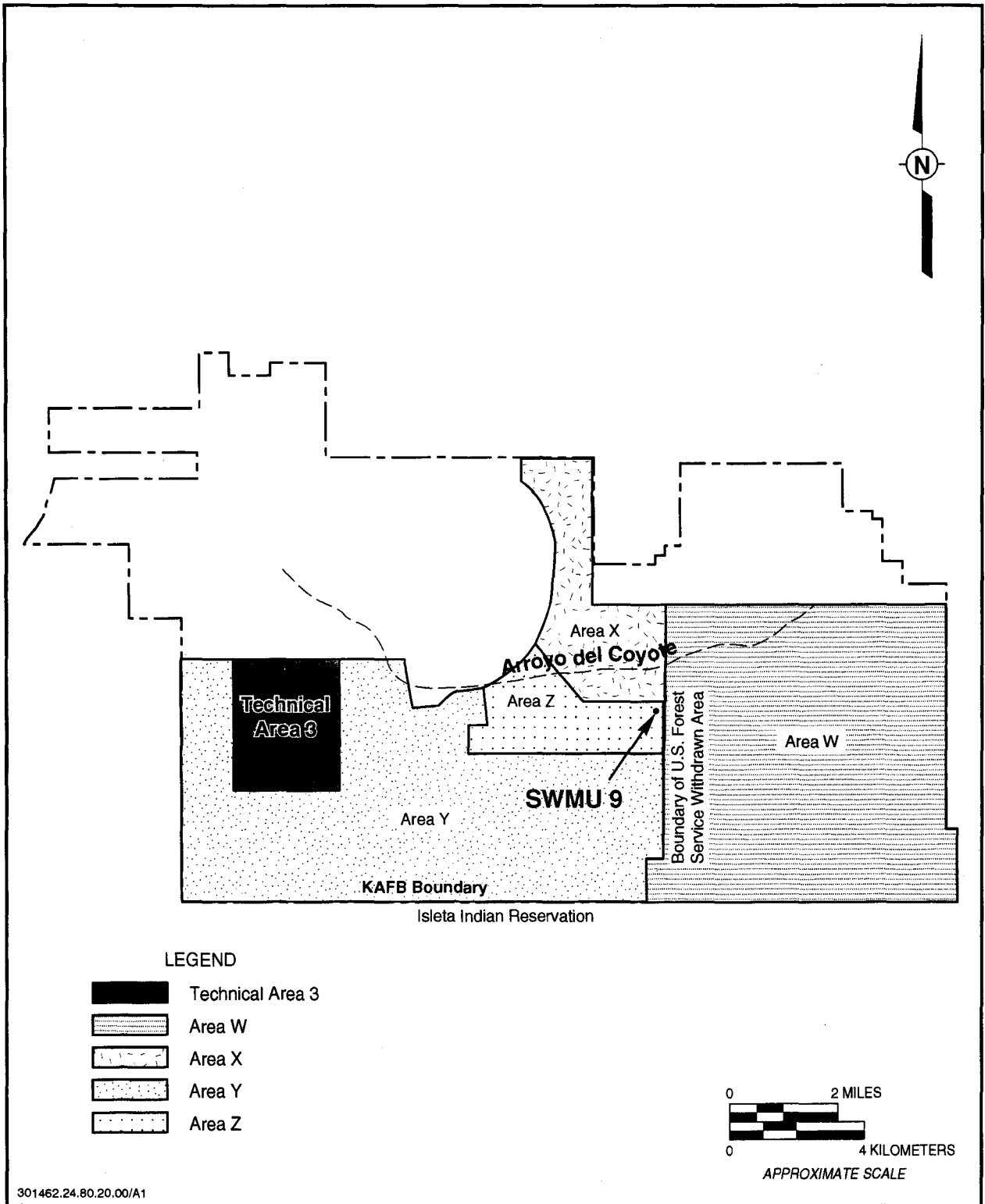


Figure 10.2.2-1
Location of Former Coyote Test Field Areas and SWMU 9

thought to have come from testing activities at adjacent SWMU 61A, although that speculation could not be confirmed in interviews with SNL/NM and KAFB workers, as detailed in Section 10.4.3.1.1. In 1999, a retired worker confirmed that SWMU 9 was used as an unregulated open dump for test debris and trash generated in the local area (Pavletich March 1999).

10.3 Land Use

10.3.1 Current

SWMU 9 is located on land owned by the USAF and permitted to the DOE and SNL/NM. The current land use is industrial (Figure 10.3.1-1).

10.3.2 Future/Proposed

For future use planning, SWMU 9 has been recommended for industrial land use purposes (DOE and USAF March 1996).

10.4 Investigatory Activities

10.4.1 Summary

SWMU 9 was identified during investigations conducted under the DOE Comprehensive Environmental Assessment and Response Program (CEARP) and RCRA Facility Assessment (RFA) in the mid-1980s in conformance with the Comprehensive Environmental Response, Compensation, and Liability Act (Investigation #1). In 1992, preliminary investigations included background information reviews, personnel interviews, field surveys, and scoping sampling (Investigation #2). In 1996, preliminary RFI soil sampling included trenching and sampling the mounds (Investigation #3). A radiological VCM to excavate Mounds 1 and 2 was also started in 1996, and, after completion in 1999, was followed by confirmatory soil sampling (Investigation #4).

10.4.2 Investigation #1—CEARP

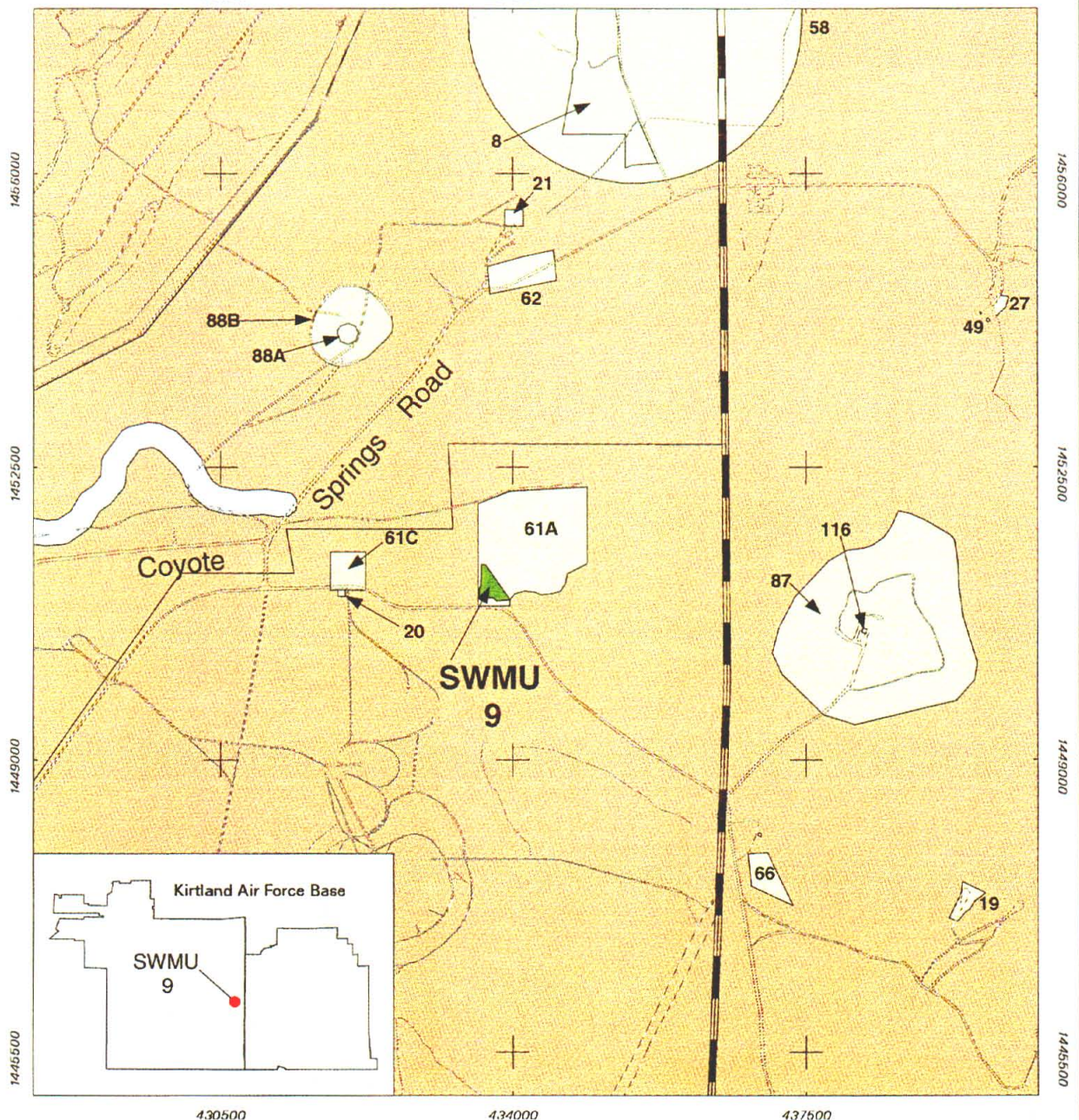
10.4.2.1 *CEARP Sampling Data Collection*

No sampling activities were performed at SWMU 9 as part of the CEARP.

10.4.2.2 *CEARP Data Gaps*

A lack of information prevented calculating the Hazard Ranking System (HRS) and Modified HRS migration mode scores.

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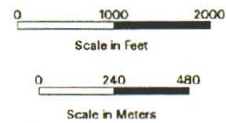
-  KAFB Boundary
-  Road
-  SWMU 9
-  Other SWMUs
-  Recreational Land Use
-  Industrial Land Use

Figure 10.3.1-1
SWMU 9: Burial Site/Open Dump
and Associated Land Uses
within KAFB Boundary and Vicinity



Sandia National Laboratories, New Mexico
 Environmental Geographic Information System

10.4.2.3 *CEARP Results and Conclusions*

The CEARP finding was uncertain for Federal Facility Site Discovery and identification findings, preliminary assessment, and preliminary site inspection (DOE September 1987).

10.4.3 Investigation #2—SNL/NM ER Project Preliminary Investigations

10.4.3.1 *Nonsampling Data Collection*

10.4.3.1.1 *Background Review*

A background review was conducted to collect available and relevant information regarding SWMU 9. Background information sources included interviews with current and former SNL/NM staff and contractors familiar with area operations, site operational history, and existing historical site records and reports. No specific information on-site activities at SWMU 9 or adjacent SWMU 61A was discovered until a retired worker confirmed that SWMU 9 was used as an open dump for test debris and trash generated in the local area (Pavletich March 1999). The study was completely documented and has provided traceable references that sustain the integrity of the NFA proposal. Table 10.4.3-1 lists the information sources that were used to assist in this background review.

10.4.3.1.2 *Unexploded Ordnance/High Explosives Survey*

In November 1993, KAFB EOD personnel conducted a visual survey for unexploded ordnance (UXO)/HE at Schoolhouse Mesa Test Sites that included SWMUs 20, 61C, 61A, and 9. UXO/HE materials identified and removed included one live ground burst simulator and one pound of HE fragments at SWMU 61A. Ordnance debris that was collected and removed from these four sites included six smoke grenades, two flare-illuminating cartridges, and three 40-millimeter white star parachute cartridges. These materials were associated with recent Department of Defense (DoD) war game exercises conducted throughout the Schoolhouse Mesa area. No live UXO/HE was found on the surface of the three mounds at SWMU 9.

10.4.3.1.3 *Radiological Surveys*

On January 6, 1993, SNL/NM Radiation Protection Office personnel conducted a beta/gamma radiation survey at the site with a Geiger-Muller detector and pancake probe. No activity above background was detected at the debris mounds or at a shallow surface depression located approximately 70 feet east-northeast of Mound 1 inside SWMU 61A.

A Phase I surface gamma radiation survey was conducted in conjunction with SWMUs 7, 61C, and 20 during February and April 1994. These surveys covered a total of 39.5 acres. For ease of reference and because SWMU 61A surrounds SWMU 9, all relevant radiological data were designated as SWMU 61A. A gamma scan survey was performed at 10-foot centers (70-percent coverage) over the surface of SWMU 61A and at 6-foot centers (100-percent coverage) over the surface of SWMU 9. Because no anomalies were detected within the

Table 10.4.3-1
Summary of Background Information Reviewed for SWMU 9

Information source	Reference
Technical test reports and project log books	None
Engineering drawings/maps	Basic Information, Reservation Boundary and Ownership (test Areas), October 7, 1954
Site Inspections (field notes, aerial photograph review, site photographs, radiological, UXO/HE, biological, and cultural resource surveys)	Fritz and Perkins March 1985 Martz May 1985 Bayliss July 1992 Byrd et al. July 1992 Gaither July 1992 Lojek November 1992 Lojek January 1993a Lojek January 1993b Lojek January 1993c Lojek February 1993 Sandhaus February 1994a Lojek March 1994 Young September 1994
Employee interviews, 22 interviews with 12 facility personnel (current and retired)	Gaither and Byrd June 1992 Bayliss July 1992 Byrd et al. July 1992 Gaither July 1992 Lojek December 1992 Lojek January 1993d Lojek January 1993e Lojek January 1993f Lojek January 1993g Cooper and Sandhaus December 1993 Cooper and Sandhaus February 1994 Sandhaus February 1994b Sandhaus February 1994c Lojek and Sandhaus March 1994 Peters and Sandhaus March 1994 Sandhaus March 1994 Sandhaus April 1994 Pavletich March 1999

HE = High explosives(s).
UXO = Unexploded ordnance.

eastern portion of the survey grid, the far eastern portion of SWMU 61A was not surveyed. During the survey, 63 point sources and 11 area sources of gamma activity at 30 percent or more above the natural background activity of 12 microrentgens (μR) per hour (hr) were identified at SWMUs 61A and 9. Three of the point sources were fragments of oxidized depleted uranium (schoepite [DU]) (RUST Geotech Inc. December 1994). One point-source anomaly was detected at 18 $\mu\text{R/hr}$ in the southeast corner of Mound 1. Figure 10.4.3-1 shows the survey boundaries and anomalies found during the Phase I survey. At that time, it was believed that the radioactive material was deposited by testing activities at SWMU 61A and that no radioactive material had been disposed of in the debris mounds. A detailed summary of the survey and anomalies found at these SWMUs is presented in Section 5.7.1 of the Surface Gamma Radiation Surveys Final Report (RUST Geotech Inc. December 1994).

VCM activities were conducted at SWMUs 61A and 9 during March 1995 and February, March, May, July, and October 1996. Point sources identified during the Phase I survey were removed in March 1995. In February 1996, SWMU 61A was resurveyed on 6-foot centers (100-percent coverage), and additional point and area sources that were discovered were remediated as the schedule permitted in February, March, May, and July 1996.

10.4.3.1.4 Cultural Resources Survey

A cultural resources survey was conducted as part of the SNL/NM sitewide environmental assessment. No cultural resources were identified at SWMU 9 (Hoagland and Dello-Russo February 1995).

10.4.3.1.5 Sensitive Species Survey

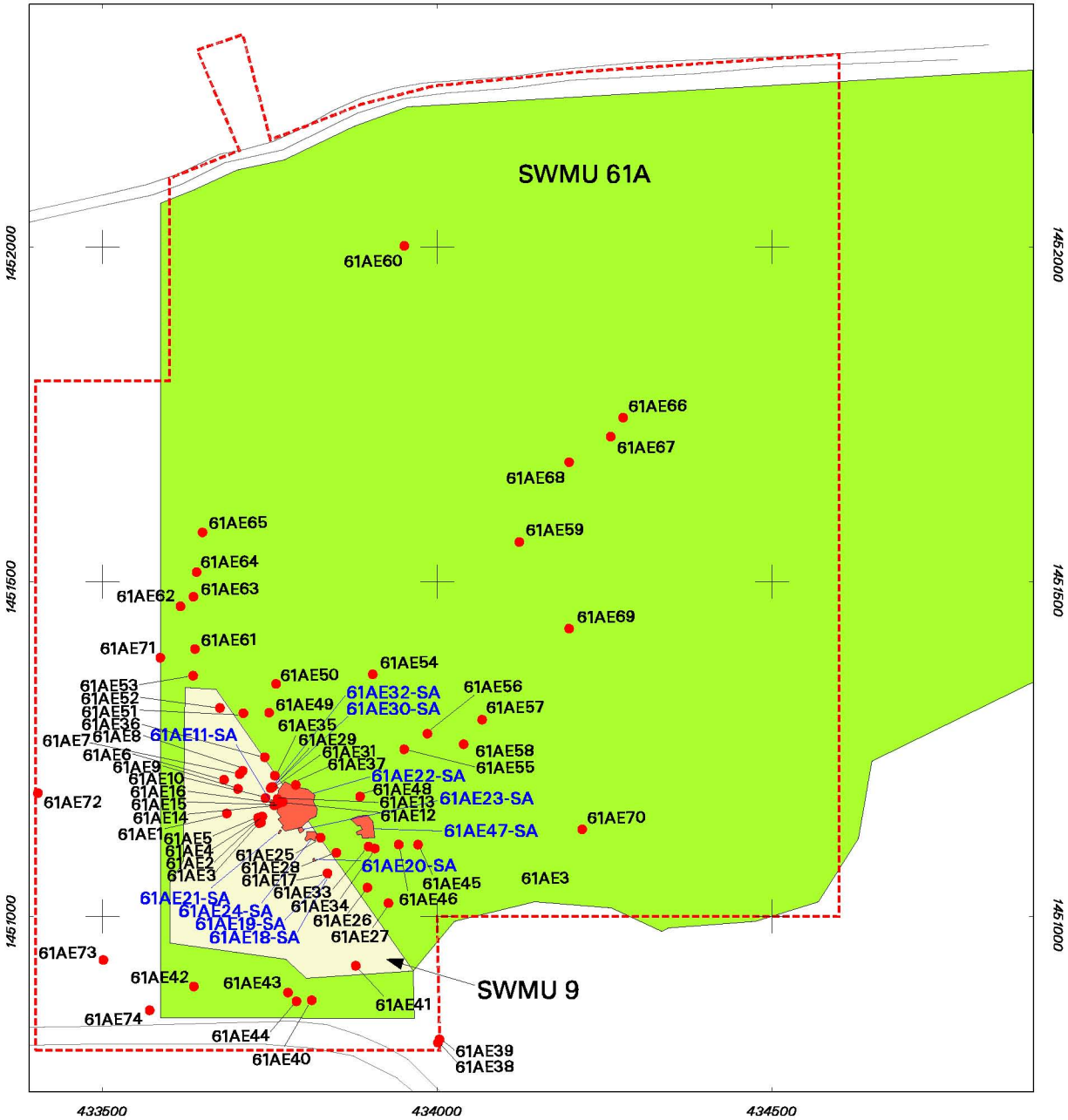
A sensitive species survey performed at SWMU 9 in 1994 did not indicate that any sensitive species were present on the site (IT February 1995).

10.4.3.2 Scoping Soil Sampling Data Collection

In June 1995, SWMU 9 was investigated as part of a sitewide scoping sampling program, which was established to obtain preliminary analytical data to support the ER Project site ranking and prioritization. A single soil sample was collected from the 0- to 0.5-foot depth interval from each of the three mounds. Another soil sample was collected south of Demolition Range Road for background metals and radionuclide comparison. The four samples were analyzed at the SNL/NM Environmental Restoration Chemistry Laboratory (ERCL) for RCRA metals plus beryllium, HE (by high pressure liquid chromatography [HPLC]), and total petroleum hydrocarbons (by immunoassay). The samples were also analyzed by gamma spectroscopy at the SNL/NM Radiation Protection Sample Diagnostics (RPSD) Laboratory. No quality assurance (QA)/quality control (QC) samples were collected.

This data is not included with this NFA proposal or used in any risk screening assessment. The high detection limits for metals and radionuclide analyses prevent a comparison with NMED-approved background values. No petroleum hydrocarbons were detected with the immunoassay analyses, and no HE compounds were detected by HPLC. No statement could

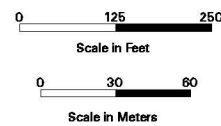
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Legend

- 61AE74 Point Source Gamma Radiation Anomaly (Elevated relative to site specific background)
- Road
- Rad Survey Boundary
- SWMU 61A - Schoolhouse Mesa Test Site: Blast Site
- SWMU 9 - Burial Site Open Dump
- 61AE18-SA Area Source Gamma Radiation Anomaly (Elevated relative to site specific background)

Figure 10.4.3-1
Phase I Survey Radiation Anomalies at
SWMU 61A: Schoolhouse Mesa
Test Site: Blast Site and
SWMU 9: Burial Site / Open Dump



be made about possible radiological contamination because of the high minimum detectable activities (MDAs) for the gamma spectroscopy analyses.

10.4.3.3 *Preliminary Investigations Data Gaps*

Information gathered from site visits, radiological surveys, and personnel interviews aided in identifying the most likely COCs at SWMU 9 and selecting the types of analyses to be performed on soil samples. However, the scoping sample data was not adequate to support a risk screening assessment. The data was insufficient to determine if radiological materials were present in the mounds.

10.4.3.4 *Preliminary Investigations Results and Conclusions*

The analytical data from the scoping sampling was inadequate to define possible soil contamination at SWMU 9.

10.4.4 Investigation #3—SNL/NM ER Project 1996 RFI Sampling

10.4.4.1 *1996 RFI Nonsampling Data Collection*

No new site information was discovered prior to this phase of the investigation.

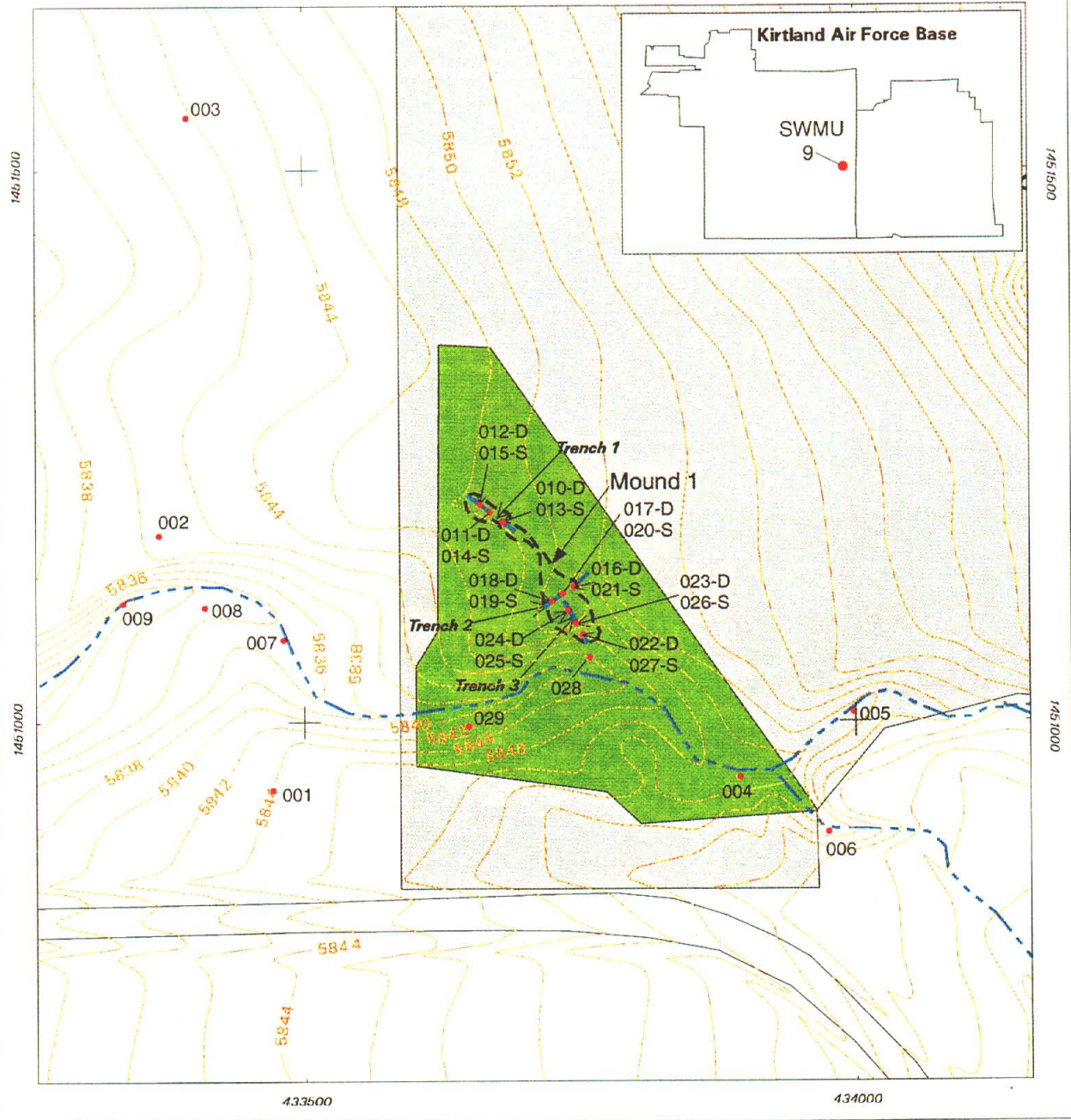
10.4.4.2 *1996 RFI Sampling Data Collection*

In June 1996, SWMU 9 was sampled according to the strategy, methodology, and procedures outlined in the OU 1334 RFI Work Plan (SNL/NM October 1994), as reviewed by the New Mexico Environment Department (NMED) and the U.S. Environmental Protection Agency (EPA). However, pursuant to draft EPA comments on the Work Plan (EPA November 1995), the sampling depth for subsurface samples was redefined as 0.5 to 1.0 feet bgs instead of the proposed 1.5 to 2.0 feet bgs.

The samples were identified by the following scheme: CCTA-09-GR-001-0-0.5-S, where CCTA-09-GR specifies that this is a grab sample (GR) taken from the Central Coyote Test Area at SWMU 9. "001" indicates the sample location at SWMU 9, as shown on Figures 10.4.4-1 and 10.4.4-2. "0-0.5" is the sample interval (feet bgs). The final character (S, D, DU, EB, TB) identifies the type of sample (soil, debris, duplicate, equipment blank, or trip blank, respectively).

Site-specific background soil and arroyo channel sediment samples were collected to establish site-specific background concentrations and activities for metals and radionuclides. Background soil samples were collected from three locations in the western portion of the site (locations 001-003 on Figure 10.4.4-1) and background arroyo sediment samples were collected from three locations upstream of the Mound 1 area (locations 004-006 on Figure 10.4.4-1). Samples were collected from the surface (0 to 0.5 feet bgs) and subsurface (0.5 to 1.0 feet bgs) at these locations and were analyzed for gamma spectroscopy, RCRA metals plus beryllium, isotopic uranium, and isotopic thorium.

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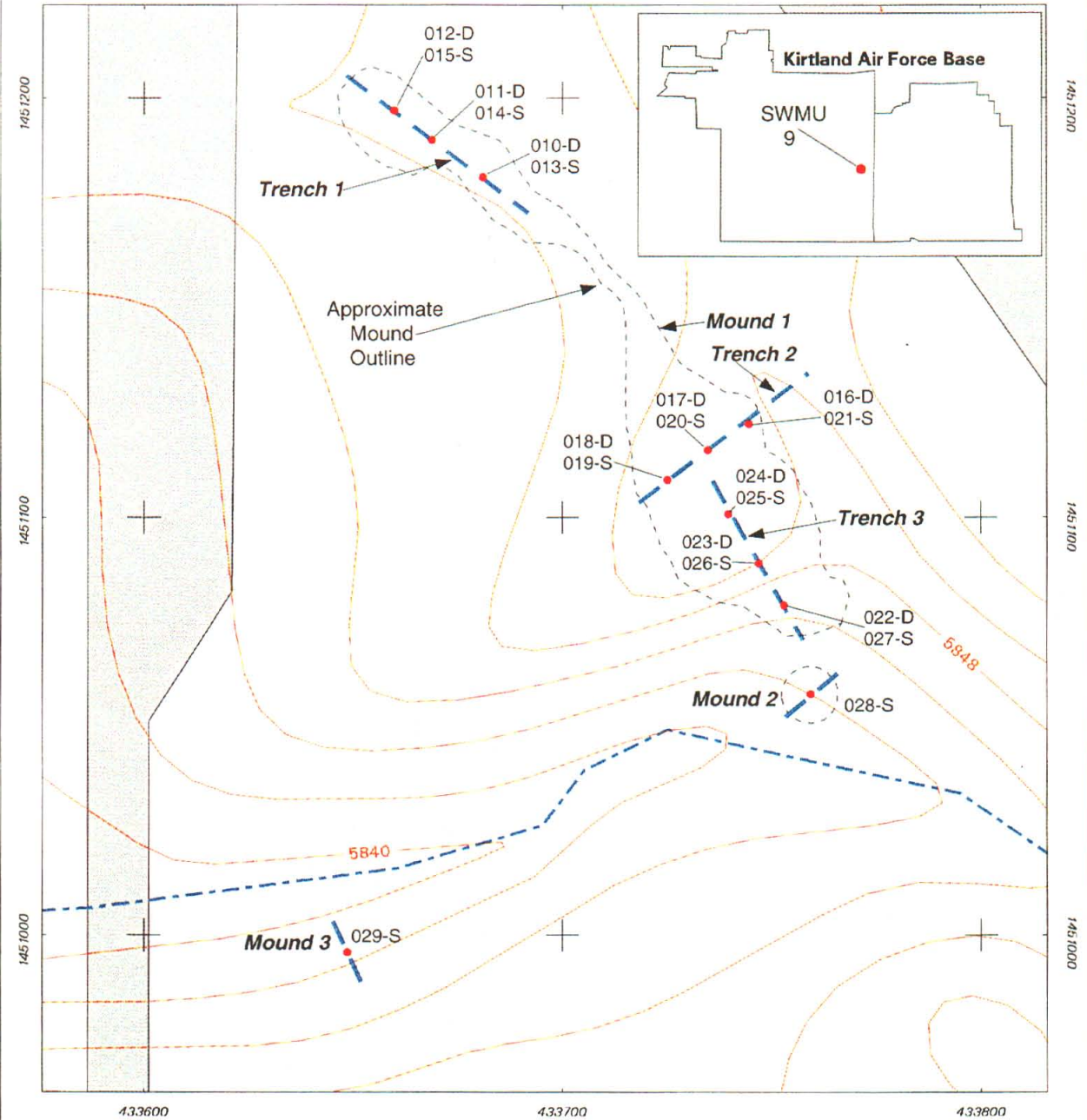
Legend

- 001 Sampling Location & Identification
- SWMU 9
- SWMU 61A
- Trench
- - - Mound Outline
- - - Surface Drainage
- Road
- 2 Ft Contour

Figure 10.4.4-1
1996 & 1999 RFI Soil Sampling
Locations at SWMU 9,
Burial Site / Open Dump



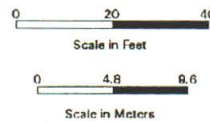
Sandia National Laboratories, New Mexico
Environmental Geographic Information System



Legend

- 028-S Sampling Location & Identification (-D=Debris, -S=Soil)
- Trench
- Mound
- 2 Ft Contour (Previous Topology)
- Surface Drainage
- SWMU 61A

Figure 10.4.4-2
1996 RFI Soil Sampling Locations
Mounds 1, 2, & 3 at SWMU 9,
Burial Site / Open Dump



Sandia National Laboratories, New Mexico
Environmental Geographic Information System

To check for possible contaminant migration downstream, arroyo channel sediment samples were collected downstream of Mound 3 (locations 007-009 on Figure 10.4.4-1) and analyzed for gamma spectroscopy, RCRA metals plus beryllium, HE, and semivolatile organic compounds (SVOCs).

Trenches were excavated across the three mounds to determine the extent and possible types of buried debris and to collect samples for characterization. One sample was collected from the trench excavated across Mound 2, and another sample was collected from the trench excavated across Mound 3 (locations 028 and 029, respectively, on Figure 10.4.4-2). Samples were analyzed for gamma spectroscopy, RCRA metals plus beryllium, HE, and SVOCs.

Three trenches were excavated across Mound 1, and samples were collected at three locations along each trench (Figure 10.4.4-2). At each of the nine locations, two samples were collected. The first sample was collected at the approximate center of the mound. The second sample was collected below the point of contact of the mound with native material at each location. All of these samples were analyzed for gamma spectroscopy, RCRA metals plus beryllium, HE, and SVOCs. The center of the mound samples were also analyzed for toxicity characteristic leaching procedure (TCLP) SVOCs and TCLP metals.

RCRA metals plus beryllium, HE, volatile organic compounds (VOCs), and gamma spectroscopy samples were analyzed at SNL/NM ERCL and RPSD on-site laboratories. Isotopic uranium, isotopic thorium, SVOCs, TCLP metals, TCLP SVOCs, and duplicates of some metals and HE samples were analyzed by Lockheed Analytical Services, Las Vegas, Nevada. Off-site samples were analyzed for RCRA metals plus beryllium and TCLP metals by EPA Method 6010/7000, for HE compounds using EPA Method 8330, for SVOCs and TCLP SVOCs using EPA Method 8270, for isotopic uranium and thorium by HASL-300, and for gamma spectroscopy by EPA Method 901.1.

10.4.4.3 1996 RFI Sampling Results and Conclusions

The analytical data indicated that Mound 1 contained radioactive materials (DU), VOCs, and HE residues. The isotopic analyses of the site-specific and arroyo sediment background samples (Table A-10, Annex A) indicated that slightly elevated thorium-232 activities might be naturally occurring at the SWMU.

The three trenches across Mound 1 (Figure 10.4.4-2) showed that only the southern end contained buried wastes, while the northern end was composed only of burlap bags filled with crushed granite. A shallow depression along the northwest side of Mound 1 indicated that it might have been used as protective berm during testing at SWMU 61A. The burned and buried debris exposed in Trenches 2 and 3 at the south end of Mound 1 consisted of shrapnel-riddled galvanized steel and metal-plate test stands, steel I-beams, wire and cable, metal tubing, plastic sheeting, concrete pieces, cans and bottles, burned wood and paper, and glazed tile fragments. The trench excavated across Mound 2 revealed that it was simply a pile of debris dumped in the arroyo and was not an extension of Mound 1 (location 028, Figure 10.4.4-2). The trench into Mound 3 showed that this feature was a natural terrace deposit with debris scattered on the surface rather than a burial mound (location 029, Figure 10.4.4-2). A VCM was planned to excavate, characterize, and dispose of the materials in the south end of Mound 1 and to characterize and dispose of the materials from Mounds 2 and 3.

Because of analytical problems such as method detection limits (MDLs) or MDAs above the NMED-approved background values, the on-site laboratory analytical data quality was considered unsuitable for site characterization or for use in risk assessments. To avoid confusion, the 1996 on-site laboratory data is not presented in this NFA proposal.

The limited amount of off-site laboratory analytical data was insufficient for complete site characterization. Only the seven HE soil samples from the north end of Mound 1 were included in the risk assessment evaluations since this portion of the mound will remain on site. The southern end of the mound was excavated and characterized separately for later disposal determination. On-site gamma spectroscopy results, off-site analytical data, and method detection limits are presented in Tables A-1 through A-10 in Annex A.

Following the VCM to excavate Mound 1 and to remove the debris from Mounds 2 and 3, the site was resampled, as described in Section 10.4.5.3.

10.4.4.4 1996 RFI Data Gaps

The available data was insufficient to adequately characterize the site or to perform risk assessments. However, the data indicated that the south end of Mound 1 contained radioactive material, mainly DU. The materials exposed during the Mound 1 trenching also indicated that the scope of work would be much larger than anticipated in the OU 1334 Work Plan. A VCM to excavate and manage potential mixed wastes was performed, as described in Section 10.4.5.

10.4.4.5 Data Quality

The SNL/NM ERCL Laboratory data was unsuitable for site characterization and for use in risk assessments, and there was insufficient off-site analytical data for complete site characterization and risk assessment purposes. However, a number of QA/QC samples were collected, and the results are included in the respective analytical results tables in Annex A. The equipment blanks associated with seven HE soil samples analyzed at the off-site laboratory are included in the risk assessment data set and did not contain any HE compounds.

10.4.4.6 Data Validation

All off-site laboratory results were reviewed and verified/validated according to "Data Verification/Validation Level 3—DV-3" in Attachment C of the Technical Operating Procedure 94-03, Rev. 0 (SNL/NM July 1994). In addition, SNL/NM Department 7713 (RPSD Laboratory) reviewed all gamma spectroscopy results according to "Laboratory Data Review Guidelines," Procedure No. RPSD-02-11, Issue No. 2 (SNL/NM July 1996). Annex A contains the off-site data validation reports for the HE data (the only data from the 1996 sampling included in the risk assessments).

10.4.5 Investigation #4-SNL/NM ER Project Voluntary Corrective Measure and 1999 RFI Confirmatory Sampling

The following sections discuss the radiological VCM, waste management activities, and 1999 RFI confirmatory sampling activities at SWMU 9.

10.4.5.1 *VCM and 1999 RFI Nonsampling Data Collection*

In a March 1999 interview, a former DoD employee confirmed that SWMU 9 was used as a general dump by area workers (Pavletich March 1999). This employee did not have any knowledge of radioactive material disposal in the mound or at the SWMU.

10.4.5.2 *VCM Activities*

Soil samples collected from the exploratory trenches across the southern end of Mound 1 during the June 1996 RFI sampling indicated radioactive (DU) contamination. A subsequent gamma radiation survey of Mound 1 in October 1996 also indicated contamination in the soil and on some of the excavated materials. Also in October of 1996, SNL/NM began to excavate Mound 1 as a VCM and to segregate radioactive materials for proper disposal.

A backhoe was used to excavate Mound 1 because it was evident that the lateral and vertical extent of contaminated materials would exceed the capabilities of manual excavation and clean-up procedures. Excavated materials (soil and small debris pieces) were spread out in a 6-inch thick layer and surveyed for elevated radiation readings (alpha and beta-gamma). Any materials with radiation readings above 1.3 times background were segregated for additional characterization and disposal. Radioactive soil and small contaminated debris pieces were placed into lined 55-gallon drums. Clean (i.e., non-radioactive) soil and small debris pieces were stockpiled on site in soil piles. Larger debris pieces were surveyed individually and segregated. The drums and soil piles were later sampled for waste characterization, as described below. Contamination on the larger debris pieces usually could be removed by scraping or wiping. The contaminated materials (soil, rust, DU) removed in this fashion were isolated and placed into the lined 55-gallon drums. Additional details of clean-up procedures are presented in the Final Report, Survey and Removal of Radioactive Surface Contamination at Environmental Restoration Sites, Sandia National Laboratories/New Mexico (SNL/NM September 1997).

The VCM was stopped after 10 days when UXO (a rocket warhead and a 5-inch diameter artillery shell) was encountered in the excavation. The open excavation was covered with soil and additional safety precautions and procedures were scheduled for implementation. However, due to budgetary restrictions, the VCM could not be resumed until June 1998. The Mound 1 excavation and surveying continued for one week in June and the first two weeks of August 1998, when it was finally completed.

A small burial pit containing DU-contaminated soil and debris was also discovered about 10 feet east of Mound 1. The pit was excavated during the June 1998 portion of the VCM.

The debris scattered in the arroyo (Mound 2) and on the arroyo terrace (Mound 3) was picked-up and surveyed for radiation in August 1998. Mound 2 debris consisted of a tangled mass of

barbed wire, empty paint cans, ceramic electrical insulators, mortar shell storage cases, a military bomb rack, vehicle parts, a shrapnel-riddled iron plate, pieces of wood and metal, and building rubble (cinder blocks and glazed masonry tiles). Mound 3 debris consisted of wooden crate remnants, empty paint cans, expended smoke grenades, an empty 55-gallon drum containing a grate that appears to have been used as a grill, and other miscellaneous solid waste. No radioactive contamination was found on the materials from Mounds 2 or 3.

Debris excavated from Mound 1 included shrapnel-riddled and blasted galvanized sheet metal forms and sheets, steel plates, iron beams, shipping containers, empty 55-gallon drums, weapon transport racks, construction rubble (cinder blocks, concrete blocks, glazed tiles, plumbing pipes, a small amount of Transite™ tiles), plastic wrappers for C-4 high explosive charges, burned wood and paper, wiring, unexploded ordnance (3- and 5-inch diameter artillery shells), spent fuze lines, paper, broken glass, and various beverage containers. Scattered pockets of radioactive materials (schoepite [DU] and DU-contaminated debris) were found in Mound 1. The wide variety of materials found agrees with the former employee's report that the site was used as a general dump for area activities (Pavletich March 1999).

When the VCM was completed in August 1998, approximately 520 cubic yards of soil had been excavated and screened from the southern portion of Mound 1. As mentioned earlier (Section 10.4.4.3), only the southern end of Mound 1 contained buried wastes. The northern end of the mound, consisting of burlap bags filled with crushed granite, was not excavated during the VCM.

The excavated soil is currently stored on site in 13 soil piles (each approximately 40 cubic yards) near the north end of Mound 1. With regulatory approval, the soil piles will be processed to remove as much debris as possible and then will be buried in the northern portion of the site. The scrap metal from Mounds 1, 2, and 3 is staged near the soil piles awaiting a waste disposal determination.

10.4.5.2.1 VCM Waste Management Activities

When the VCM was completed in August 1998, a total of 18 55-gallon drums of contaminated waste (soil and small debris pieces) and approximately 50 cubic yards of scrap metal had been excavated from Mound 1 and picked up from Mounds 2 and 3, and 520 cubic yards of soil had been excavated and surveyed from Mound 1 and the burial pit.

The 18 drums of contaminated soil and debris was sampled in September 1998 and were determined to be mixed waste. These waste drums were shipped to Envirocare of Utah for disposal by SNL/NM Waste Management.

Following the VCM stoppage in October 1996, approximately 30 cubic yards of scrap metal were disposed of as nonregulated waste by SNL/NM Waste Management. The remaining 20 cubic yards of scrap metal pieces (steel beams and sheets, empty drums, and weapon transport racks) are currently stored on site pending release and off-site disposal approval by SNL/NM Waste Management.

The 520 cubic yards of excavated soil and small debris pieces were stored in 13 soil piles on site and were sampled for waste characterization. When it became possible to consider the soil for redeposition on site, the piles were resampled for use in the SWMU 9 risk assessment

evaluation. These sampling results and ultimate disposition of the soil piles are discussed below in Section 10.4.5.2.2.

10.4.5.2.2 VCM Soil Pile Sampling

The 520 cubic yards of soil and small debris pieces in the 13 soil piles were extensively sampled for waste characterization in September, October, and November 1998. In February 1999, SNL/NM Waste Management determined that the soil and debris did not contain any RCRA-regulated waste. The piles were resampled in March and October 1999 and May 2000 to determine if COC concentrations would exceed acceptable risk assessment values and prohibit on-site redeposition.

Soil pile samples are identified by the following scheme: CCTA-09-VCM-Pile1-N, where VCM-Pile1 specifies that this was a VCM soil sample taken from Pile 1. The final character (N, S) identifies the sample location as being from the north or south side of the pile.

Twenty-six soil samples were collected from the 13 soil piles (one from the north and one from the south side of each pile). The samples were analyzed for: Target Analyte List (TAL) metals plus uranium, TCLP metals plus copper, zinc and mercury, VOCs, and TCLP VOCs, SVOCs, and TCLP SVOCs, HE, isotopic uranium, isotopic thorium, gamma spectroscopy, and tritium. The analytical results are in Tables B-1 through B-13 in Annex B and are summarized below. The results for all 26 soil samples were included in the risk assessment. The QA/QC is discussed in Section 10.4.5.4.1.

Soil pile sample analyses were performed off site at Core Laboratories Denver, Colorado, and the Casper, Wyoming, facilities. Samples were analyzed for TCLP and TAL metals plus total uranium by EPA Method 6010/7000, for HE compounds using EPA Method 8330, for SVOCs and TCLP SVOCs using EPA Method 8270, for VOCs and TCLP VOCs using EPA Method 8260A, for tritium by EPA Method 906.0, for isotopic uranium and thorium by HASL-300, and for gamma spectroscopy by EPA 901.1. Tritium, gamma spectroscopy, isotopic uranium, and isotopic thorium analyses were performed at the Casper, Wyoming, facility. Gamma spectroscopy analyses were also performed on site at the SNL/NM RPSD Laboratory.

Because of low soil moisture content, only 6 of the 26 soil pile samples could actually be analyzed for tritium. The low moisture content of these six samples also produced biased-high results, and two of the piles were resampled for confirmation. The second set of analyses were performed in October 1999 by General Engineering Laboratories of Charleston, South Carolina.

TAL Metals Plus Uranium and TCLP Metals Plus Mercury, Copper, and Zinc

Table B-1 (Annex B) presents the analytical results for the TAL metals and total uranium analyses. The NMED-approved background concentrations were exceeded for barium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, uranium, vanadium, and zinc in several samples. These samples were also analyzed for TCLP metals, and the results are presented in Table B-2 (Annex B).

Barium concentrations ranged from 65.2 to 158 J milligrams (mg) per kilogram (kg) and exceeded the NMED-approved background concentration of 130 mg/kg in four samples.

Cadmium concentrations ranged from 0.458 to 2.78 mg/kg and exceeded the NMED-approved background concentration of 0.9 mg/kg in nine samples. Chromium concentrations ranged from 8.36 to 28.4 mg/kg and exceeded the NMED-approved background concentration limit of 17.3 mg/kg in three samples. Cobalt concentrations ranged from 3.76 to 8.61 mg/kg and exceeded the NMED-approved background concentration limit of 5.2 mg/kg in nine samples. Copper concentrations ranged from 10.1 to 194 mg/kg and exceeded the NMED-approved background concentration limit of 15.4 mg/kg in 16 samples. Lead concentrations ranged from 12.4 to 107 mg/kg and exceeded the NMED-approved background concentration limit of 21.4 mg/kg in thirteen samples. Mercury concentrations ranged from nondetect (ND) to 2.09 mg/kg. Only the Pile 7-N sample exceeded the NMED-approved background concentration of <0.1 mg/kg. Nickel concentrations ranged from 8.12 to 14.9 mg/kg and exceeded the NMED-approved background concentration limit of 11.5 mg/kg in five samples. Selenium concentrations ranged from 0.530 to 1.08 mg/kg; only the Pile 9-N sample exceeded the NMED-approved background concentration of <1 mg/kg. Uranium concentrations ranged from ND to 12.6 mg/kg; 20 of the 26 samples exceeded the NMED-approved background concentration of 3.42 mg/kg. Both samples from Pile 10 were below the background concentration. Vanadium concentrations ranged from 13.4 to 24.6 mg/kg and exceeded the NMED-approved background concentration of 20.4 mg/kg in seven samples. Zinc concentrations ranged from 38.3 to 354 J mg/kg; 22 of the 26 samples exceeded the NMED-approved background concentration of 62 mg/kg. Samples from Piles 8 and 13 were all below the background concentration.

TCLP analysis showed all metals analyzed for were below the maximum contaminant concentrations for the toxicity characteristic analysis (Table B-2, Annex B).

VOCs and TCLP VOCs

Methylene chloride, the only VOC detected, was found at concentrations of 2.4 J to 3.6 J $\mu\text{g}/\text{kg}$ in 3 of the 26 samples (Table B-3, Annex B). The MDLs for the VOC analyses are in Table B-4 (Annex B). No compounds were detected in the TCLP VOC analysis of the soil pile samples. The MDLs used for the TCLP VOC analysis are provided in Table B-5 (Annex B).

SVOCs and TCLP SVOCs

Anthracene, the only SVOC compound detected, was found in both samples from Pile 12 at concentrations of 140 J and 1,100 $\mu\text{g}/\text{kg}$ (Table B-6, Annex B). The MDLs for the SVOC analysis are in Table B-7 (Annex B). No compounds were detected in the TCLP SVOC analysis of the soil pile samples. The MDLs used for the TCLP SVOC analysis are provided in Table B-8 (Annex B).

HE

Due to analytical problems with the laboratory, the initial soil pile samples were rejected during data validation (Annex D). The piles were resampled in May 2000, and the 26 samples plus 3 duplicates were analyzed at General Engineering Laboratories in Charleston, South Carolina. The analytical results are presented in Table B-9 (Annex B) and are discussed below. The MDLs for the analysis are provided in Table B-10 (Annex B).

Six HE compounds were detected in the soil pile samples and duplicates. 1,3,5-Trinitrobenzene (ND [11.9] to 196 J $\mu\text{g}/\text{kg}$) was only detected in the sample and duplicate from the north side of Pile 12. 2,4,6-Trinitrotoluene (ND [14.1] to 4,800 $\mu\text{g}/\text{kg}$) was detected in 10 samples and 1 duplicate. 2-Amino-4,6-dinitrotoluene (ND [13.4] to 3,680 $\mu\text{g}/\text{kg}$) was detected in 11 samples and 2 duplicates. 4-Amino-2,6-dinitrotoluene (ND [10.1] to 2,290 $\mu\text{g}/\text{kg}$) was detected in 9 samples and 2 duplicates. 1,3,5,7-Tetranitro-1,3,5,7-tetrazacyclooctane (HMX) (ND [16.8] to 3,340 J $\mu\text{g}/\text{kg}$) and 1,3,5-trinitro-1,3,5-triazacyclohexane (RDX) (ND [12.5] to 23,200 $\mu\text{g}/\text{kg}$) were detected in every sample except those from the north side of Pile 1 and the sample and duplicate from the north side of Pile 8.

Radionuclides

Gamma spectroscopy analyses were performed on all 26 soil pile samples at an off-site laboratory, and 10 of the samples were also analyzed on site at SNL/NM RPSD Laboratory. The gamma spectroscopy results are presented in Table B-11 (Annex B). The NMED-approved background activity was exceeded in a number of the soil pile samples for uranium-235, uranium-238, and cesium-137, irrespective of the analytical laboratory.

Uranium-235 activities (1E-01 to 5E-01 pCi/g) exceeded the NMED-approved background activity of 1.8E-01 pCi/g in 19 of the 36 samples (from all piles except piles 8 and 11). Uranium-238 activities (ND [8.25E-01] to 2.42E+01 pCi/g) exceeded the NMED-approved background activity of 1.4E+00 pCi/g in 34 of the 36 samples (from all piles). Cesium-137 activities (ND [1.61E-02] to 8E-01 pCi/g) exceeded the NMED-approved background activity of 7.9E-02 pCi/g in 27 of the 36 samples (from all piles). Cobalt-60 (ND [1E-01 J] to 1.1E+00 pCi/g) is an anthropogenic radionuclide that was also present in these samples. There is no background value for cobalt-60, so the maximum observed values were used for the risk assessment.

Isotopic Uranium and Isotopic Thorium

Table B-12 (Annex B) presents the analytical results of the isotopic uranium and isotopic thorium analyses. Uranium-234 activities (8.70E-01 to 2.51E+00 pCi/g) were detected above the NMED-approved background activity of 1.6E+00 pCi/g in nine of the 26 samples. Uranium-235 activities (2E-02 to 3.6E-01 J pCi/g) were detected above the NMED-approved background activity of 1.8E-01 in two samples (piles 2-N and 8-S). Uranium-238 activities (1.85E+00 to 5.84E+00 pCi/g) were detected above the NMED-approved background activity of 1.4E+00 pCi/g in all 26 samples. Thorium-232 (5.70E-01 J to 1.95E+00 pCi/g) was detected above the NMED-approved background activity of 1.01E+00 in 11 of the 26 samples.

Because of the higher analytical precision in the isotopic analysis for uranium-238, uranium-235, uranium-234, and thorium-232 in the soil pile samples, the isotopic results for these four isotopes were used in the risk assessment rather than the gamma spectroscopy results.

Tritium

Low soil moisture content caused biased-high results with large uncertainties for tritium in six of the 26 soil samples collected in September 1998 (analyzed at Core Laboratories, Casper,

Wyoming). Two of the piles (2 and 9) with the highest apparent tritium concentrations were resampled for confirmation in October 1999. The second set of analyses were performed by GEL of Charleston, South Carolina. Considering the low moisture content of all the samples and the uncertainty for each analysis, tritium is not present in the soil piles at activities above the SNL/NM background value of 420 pCi/L. The analytical results are presented in Table B-13 (Annex B).

10.4.5.2.3 VCM Summary and Conclusions

In February 1999, SNL/NM Waste Management determined that the soil piles did not contain any RCRA-regulated wastes and that the unexcavated north end of Mound 1 did not contain any RCRA hazardous waste.

Based on the results of Human Health Screening and RESRAD risk assessments, DOE removed the site radiological restrictions in July 1999. SNL/NM delisted the site as a Radioactive Materials Management Area in January 2000.

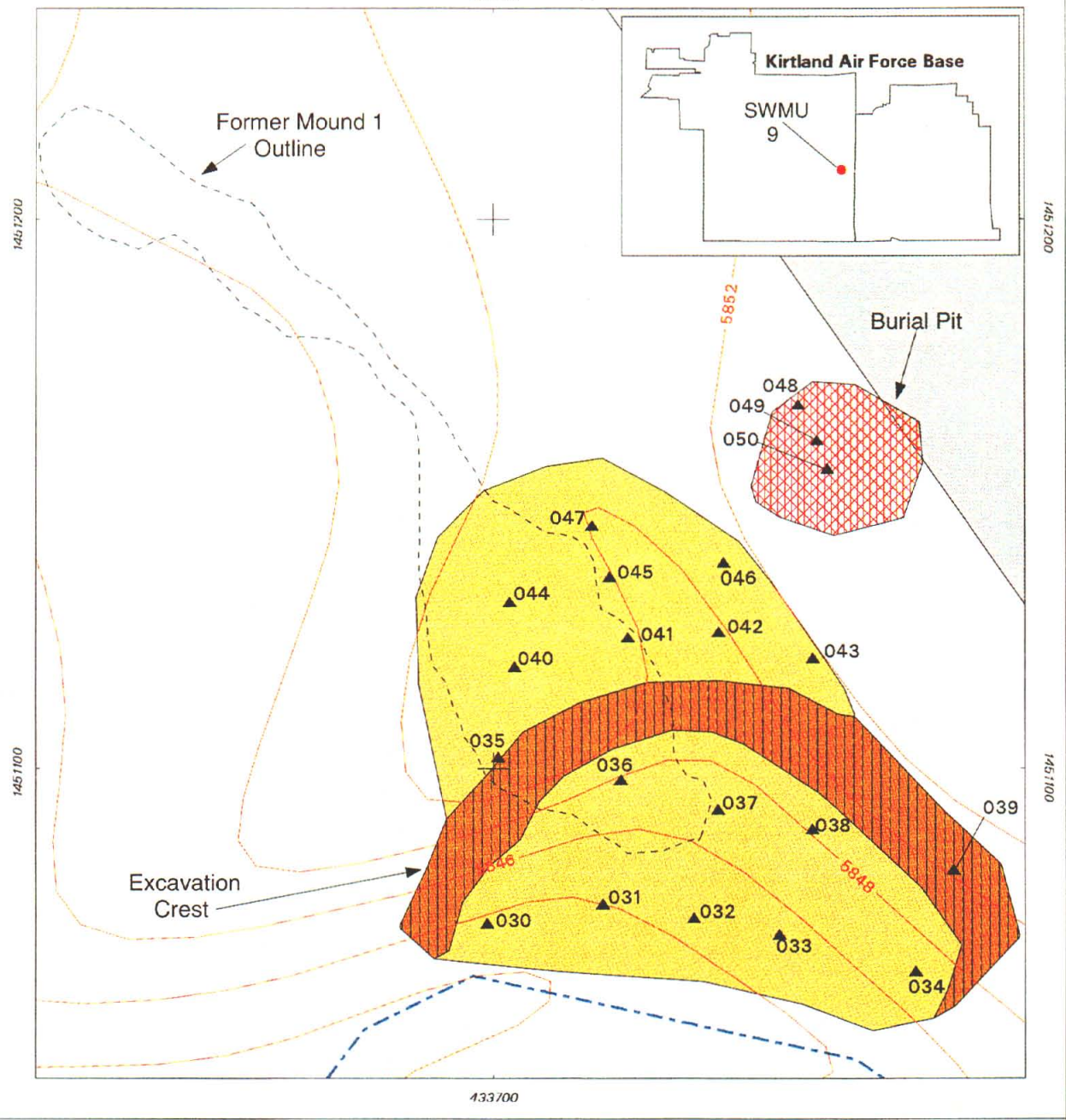
A risk assessment evaluation for the soil piles showed that the soil would also be acceptable for redeposition on site. Current plans are to sift the soil piles through a 2-inch opening screen (grizzly) to remove as much of the small debris pieces as possible and to deposit the soil on site in a shallow excavation with a 2- to 3-foot-thick native soil cover. The soil pile processing and redeposition is scheduled for September 2000. The unexcavated north end of Mound 1 will also be processed with the soil piles and will be redeposited on site.

Because the soil piles will be redeposited back onto the site, the data has been included in the overall SWMU Human Health Risk Assessment in Section 10.6.

10.4.5.3 1999 RFI Confirmatory Sampling

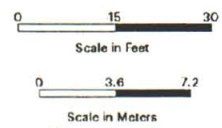
In July 1999, following the VCM, the excavated area under the south end of former Mound 1 was sampled. Because of the analytical problems with the 1996 RFI samples, as described in Sections 10.4.4.3 and 10.4.4.4, the SWMU was resampled following the general strategy, methodology and procedures outlined in the OU 1334 RFI Work Plan (SNL/NM October 1994), as reviewed by the NMED and the EPA. However, pursuant to draft EPA comments on the Work Plan (EPA November 1995), the sampling depth for near-surface samples was redefined as 0.5- to 1.0-foot bgs, instead of the proposed 1.5- to 2.0-foot bgs. The Mound 3 sample depth was kept at the originally specified 3- to 3.5-foot bgs. An NMED Request for Supplemental Information (RSI) (NMED August 1997) required gross alpha and gross beta analyses at all locations and additional samples under Mound 1 (Figure 10.4.5.3-1). A second NMED RSI (NMED March 1998) required gamma spectrum analyses for the arroyo channel sediment samples. The full analytical suite was also used when the shallow burial pit just east of Mound 1 was sampled.

The RFI confirmatory samples are identified by the following scheme: CCTA-09-GR-001-0-0.5-S, where CCTA-09-GR specifies that this is a grab sample taken from the Central Coyote Test Area at SWMU 9. "001" indicates the sample location at the SWMU, as shown on Figures 10.4.4-1 and 10.4.5.3-1. "0.0-0.5" is the sample interval (feet bgs). The final character



- Legend**
- ▲ Sample Location
 - - - Mound
 - 2 Ft Contour (Previous Topology)
 - - - Surface Drainage
 - SWMU 61A
 - ▨ Burial Pit
 - Excavation Floor
 - ▨ Excavation Crest

Figure 10.4.5.3-1
1999 Soil Sampling Locations &
VCM Excavation at SWMU 9,
Burial Site / Open Dump



Sandia National Laboratories, New Mexico
 Environmental Geographic Information System

(S, DU, EB, TB) identifies the type of sample (soil, duplicate, equipment blank, or trip blank, respectively).

RFI confirmatory samples were collected from 50 locations covering five areas at SWMU 9. These five areas or locations sampled were Site-Specific and Arroyo Channel Sediment Background, Arroyo Channel Sediment, Mound 3, VCM Excavation at Mound 1, and the Burial Pit.

No samples were collected at the former Mound 2 site (location 028 on Figure 10.4.4-2) because it was discovered to be a debris pile rather than a burial mound, and the debris had been removed during the VCM. RFI sampling in the VCM excavation at Mound 1 also covered the former Mound 2 area (Figure 10.4.5.3-1).

All but the gamma spectroscopy analyses were performed off site at General Engineering Laboratories of Charleston, South Carolina. Samples were analyzed for TAL metals plus uranium by EPA Method 6010/7000, for HE compounds using EPA Method 8330, for SVOCs using EPA Method 8270, for VOCs using EPA Method 8260A, and for gross alpha and gross beta using EPA Method 900.0. Gamma spectroscopy analyses were performed on site at the SNL/NM RPSD Laboratory. Copies of the on-site gamma spectroscopy results are in Annex C.

Site-Specific and Arroyo Sediment Background Samples

SNL/NM conducted background soil and arroyo sediment sampling at SWMU 9 to establish site-specific background concentrations for metals and activities for radionuclides. As specified in the OU 1334 Work Plan, background soil samples were collected at three locations west of the site boundary (locations 001–003 on Figure 10.4.4-1), and background arroyo sediment samples were collected at three locations upstream of the site (locations 004-006 on Figure 10.4.4-1). The samples were analyzed for TAL metals plus uranium and radionuclides. The analytical results are summarized below.

TAL Metals Plus Uranium

Table 10.4.5-1 presents the analytical results for the TAL metals plus uranium analyses. The NMED-approved background concentrations were exceeded for barium, cobalt, and nickel.

Barium (59.8 J to 158 J mg/kg) exceeded the 130 mg/kg NMED-approved background concentration in the site-specific background sample (003-0.5-1.0) and the arroyo sediment background sample (006-0.5-1.0). Cobalt (3.8 to 5.65 mg/kg) and nickel (7.63 to 16.2 mg/kg) were detected above the NMED-approved background concentrations of 5.2 and 11.5 mg/kg, respectively, only in one arroyo sediment sample (006-0-0.5).

All other metals were below their respective NMED-approved background concentrations for these background samples. However, the antimony results were rejected during data validation, as explained in Annex D.

Radionuclides

Table 10.4.5-2 presents the analytical results for the gamma spectroscopy analyses. Uranium-235 activities (1.36E-01 to 2.06E-01 pCi/g) exceeded the NMED-approved background

Table 10.4.5-1
 Summary of SWMU 9 Confirmatory Soil Sampling TAL Metals Plus Uranium Analytical Results
 July 1999
 (Off-Site Laboratory)

Sample Attributes				Metals (EPA Method 6010/7000) ^a (mg/kg)										
Record Number	ER Sample ID ^c (Figures 10.4.4-1 and 10.4.5.3-1)	Date Sampled	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	
Site-specific background samples (locations 001-003)														
602158	CCTA-09-GR-001-0-0.5-S	7-12-99	0.0-0.5	ND (0.191) R	2.65 J	86.1 J	0.374 J (0.500)	ND (0.019)	10.3 J	4.74	8.84	8.15	281	
602158	CCTA-09-GR-001-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.191) R	2.86 J	87.6 J	0.399 J (0.500)	ND (0.019)	8.70 J	4.61	8.86	7.74	275	
602158	CCTA-09-GR-002-0-0.5-S	7-12-99	0.0-0.5	ND (0.191) R	2.78 J	85.0 J	0.366 J (0.493)	ND (0.019)	8.29 J	4.49	9.09	7.95	282	
602158	CCTA-09-GR-002-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.191) R	2.75 J	84.2 J	0.362 J (0.463)	ND (0.019)	7.85 J	4.49	9.83	8.90	285	
602158	CCTA-09-GR-003-0-0.5-S	7-12-99	0.0-0.5	ND (0.191) R	3.33 J	130 J	0.411 J (0.500)	ND (0.019)	8.31 J	3.93	8.87	6.89	211	
602158	CCTA-09-GR-003-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.191) R	3.48 J	139 J	0.428 J (0.500)	ND (0.019)	8.76 J	4.08	8.91	6.49	205	
Arroyo sediment background samples (locations 004-006)														
602158	CCTA-09-GR-004-0-0.5-S	7-12-99	0.0-0.5	ND (0.191) R	2.17 J	63.8 J	0.241 J (0.481)	ND (0.019)	5.65 J	3.89	8.28	8.11	212	
602158	CCTA-09-GR-004-0-0.5-DU	7-12-99	0.0-0.5	ND (0.191) R	3.13 J	94.0 J	0.338 J (0.490)	ND (0.019)	9.20 J	5.06	12.0	7.52	257	
602158	CCTA-09-GR-004-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.191) R	3.19 J	77.1 J	0.288 J (0.485)	ND (0.019)	7.66 J	4.91	11.2	7.02	243	
602158	CCTA-09-GR-004-0-0.5-S	7-12-99	0.0-0.5	ND (0.191) R	2.39 J	75.3 J	0.244 J (0.495)	ND (0.019)	8.11 J	5.06	10.6	6.79	246	
602158	CCTA-09-GR-005-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.191) R	4.02 J	59.8 J	0.242 J (0.495)	ND (0.019)	7.81 J	4.27	9.83	5.70	218	
602158	CCTA-09-GR-006-0-0.5-S	7-12-99	0.0-0.5	ND (0.191) R	3.16 J	158 J	0.419 J (0.500)	ND (0.019)	12.9 J	5.65	11.4	6.64	275	
602158	CCTA-09-GR-006-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.191) R	2.83 J	94.3 J	0.335 J (0.485)	ND (0.019)	7.96 J	4.78	10.2	5.99	239	
Arroyo channel sediment samples (locations 007-009)														
602158	CCTA-09-GR-007-0-0.5-S	7-12-99	0.0-0.5	ND (0.191) R	2.34 J	77.3 J	0.282 J (0.485)	ND (0.019)	9.24 J	4.31	10.7	7.11	204	
602158	CCTA-09-GR-007-0-0.5-DU	7-12-99	0.0-0.5	ND (0.191) R	2.03 J	58.4 J	0.196 J (0.467)	ND (0.019)	5.22 J	3.25	8.15	5.45	161	
602158	CCTA-09-GR-007-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.191) R	2.61 J	76.5 J	0.273 J (0.459)	ND (0.019)	8.48 J	4.47	10.6	7.65	223	
602158	CCTA-09-GR-008-0-0.5-S	7-12-99	0.0-0.5	ND (0.191) R	2.48 J	65.0 J	0.254 J (0.463)	ND (0.019)	7.18 J	4.18	12.6	6.81	214	
602158	CCTA-09-GR-008-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.191) R	2.90 J	62.9 J	0.201 J (0.476)	ND (0.019)	5.60 J	3.54	7.24	5.57	187	
602158	CCTA-09-GR-009-0-0.5-S	7-12-99	0.0-0.5	ND (0.191) R	2.25 J	73.5 J	0.269 J (0.490)	ND (0.019)	8.05 J	3.88	8.76	5.98	205	
602158	CCTA-09-GR-009-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.191)	2.50	124	0.270 J (0.490)	ND (0.019)	7.70	3.92	9.05	12.2	196	
Mound 3 soil sample (location 029)														
602159	CCTA-09-GR-029-3.0-3.5-S	7-12-99	3.0-3.5	ND (0.191)	2.70	103	0.421 J (0.463)	0.0657 J (0.463)	8.49	4.67	9.07	7.41	253	
VCM excavation under Mound 1 samples (locations 030-047)														
602159	CCTA-09-GR-030-0-0.5-S	7-12-99	0.0-0.5	ND (0.191)	3.22	86.7	0.379 J (0.467)	0.172 J (0.467)	7.94	4.76	32.4	8.05	227	
602159	CCTA-09-GR-030-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.191)	1.90	50.4	0.224 J (0.459)	ND (0.019)	5.84	3.24	7.66	4.62	165	
602159	CCTA-09-GR-031-0-0.5-S	7-12-99	0.0-0.5	ND (0.191)	2.66	78.0	0.330 J (0.455)	0.0550 J (0.455)	8.45	4.61	10.4	9.95	227	
602159	CCTA-09-GR-031-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.191)	2.16	63.4	0.260 J (0.455)	ND (0.019)	5.42	3.87	8.12	6.10	204	
602159	CCTA-09-GR-032-0-0.5-S	7-12-99	0.0-0.5	ND (0.191)	3.17	109	0.482	0.0530 J (0.467)	9.36	4.59	11.4	10.5	229	
602159	CCTA-09-GR-032-0-0.5-DU	7-12-99	0.0-0.5	ND (0.191)	3.37	110	0.447 J (0.472)	0.0617 J (0.472)	9.55	4.57	11.0	11.7	232	
602159	CCTA-09-GR-032-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.191)	2.97	96.5	0.405 J (0.485)	0.108 J (0.485)	8.67	4.39	10.4	12.2	229	
602159	CCTA-09-GR-033-0-0.5-S	7-12-99	0.0-0.5	ND (0.191)	3.68	131	0.471 J (0.481)	0.444 J (0.481)	16.5	4.67	30.5	26.5	257	
602159	CCTA-09-GR-033-0.5-1.0-S	7-12-99	0.5-1.0	0.392 J (0.962)	3.76	125	0.448 J (0.481)	0.380 J (0.481)	11.7	4.29	33.7	23.3	247	
602159	CCTA-09-GR-034-0-0.5-S	7-12-99	0.0-0.5	ND (0.191)	3.09	127	0.440 J (0.485)	0.406 J (0.485)	20.7	5.30	13.2	28.5	246	
602159	CCTA-09-GR-034-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.191)	4.89	61.8	0.305 J (0.485)	ND (0.019)	7.00	4.37	10.5	8.36	225	

Refer to footnotes at end of table.

Table 10.4.5-1 (Continued)
 Summary of SWMU 9 Confirmatory Soil Sampling TAL Metals Plus Uranium Analytical Results
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Sample Attributes				Metals (EPA Method 6010/7000) ^a (mg/kg)									
Record Number	ER Sample ID ^c (Figures 10.4.4-1 and 10.4.5-3-1)	Date Sampled	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese
602162	CCTA-09-GR-035-0-0.5-S	7-13-99	0-0.5	ND (0.191) R	2.91	109 J	0.513	0.135 J (0.500)	8.49	5.12	10.5 J	7.57	256 J
602162	CCTA-09-GR-035-0.5-1.0-S	7-13-99	0.5-1.0	ND (0.191) R	3.17	145 J	0.510	0.132 J (0.490)	8.06	4.76	10.9 J	7.20	244 J
602162	CCTA-09-GR-036-0-0.5-S	7-13-99	0-0.5	ND (0.191) R	2.55	121 J	0.434 J (0.485)	0.214 J (0.485)	11.3	4.68	12.3 J	12.4	252 J
602162	CCTA-09-GR-036-0.5-1.0-S	7-13-99	0.5-1.0	ND (0.191) R	2.88	103 J	0.416 J (0.485)	0.215 J (0.485)	10.1	5.40	536 J	20.3	313 J
602162	CCTA-09-GR-036-0.5-1.0-DU	7-13-99	0.5-1.0	ND (0.191) R	2.15	103 J	0.346 J (0.500)	0.182 J (0.500)	8.06	3.87	14.2 J	11.3	217 J
602162	CCTA-09-GR-037-0-0.5-S	7-13-99	0-0.5	ND (0.191) R	2.40	116 J	0.385 J (0.485)	0.530	13.9	5.29	30.2 J	27.9	259 J
602162	CCTA-09-GR-037-0.5-1.0-S	7-13-99	0.5-1.0	ND (0.191) R	1.94	79.9 J	0.318 J (0.490)	0.237 J (0.490)	7.25	4.37	16.5 J	14.8	219 J
602162	CCTA-09-GR-038-0-0.5-S	7-13-99	0-0.5	ND (0.191) R	2.76	117 J	0.425 J (0.495)	0.513	9.60	4.55	27.7 J	28.1	245 J
602162	CCTA-09-GR-038-0.5-1.0-S	7-13-99	0.5-1.0	ND (0.191) R	1.86	55.6 J	0.263 J (0.490)	0.179 J (0.490)	12.4	4.29	10.4 J	7.63	229 J
602162	CCTA-09-GR-039-0-0.5-S	7-13-99	0-0.5	ND (0.191) R	3.32	110 J	0.455 J (0.490)	0.122 J (0.490)	9.94	4.49	10.0 J	17.1	223 J
602162	CCTA-09-GR-039-0.5-1.0-S	7-13-99	0.5-1.0	ND (0.191) R	2.49	95.1 J	0.367 J (0.485)	0.0767 J (0.485)	5.79	3.73	7.68 J	7.64	193 J
602162	CCTA-09-GR-040-0-0.5-S	7-13-99	0-0.5	ND (0.191) R	2.86	101 J	0.505	0.377 J (0.500)	8.78	5.00	53.0 J	14.1	255 J
602162	CCTA-09-GR-040-0.5-1.0-S	7-13-99	0.5-1.0	0.566 J (0.962) R	3.67	137 J	0.505	1.90	11.5	5.4	94.5 J	31.7	275 J
602162	CCTA-09-GR-041-0-0.5-S	7-13-99	0-0.5	ND (0.191) R	3.54	151 J	0.489	0.639	8.88	4.52	30.1 J	19.0	226 J
602162	CCTA-09-GR-041-0-0.5-DU	7-13-99	0-0.5	ND (0.191) R	3.59	140 J	0.469 J (0.485)	0.608	9.17	4.49	24.8 J	18.4	212 J
602162	CCTA-09-GR-041-0.5-1.0-S	7-13-99	0.5-1.0	ND (0.191) R	3.06	120 J	0.375 J (0.490)	0.204 J (0.490)	6.73	3.73	9.13 J	7.98	163 J
602162	CCTA-09-GR-042-0-0.5-S	7-13-99	0-0.5	ND (0.191) R	3.04	169 J	0.463 J (0.481)	0.807	11.6	4.79	68.0 J	36.0	233 J
602162	CCTA-09-GR-042-0.5-1.0-S	7-13-99	0.5-1.0	ND (0.191) R	3.06	209 J	0.463 J (0.490)	0.409 J (0.490)	8.04	4.48	30.0 J	126	236 J
602162	CCTA-09-GR-043-0-0.5-S	7-13-99	0-0.5	ND (0.191) R	2.70	91.3 J	0.421 J (0.500)	0.289 J (0.500)	8.97	4.36	13.0 J	15.7	235 J
602162	CCTA-09-GR-043-0.5-1.0-S	7-13-99	0.5-1.0	ND (0.191) R	1.87	61.7 J	0.327 J (0.500)	0.198 J (0.500)	6.10	3.22	8.41 J	9.18	165 J
602163	CCTA-09-GR-044-0-0.5-S	7-13-99	0-0.5	1.06	3.86	157	0.546	0.836	16.7	5.35	102	96.5	275
602163	CCTA-09-GR-044-0.5-1.0-S	7-13-99	0.5-1.0	1.34	4.46	147	0.539	0.948	15.4	5.27	51.4	36.9	269
602163	CCTA-09-GR-045-0-0.5-S	7-13-99	0-0.5	1.83	3.91	156	0.538	0.861	17.9	5.35	52.2	33.3	274
602163	CCTA-09-GR-045-0-0.5-DU	7-13-99	0-0.5	1.75	3.79	169	0.554	1.04	21.8	5.70	47.8	36.3	284
602163	CCTA-09-GR-045-0.5-1.0-S	7-13-99	0.5-1.0	ND (0.191)	3.66	152	0.537	0.746	20.5	5.49	32.6	39.7	292
602163	CCTA-09-GR-046-0-0.5-S	7-13-99	0-0.5	ND (0.191)	3.08	116	0.546	0.277 J (0.476)	11.7	5.51	38.8	24.7	278
602163	CCTA-09-GR-046-0.5-1.0-S	7-13-99	0.5-1.0	ND (0.191)	3.57	158	0.531	0.145 J (0.472)	11.5	5.67	15.0	24.2	285
602163	CCTA-09-GR-047-0-0.5-S	7-13-99	0-0.5	ND (0.191)	3.66	167	0.572	0.257 J (0.495)	14.2	5.33	15.5	23.2	268
602163	CCTA-09-GR-047-0.5-1.0-S	7-13-99	0.5-1.0	ND (0.191)	3.54	156	0.589	0.306 J (0.463)	13.3	5.49	16.4	24.8	285
Burial Pit samples (locations 048-050)													
602163	CCTA-09-GR-048-0-0.5-S	7-13-99	0-0.5	0.386 J (0.980)	3.26	96.8	0.553	0.0847 J (0.490)	11.6	5.04	11.6	16.6	265
602163	CCTA-09-GR-048-0.5-1.0-S	7-13-99	0.5-1.0	ND (0.191)	3.45	93.9	0.542	0.0889 J (0.495)	10.6	4.86	10.7	15.9	258
602163	CCTA-09-GR-049-0-0.5-S	7-13-99	0-0.5	ND (0.191)	3.31	106	0.591	0.175 J (0.472)	12.4	5.46	33.3	29.2	286
602163	CCTA-09-GR-049-0.5-1.0-S	7-13-99	0.5-1.0	ND (0.191)	3.11	116	0.653	0.215 J (0.472)	13.4	5.66	17.2	24.3	300

Refer to footnotes at end of table.

Table 10.4.5-1 (Continued)
 Summary of SWMU 9 Confirmatory Soil Sampling TAL Metals Plus Uranium Analytical Results
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Sample Attributes				Metals (EPA Method 6010/7000) ^a (mg/kg)									
Record Number ^b	ER Sample ID ^c (Figures 10.4.4-1 and 10.4.5.3-1)	Date Sampled	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese
602163	CCTA-09-GR-050-0-0.5-S	7-13-99	0-0.5	ND (0.191)	3.10	78.9	0.452 J (0.485)	0.117 J (0.485)	12.2	4.68	12.3	16.1	241
602163	CCTA-09-GR-050-0.5-1.0-S	7-13-99	0.5-1.0	ND (0.191)	2.84	80.9	0.448 J (0.459)	0.0476 J (0.485)	10.2	4.83	12.5	14.4	257
Background Soil Concentrations—Coyote Test Field ^d				3.9	5.6	130	0.65	0.9	17.3	5.2	15.4	21.4	NE
Quality Assurance/Quality Control Samples (mg/L)													
602159	CCTA-09-GR-000-EB	7-12-99	NA	ND (0.00349)	ND (0.00451)	ND (0.00051)	ND (0.00026)	ND (0.00044)	ND (0.00056)	ND (0.00069)	ND (0.00104)	ND (0.00159)	ND (0.00448)
602163	CCTA-09-GR-000-EB	7-13-99	NA	ND (0.00349)	ND (0.00451)	ND (0.00051)	ND (0.00026)	ND (0.00044)	ND (0.00056)	ND (0.00069)	ND (0.00104)	ND (0.00159)	ND (0.00448)

Refer to footnotes at end of table.

Table 10.4.5-1 (Continued)
 Summary of SWMU 9 Confirmatory Soil Sampling TAL Metals Plus Uranium Analytical Results
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Sample Attributes				Metals (EPA Method 6010/7000) ^a (mg/kg)							
Record Number	ER Sample ID ^c (Figures 10.4.4-1 and 10.4.5.3-1)	Date Sampled	Sample Depth (ft)	Mercury	Nickel	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc
Site-specific background samples (locations 001-003)											
602158	CCTA-09-GR-001-0-0.5-S	7-12-99	0-0.5	0.0222 J (0.0332)	9.55	ND (0.135)	0.345 J (0.500)	ND (0.221)	0.605 J	15.0	28.3
602158	CCTA-09-GR-001-0.5-1.0-S	7-12-99	0.5-1.0	0.00909 J (0.0329)	8.90	ND (0.135)	0.339 J (0.500)	ND (0.221)	1.22 J	15.6	27.7
602158	CCTA-09-GR-002-0-0.5-S	7-12-99	0-0.5	0.0181 J (0.0261)	8.48	ND (0.135)	0.355 J (0.493)	ND (0.221)	0.510 J	14.6	28.5
602158	CCTA-09-GR-002-0.5-1.0-S	7-12-99	0.5-1.0	0.0170 J (0.0315)	8.36	ND (0.135)	0.364 J (0.463)	ND (0.221)	0.544 J	14.1	28.7
602158	CCTA-09-GR-003-0-0.5-S	7-12-99	0-0.5	0.0105 J (0.0291)	8.75	ND (0.135)	0.435 J (0.500)	ND (0.221)	0.412 J	15.4	29.2
602158	CCTA-09-GR-003-0.5-1.0-S	7-12-99	0.5-1.0	0.0118 J (0.0269)	9.44	ND (0.135)	0.400 J (0.500)	ND (0.221)	0.520 J	16.1	30.2
Arroyo sediment background samples (locations 004-006)											
602158	CCTA-09-GR-004-0-0.5-S	7-12-99	0-0.5	ND (0.00225)	7.63	ND (0.135)	0.382 J (0.481)	ND (0.221)	0.550 J	11.9	30.2
602158	CCTA-09-GR-004-0-0.5-DU	7-12-99	0-0.5	0.00264 J (0.0304)	10.4	ND (0.135)	0.447 J (0.490)	ND (0.221)	0.666 J	15.7	34.5
602158	CCTA-09-GR-004-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.00225)	9.66	ND (0.135)	0.393 J (0.485)	ND (0.221)	0.589 J	14.8	32.7
602158	CCTA-09-GR-005-0-0.5-S	7-12-99	0-0.5	ND (0.00225)	9.90	ND (0.135)	0.414 J (0.495)	ND (0.221)	0.414 J	14.6	33.0
602158	CCTA-09-GR-005-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.00225)	8.38	ND (0.135)	0.457 J (0.495)	ND (0.221)	0.477 J	13.5	25.4
602158	CCTA-09-GR-006-0-0.5-S	7-12-99	0-0.5	0.00361 J (0.0313)	16.2	ND (0.135)	0.478 J (0.500)	ND (0.221)	0.458 J	16.6	34.6
602158	CCTA-09-GR-006-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.00225)	9.48	ND (0.135)	0.477 J (0.485)	ND (0.221)	0.463 J	15.2	31.3
Arroyo channel sediment samples (locations 007-009)											
602158	CCTA-09-GR-007-0-0.5-S	7-12-99	0-0.5	ND (0.00225)	9.98	ND (0.135)	0.458 J (0.485)	ND (0.221)	0.894 J	13.4	30.4
602158	CCTA-09-GR-007-0-0.5-DU	7-12-99	0-0.5	ND (0.00225)	6.94	ND (0.135)	0.330 J (0.467)	ND (0.221)	0.545 J	10.0	22.8
602158	CCTA-09-GR-007-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.00225)	10.1	ND (0.135)	0.313 J (0.459)	ND (0.221)	0.535 J	13.7	32.3
602158	CCTA-09-GR-008-0-0.5-S	7-12-99	0-0.5	ND (0.00225)	9.95	ND (0.135)	0.315 J (0.463)	ND (0.221)	1.02 J	12.4	30.5
602158	CCTA-09-GR-008-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.00225)	7.36	ND (0.135)	0.323 J (0.476)	ND (0.221)	4.03 J	11.0	25.3
602158	CCTA-09-GR-009-0-0.5-S	7-12-99	0-0.5	ND (0.00225)	9.35	ND (0.135)	0.324 J (0.490)	ND (0.221)	0.473 J	12.1	28.3
602158	CCTA-09-GR-009-0.5-1-S	7-12-99	0.5-1.0	ND (0.00225)	8.74	ND (0.135)	0.352 J (0.490)	ND (0.221)	0.503	12.8	28.2
Mound 3 soil sample (location 029)											
602159	CCTA-09-GR-029-3.0-3.5-S	7-12-99	3.0-3.5	0.00613 J (0.0301)	8.71	ND (0.135)	0.287 J (0.463)	ND (0.221)	0.598	15.3	29.7
VCM excavation under Mound 1 samples (locations 030-047)											
602159	CCTA-09-GR-030-0-0.5-S	7-12-99	0-0.5	ND (0.00225)	8.92	0.338 J (0.467)	0.278 J (0.467)	ND (0.221)	1.25	15.1	41.7
602159	CCTA-09-GR-030-0.5-1.0-S	7-12-99	0.5-1.0	0.00262 J (0.0277)	6.28	ND (0.135)	0.246 J (0.459)	ND (0.221)	1.19	9.75	24.5
602159	CCTA-09-GR-031-0-0.5-S	7-12-99	0-0.5	0.0128 J (0.0302)	9.00	0.402 J (0.455)	0.220 J (0.455)	ND (0.221)	2.04	14.2	42.2
602159	CCTA-09-GR-031-0.5-1.0-S	7-12-99	0.5-1.0	ND (0.00225)	7.07	ND (0.135)	0.233 J (0.455)	ND (0.221)	2.24	10.9	28.7
602159	CCTA-09-GR-032-0-0.5-S	7-12-99	0-0.5	0.00408 J (0.0333)	9.19	0.287 J (0.467)	0.268 J (0.467)	ND (0.221)	3.20	16.5	34.3
602159	CCTA-09-GR-032-0-0.5-DU	7-12-99	0-0.5	0.0133 J (0.0306)	9.42	ND (0.135)	0.223 J (0.472)	ND (0.221)	3.01	16.6	35.6
602159	CCTA-09-GR-032-0.5-1.0-S	7-12-99	0.5-1.0	0.0129 J (0.0287)	8.66	0.324 J (0.485)	0.279 J (0.485)	ND (0.221)	3.52	15.3	35.7
602159	CCTA-09-GR-033-0-0.5-S	7-12-99	0-0.5	0.0424	10.6	0.435 J (0.481)	0.351 J (0.481)	ND (0.221)	4.73	16.8	207
602159	CCTA-09-GR-033-0.5-1.0-S	7-12-99	0.5-1.0	0.0436	9.18	0.415 J (0.481)	0.371 J (0.481)	ND (0.221)	3.67	16.0	243
602159	CCTA-09-GR-034-0-0.5-S	7-12-99	0-0.5	0.00950 J (0.0272)	10.6	0.396 J (0.485)	0.431 J (0.485)	ND (0.221)	6.68	16.9	67.2

Refer to footnotes at end of table.

Table 10.4.5-1 (Continued)
 Summary of SWMU 9 Confirmatory Soil Sampling TAL Metals Plus Uranium Analytical Results
 July 1999
 (Off-Site Laboratory)

Sample Attributes				Metals (EPA Method 6010/7000) ^a (mg/kg)							
Record Number	ER Sample ID ^c (Figures 10.4.4-1 and 10.4.5.3-1)	Date Sampled	Sample Depth (ft)	Mercury	Nickel	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc
602159	CCTA-09-GR-034-0.5-1.0-S	7-12-99	0.5-1.0	0.00300 J (0.0314)	8.43	0.351 J (0.485)	0.281 J (0.485)	ND (0.221)	2.62	13.4	31.8
602162	CCTA-09-GR-035-0-0.5-S	7-13-99	0-0.5	0.0242 J (0.0333)	10.2 J	0.544	ND (0.031)	ND (0.221)	0.793 J	16.3	28.7 J
602162	CCTA-09-GR-035-0.5-1.0-S	7-13-99	0.5-1.0	0.0197 J (0.0290)	9.60 J	0.536	ND (0.031)	ND (0.221)	0.613 J	16.1	28.4 J
602162	CCTA-09-GR-036-0-0.5-S	7-13-99	0-0.5	0.0201 J (0.0288)	10.3 J	0.675	ND (0.031)	ND (0.221)	5.53 J	14.3	80.6 J
602162	CCTA-09-GR-036-0.5-1.0-S	7-13-99	0.5-1.0	0.0227 J (0.0330)	11.5 J	0.672	ND (0.031)	ND (0.221)	5.49 J	14.9	288 J
602162	CCTA-09-GR-036-0.5-1.0-DU	7-13-99	0.5-1.0	0.0239 J (0.0330)	8.01 J	0.562	ND (0.031)	ND (0.221)	3.85 J	12.3	60.4 J
602162	CCTA-09-GR-037-0-0.5-S	7-13-99	0-0.5	0.0260 J (0.0305)	14.1 J	0.709	ND (0.031)	ND (0.221)	8.35 J	14.7	241 J
602162	CCTA-09-GR-037-0.5-1.0-S	7-13-99	0.5-1.0	0.0212 J (0.0276)	8.76 J	0.514	ND (0.031)	ND (0.221)	7.04 J	12.6	176 J
602162	CCTA-09-GR-038-0-0.5-S	7-13-99	0-0.5	0.0215 J (0.0243)	9.75 J	0.474 J (0.495)	ND (0.031)	ND (0.221)	8.28 J	14.3	70.1 J
602162	CCTA-09-GR-038-0.5-1.0-S	7-13-99	0.5-1.0	0.0109 J (0.0288)	10.8 J	0.431 J (0.490)	ND (0.031)	ND (0.221)	1.94 J	11.7	33.7 J
602162	CCTA-09-GR-039-0-0.5-S	7-13-99	0-0.5	0.00898 J (0.0274)	9.13 J	0.447 J (0.490)	ND (0.031)	ND (0.221)	2.71 J	15.0	29.3 J
602162	CCTA-09-GR-039-0.5-1.0-S	7-13-99	0.5-1.0	0.0107 J (0.0302)	7.38 J	0.347 J (0.485)	ND (0.031)	ND (0.221)	2.03 J	12.8	24.5 J
602162	CCTA-09-GR-040-0-0.5-S	7-13-99	0-0.5	0.0709 J	10.1 J	0.458 J (0.500)	ND (0.031)	ND (0.221)	4.31 J	15.9	59.3 J
602162	CCTA-09-GR-040-0.5-1.0-S	7-13-99	0.5-1.0	0.0993 J	12.0 J	0.751	0.113 J (0.481)	ND (0.221)	7.93 J	16.5	134 J
602162	CCTA-09-GR-041-0-0.5-S	7-13-99	0-0.5	0.0340 J	9.86 J	0.610	0.140 J (0.485)	ND (0.221)	8.97 J	16.5	87.8 J
602162	CCTA-09-GR-041-0-0.5-DU	7-13-99	0-0.5	0.0237 J (0.0283)	9.63 J	0.576	0.0875 J (0.485)	ND (0.221)	9.67 J	16.3	83.9 J
602162	CCTA-09-GR-041-0.5-1.0-S	7-13-99	0.5-1.0	0.0122 J (0.0323)	7.86 J	0.286 J (0.490)	ND (0.031)	ND (0.221)	19.5 J	14.5	34.9 J
602162	CCTA-09-GR-042-0-0.5-S	7-13-99	0-0.5	0.0965 J	10.8 J	0.504	0.210 J (0.481)	ND (0.221)	17.7 J	15.6	148 J
602162	CCTA-09-GR-042-0.5-1.0-S	7-13-99	0.5-1.0	0.0266 J (0.0281)	9.80 J	0.592	0.153 J (0.490)	ND (0.221)	6.21 J	16.0	184 J
602162	CCTA-09-GR-043-0-0.5-S	7-13-99	0-0.5	0.0146 J (0.0288)	8.47 J	0.418 J (0.500)	ND (0.031)	ND (0.221)	7.91 J	14.1	40.2 J
602162	CCTA-09-GR-043-0.5-1.0-S	7-13-99	0.5-1.0	0.0192 J (0.0323)	6.50 J	0.294 J (0.500)	ND (0.031)	ND (0.221)	2.73 J	11.5	26.9 J
602163	CCTA-09-GR-044-0-0.5-S	7-13-99	0-0.5	0.0740	11.6	0.447 J (0.485)	0.0852 J (0.485)	ND (0.221)	8.99	22.0	141
602163	CCTA-09-GR-044-0.5-1.0-S	7-13-99	0.5-1.0	0.0686	11.2	0.621	0.247 J (0.481)	ND (0.221)	9.33	22.0	136
602163	CCTA-09-GR-045-0-0.5-S	7-13-99	0-0.5	0.0946	11.6	0.562	0.207 J (0.495)	ND (0.221)	11.5	22.4	151
602163	CCTA-09-GR-045-0-0.5-DU	7-13-99	0-0.5	0.0679	12.7	0.536	0.107 J (0.481)	ND (0.221)	14.7	23.6	148
602163	CCTA-09-GR-045-0.5-1.0-S	7-13-99	0.5-1.0	0.296	12.2	0.721	0.185 J (0.463)	ND (0.221)	12.1	21.7	133
602163	CCTA-09-GR-046-0-0.5-S	7-13-99	0-0.5	0.0404	11.2	0.689	0.0844 J (0.476)	ND (0.221)	15.2	20.4	72.0
602163	CCTA-09-GR-046-0.5-1.0-S	7-13-99	0.5-1.0	0.0163 J (0.0333)	11.3	0.660	0.0866 J (0.472)	ND (0.221)	13.5	22.9	40.8
602163	CCTA-09-GR-047-0-0.5-S	7-13-99	0-0.5	0.108	11.7	0.719	ND (0.031)	ND (0.221)	10.5	22.4	54.3
602163	CCTA-09-GR-047-0.5-1.0-S	7-13-99	0.5-1.0	0.105	11.2	0.533	ND (0.031)	ND (0.221)	10.0	22.5	71.8
Burial Pit samples (locations 048-050)											
602163	CCTA-09-GR-048-0-0.5-S	7-13-99	0-0.5	0.00783 J (0.0317)	10.3	0.678	ND (0.031)	ND (0.221)	11.5	20.4	35.0
602163	CCTA-09-GR-048-0.5-1.0-S	7-13-99	0.5-1.0	0.0125 J (0.0308)	9.88	0.556	ND (0.031)	ND (0.221)	12.7	19.3	33.5
602163	CCTA-09-GR-049-0-0.5-S	7-13-99	0-0.5	0.0225 J (0.0316)	11.1	0.754	ND (0.031)	ND (0.221)	13.5	18.7	47.3
602163	CCTA-09-GR-049-0.5-1.0-S	7-13-99	0.5-1.0	0.0227 J (0.0329)	11.9	0.738	ND (0.031)	ND (0.221)	14.1	19.7	54.6
602163	CCTA-09-GR-050-0-0.5-S	7-13-99	0-0.5	0.0105 J (0.0251)	9.30	0.521	ND (0.031)	ND (0.221)	5.85	16.7	42.9
602163	CCTA-09-GR-050-0.5-1.0-S	7-13-99	0.5-1.0	0.0222 J (0.0320)	9.49	0.591	ND (0.031)	ND (0.221)	4.61	17.2	37.8

Refer to footnotes at end of table.

Table 10.4.5-1 (Concluded)
 Summary of SWMU 9 Confirmatory Soil Sampling TAL Metals Plus Uranium Analytical Results
 July 1999
 (Off-Site Laboratory)

Sample Attributes				Metals (EPA Method 6010/7000) ^a (mg/kg)							
Record Number ^b	ER Sample ID ^c (Figures 10.4.4-1 and 10.4.5.3-1)	Date Sampled	Sample Depth (ft)	Mercury	Nickel	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc
Quality Assurance/Quality Control Samples (mg/L)											
602159	CCTA-09-GR-000-EB	7-12-99	NA	ND (0.000035)	ND (0.00129)	ND (0.00271)	ND (0.00073)	ND (0.00308)	0.000131 J (0.000200)	ND (0.00059)	0.0154
602163	CCTA-09-GR-000-EB	7-13-99	NA	ND (0.000035)	ND (0.00129)	ND (0.00271)	ND (0.00073)	ND (0.00308)	ND (0.0000251)	ND (0.00059)	0.00641
Background Soil Concentrations—Coyote Test Field^d				<0.1	11.5	<1	<1	<1.1	3.42	20.4	62

Note: Values in **bold** exceed background soil concentrations.

^a EPA November 1986.

^b Analysis request/chain-of-custody record.

^c **Bold** portion of the Sample ID corresponds to the sample location in Figures 10.4.4-1 and 10.4.5.3-1.

^d From Dinwiddie September 1997. The minimum background concentration between surface and subsurface is reported.

CCTA = Central Coyote Test Area.

DU = Duplicate sample.

EB = Equipment blank.

EPA = U.S. Environmental Protection Agency.

ER = Environmental Restoration.

ft = Foot (feet).

GR = Grab sample.

ID = Identification.

J = Estimated value. See Data Validation report.

J () = The reported value is greater than or equal to the method detection limit but is less than the practical quantitation limit, shown in parentheses.

mg/kg = Milligram(s) per kilogram.

mg/L = Milligram(s) per liter.

NA = Not applicable.

ND () = Not detected above the method detection limit, shown in parentheses.

R = Rejected value. See Data Validation report.

Rad = Radioactive.

S = Soil sample.

SWMU = Solid Waste Management Unit.

TAL = Target analyte list.

VCM = Voluntary Corrective Measure.

Table 10.4.5-2
Summary of SWMU 9 Confirmatory Soil Sampling Gamma Spectroscopy Analytical Results
July 1999
(On-Site Laboratory)

Record Number ^a	Sample Attributes			Activity (pCi/g)							
	ER Sample ID ^b (Figures 10.4.4-1 and 10.4.5.3-1)	Date Sampled	Sample Depth (ft)	Uranium-235		Uranium-238		Thorium-232		Cesium-137	
				Result	Error ^c	Result	Error ^c	Result	Error ^c	Result	Error ^c
Site-specific background samples (locations 001-003)											
602160	CCTA-09-GR-001-0-0.5-S	7-12-99	0.0-0.5	2.06E-01	1.70E-01	ND (7.19E-01)	--	8.79E-01	4.42E-01	5.04E-02	3.66E-02
602161	CCTA-09-GR-001-0.5-1.0-S	7-12-99	0.5-1.0	ND (1.99E-01)	--	ND (5.39E-01)	--	8.57E-01	4.61E-01	1.03E-01	2.30E-02
602161	CCTA-09-GR-002-0-0.5-S	7-12-99	0.0-0.5	ND (2.01E-01)	--	ND (5.39E-01)	--	8.79E-01	4.68E-01	1.10E-01	1.76E-01
602161	CCTA-09-GR-002-0.5-1.0-S	7-12-99	0.5-1.0	ND (2.07E-01)	--	ND (5.45E-01)	--	7.97E-01	4.11E-01	1.20E-01	4.85E-02
602161	CCTA-09-GR-003-0-0.5-S	7-12-99	0.0-0.5	9.79E-02	1.76E-01	ND (5.26E-01)	--	7.78E-01	4.34E-01	1.98E-01	5.23E-02
602161	CCTA-09-GR-003-0.5-1.0-S	7-12-99	0.5-1.0	ND (1.96E-01)	--	ND (5.19E-01)	--	6.73E-01	3.79E-01	ND (2.33E-02)	--
Arroyo sediment background samples (locations 004-006)											
602160	CCTA-09-GR-004-0-0.5-S	7-12-99	0.0-0.5	ND (1.95E-01)	--	ND (6.62E-01)	--	7.50E-01	4.01E-01	1.03E-01	3.89E-02
602161	CCTA-09-GR-004-0-0.5-DU	7-12-99	0.0-0.5	ND (1.83E-01)	--	ND (4.89E-01)	--	7.09E-01	3.85E-01	1.37E-01	4.73E-02
602161	CCTA-09-GR-004-0.5-1.0-S	7-12-99	0.5-1.0	1.42E-01	1.78E-01	ND (5.45E-01)	--	7.79E-01	4.62E-01	ND (2.56E-02)	--
602161	CCTA-09-GR-005-0-0.5-S	7-12-99	0.0-0.5	9.85E-02	1.56E-01	ND (4.65E-01)	--	7.23E-01	4.28E-01	1.13E-01	4.62E-02
602161	CCTA-09-GR-005-0.5-1.0-S	7-12-99	0.5-1.0	ND (1.88E-01)	--	ND (4.80E-01)	--	7.34E-01	4.11E-01	ND (2.46E-02)	--
602161	CCTA-09-GR-006-0-0.5-S	7-12-99	0.0-0.5	1.36E-01	1.98E-01	ND (6.13E-01)	--	9.35E-01	4.75E-01	6.35E-02	4.12E-02
602161	CCTA-09-GR-006-0.5-1.0-S	7-12-99	0.5-1.0	ND (1.95E-01)	--	ND (5.01E-01)	--	7.38E-01	4.21E-01	3.90E-02	3.57E-02
Arroyo channel sediment samples (locations 007-009)											
602160	CCTA-09-GR-007-0-0.5-S	7-12-99	0.0-0.5	ND (1.81E-01)	--	ND (6.12E-01)	--	7.79E-01	4.03E-01	6.27E-02	2.83E-02
602161	CCTA-09-GR-007-0-0.5-DU	7-12-99	0.0-0.5	ND (1.84E-01)	--	ND (4.95E-01)	--	7.80E-01	4.02E-01	6.95E-02	3.23E-02
602161	CCTA-09-GR-007-0.5-1.0-S	7-12-99	0.5-1.0	1.01E-01	1.56E-01	ND (4.68E-01)	--	7.23E-01	3.85E-01	ND (2.41E-02)	--
602161	CCTA-09-GR-008-0-0.5-S	7-12-99	0.0-0.5	ND (1.75E-01)	--	ND (4.76E-01)	--	ND (1.28E-01)	--	6.08E-02	3.55E-02
602161	CCTA-09-GR-008-0.5-1.0-S	7-12-99	0.5-1.0	ND (1.69E-01)	--	ND (4.48E-01)	--	5.59E-01	3.30E-01	ND (2.01E-02)	--
602160	CCTA-09-GR-009-0-0.5-S	7-12-99	0.0-0.5	1.99E-01	1.56E-01	ND (7.02E-01)	--	6.74E-01	3.64E-01	6.52E-02	6.58E-02
602161	CCTA-09-GR-009-0.5-1.0-S	7-12-99	0.5-1.0	ND (1.71E-01)	--	ND (4.44E-01)	--	6.35E-01	4.92E-01	7.30E-02	3.92E-02
Mound 3 soil sample (location 029)											
602161	CCTA-09-GR-029-3.0-3.5-S	7-12-99	3.0-3.5	8.88E-02	1.65E-01	3.77E-01	4.26E-01	7.92E-01	4.25E-01	3.22E-02	2.53E-02
VCM excavation under Mound 1 samples (locations 030-047)											
602160	CCTA-09-GR-030-0-0.5-S	7-12-99	0.0-0.5	1.28E-01	1.59E-01	ND (7.02E-01)	--	7.41E-01	3.83E-01	5.59E-02	4.90E-02
602161	CCTA-09-GR-030-0.5-1.0-S	7-12-99	0.5-1.0	ND (1.79E-01)	--	4.59E-01	3.62E-01	5.80E-01	3.49E-01	2.75E-02	1.79E-02
602161	CCTA-09-GR-031-0-0.5-S	7-12-99	0.0-0.5	ND (1.74E-01)	--	ND (4.89E-01)	--	ND (1.38E-01)	--	3.49E-02	3.58E-02
602161	CCTA-09-GR-031-0.5-1.0-S	7-12-99	0.5-1.0	ND (1.94E-01)	--	ND (5.37E-01)	--	7.08E-01	3.99E-01	ND (3.80E-02)	--
602160	CCTA-09-GR-032-0-0.5-S	7-12-99	0.0-0.5	ND (1.90E-01)	--	1.16E+00	6.56E-01	8.03E-01	7.28E-01	7.78E-02	3.85E-02
602161	CCTA-09-GR-032-0-0.5-DU	7-12-99	0.0-0.5	ND (1.90E-01)	--	ND (5.47E-01)	--	8.53E-01	4.63E-01	8.25E-02	4.11E-02
602161	CCTA-09-GR-032-0.5-1.0-S	7-12-99	0.5-1.0	8.91E-02	1.66E-01	8.77E-01	6.11E-01	7.10E-01	4.16E-01	ND (2.44E-02)	--
602161	CCTA-09-GR-033-0-0.5-S	7-12-99	0.0-0.5	ND (2.24E-01)	--	1.48E+00	5.68E-01	9.23E-01	5.20E-01	1.55E-01	4.96E-02
602161	CCTA-09-GR-033-0.5-1.0-S	7-12-99	0.5-1.0	1.18E-01	7.90E-02	2.02E+00	5.62E-01	8.27E-01	5.04E-01	1.57E-01	5.63E-02
602160	CCTA-09-GR-034-0-0.5-S	7-12-99	0.0-0.5	ND (1.93E-01)	--	2.15E+00	1.93E+00	7.75E-01	4.16E-01	3.20E-01	6.49E-02
602161	CCTA-09-GR-034-0.5-1.0-S	7-12-99	0.5-1.0	8.82E-02	1.57E-01	ND (4.62E-01)	--	6.99E-01	3.60E-01	4.51E-02	3.40E-02
602165	CCTA-09-GR-035-0-0.5-S	7-13-99	0.0-0.5	ND (2.32E-01)	--	ND (8.21E-01)	--	ND (1.47E-01)	--	ND (3.18E-02)	--

Refer to footnotes at end of table.

Table 10.4.5-2 (Continued)
 Summary of SWMU 9 Confirmatory Soil Sampling Gamma Spectroscopy Analytical Results
 July 1999
 (On-Site Laboratory)

Sample Attributes				Activity (pCi/g)							
Record Number ^a	ER Sample ID ^b (Figures 10.4.4-1 and 10.4.5.3-1)	Date Sampled	Sample Depth (ft)	Uranium-235		Uranium-238		Thorium-232		Cesium-137	
				Result	Error ^c	Result	Error ^c	Result	Error ^c	Result	Error ^c
602165	CCTA-09-GR-035-0.5-1.0-S	7-13-99	0.5-1.0	1.53E-01	1.71E-01	ND (7.38E-01)	--	8.23E-01	4.76E-01	ND (2.99E-02)	--
602164	CCTA-09-GR-036-0.0-0.5-S	7-13-99	0.0-0.5	1.37E-01	6.55E-02	2.38E+00	3.81E+00	9.87E-01	4.87E-01	5.06E-02	3.56E-02
602165	CCTA-09-GR-036-0.5-1.0-S	7-13-99	0.5-1.0	1.60E-01	1.50E-01	ND (6.65E-01)	--	7.96E-01	4.22E-01	1.91E-02	2.29E-02
602165	CCTA-09-GR-036-0.5-1.0-DU	7-13-99	0.5-1.0	ND (2.09E-01)	--	1.69E+00	2.01E+00	8.76E-01	4.46E-01	2.62E-02	2.38E-02
602164	CCTA-09-GR-037-0.0-0.5-S	7-13-99	0.0-0.5	ND (1.98E-01)	--	ND (7.45E-01)	--	7.53E-01	3.75E-01	3.73E-02	4.89E-02
602165	CCTA-09-GR-037-0.5-1.0-S	7-13-99	0.5-1.0	1.25E-01	2.08E-01	ND (6.92E-01)	--	6.27E-01	3.48E-01	1.97E-02	2.76E-02
602165	CCTA-09-GR-038-0.0-0.5-S	7-13-99	0.0-0.5	ND (2.14E-01)	--	ND (8.66E-01)	--	8.83E-01	4.57E-01	4.84E-02	2.19E-02
602165	CCTA-09-GR-038-0.5-1.0-S	7-13-99	0.5-1.0	2.08E-01	1.48E-01	ND (6.56E-01)	--	ND (1.13E-01)	--	ND (1.48E-02)	--
602164	CCTA-09-GR-039-0.0-0.5-S	7-13-99	0.0-0.5	2.12E-01	1.70E-01	ND (7.35E-01)	--	ND (1.22E-01)	--	2.22E-02	3.41E-03
602165	CCTA-09-GR-039-0.5-1.0-S	7-13-99	0.5-1.0	ND (2.01E-01)	--	ND (7.33E-01)	--	9.58E-01	4.89E-01	ND (2.77E-02)	--
602165	CCTA-09-GR-040-0.0-0.5-S	7-13-99	0.0-0.5	1.11E-01	1.54E-01	ND (7.05E-01)	--	8.52E-01	7.29E-01	2.75E-02	2.57E-02
602165	CCTA-09-GR-040-0.5-1.0-S	7-13-99	0.5-1.0	ND (1.21E-01)	--	2.64E+00	2.67E+00	7.45E-01	5.59E-01	6.33E-02	9.85E-02
602164	CCTA-09-GR-041-0.0-0.5-S	7-13-99	0.0-0.5	1.31E-01	1.62E-01	2.51E+00	3.26E+00	9.25E-01	4.76E-01	2.32E-02	3.19E-02
602165	CCTA-09-GR-041-0.0-0.5-DU	7-13-99	0.0-0.5	ND (1.99E-01)	--	2.55E+00	1.14E+00	8.74E-01	4.40E-01	2.43E-02	4.07E-02
602165	CCTA-09-GR-041-0.5-1.0-S	7-13-99	0.5-1.0	ND (1.28E-01)	--	4.00E+00	3.62E+00	8.40E-01	4.52E-01	ND (2.99E-02)	--
602165	CCTA-09-GR-042-0.0-0.5-S	7-13-99	0.0-0.5	3.01E-01	2.75E-01	4.50E+00	4.25E+00	7.87E-01	4.04E-01	2.65E-02	4.13E-02
602165	CCTA-09-GR-042-0.5-1.0-S	7-13-99	0.5-1.0	9.12E-02	1.46E-01	ND (6.59E-01)	--	7.11E-01	3.74E-01	ND (2.43E-02)	--
602165	CCTA-09-GR-043-0.0-0.5-S	7-13-99	0.0-0.5	1.15E-01	1.72E-01	3.30E+00	3.16E+00	9.05E-01	7.17E-01	3.75E-02	2.81E-02
602165	CCTA-09-GR-043-0.5-1.0-S	7-13-99	0.5-1.0	ND (1.86E-01)	--	ND (6.71E-01)	--	7.59E-01	1.10E+00	ND (2.62E-02)	--
602165	CCTA-09-GR-044-0.0-0.5-S	7-13-99	0.0-0.5	1.82E-01	1.59E-01	ND (7.82E-01)	--	7.92E-01	4.12E-01	6.72E-02	4.14E-02
602165	CCTA-09-GR-044-0.5-1.0-S	7-13-99	0.5-1.0	ND (2.03E-01)	--	2.73E+00	1.04E+00	8.10E-01	4.59E-01	5.73E-02	3.81E-02
602164	CCTA-09-GR-045-0.0-0.5-S	7-13-99	0.0-0.5	1.06E-01	1.68E-01	4.28E+00	3.42E+00	ND (1.20E-01)	--	8.23E-02	1.51E-01
602165	CCTA-09-GR-045-0.0-0.5-DU	7-13-99	0.0-0.5	ND (1.98E-01)	--	3.50E+00	1.87E+00	7.61E-01	1.20E+00	8.34E-02	3.49E-02
602165	CCTA-09-GR-045-0.5-1.0-S	7-13-99	0.5-1.0	ND (1.22E-01)	--	3.04E+00	3.29E+00	ND (1.39E-01)	--	5.46E-02	3.71E-02
602165	CCTA-09-GR-046-0.0-0.5-S	7-13-99	0.0-0.5	9.83E-02	1.74E-01	4.56E+00	3.57E+00	9.25E-01	4.65E-01	5.29E-02	3.63E-02
602165	CCTA-09-GR-046-0.5-1.0-S	7-13-99	0.5-1.0	ND (9.19E-02)	--	3.62E+00	2.04E+00	ND (1.25E-01)	--	1.71E-02	3.30E-02
602164	CCTA-09-GR-047-0.0-0.5-S	7-13-99	0.0-0.5	ND (2.17E-01)	--	3.60E+00	1.99E+00	9.02E-01	6.01E-01	7.83E-02	2.40E-02
602165	CCTA-09-GR-047-0.5-1.0-S	7-13-99	0.5-1.0	3.15E-01	1.86E-01	4.07E+00	3.07E+00	1.08E+00	7.99E-01	1.06E-01	4.38E-02
Burial Pit samples (locations 049-050)											
602165	CCTA-09-GR-048-0.0-0.5-S	7-13-99	0.0-0.5	1.13E-01	4.38E-02	4.92E+00	3.06E+00	ND (1.56E-01)	--	4.23E-02	3.67E-02
602165	CCTA-09-GR-048-0.5-1.0-S	7-13-99	0.5-1.0	ND (1.43E-01)	--	3.61E+00	3.11E+00	8.35E-01	4.34E-01	2.85E-02	3.50E-02
602165	CCTA-09-GR-049-0.0-0.5-S	7-13-99	0.0-0.5	1.35E-01	1.23E-01	4.82E+00	3.33E+00	8.64E-01	1.55E+00	1.30E-01	4.76E-02
602165	CCTA-09-GR-049-0.5-1.0-S	7-13-99	0.5-1.0	1.24E-01	1.81E-01	ND (6.47E-01)	--	ND (1.33E-01)	--	1.34E-01	4.89E-02
602164	CCTA-09-GR-050-0.0-0.5-S	7-13-99	0.0-0.5	8.46E-02	1.56E-01	ND (5.98E-01)	--	7.94E-01	3.88E-01	4.46E-02	3.83E-02
602165	CCTA-09-GR-050-0.5-1.0-S	7-13-99	0.5-1.0	8.06E-02	1.59E-01	ND (6.01E-01)	--	9.02E-01	4.55E-01	4.92E-02	3.06E-02
Quality Assurance/Quality Control Samples (pCi/mL)											
602160	CCTA-09-GR-000-EB	7-12-99	NA	ND (1.26E-01)	--	ND (3.20E-01)	--	ND (1.11E-01)	--	ND (1.69E-02)	--
602164	CCTA-09-GR-000-EB	7-13-99	NA	ND (1.42E-01)	--	ND (3.84E-01)	--	ND (1.29E-01)	--	ND (1.90E-02)	--
Background Soil Activities—Coyote Test Field ^d				1.8E-01		1.4E+00 ^e		1.01E+00 ^e		7.9E-02 ^{e,f}	

Refer to footnotes at end of table.

Table 10.4.5-2 (Concluded)
Summary of SWMU 9 Confirmatory Soil Sampling Gamma Spectroscopy Analytical Results
July 1999
(On-Site Laboratory)

Note: Values in **bold** exceed background soil activities.

^a Analysis request/chain-of-custody record.

^b **Bold** portion of the Sample ID corresponds to the sample location in Figures 10.4.4-1 and 10.4.5.3-1.

^c Two standard deviations about the mean detected activity.

^d From Dinwiddie September 1997.

^e Southwest background activities are presented where Coyote Test Field Background activities are not available.

^f The more conservative, lower subsurface background activity is used as a benchmark for consistency with current risk screening assessment methodology.

CCTA = Central Coyote Test Area.

DU = Duplicate sample.

EB = Equipment blank.

ER = Environmental Restoration.

ft = Foot (feet).

GR = Grab sample.

ID = Identification.

NA = Not applicable.

ND () = Not detected at or above the reported value, shown in parentheses.

pCi/g = Picocurie(s) per gram.

pCi/mL = Picocurie(s) per milliliter.

Rad = Radioactive.

S = Surface soil sample.

SWMU = Solid Waste Management Unit.

VCM = Voluntary corrective measure.

-- = Error not provided for nondetectable results.

activity of 1.8E-01 pCi/g only in the 0.0- to 0.5-foot sample at location 001. Cesium-137 (ND [2.33E-02] to 1.98E-01 pCi/g) were detected above the NMED-approved background activity of 7.9E-02 pCi/g in seven of the 12 background samples.

Gross Alpha/Gross Beta

Gross alpha /gross beta analyses give a site-specific range of 7.53 to 32.5 pCi/g for gross alpha and 20.8 to 35.0 pCi/g for gross beta (Table 10.4.5-3).

Arroyo Channel Sediment Samples

Soil samples were collected at three downstream locations west of the soil mounds and the site boundary (locations 007–009 on Figure 10.4.4-1). The samples were analyzed for TAL metals plus uranium, VOCs, HE, and radionuclides. The results are summarized below.

TAL Metals Plus Uranium

Table 10.4.5-1 presents the analytical results for the TAL metals plus uranium analyses. The 0.5- to 1.0-foot sample at location 008 (Figure 10.4.4-1) contained uranium (4.03 J mg/kg) above the NMED-approved background concentration of 3.42 mg/kg. This was the only metal in these samples that exceeded the NMED-approved background values; however, the antimony results were rejected during data validation (Annex D) for all but the 0.5- to 1.0-foot sample at location 009.

VOCs

Table 10.4.5-4 presents the analytical results for the VOC analyses. The 0.0- to 0.5-foot sample from location 008 (Figure 10.4.4-1) contained ethylbenzene (0.51 J µg/kg) and xylene (6.1 µg/kg). These were the only VOC detections in these samples. The MDLs for the VOC analysis are provided in Table 10.4.5-5.

Radionuclides

Table 10.4.5-2 presents the analytical results for the gamma spectroscopy analyses. The 0.0- to 0.5-foot sample from location 009 (Figure 10.4.4-1) contained uranium-235 (1.99E-01 pCi/g) at an activity above the NMED-approved background of 1.8E-01 pCi/g. All other radionuclides in these samples were below background values.

Gross Alpha/Gross Beta

Table 10.4.5-3 presents the analytical results for the gross alpha/gross beta analyses. Gross alpha (6.50 to 24.7 pCi/g) was within the same order of magnitude as the site-specific range of

Table 10.4.5-3
Summary of SWMU 9 Confirmatory Soil Sampling
Gross Alpha and Gross Beta Analytical Results
July 1999
(Off-Site Laboratory)

Sample Attributes				Activity (pCi/g)			
Record Number ^a	ER Sample ID ^b (Figures 10.4.4-1 and 10.4.5.3-1)	Sample Date	Sample Depth (ft)	Gross Alpha		Gross Beta	
				Result	Error ^c	Result	Error ^c
Site-specific background samples (locations 001–003)							
602158	CCTA-09-GR-001-0-0.5-S	7-12-99	0.0–0.5	14.1 J	3.83	24.5	3.87
602158	CCTA-09-GR-001-0.5-1.0-S	7-12-99	0.5–1.0	12.4 J	3.76	27.6	3.7
602158	CCTA-09-GR-002-0-0.5-S	7-12-99	0.0–0.5	15.0 J	3.84	24.6	3.56
602158	CCTA-09-GR-002-0.5-1.0-S	7-12-99	0.5–1.0	12.4 J	3.51	26.6	3.71
602158	CCTA-09-GR-003-0-0.5-S	7-12-99	0.0–0.5	10.1 J	3.26	20.8	3.23
602158	CCTA-09-GR-003-0.5-1.0-S	7-12-99	0.5–1.0	8.48 J	3.09	22.4	3.47
Arroyo sediment background samples (locations 004–006)							
602158	CCTA-09-GR-004-0-0.5-S	7-12-99	0.0–0.5	7.85 J	3.02	35.0	4.24
602158	CCTA-09-GR-004-0-0.5-DU	7-12-99	0.0–0.5	8.49 J	3.21	30.8	3.98
602158	CCTA-09-GR-004-0.5-1.0-S	7-12-99	0.5–1.0	7.53	2.41	29.0	3.07
602158	CCTA-09-GR-005-0-0.5-S	7-12-99	0.0–0.5	9.16	3.06	28.6	3.66
602158	CCTA-09-GR-005-0.5-1.0-S	7-12-99	0.5–1.0	15.0	3.66	28.8	3.34
602158	CCTA-09-GR-006-0-0.5-S	7-12-99	0.0–0.5	12.7	3.63	27.0	3.49
602158	CCTA-09-GR-006-0.5-1.0-S	7-12-99	0.5–1.0	32.5	5.07	33.9	3.47
Arroyo channel sediment samples (locations 007–009)							
602158	CCTA-09-GR-007-0-0.5-S	7-12-99	0.0–0.5	7.27	2.85	25.5	3.47
602158	CCTA-09-GR-007-0-0.5-DU	7-12-99	0.0–0.5	10.1	3.2	27.4	3.75
602158	CCTA-09-GR-007-0.5-1.0-S	7-12-99	0.5–1.0	10.7	3.37	33.4	3.62
602158	CCTA-09-GR-008-0-0.5-S	7-12-99	0.0–0.5	12.9	3.67	34.3	3.68
602158	CCTA-09-GR-008-0.5-1.0-S	7-12-99	0.5–1.0	6.50	3.14	30.3	4.45
602158	CCTA-09-GR-009-0-0.5-S	7-12-99	0.0–0.5	10.9	3.35	26.9	3.58
602158	CCTA-09-GR-009-0.5-1.0-S	7-12-99	0.5–1.0	24.7	4.83	27.8	3.62
Mound 3 soil sample (location 029)							
602159	CCTA-09-GR-029-3.0-3.5-S	7-12-99	3–3.5	15.6	4.39	27.5	4.15
VCN excavation under Mound 1 samples (locations 030–047)							
602159	CCTA-09-GR-030-0-0.5-S	7-12-99	0.0–0.5	12.1	4.01	26.8	4.02
602159	CCTA-09-GR-030-0.5-1.0-S	7-12-99	0.5–1.0	9.01	3.5	29.6	3.98
602159	CCTA-09-GR-031-0-0.5-S	7-12-99	0.0–0.5	13.7	4.33	30.8	4.26
602159	CCTA-09-GR-031-0.5-1.0-S	7-12-99	0.5–1.0	12.5	3.89	25.2	3.98
602159	CCTA-09-GR-032-0-0.5-S	7-12-99	0.0–0.5	16.1	4	27.3	3.78
602159	CCTA-09-GR-032-0-0.5-DU	7-12-99	0.0–0.5	12.9	3.96	23.3	3.75
602159	CCTA-09-GR-032-0.5-1.0-S	7-12-99	0.5–1.0	19.4	5.13	22.8	3.98
602159	CCTA-09-GR-033-0-0.5-S	7-12-99	0.0–0.5	15.0	3.99	23.9	3.71
602159	CCTA-09-GR-033-0.5-1.0-S	7-12-99	0.5–1.0	13.8	3.77	22.1	3.61
602159	CCTA-09-GR-034-0-0.5-S	7-12-99	0.0–0.5	15.0	3.79	30.7	3.85
602159	CCTA-09-GR-034-0.5-1.0-S	7-12-99	0.5–1.0	11.7	3.54	30.8	3.8
602162	CCTA-09-GR-035-0-0.5-S	7-13-99	0.0–0.5	16.0	4.1	28.5	3.84
602162	CCTA-09-GR-035-0.5-1.0-S	7-13-99	0.5–1.0	16.5	4.1	29.7	3.9
602162	CCTA-09-GR-036-0-0.5-S	7-13-99	0.0–0.5	16.2	4.19	34.1	4.21
602162	CCTA-09-GR-036-0.5-1.0-S	7-13-99	0.5–1.0	19.2	4.49	33.7	4.09
602162	CCTA-09-GR-036-0.5-1.0-DU	7-13-99	0.5–1.0	18.0	4.28	31.8	4.03
602162	CCTA-09-GR-037-0-0.5-S	7-13-99	0.0–0.5	12.8	3.46	27.4	3.51
602162	CCTA-09-GR-037-0.5-1.0-S	7-13-99	0.5–1.0	14.1	3.78	27.9	3.98
602162	CCTA-09-GR-038-0-0.5-S	7-13-99	0.0–0.5	16.0	3.94	27.1	3.82
602162	CCTA-09-GR-038-0.5-1.0-S	7-13-99	0.5–1.0	9.07	3.24	31.2	3.89
602162	CCTA-09-GR-039-0-0.5-S	7-13-99	0.0–0.5	12.7	3.55	22.6	3.57
602162	CCTA-09-GR-039-0.5-1.0-S	7-13-99	0.5–1.0	12.3	3.62	24.5	3.75
602162	CCTA-09-GR-040-0-0.5-S	7-13-99	0.0–0.5	12.9	3.39	26.3	3.56

Refer to footnotes at end of table.

Table 10.4.5-3 (Concluded)
 Summary of SWMU 9 Confirmatory Soil Sampling
 Gross Alpha and Beta Analytical Results
 July 1999
 (Off-Site Laboratory)

Sample Attributes				Activity (pCi/g)			
Record Number ^a	ER Sample ID ^b (Figures 10.4.4-1 and 10.4.5.3-1)	Sample Date	Sample Depth (ft)	Gross Alpha		Gross Beta	
				Result	Error ^c	Result	Error ^c
602162	CCTA-09-GR-040-0.5-1.0-S	7-13-99	0.5-1.0	16.2	4.12	28.3	3.87
602162	CCTA-09-GR-041-0-0.5-S	7-13-99	0.0-0.5	15.1	4	25.1	3.89
602162	CCTA-09-GR-041-0-0.5-DU	7-13-99	0.0-0.5	16.7	4.11	21.9	3.65
602162	CCTA-09-GR-041-0.5-1.0-S	7-13-99	0.5-1.0	11.7	3.83	24.5	3.85
602162	CCTA-09-GR-042-0-0.5-S	7-13-99	0.0-0.5	22.9	5.02	29.0	3.94
602162	CCTA-09-GR-042-0.5-1.0-S	7-13-99	0.5-1.0	13.2	3.85	27.7	4.02
602162	CCTA-09-GR-043-0-0.5-S	7-13-99	0.0-0.5	18.3	4.76	28.8	4.32
602162	CCTA-09-GR-043-0.5-1.0-S	7-13-99	0.5-1.0	13.6	3.76	27.8	3.82
602163	CCTA-09-GR-044-0-0.5-S	7-13-99	0.0-0.5	18.3	4.25	37.1	4.2
602163	CCTA-09-GR-044-0.5-1.0-S	7-13-99	0.5-1.0	19.7	4.85	38.6	4.58
602163	CCTA-09-GR-045-0-0.5-S	7-13-99	0.0-0.5	18.0	4.45	41.1	4.48
602163	CCTA-09-GR-045-0-0.5-DU	7-13-99	0.0-0.5	26.4	5.33	49.4	4.94
602163	CCTA-09-GR-045-0.5-1.0-S	7-13-99	0.5-1.0	17.7	4.07	29.4	3.84
602163	CCTA-09-GR-046-0-0.5-S	7-13-99	0.0-0.5	12.4	3.57	27.9	3.73
602163	CCTA-09-GR-046-0.5-1.0-S	7-13-99	0.5-1.0	18.9	4.49	37.3	4.44
602163	CCTA-09-GR-047-0-0.5-S	7-13-99	0.0-0.5	12.3	3.58	30.1	3.86
602163	CCTA-09-GR-047-0.5-1.0-S	7-13-99	0.5-1.0	11.9	3.56	27.8	3.96
Burial Pit samples (locations 048-050)							
602163	CCTA-09-GR-048-0-0.5-S	7-13-99	0.0-0.5	19.2	4.05	31.9	3.7
602163	CCTA-09-GR-048-0.5-1.0-S	7-13-99	0.5-1.0	13.6	3.53	31	3.88
602163	CCTA-09-GR-049-0-0.5-S	7-13-99	0.0-0.5	23.8	4.71	42.4	4.22
602163	CCTA-09-GR-049-0.5-1.0-S	7-13-99	0.5-1.0	21.3	4.58	45	4.62
602163	CCTA-09-GR-050-0-0.5-S	7-13-99	0.0-0.5	14.1	3.78	32.3	4.24
602163	CCTA-09-GR-050-0.5-1.0-S	7-13-99	0.5-1.0	13	3.64	30.2	3.86
Quality Assurance/Quality Control Samples (pCi/L)							
602159	CCTA-09-GR-000-EB	7-12-99	NA	1.02	0.699	0.256	1.33
602163	CCTA-09-GR-000-EB	7-13-99	NA	0.956	0.488	1.85	0.869

^a Analysis request/chain-of-custody record.

^b Bold portion of the Sample ID corresponds to the sample location in Figures 10.4.4-1 and 10.4.5.3-1.

^c Two standard deviations about the mean detected activity.

CCTA = Central Coyote Test Area.

DU = Duplicate sample.

EB = Equipment blank.

ER = Environmental Restoration.

ft = Foot (feet).

GR = Grab sample.

ID = Identification.

J = Estimated value. See Data Validation report.

NA = Not applicable.

pCi/g = Picocurie(s) per gram.

pCi/L = Picocurie(s) per liter.

Rad = Radioactive.

S = Soil sample.

SWMU = Solid Waste Management Unit.

VCM = Voluntary corrective measure.

Table 10.4.5-4
Summary of SWMU 9 Confirmatory Soil Sampling VOC Analytical Results
July 1999
(Off-Site Laboratory)

Sample Attributes				VOCs (EPA Method 8260) ^a (µg/kg)						
Record Number ^b	ER Sample ID ^c (Figures 10.4.4-1 and 10.4.5.3-1)	Sample Date	Sample Depth (ft)	Acetone	Chloroform	Ethylbenzene	Methylene chloride	Toluene	Trichloroethene	Xylene
Arroyo channel sediment samples (locations 007-009)										
602158	CCTA-09-GR-007-0-0.5-S	7-12-99	0.0-0.5	ND (10.3)	ND (1.0 U)	ND (0.3)	ND (1.4)	ND (0.9)	ND (0.3)	ND (0.7)
602158	CCTA-09-GR-007-0-0.5-DU	7-12-99	0.0-0.5	ND (10.3)	ND (1.0 U)	ND (0.3)	ND (1.4)	ND (0.9)	ND (0.3)	ND (0.7)
602158	CCTA-09-GR-007-0.5-1.0-S	7-12-99	0.5-1.0	ND (10.3)	ND (1.0 U)	ND (0.3)	ND (1.4)	ND (0.9)	ND (0.3)	ND (0.7)
602158	CCTA-09-GR-008-0-0.5-S	7-12-99	0.0-0.5	ND (10.3)	ND (1.0 U)	0.51 J (1.00)	ND (1.4)	ND (0.9)	ND (0.3)	6.1
602158	CCTA-09-GR-008-0.5-1.0-S	7-12-99	0.5-1.0	ND (10.3)	ND (1.0 U)	ND (0.3)	ND (1.4)	ND (0.9)	ND (0.3)	ND (0.7)
602158	CCTA-09-GR-009-0-0.5-S	7-12-99	0.0-0.5	ND (10.3)	ND (1.0 U)	ND (0.3)	ND (5.0 U)	ND (0.9)	ND (0.3)	ND (0.7)
602158	CCTA-09-GR-009-0.5-1.0-S	7-12-99	0.5-1.0	ND (10.3)	ND (1.0 U)	ND (0.3)	ND (1.4)	ND (0.9)	ND (0.3)	ND (0.7)
Mound 3 soil sample (location 029)										
602159	CCTA-09-GR-029-3.0-3.5-S	7-12-99	3.0-3.5	ND (10.3)	ND (1.0 U)	ND (0.3)	ND (5.0 U)	ND (0.9)	ND (0.3)	3.2 J
VCM excavation under Mound 1 samples (locations 030-047)										
602159	CCTA-09-GR-030-0-0.5-S	7-12-99	0.0-0.5	ND (10.3)	ND (1.0 U)	ND (0.3)	ND (1.4)	ND (0.9)	ND (0.3)	ND (0.7 J)
602159	CCTA-09-GR-030-0.5-1.0-S	7-12-99	0.5-1.0	ND (10.3)	ND (1.0 U)	ND (0.3)	ND (1.4)	ND (0.9)	ND (0.3)	ND (0.7 J)
602159	CCTA-09-GR-031-0-0.5-S	7-12-99	0.0-0.5	ND (10.3)	ND (1.0 U)	ND (0.3)	ND (5.0 U)	ND (0.9)	ND (0.3)	ND (0.7 J)
602159	CCTA-09-GR-031-0.5-1.0-S	7-12-99	0.5-1.0	ND (10.3)	ND (1.0 U)	ND (0.3)	ND (1.4)	ND (0.9)	ND (0.3)	ND (0.7 J)
602159	CCTA-09-GR-032-0-0.5-S	7-12-99	0.0-0.5	ND (10.3)	ND (1.1 U)	ND (0.3)	ND (9.5 U)	1.4	ND (0.3)	3.3 J
602159	CCTA-09-GR-032-0-0.5-DU	7-12-99	0.0-0.5	ND (10.3)	ND (1.0 U)	ND (0.3)	ND (5.0 U)	ND (0.9)	ND (0.3)	ND (0.7 J)
602159	CCTA-09-GR-032-0.5-1.0-S	7-12-99	0.5-1.0	ND (10.3)	ND (1.0 U)	ND (0.3)	ND (5.0 U)	ND (0.9)	ND (0.3)	3.9 J
602159	CCTA-09-GR-033-0-0.5-S	7-12-99	0.0-0.5	ND (10.3)	ND (1.5 U)	ND (0.3)	44	1.5	ND (0.3)	3.2 J
602159	CCTA-09-GR-033-0.5-1.0-S	7-12-99	0.5-1.0	ND (10.3)	ND (1.5 U)	ND (0.3)	26	1.7	ND (0.3)	4.1 J
602159	CCTA-09-GR-034-0-0.5-S	7-12-99	0.0-0.5	ND (10.3)	ND (1.0 U)	ND (0.3)	ND (1.4)	ND (0.9)	ND (0.3)	ND (0.7 J)
602159	CCTA-09-GR-034-0.5-1.0-S	7-12-99	0.5-1.0	ND (10.3)	ND (1.0 U)	ND (0.3)	ND (1.4)	ND (0.9)	ND (0.3)	ND (0.7 J)
602162	CCTA-09-GR-035-0-0.5-S	7-13-99	0.0-0.5	ND (10.3)	ND (0.1)	ND (0.3)	18	ND (0.9)	ND (0.3)	ND (0.7)
602162	CCTA-09-GR-035-0.5-1.0-S	7-13-99	0.5-1.0	ND (10.3)	ND (0.1)	ND (0.3)	ND (5.0 U)	ND (0.9)	ND (0.3)	ND (0.7)
602162	CCTA-09-GR-036-0-0.5-S	7-13-99	0.0-0.5	ND (10.3)	ND (0.1)	ND (0.3)	ND (9.6 U)	ND (0.9)	ND (0.3)	ND (0.7)
602162	CCTA-09-GR-036-0.5-1.0-S	7-13-99	0.5-1.0	ND (10.3)	ND (0.1)	ND (0.3)	ND (5.0 U)	ND (0.9)	ND (0.3)	ND (0.7)
602162	CCTA-09-GR-036-0.5-1.0-DU	7-13-99	0.5-1.0	ND (10.3)	ND (0.1)	ND (0.3)	ND (5.0 U)	ND (0.9)	ND (0.3)	ND (0.7)
602162	CCTA-09-GR-037-0-0.5-S	7-13-99	0.0-0.5	13 J (25.0)	ND (0.1)	ND (0.3)	ND (8.4 U)	1.1	ND (0.3)	1.0 J (2.00)

Refer to footnotes at end of table.

Table 10.4.5-4 (Continued)
 Summary of SWMU 9 Confirmatory Soil Sampling VOC Analytical Results,
 July 1999
 (Off-Site Laboratory)

Sample Attributes				VOCs (EPA Method 8260) ^a (µg/kg)						
Record Number ^b	ER Sample ID ^c (Figures 10.4.4-1 and 10.4.5.3-1)	Sample Date	Sample Depth (ft)	Acetone	Chloroform	Ethylbenzene	Methylene chloride	Toluene	Trichloroethene	Xylene
602162	CCTA-09-GR-037-0.5-1.0-S	7-13-99	0.5-1.0	ND (10.3)	ND (0.1)	ND (0.3)	ND (7.0 U)	ND (0.9)	ND (0.3)	ND (0.7)
602162	CCTA-09-GR-038-0-0.5-S	7-13-99	0.0-0.5	ND (10.3)	ND (0.1)	ND (0.3)	15	ND (0.9)	ND (0.3)	ND (0.7)
602162	CCTA-09-GR-038-0.5-1.0-S	7-13-99	0.5-1.0	ND (10.3)	ND (0.1)	ND (0.3)	ND (5.0 U)	ND (0.9)	ND (0.3)	ND (0.7)
602162	CCTA-09-GR-039-0-0.5-S	7-13-99	0.0-0.5	ND (10.3)	ND (0.1)	ND (0.3)	ND (6.3 U)	ND (0.9)	ND (0.3)	ND (0.7)
602162	CCTA-09-GR-039-0.5-1.0-S	7-13-99	0.5-1.0	ND (10.3)	0.51 J (1.00)	ND (0.3)	ND (5.0 U)	ND (0.9)	ND (0.3)	ND (0.7)
602162	CCTA-09-GR-040-0-0.5-S	7-13-99	0.0-0.5	ND (10.3)	0.97 J (1.00)	0.52 J (1.00)	33	2.6	0.58 J (1.00)	1.2 J (2.00)
602162	CCTA-09-GR-040-0.5-1.0-S	7-13-99	0.5-1.0	ND (10.3)	ND (0.1)	ND (0.3)	ND (8.2 U)	ND (0.9)	ND (0.3)	ND (0.7)
602162	CCTA-09-GR-041-0-0.5-S	7-13-99	0.0-0.5	ND (10.3)	ND (0.1)	ND (0.3)	ND (6.3 U)	ND (0.9)	ND (0.3)	ND (0.7)
602162	CCTA-09-GR-041-0-0.5-DU	7-13-99	0.0-0.5	ND (10.3)	ND (0.1)	ND (0.3)	ND (6.5 U)	ND (0.9)	ND (0.3)	ND (0.7)
602162	CCTA-09-GR-041-0.5-1.0-S	7-13-99	0.5-1.0	ND (10.3)	ND (0.1)	ND (0.3)	ND (1.4)	ND (0.9)	ND (0.3)	ND (0.7)
602162	CCTA-09-GR-042-0-0.5-S	7-13-99	0.0-0.5	ND (10.3)	ND (0.1)	ND (0.3)	ND (5.0 U)	ND (0.9)	ND (0.3)	ND (0.7)
602162	CCTA-09-GR-042-0.5-1.0-S	7-13-99	0.5-1.0	ND (10.3)	ND (0.1)	ND (0.3)	ND (1.4)	ND (0.9)	ND (0.3)	ND (0.7)
602162	CCTA-09-GR-043-0-0.5-S	7-13-99	0.0-0.5	ND (10.3)	ND (0.1)	ND (0.3)	ND (7.1 U)	1.4	ND (0.3)	0.81 J (2.00)
602162	CCTA-09-GR-043-0.5-1.0-S	7-13-99	0.5-1.0	ND (10.3)	ND (0.1)	ND (0.3)	ND (1.4)	ND (0.9)	ND (0.3)	ND (0.7)
602163	CCTA-09-GR-044-0-0.5-S	7-13-99	0.0-0.5	ND (10.3)	ND (1.0 U)	ND (0.3)	33	1.6	ND (0.3)	ND (0.7)
602163	CCTA-09-GR-044-0.5-1.0-S	7-13-99	0.5-1.0	ND (10.3)	ND (0.1)	ND (0.3)	18	ND (0.9)	ND (0.3)	ND (0.7)
602163	CCTA-09-GR-045-0-0.5-S	7-13-99	0.0-0.5	ND (10.3)	ND (0.1)	ND (0.3)	25	1.6	ND (0.3)	ND (0.7)
602163	CCTA-09-GR-045-0-0.5-DU	7-13-99	0.0-0.5	ND (10.3)	ND (0.1)	ND (0.3)	26	1.3	ND (0.3)	ND (0.7)
602163	CCTA-09-GR-045-0.5-1.0-S	7-13-99	0.5-1.0	ND (10.3)	ND (0.1)	ND (0.3)	41	1.4	ND (0.3)	ND (0.7)
602163	CCTA-09-GR-046-0-0.5-S	7-13-99	0.0-0.5	ND (10.3)	ND (1.0 U)	0.47 J (1.00)	23	2.8	ND (0.3)	1.1 J (2.00)
602163	CCTA-09-GR-046-0.5-1.0-S	7-13-99	0.5-1.0	ND (10.3)	ND (1.0 U)	ND (0.3)	ND (1.4)	ND (0.9)	ND (0.3)	ND (0.7)
602163	CCTA-09-GR-047-0-0.5-S	7-13-99	0.0-0.5	ND (10.3)	ND (1.1 U)	0.44 J (1.00)	14	2.4	ND (0.3)	0.81 J (2.00)
602163	CCTA-09-GR-047-0.5-1.0-S	7-13-99	0.5-1.0	ND (10.3)	ND (1.2 U)	ND (0.3)	26	1.6	ND (0.3)	ND (0.7)
Burial Pit samples (locations 048-050)										
602163	CCTA-09-GR-048-0-0.5-S	7-13-99	0.0-0.5	ND (10.3)	ND (1.0 U)	ND (0.3)	ND (1.4)	ND (0.9)	ND (0.3)	ND (0.7)
602163	CCTA-09-GR-048-0.5-1.0-S	7-13-99	0.5-1.0	ND (10.3)	ND (0.1)	ND (0.3)	ND (1.4)	ND (0.9)	ND (0.3)	ND (0.7)
602163	CCTA-09-GR-049-0-0.5-S	7-13-99	0.0-0.5	ND (10.3)	ND (0.1)	ND (0.3)	ND (5.0 U)	ND (0.9)	ND (0.3)	ND (0.7)
602163	CCTA-09-GR-049-0.5-1.0-S	7-13-99	0.5-1.0	ND (10.3)	ND (0.1)	ND (0.3)	ND (1.4)	ND (0.9)	ND (0.3)	ND (0.7)
602163	CCTA-09-GR-050-0-0.5-S	7-13-99	0.0-0.5	ND (10.3)	ND (0.1)	ND (0.3)	ND (5.0 U)	ND (0.9)	ND (0.3)	ND (0.7)
602163	CCTA-09-GR-050-0.5-1.0-S	7-13-99	0.5-1.0	ND (10.3)	ND (0.1)	ND (0.3)	ND (1.4)	ND (0.9)	ND (0.3)	ND (0.7)

Refer to footnotes at end of table.

Table 10.4.5-4 (Concluded)
 Summary of SWMU 9 Confirmatory Soil Sampling VOC Analytical Results
 July 1999
 (Off-Site Laboratory)

Sample Attributes				VOCs (EPA Method 8260) ^a (µg/kg)						
Record Number ^b	ER Sample ID ^c (Figures 10.4.4-1 and 10.4.5.3-1)	Sample Date	Sample Depth (ft)	Acetone	Chloroform	Ethylbenzene	Methylene chloride	Toluene	Trichloroethene	Xylene
Quality Assurance/Quality Control Samples (µg/L)										
602159	CCTA-09-GR-000-EB	7-12-99	NA	3.7 J (5.00)	ND (0.7)	ND (0.3)	ND (1.2)	ND (0.5)	ND (0.6 J)	ND (1.1)
602159	CCTA-09-GR-000-TB	7-12-99	NA	ND (3.7)	ND (0.7)	ND (0.3)	1.5 J (5.00)	ND (0.5)	ND (0.6 J)	ND (1.1)
602163	CCTA-09-GR-000-EB	7-13-99	NA	ND (3.7)	ND (0.7)	ND (0.3)	1.3 J (5.00)	ND (0.5)	ND (0.6)	ND (1.1)
602163	CCTA-09-GR-000-TB	7-13-99	NA	ND (3.7)	ND (0.7)	ND (0.3)	ND (1.2)	ND (0.5)	ND (0.6)	ND (1.1)

Note: Values in **bold** represent detected VOCs.

^aEPA November 1986.

^bAnalysis request/chain-of-custody record.

^c**Bold** portion of the Sample ID corresponds to the sample location in Figures 10.4.4-1 and 10.4.5.3-1.

CCTA = Central Coyote Test Area.

DU = Duplicate sample.

EB = Equipment blank.

EPA = U.S. Environmental Protection Agency.

ER = Environmental Restoration.

ft = Foot (feet).

GR = Grab sample.

ID = Identification.

J = Estimated value. See Data Validation report

J () = The reported value is greater than or equal to the method detection limit but is less than the practical quantitation limit, shown in parentheses.

µg/kg = Microgram(s) per kilogram.

µg/L = Microgram(s) per liter.

NA = Not applicable.

ND () = Not detected at or above the reported value, shown in parentheses.

Rad = Radioactive.

S = Soil sample.

SWMU = Solid Waste Management Unit.

TB = Trip blank.

U = Nondetected value. See Data Validation report.

VCM = Voluntary corrective measure.

VOC = Volatile organic compound.

Table 10.4.5-5
 VOC Analytical Method Detection Limits (EPA Method 8260)^a
 Used for SWMU 9 Confirmatory Soil Sampling
 July 1999
 (Off-Site Laboratory)

Analyte	Soil Sample MDL ($\mu\text{g}/\text{kg}$)	Aqueous Sample MDL ($\mu\text{g}/\text{L}$)
Acetone	10.3	3.7
Benzene	0.5	0.3
Bromoform	0.3	0.4
2-Butanone	3.2	5.9
Carbon disulfide	0.3	1.8
Carbon tetrachloride	0.5	0.2
Chlorobenzene	0.3	0.3
Chlorodibromomethane	0.2	0.3
Chloroethane	0.3	0.3
Chloroform	0.1	0.7
Dichlorobromomethane	0.1	0.4
1,1-Dichloroethane	0.1	0.4
1,2-Dichloroethane	0.2	0.2
1,1-Dichloroethylene	0.3	0.7
cis-1,2-Dichloroethylene	0.1	0.7
trans-1,2-Dichloroethylene	0.1	0.3
1,2-Dichloropropane	0.2	0.2
cis-1,3-Dichloropropylene	0.2	0.3
trans-1,3-Dichloropropylene	0.3	0.3
Ethylbenzene	0.3	0.3
2-Hexanone	2.8	3.2
Methyl bromide	0.3	0.4
Methyl chloride	0.2	0.2
Methylene chloride	1.4	0.2
4-Methyl-2-pentanone	3.1	1.6
Styrene	0.3	0.2
1,1,2,2-Tetrachloroethane	0.6	0.5
Tetrachloroethylene	0.4	0.7
Toluene	0.9	0.5
1,1,1-Trichloroethane	0.1	0.2
1,1,2-Trichloroethane	0.3	0.4
Trichloroethylene	0.3	0.6
Vinyl acetate	2.1	1.8
Vinyl chloride	0.4	0.4
Xylenes (total)	0.7	1.1

^aEPA November 1986.

EPA = U.S. Environmental Protection Agency.

MDL = Method detection limit.

$\mu\text{g}/\text{kg}$ = Microgram(s) per kilogram.

$\mu\text{g}/\text{L}$ = Microgram(s) per liter.

SWMU = Solid Waste Management Unit.

VOC = Volatile organic compound.

7.53 to 32.5 pCi/g. Gross beta (25.5 to 34.3 pCi/g) was within the same order of magnitude of the site-specific range of 20.8 to 35.0 pCi/g.

Mound 3 Samples

As previously mentioned in Section 10.4.4.3, when a trench was cut into this feature during the 1996 sampling event (location 029 on Figure 10.4.4-2), it was discovered to be a natural terrace deposit along the arroyo wall rather than an actual burial mound. Nevertheless, a sample was collected at the same level as the arroyo channel (i.e., 3.0- to 3.5-feet below the terrace top). The sample was analyzed for TAL metals plus uranium, VOCs, SVOCs, HE, and radionuclides. The results are summarized below.

TAL Metals plus Uranium

Table 10.4.5-1 presents the analytical results for the TAL metals plus uranium analyses. All metals were below their NMED-approved background concentrations.

VOCs

Table 10.4.5-4 presents the analytical results for the VOC analysis. Xylene (3.2 J $\mu\text{g}/\text{kg}$) was the only VOC compound detected in this sample. The MDLs for the VOC analysis are provided in Table 10.4.5-5.

SVOCs

Table 10.4.5-6 presents the analytical results for the SVOC analysis. No SVOC compounds were detected in this sample. The MDLs for the SVOC analysis are provided in Table 10.4.5-7.

HE

Table 10.4.5-8 presents the analytical results for the HE analysis. HMX (1,400 $\mu\text{g}/\text{kg}$) and RDX (3,200 $\mu\text{g}/\text{kg}$) were detected in this sample. This conflicts with the on-site analytical data from the 1996 sampling where no HE compounds were detected. The MDLs used for the HE analyses are provided in Table 10.4.5-9.

Radionuclides

Table 10.4.5-2 presents the analytical results for the gamma spectroscopy analyses. No isotopes were present above their respective NMED-approved background activities.

Table 10.4.5-6
 Summary of SWMU 9 Confirmatory Soil Sampling SVOC Analytical Results
 July 1999
 (Off-Site Laboratory)

Sample Attributes				SVOCs (EPA Method 8270) ^a (µg/kg)					
Record Number ^b	ER Sample ID ^c (Figures 10-10.4.4-1 and 10.4.5.3-1)	Sample Date	Sample Depth (ft)	2,4-Dinitrotoluene	Anthracene	Benzo(a)pyrene	Benzo(g,h,i)perylene	Chrysene	Pentachlorophenol
Mound 3 soil sample (location 029)									
602159	CCTA-09-GR-029-3.0-3.5-S	7-12-99	3.0-3.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
VCM excavation under Mound 1 samples (locations 030-047)									
602159	CCTA-09-GR-030-0-0.5-S	7-12-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602159	CCTA-09-GR-030-0.5-1.0-S	7-12-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602159	CCTA-09-GR-031-0-0.5-S	7-12-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602159	CCTA-09-GR-031-0.5-1.0-S	7-12-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602159	CCTA-09-GR-032-0-0.5-S	7-12-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602159	CCTA-09-GR-032-0-0.5-DU	7-12-99	0-0.5	440	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602159	CCTA-09-GR-032-0.5-1.0-S	7-12-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602159	CCTA-09-GR-033-0-0.5-S	7-12-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602159	CCTA-09-GR-033-0.5-1.0-S	7-12-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602159	CCTA-09-GR-034-0-0.5-S	7-12-99	0-0.5	ND (117)	ND (88)	ND (72)	130 J (333)	ND (55)	ND (57)
602159	CCTA-09-GR-034-0.5-1.0-S	7-12-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-035-0-0.5-S	7-13-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-035-0.5-1.0-S	7-13-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-036-0-0.5-S	7-13-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-036-0.5-1.0-S	7-13-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-036-0.5-1.0-DU	7-13-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-037-0-0.5-S	7-13-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-037-0.5-1.0-S	7-13-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-038-0-0.5-S	7-13-99	0-0.5	ND (117)	720	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-038-0.5-1.0-S	7-13-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-039-0-0.5-S	7-13-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-039-0.5-1.0-S	7-13-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-040-0-0.5-S	7-13-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-040-0.5-1.0-S	7-13-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-041-0-0.5-S	7-13-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-041-0-0.5-DU	7-13-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-041-0.5-1.0-S	7-13-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-042-0-0.5-S	7-13-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-042-0.5-1.0-S	7-13-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-043-0-0.5-S	7-13-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602162	CCTA-09-GR-043-0.5-1.0-S	7-13-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)

Refer to footnotes at end of table.

Table 10.4.5-6 (Concluded)
 Summary of SWMU 9 Confirmatory Soil Sampling SVOC Analytical Results
 July 1999
 (Off-Site Laboratory)

Sample Attributes				SVOCs (EPA Method 8270) ^a (µg/kg)					
Record Number ^b	ER Sample ID ^c (Figures 10.4.4-1 and 10.4.5.3-1)	Sample Date	Sample Depth (ft)	2,4-dinitrotoluene	Anthracene	Benzo(a)pyrene	Benzo(g,h,i)perylene	Chrysene	Pentachlorophenol
602163	CCTA-09-GR-044-0-0.5-S	7-13-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	220 J (667)
602163	CCTA-09-GR-044-0.5-1.0-S	7-13-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	230 J (667)
602163	CCTA-09-GR-045-0-0.5-S	7-13-99	0-0.5	ND (117)	ND (88)	120 J (333)	110 J (333)	120 J (333)	280 J (667)
602163	CCTA-09-GR-045-0-0.5-DU	7-13-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	71 J (333)	270 J (667)
602163	CCTA-09-GR-045-0.5-1.0-S	7-13-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	230 J (667)
602163	CCTA-09-GR-046-0-0.5-S	7-13-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602163	CCTA-09-GR-046-0.5-1.0-S	7-13-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602163	CCTA-09-GR-047-0-0.5-S	7-13-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602163	CCTA-09-GR-047-0.5-1.0-S	7-13-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
Burial Pit samples (locations 048-050)									
602163	CCTA-09-GR-048-0-0.5-S	7-13-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602163	CCTA-09-GR-048-0.5-1.0-S	7-13-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602163	CCTA-09-GR-049-0-0.5-S	7-13-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602163	CCTA-09-GR-049-0.5-1.0-S	7-13-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602163	CCTA-09-GR-050-0-0.5-S	7-13-99	0-0.5	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
602163	CCTA-09-GR-050-0.5-1.0-S	7-13-99	0.5-1.0	ND (117)	ND (88)	ND (72)	ND (81)	ND (55)	ND (57)
Quality Assurance/Quality Control Samples (µg/L)									
602159	CCTA-09-GR-000-EB	7-12-99	NA	ND (1.4)	ND (2.3)	ND (2)	ND (2.5)	ND (2.2)	ND (2.8)
602163	CCTA-09-GR-000-EB	7-13-99	NA	ND (1.4)	ND (2.3)	ND (2)	ND (2.5)	ND (2.2)	ND (2.8)

Note: Values in **bold** represent detected SVOCs.

^aEPA November 1986.

^bAnalysis request/chain-of-custody record.

^c**Bold** portion of the Sample ID corresponds to the sample location in Figures 10.4.4-1 and 10.4.5.3-1.

CCTA = Central Coyote Test Area.

DU = Duplicate sample.

EB = Equipment blank.

EPA = U.S. Environmental Protection Agency.

ER = Environmental Restoration.

ft = Foot (feet).

GR = Grab sample.

ID = Identification.

J () = The reported value is greater than or equal to the method detection limit but is less than the practical quantitation limit, shown in parentheses.

µg/kg = Microgram(s) per kilogram.

µg/L = Microgram(s) per liter.

NA = Not applicable.

ND () = Not detected at or above the reported value, shown in parentheses.

Rad = Radioactive.

S = Soil sample.

SVOC = Semivolatile organic compound.

SWMU = Solid Waste Management Unit.

VCM = Voluntary corrective measure.

Table 10.4.5-7
SVOC Analytical Method Detection Limits (EPA Method 8270)^a
Used for SWMU 9 Confirmatory Soil Sampling
July 1999
(Off-Site Laboratory)

Analyte	Soil Sample MDL ($\mu\text{g}/\text{kg}$)	Aqueous Sample MDL ($\mu\text{g}/\text{L}$)
Acenaphthene	160	2.2
Acenaphthylene	147	1.3
Anthracene	88	2.3
Benzo(a)anthracene	68	2.8
Benzo(a)pyrene	72	2.0
Benzo(b)fluoranthene	142	4.7
Benzo(g,h,i)perylene	81	2.5
Benzo(k)fluoranthene	132	2.6
Benzoic acid	893	9.3
Benzyl alcohol	230	2.5
4-Bromophenyl phenyl ether	118	0.03
Butylbenzyl phthalate	90	3.7
4-Chloroaniline	155	1.5
Bis(2-chloroethoxy)methane	169	2.5
Bis(2-chloroethyl)ether	53	2.0
Bis(2-chloroisopropyl)ether	105	0.61
4-Chloro-3-methyl phenol	128	3.1
2-Chloronaphthalene	173	2.4
2-Chlorophenol	157	2.1
4-Chlorophenyl phenyl ether	146	2.8
Chrysene	55	2.2
m,p-Cresol	153	1.8
o-Cresol	63	2.1
Dibenzo(a,h)anthracene	83	2.2
Dibenzofuran	134	4.3
Di-n-butylphthalate	73	2.9
1,2-Dichlorobenzene	171	2.7
1,3-Dichlorobenzene	129	2.5
1,4-Dichlorobenzene	61	2.3
3,3'-Dichlorobenzidine	278	4.2
2,4-Dichlorophenol	176	1.4
Diethylphthalate	76	2.1
2,4-Dimethylphenol	109	6.1
Dimethylphthalate	109	2.1
2,4-Dinitrophenol	368	7.9
2,4-Dinitrotoluene	117	1.4
2,6-Dinitrotoluene	140	1.1
Di-n-octylphthalate	174	4.2
1,2-Diphenylhydrazine	57	2.3
Bis(2-ethylhexyl)phthalate	299	3.7
Fluoranthene	65	3.1
Fluorene	114	2.1

Refer to footnotes at end of table.

Table 10.4.5-7 (Concluded)
 Summary of SVOC Analytical Method Detection Limits (EPA Method 8270)
 Used for SWMU 9 Confirmatory Soil Sampling
 July 1999
 (Off-Site Laboratory)

Analyte	Soil Sample MDL ($\mu\text{g}/\text{kg}$)	Aqueous Sample MDL ($\mu\text{g}/\text{L}$)
Hexachlorobenzene	70	2.9
Hexachlorobutadiene	153	3.8
Hexachlorocyclopentadiene	193	4.4
Hexachloroethane	132	3.4
Ideno(1,2,3-cd)pyrene	80	3.4
Isophorone	146	2.6
2-Methyl-4,6-dinitrophenol	101	0.67
2-Methylnaphthalene	204	3.2
Naphthalene	157	2.0
m-Nitroaniline	83	1.8
o-Nitroaniline	67	2.8
p-Nitroaniline	103	1.0
Nitrobenzene	132	3.3
2-Nitrophenol	181	2.9
4-Nitrophenol	109	3.5
n-Nitrosodiphenylamine	21	5.0
n-Nitrosodipropylamine	129	5.0
Pentachlorophenol	57	2.8
Phenanthrene	60	1.8
Phenol	57	0.8
Pyrene	72	2.5
1,2,4-Trichlorobenzene	186	2.4
2,4,5-Trichlorophenol	154	2.5
2,4,6-Trichlorophenol	77	0.96

^aEPA November 1986.

EPA = U.S. Environmental Protection Agency.

MDL = Method detection limit.

$\mu\text{g}/\text{kg}$ = Microgram(s) per kilogram.

$\mu\text{g}/\text{L}$ = Microgram(s) per liter.

SVOC = Semivolatile organic compound.

SWMU = Solid Waste Management Unit.

Table 10.4.5-8
Summary of SWMU 9 Confirmatory Soil Sampling HE Analytical Results
July 1999
(Off-Site Laboratory)

Sample Attributes				Analyte (EPA Method 8330) ^a (µg/kg)						
Record Number ^b	ER Sample ID ^c (Figures 10.4.4-1 and 10.4.5.3-1)	Sample Date	Sample Depth (ft)	1,3,5-Trinitrobenzene	2,4,6-Trinitrotoluene	2,6-Dinitrotoluene	2-Amino-4,6-dinitrotoluene	4-Amino-2,6-dinitrotoluene	HMX	RDx
Mound 3 soil sample (location 029)										
602159	CCTA-09-GR-029-3.0-3.5-S	7-12-99	3.0-3.5	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	1,400	3,200
VCM excavation under Mound 1 samples (locations 030-047)										
602159	CCTA-09-GR-030-0-0.5-S	7-12-99	0.0-0.5	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3)	ND (9.7)
602159	CCTA-09-GR-030-0.5-1.0-S	7-12-99	0.5-1.0	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3)	ND (9.7)
602159	CCTA-09-GR-031-0-0.5-S	7-12-99	0.0-0.5	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3)	ND (9.7)
602159	CCTA-09-GR-031-0.5-1.0-S	7-12-99	0.5-1.0	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3)	ND (9.7)
602159	CCTA-09-GR-032-0-0.5-S	7-12-99	0.0-0.5	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3)	ND (9.7)
602159	CCTA-09-GR-032-0-0.5-DU	7-12-99	0.0-0.5	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3)	ND (9.7)
602159	CCTA-09-GR-032-0.5-1.0-S	7-12-99	0.5-1.0	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3)	ND (9.7)
602159	CCTA-09-GR-033-0-0.5-S	7-12-99	0.0-0.5	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	140	1,000
602159	CCTA-09-GR-033-0.5-1.0-S	7-12-99	0.5-1.0	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3)	ND (9.7)
602159	CCTA-09-GR-034-0-0.5-S	7-12-99	0.0-0.5	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3)	ND (9.7)
602159	CCTA-09-GR-034-0.5-1.0-S	7-12-99	0.5-1.0	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3)	ND (9.7)
602162	CCTA-09-GR-035-0-0.5-S	7-12-99	0.0-0.5	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	100 J	93 J
602162	CCTA-09-GR-035-0.5-1.0-S	7-12-99	0.5-1.0	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3 J)	120 J
602162	CCTA-09-GR-036-0-0.5-S	7-12-99	0.0-0.5	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	540 J	1,400 J
602162	CCTA-09-GR-036-0.5-1.0-S	7-12-99	0.5-1.0	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	300 J	310 J
602162	CCTA-09-GR-036-0.5-1.0-DU	7-13-99	0.5-1.0	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	450 J	550 J
602162	CCTA-09-GR-037-0-0.5-S	7-13-99	0.0-0.5	ND (6.6)	1,400	160	480	500	890 J	1,000 J
602162	CCTA-09-GR-037-0.5-1.0-S	7-13-99	0.5-1.0	ND (6.6)	2,000	ND (6.5)	440	460	1,800 J	2,400 J
602162	CCTA-09-GR-038-0-0.5-S	7-13-99	0.0-0.5	670	18,000	ND (6.5)	840	1,000	730 J	18,000 J
602162	CCTA-09-GR-038-0.5-1.0-S	7-13-99	0.5-1.0	510	15,000	ND (6.5)	590	760	180 J	800 J
602162	CCTA-09-GR-039-0-0.5-S	7-13-99	0.0-0.5	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3 J)	ND (9.7 J)
602162	CCTA-09-GR-039-0.5-1.0-S	7-13-99	0.5-1.0	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3 J)	ND (9.7 J)
602162	CCTA-09-GR-040-0-0.5-S	7-13-99	0.0-0.5	ND (6.6)	130	ND (6.5)	ND (6.6)	ND (5.5)	480 J	2,400 J
602162	CCTA-09-GR-040-0.5-1.0-S	7-13-99	0.5-1.0	ND (6.6)	170	ND (6.5)	170	140	940 J	26,000 J
VCM excavation under Mound 1 samples (locations 030-047)										
602162	CCTA-09-GR-041-0-0.5-S	7-13-99	0.0-0.5	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	1,100 J	4,200 J
602162	CCTA-09-GR-041-0-0.5-DU	7-13-99	0.0-0.5	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	1,100	2,800
602162	CCTA-09-GR-041-0.5-1.0-S	7-13-99	0.5-1.0	ND (6.6)	170	ND (6.5)	ND (6.6)	ND (5.5)	270 J	1,100 J
602162	CCTA-09-GR-042-0-0.5-S	7-13-99	0.0-0.5	ND (6.6)	250 J	ND (6.5)	150 J	140 J	6,200 J	6,700 J
602162	CCTA-09-GR-042-0.5-1.0-S	7-13-99	0.5-1.0	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	1,100 J	2,100 J
602162	CCTA-09-GR-043-0-0.5-S	7-13-99	0.0-0.5	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	160 J	110 J
602162	CCTA-09-GR-043-0.5-1.0-S	7-13-99	0.5-1.0	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3 J)	ND (9.7 J)
602163	CCTA-09-GR-044-0-0.5-S	7-13-99	0.0-0.5	ND (6.6)	880	ND (6.5)	830	640	1,100 J	2,900

Refer to footnotes at end of table.

Table 10.4.5-8 (Concluded)
 Summary of SWMU 9 Confirmatory Soil Sampling HE Analytical Results
 July 1999
 (Off-Site Laboratory)

Sample Attributes				HE (EPA Method 8330) ^a (µg/kg)						
Record Number ^b	ER Sample ID ^c (Figures 10.4.4-1 and 10.4.5.3-1)	Sample Date	Sample Depth (ft)	1,3,5-trinitrobenzene	2,4,6-trinitrotoluene	2,6-dinitrotoluene	2-amino-4,6-dinitrotoluene	4-amino-2,6-dinitrotoluene	HMX	RDX
602163	CCTA-09-GR-044-0.5-1.0-S	7-13-99	0.5-1.0	ND (6.6)	17,000	ND (6.5)	710	630	1,200 J	2,200
602163	CCTA-09-GR-045-0-0.5-S	7-13-99	0.0-0.5	ND (6.6)	1,800	ND (6.5)	570	460	1,100 J	1,600
602163	CCTA-09-GR-045-0-0.5-DU	7-13-99	0.0-0.5	ND (6.6)	1,200	ND (6.5)	740	630	2,700 J	1,300
602163	CCTA-09-GR-045-0.5-1.0-S	7-13-99	0.5-1.0	ND (6.6)	990	ND (6.5)	160	130	1,100 J	2,400
602163	CCTA-09-GR-046-0-0.5-S	7-13-99	0.0-0.5	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3 J)	92
602163	CCTA-09-GR-046-0.5-1.0-S	7-13-99	0.5-1.0	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	150 J	660
602163	CCTA-09-GR-047-0-0.5-S	7-13-99	0.0-0.5	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	1,500 J	ND (9.7)
602163	CCTA-09-GR-047-0.5-1.0-S	7-13-99	0.5-1.0	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3 J)	ND (9.7)
Burial Pit samples (locations 048-050)										
602163	CCTA-09-GR-048-0-0.5-S	7-13-99	0.0-0.5	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3 J)	ND (9.7)
602163	CCTA-09-GR-048-0.5-1.0-S	7-13-99	0.5-1.0	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3 J)	ND (9.7)
602163	CCTA-09-GR-049-0-0.5-S	7-13-99	0.0-0.5	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3 J)	ND (9.7)
602163	CCTA-09-GR-049-0.5-1-S	7-13-99	0.5-1.0	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3 J)	ND (9.7)
602163	CCTA-09-GR-050-0-0.5-S	7-13-99	0.0-0.5	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3 J)	ND (9.7)
602163	CCTA-09-GR-050-0.5-1-S	7-13-99	0.5-1.0	ND (6.6)	ND (5.7)	ND (6.5)	ND (6.6)	ND (5.5)	ND (5.3 J)	ND (9.7)
Quality Assurance/Quality Control Samples (µg/L)										
602159	CCTA-09-GR-000-EB	7-12-99	NA	ND (0.021)	ND (0.029)	ND (0.043)	ND (0.019)	ND (0.02)	ND (0.046)	ND (0.018)
602163	CCTA-09-GR-000-EB	7-13-99	NA	ND (0.021)	ND (0.029)	ND (0.043)	ND (0.019)	0.22	ND (0.046)	ND (0.018)

Note: Values in **bold** represent detected HE analytes.

^aEPA November 1986.

^bAnalysis request/chain-of-custody record.

^c**Bold** portion of the Sample ID corresponds to the sample location in Figures 10.4.4-1 and 10.4.5.3-1.

CCTA = Central Coyote Test Area.

DU = Duplicate sample.

EB = Equipment blank.

EPA = U.S. Environmental Protection Agency.

ER = Environmental Restoration.

ft = Foot (feet).

GR = Grab sample.

HE = High explosive(s).

HMX = 1,3,5,7-Tetranitro-1,3,5,7-tetrazacyclooctane.

ID = Identification.

J = Estimated value. See Data Validation report.

µg/kg = Microgram(s) per kilogram.

µg/L = Microgram(s) per liter.

NA = Not applicable.

ND () = Not detected at or above the reported value, shown in parentheses.

RDX = 1,3,5-Trinitro-1,3,5-triazacyclohexane.

S = Soil sample.

SWMU = Solid Waste Management Unit.

VCM = Voluntary corrective measure.

Table 10.4.5-9
 HE Analytical Method Detection Limits (EPA Method 8330)^a
 Used for SWMU 9 Confirmatory Soil Sampling
 July 1999
 (Off-Site Laboratory)

Analyte	Soil Sample MDL ($\mu\text{g}/\text{kg}$)	Aqueous Sample MDL ($\mu\text{g}/\text{L}$)
1,3-Dinitrobenzene	4.1	0.02
2-Amino-4,6-dinitrotoluene	6.6	0.019
4-Amino-2,6-dinitrotoluene	5.5	0.02
2,4-Dinitrotoluene	6.2	0.014
2,6-Dinitrotoluene	6.5	0.043
HMX	5.3	0.046
Nitrobenzene	5.2	0.016
m-Nitrotoluene	11	0.031
o-Nitrotoluene	7.8	0.024
p-Nitrotoluene	11	0.034
RDX	9.7	0.018
Tetryl	7.5	0.022
1,3,5-Trinitrobenzene	6.6	0.021
2,4,6-Trinitrotoluene	5.7	0.029

^aEPA November 1986.

EPA = U.S. Environmental Protection Agency.

HE = High explosive(s).

HMX = 1,3,5,7-Tetranitro-1,3,5,7-tetrazacyclooctane.

MDL = Method detection limit.

$\mu\text{g}/\text{kg}$ = Microgram(s) per kilogram.

$\mu\text{g}/\text{L}$ = Microgram(s) per liter.

RDX = 1,3,5-Trinitro-1,3,5-triazacyclohexane.

SWMU = Solid Waste Management Unit.

Tetryl = 2,4,6-Trinitrophenylmethylnitramine.

Gross Alpha/Gross Beta

Table 10.4.5-3 presents the analytical results for the gross alpha/gross beta analyses. Gross alpha (15.6 pCi/g) was within the same order of magnitude as the site-specific range of 7.53 to 32.5 pCi/g. Gross beta (27.5 pCi/g) was within the same order of magnitude as the site-specific range of 20.8 to 35.0 pCi/g.

VCM Excavation at Mound 1 Samples

Forty soil samples, including four duplicates, were collected at 18 locations in the VCM excavation at the south end of Mound 1 (locations 030 to 047 on Figure 10.4.5.3-1). The samples were analyzed for TAL metals plus uranium, VOCs, SVOCs, HE, and radionuclides. The results are summarized below.

TAL Metals Plus Uranium

Table 10.4.5-1 presents the analytical results for the TAL metals plus uranium analyses. Eleven metals were detected at concentrations above the NMED-approved background limit. The results are summarized below.

Barium (50.4 to 209 J mg/kg) exceeded the NMED-approved background of 130 mg/kg in 15 samples from nine locations. Cadmium (ND [0.019] to 1.90 mg/kg) exceeded the NMED-approved background of 0.9 mg/kg in three samples from three locations. Chromium (5.42 to 21.8 mg/kg) exceeded the NMED-approved background of 17.3 mg/kg in one sample from location 034, and in both samples and one duplicate at location 045. Cobalt (3.22 to 5.70 mg/kg) exceeded the NMED-approved background of 5.2 mg/kg in thirteen samples from eight locations. Copper (7.66 to 536 J mg/kg) exceeded the NMED-approved background of 15.4 mg/kg in 21 samples from 12 locations. Lead (4.62 to 126 mg/kg) exceeded the NMED-approved background of 21.4 mg/kg in 17 samples from 10 locations. Mercury (ND [0.00225-0.0333] to 0.296 mg/kg) exceeded the NMED-approved background of <0.1 mg/kg in three samples from two locations. Nickel (6.28 to 14.1 J mg/kg) exceeded the NMED-approved background of 11.5 mg/kg in seven samples from five locations. Uranium (0.613 to 19.5 mg/kg) exceeded the NMED-approved background of 3.42 mg/kg in 27 samples from 14 of the 18 locations. Vanadium (9.75 to 23.6 mg/kg) exceeded the NMED-approved background concentration of 20.4 mg/kg in eight samples and one duplicate from four locations. Zinc (24.5 to 288 mg/kg) exceeded the NMED-approved background concentration of 62 mg/kg in twenty samples from twelve locations.

The antimony results were rejected during data validation for the 20 samples collected from locations 035–043. However, the number of nondetects and low concentrations that were detected in these samples probably indicate that this metal is not present in concentrations above the NMED-approved background concentration.

VOCs

Table 10.4.5-4 presents the analytical results for the VOC analyses. Acetone (13 J µg/kg) was detected in the 0.0- to 0.5-foot sample at location 037. Chloroform (0.51 J and 0.97 J µg/kg) was

detected in two samples (locations 039 and 040). Ethylbenzene (0.44 J to 0.52 J $\mu\text{g}/\text{kg}$) was detected in three samples (locations 040, 046, and 047). Methylene chloride (14 to 44 $\mu\text{g}/\text{kg}$) was detected in 13 samples from 8 locations (033, 035, 038, 040, 044, 045, 046, and 047). Toluene (1.1 to 2.8 $\mu\text{g}/\text{kg}$) was detected in 13 samples from 9 locations (032, 033, 037, 040, 043, 044, 045, 046, and 047). Trichloroethylene (0.58 J $\mu\text{g}/\text{kg}$) was only detected in the 0.0- to 0.5-foot sample from location 039. Xylene (0.81 J to 4.1 J $\mu\text{g}/\text{kg}$) was detected in nine samples from seven locations (032, 033, 037, 040, 043, 046, and 047). The MDLs used for the VOC analyses are provided in Table 10.4.5-5.

SVOCs

Table 10.4.5-6 presents the analytical results for the SVOC analyses. A total of six SVOC analytes were detected in these samples. 2,4-Dinitrotoluene (440 $\mu\text{g}/\text{kg}$) was detected in the 0.0- to 0.5-foot duplicate sample at location 032. Anthracene (720 $\mu\text{g}/\text{kg}$) and was detected in the 0.0- to 0.5-foot sample at location 038. Benzo(a)pyrene (120 J $\mu\text{g}/\text{kg}$) was detected in the 0.0- to 0.5-foot sample at location 045. Benzo(g,h,i)perylene (130 J and 110 J $\mu\text{g}/\text{kg}$) was detected in the 0.0- to 0.5-foot sample at location 034 and the 0.0- to 0.5-foot sample from location 045. Chrysene (120 J and 71 J $\mu\text{g}/\text{kg}$) was detected in the 0.0- to 0.5-foot sample and duplicate at location 045. Pentachlorophenol (220 J to 280 J $\mu\text{g}/\text{kg}$) was detected in the four sample and duplicate collected at locations 044 and 045. The MDLs used for the SVOC analyses are presented in Table 10.4.5-7.

HE

Table 10.4.5-8 presents the analytical results for the HE analyses. A total of seven HE compounds were detected in these samples. 1,3,5-Trinitrobenzene (670 and 510 $\mu\text{g}/\text{kg}$) was detected in both samples from location 038. 2,4,6-Trinitrotoluene (130 to 18,000 $\mu\text{g}/\text{kg}$) was detected in 12 samples and one duplicate from seven locations (037, 038, 040, 041, 042, 044, and 045). 2,6-Dinitrotoluene (160 $\mu\text{g}/\text{kg}$) was detected in the 0.0- to 0.5-foot sample from location 037. Both 2-amino-2,6-dinitrotoluene (150 J to 840 $\mu\text{g}/\text{kg}$) and 4-amino-2,6-dinitrotoluene (130 J to 1,000 $\mu\text{g}/\text{kg}$) were detected in 10 samples and one duplicate from six locations (037, 038, 040, 042, 044, and 045). HMX (100 J to 6,200 J $\mu\text{g}/\text{kg}$) was detected in 21 samples and three duplicates from 13 of the 18 locations under the former mound. RDX (92 to 26,000 J $\mu\text{g}/\text{kg}$) was detected in 22 samples and 3 three duplicates from 12 of the 18 locations under the former mound. The MDLs used for the HE analyses are provided in Table 10.4.5-9.

Radionuclides

Table 10.4.5-2 presents the analytical results for the gamma spectroscopy analyses. Uranium-235 (ND [9.12 E-02] to 3.15E-01 pCi/g) exceeded the 1.8E-01 pCi/g NMED-approved background activity in five samples from five locations (038, 039, 042, 044, and 047). Uranium-238 (ND [4.62E-01] to 4.56E+00 pCi/g) exceeded the NMED-approved background activity of 1.4E+00 pCi/g in 16 samples and 3 duplicates from 11 locations (033, 034, 036, 040, 041, 042, 043, 044, 045, 046, and 047). Thorium-232 (ND [1.13E-01 to 1.08E+00 pCi/g) only exceeded the NMED-approved background activity of 1.01E+00 in the 0.5- to 1.0-foot sample from location 047. Cesium-137 (ND [1.48E-02] to 3.20E-01 pCi/g) exceeded the

NMED-approved background activity of 7.9E-02 pCi/g in five samples and two duplicates from five locations (032, 033, 034, 045, and 047).

Gross Alpha/Gross Beta

Table 10.4.5-3 presents the analytical results for the gross alpha /gross beta analyses. Gross alpha (9.01 to 26.4 pCi/g) was within the same order of magnitude as the site-specific range of 7.53 to 32.5 pCi/g. Gross beta (21.9 to 49.4 pCi/g) was within the same order of magnitude as the site-specific range of 20.8 to 35.0 pCi/g.

Burial Pit Samples

This small burial pit was discovered 10 feet east of Mound 1 and was excavated during the June 1998 portion of the VCM. It contained DU-contaminated test debris from a depth of about 1 to 3 feet below grade. Six samples were collected at 3 locations in the burial pit northeast of the former Mound 1 excavation (locations 048–050 on Figure 10.4.5.3-1). The samples were analyzed for TAL metals plus uranium, VOCs, SVOCs, HE, and radionuclides. The results are summarized below.

TAL Metals Plus Uranium

Table 10.4.5-1 presents the analytical results for the TAL metals plus uranium analyses. Beryllium (0.452 J to 0.653 mg/kg) exceeded the NMED-approved background concentration of 0.65 mg/kg in the 0.5- to 1.0-foot sample from location 049. Nickel (9.30 to 11.9 mg/kg) also exceeded the NMED-approved background concentration of 11.5 mg/kg in this same sample. In the 0.0- to 0.5- and 0.5- to 1.0-foot samples at location 049, cobalt (4.68 to 5.66 mg/kg), copper (10.7 to 33.3 mg/kg), and lead (14.4 to 29.2 mg/kg) exceeded their NMED-approved background concentrations of 5.2, 15.4, and 21.4 mg/kg. Uranium (4.61 to 14.1 mg/kg) exceeded the NMED-approved background concentration of 3.42 mg/kg in all six samples from the three locations (048, 049, and 050).

VOCs

Table 10.4.5-4 presents the analytical results for the VOC analysis. No VOCs were detected in any of the burial pit samples. The MDLs for the VOC analysis are provided in Table 10.4.5-5.

SVOCs

Table 10.4.5-6 presents the analytical results for the SVOC analysis. No SVOC compounds were detected in any of the burial pit samples. The MDLs for the SVOC analysis are provided in Table 10.4.5-7.

HE

Table 10.4.5-8 presents the analytical results for the HE analysis. No HE compounds were detected in any of the burial pit samples. The MDLs used for the HE analyses are provided in Table 10.4.5-9.

Radionuclides

Table 10.4.5-2 presents the analytical results for the gamma spectroscopy analyses. Uranium-238 (ND [5.98E-01] to 4.92E+00 pCi/g) exceeded the NMED-approved background activity of 1.4E+00 pCi/g in three samples from two locations (048 and 049). Cesium-137 (2.85E-02 to 1.34E-01 pCi/g) exceeded the NMED-approved background activity of 7.9E-02 pCi/g in the 0.0- to 0.5 and 0.5- to 1.0-foot samples from location 049.

Gross Alpha/Gross Beta

Table 10.4.5-3 presents the analytical results for the gross alpha/gross beta analyses. Gross alpha (13 to 23.8 pCi/g) was within the same order of magnitude as the site-specific range of 7.53 to 32.5 pCi/g. Gross beta (30.2 to 45 pCi/g) was within the same order of magnitude as the site-specific range of 20.8 to 35.0 pCi/g.

10.4.5.4 Data Quality

10.4.5.4.1 Quality Assurance/Quality Control Results

All off-site samples were processed at state-certified laboratories using accepted contract laboratory program protocols and EPA methods for Level III data generation. The on-site SNL/NM RPSD Laboratory used acceptable EPA methods and sufficient QA/QC procedures to produce acceptable data for site characterization.

Soil Pile Samples

Tables B-1, B-3, B-6, B-9, B-11, and B-13 (Annex B) present the analytical results for the QA/QC samples collected during the soil pile sampling at SWMU 9.

Because the objective of the soil pile sampling was to collect data for waste characterization, QA/QC samples were limited to one equipment blank (EB) and two trip blanks (TBs). However, three duplicate samples were collected in the May 2000 resampling of the soil piles for HE. EB samples were analyzed off site for metals, VOCs, SVOCs, HE, gamma spectroscopy, and tritium. Two gamma spectroscopy EB samples were analyzed on site at the SNL/NM RPSD Laboratory for site characterization and sample release to off-site laboratories. Two TB samples were analyzed off site for VOCs.

Metal concentrations in the EB sample were either below detection limits or were low estimated (J) values (Table B-1, Annex B). No VOCs were detected in the EB sample or the two TB samples (Table B-3, Annex B). No SVOCs were detected in the EB sample (Table B-6,

Annex B). No HE compounds were detected in the EB sample (Table B-9, Annex B). No radionuclides were detected in either the gamma spectroscopy or tritium analyses (Tables B-11 and B-13, respectively, Annex B).

For the May 2000 HE sample analyses, matrix interferences related to the heterogeneity of the samples were the probable cause for low matrix spike and matrix spike duplicate recoveries and variability in the duplicate sample results. Laboratory control samples and duplicates also experienced low recoveries and, as a result, many tetra results were qualified as "UJ" and some HMX results were qualified "J" during data validation.

Because of the higher analytical precision in the isotopic analysis for uranium-238, uranium-235, uranium-234, and thorium-232 in the soil pile samples, the isotopic results for these four isotopes were used in the risk assessment rather than the gamma spectroscopy results.

1999 RFI Confirmatory Samples

TAL Metals plus Uranium

Table 10.4.5-1 presents the analytical results for the metals QA/QC results collected during the 1999 RFI confirmatory sampling at SWMU 9. The analytical results include arroyo sediment background, arroyo sediment, samples from the VCM excavation (under former Mound 1), and equipment blanks. Six duplicate soil samples were collected. Two equipment blanks were collected, one per day of sampling. Analysis of the EBs yielded one uranium detection (0.000131 J mg/L) and two zinc detections (0.0154 and 0.00641 mg/L). The detections were not high enough to invalidate or qualify the soil data.

Table 10.4.5-10 presents the relative percent difference (RPD) results for the TAL metals plus uranium analyses performed for the six duplicate soil samples. RPDs were only calculated for detections and were not calculated for results that were qualified "J" during data validation. As a result, RPDs were not calculated for either silver or thallium. All other metals had at least one RPD value. The following list includes the RPDs for those metals for which only one value could be calculated: antimony (0.03), beryllium (0.016), and mercury (0.0269). Other RPDs ranged from 0.05 to 0.73 for arsenic, 1.0 to 13 for barium, 0.031 to 0.179 for cadmium, 0.19 to 2.04 for chromium, 0.02 to 1.53 for cobalt, 0.4 to 4.4 for copper, 0.59 to 9.0 for lead, 3 to 45 for manganese, 0.23 to 3.04 for nickel, 0.026 to 0.11 for selenium, 0.19 to 3.2 for uranium, 0.1 to 3.8 for vanadium, and 1.3 to 7.6 for zinc.

VOCs

Table 10.4.5-4 presents the analytical results for VOCs in the QA/QC samples that were collected during the RFI sampling of SWMU 9. Five duplicate soil samples, two EBs, and two TBs were collected and analyzed. Acetone was detected in one EB sample and methylene chloride was detected in one EB and one TB sample.

The 0.0- to 0.5-foot duplicate soil sample from location 032 did not contain the toluene (1.4 µg/kg) or xylene (3.3 J µg/kg) found in the "normal" sample. The 0.0- to 0.5-foot sample and duplicate from location 045 did contain comparable amounts of methylene chloride

Table 10.4.5-10
Summary of SWMU 9 Field Duplicate Relative Percent Differences
Confirmatory Soil Sampling
July 1999
(Off-Site Laboratory)

Sample Attributes			Relative Percent Difference									
Record Number ^a	ER Sample ID ^b (Figures 10.4.4-1 and 10.4.5.3-1)	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese
602158	CCTA-09-GR-004-0-0.5-S CCTA-09-GR-004-0-0.5-DU	0-0.5	NC	36.2	38.3	NC	NC	47.8	26.1	36.7	7.5	19.2
602158	CCTA-09-GR-007-0-0.5-S CCTA-09-GR-007-0-0.5-DU	0-0.5	NC	25.0	26.8	NC	NC	47.6	31.6	26.1	33.6	32.3
602159	CCTA-09-GR-032-0-0.5-S CCTA-09-GR-032-0-0.5-DU	0-0.5	NC	6.1	0.9	NC	NC	2.0	0.4	3.6	10.8	1.3
602162	CCTA-09-GR-036-0.5-1.0-S CCTA-09-GR-036-0.5-1.0-DU	0.5-1.0	NC	29.0	0.0	NC	NC	22.5	33.0	189.7	57.0	36.2
602162	CCTA-09-GR-041-0-0.5-S CCTA-09-GR-041-0-0.5-DU	0-0.5	NC	1.4	7.6	NC	5.0	3.2	0.7	19.3	3.2	6.4
602163	CCTA-09-GR-045-0-0.5-S CCTA-09-GR-045-0-0.5-DU	0-0.5	4.5	3.1	8.0	2.9	18.8	19.6	6.3	8.8	8.6	3.6

Sample Attributes			Relative Percent Difference							
Record Number ^a	ER Sample ID ^b (Figures 10.4.4-1 and 10.4.5.3-1)	Sample Depth (ft)	Mercury	Nickel	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc
602158	CCTA-09-GR-004-0-0.5-S CCTA-09-GR-004-0-0.5-DU	0-0.5	NC	30.7	NC	NC	NC	19.1	27.5	13.3
602158	CCTA-09-GR-007-0-0.5-S CCTA-09-GR-007-0-0.5-DU	0-0.5	NC	35.9	NC	NC	NC	48.5	29.1	28.6
602159	CCTA-09-GR-032-0-0.5-S CCTA-09-GR-032-0-0.5-DU	0-0.5	NC	2.5	NC	NC	NC	6.1	0.6	3.7
602162	CCTA-09-GR-036-0.5-1.0-S CCTA-09-GR-036-0.5-1.0-DU	0.5-1.0	NC	35.8	17.8	NC	NC	35.1	19.1	130.7
602162	CCTA-09-GR-041-0-0.5-S CCTA-09-GR-041-0-0.5-DU	0-0.5	NC	2.4	5.7	NC	NC	7.5	1.2	4.5
602163	CCTA-09-GR-045-0-0.5-S CCTA-09-GR-045-0-0.5-DU	0-0.5	125.4	4.0	29.4	NC	NC	19.4	8.4	10.7

^a Analysis request/chain-of-custody record.

^b **Bold** portion of the Sample ID corresponds to the sample location in Figures 10.4.4-1 and 10.4.5.3-1.

CCTA = Central Coyote Test Area.

DU = Duplicate sample.

ER = Environmental Restoration.

ft = Foot (feet).

GR = Grab sample.

ID = Identification.

NC = Not calculated for nondetected results or laboratory estimated values.

S = Soil sample.

SWMU = Solid Waste Management Unit.

(25 versus 26 µg/kg) and toluene (1.6 versus 1.3 µg/kg). No VOCs were detected in the other duplicate sample pairs.

SVOCs

Table 10.4.5-6 presents the analytical results for SVOCs in the QA/QC samples that were collected during the RFI sampling of SWMU 9. Four duplicate soil samples and two EBs were collected and analyzed.

2,4-Dinitrotoluene (440 µg/kg) was detected only in the duplicate 0.0- to 0.5-foot sample from location 032, and not in the "normal" sample. The duplicate 0.0- to 0.5-foot sample from location 045 contained chrysene and pentachlorophenol, while the normal sample also contained benzo(a)pyrene and benzo(g,h,i)perylene. No SVOCs were detected in the other duplicate soil pairs or in the EBs.

HE

Table 10.4.5-8 presents the analytical results for HE in the QA/QC samples that were collected during the RFI sampling of SWMU 9. Four duplicate soil samples and two EBs were collected and analyzed.

Similar concentrations of HMX and RDX were detected in the sample and duplicate pairs from location 036 (0.5- to 1.0-foot depth) and location 041 (0.0- to 0.5-foot depth). Five SVOCs at similar concentrations were detected in the 0.0- to 0.5-foot duplicate pair from location 045. One HE compound (4-amino-2,6-dinitrotoluene; 0.22 µg/L) was detected in one EB.

Radionuclides

Table 10.4.5-2 presents the analytical results for gamma spectroscopy analyses in the QA/QC samples that were collected during the RFI sampling of SWMU 9. Six duplicate soil samples and two EBs were collected and analyzed at the SNL on-site laboratory.

No elevated activities were measured in the 0.0- to 0.5-foot duplicate pair from location 007. Cesium-137 was detected in the duplicate 0.0- to 0.5-foot sample from location 032 and 045. Uranium-238 was only detected in the duplicate 0.5- to 1.0-foot sample from location 036, 041, and 045. Similar concentrations of cesium-137 and/ or uranium-238 were detected in the three duplicate pairs. No elevated activities were measured in the EBs.

Gross Alpha/Gross Beta

Table 10.4.5-3 presents the analytical results for the gross alpha/gross beta analyses in the QA/QC samples that were collected during the RFI sampling of SWMU 9. Six duplicate soil samples and two EBs were collected and analyzed.

Results were similar for all the duplicate pairs. Low levels of activity were detected in both EBs.

10.4.5.5 Data Validation

All off-site laboratory results were reviewed and verified/validated according to "Data Verification/Validation Level 3—DV-3," in Attachment C of the Technical Operating Procedure 94-03, Rev. 0 (SNL/NM July 1994) or "Data Validation Procedure for Chemical and Radiochemical Data," in SNL/NM Environmental Restoration Project Administrative Operating Procedure (AOP) 00-03, Rev. 0 (SNL/NM December 1999). In addition, SNL/NM Department 7713 (RPSD Laboratory) reviewed all gamma spectroscopy results according to "Laboratory Data Review Guidelines," Procedure No. RPSD-02-11, Issue No. 2 (SNL/NM July 1996). Annex C contains the off-site data validation reports for SWMU 9 soil piles and Annex D contains the off-site data validation reports for SWMU 9 confirmatory sampling.

10.5 Site Conceptual Model

The site conceptual model for SWMU 9 is based upon the residual COCs identified in the soil samples for the surface, near-surface, and subsurface of the burial site/open dump. This section summarizes the nature and extent of contamination and the environmental fate of the COCs.

10.5.1 Nature and Extent of Contamination

The potential COCs at SWMU 9 are metals, VOCs, SVOCs, HE, and radionuclides resulting from waste disposal practices (burial) of debris at the site. Metal and radionuclide COCs were determined by comparing sample results to background concentrations and activities established for the Coyote Test Field Area (Dinwiddie September 1997). Any metal or radionuclide found to exceed background in any sample was considered to be a potential COC for the site. Metal COCs included 18 of the 20 TAL metals (Table 10.4.5-11). VOC COCs included acetone, chloroform, ethylbenzene, methylene chloride, toluene, trichloroethylene, and xylene. SVOC COCs included 2,5-dinitrotoluene, anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, chrysene, and pentachlorophenol. HE COCs included 1,3,5-trinitrobenzene, 2,4,6-trinitrotoluene, 2-amino-4,6-dinitrotoluene, 4-amino-2,6-dinitrotoluene, HMX, and RDX. Radionuclide COCs included cobalt-60, cesium-137, thorium-232, uranium-234, uranium-235, and uranium-238.

Table 10.4.5-11 summarizes the COCs and the locations where metals and radionuclides exceeded background and VOCs, SVOCs, and HE compounds were detected. Confirmatory samples were collected from areas within SWMU 9 where potential releases to the environment could have occurred, and from the soil piles which will be redeposited back on the site. Twenty-six samples were collected from the 13 soil piles. Seven samples, including one duplicate, were collected in the arroyo channel downstream from Mound 3. One sample was collected under Mound 3. Forty samples, including four duplicates, were collected in the VCM excavation at the south end of Mound 1. Six samples were collected in the burial pit.

Table 10.4.5-11
Summary of COCs for SWMU 9

COC Type	Number of Samples ^a	COCs Greater Than Background	Maximum Background Limit/Coyote Test Field ^b (mg/kg, except where noted)	Maximum Concentration (mg/kg, except where noted)	Average Concentration ^c (mg/kg, except where noted)	Sampling Locations Where Background Concentration Exceeded ^d
Metals	38 environmental, 2 duplicates	Antimony	3.9	1.91 J	0.468	(All samples with detections below background value)
	82 environmental, 5 duplicates	Arsenic	5.6	4.89	3.19	(All samples below background value)
		Barium	130	209 J	111	19 samples above background value
		Beryllium	0.65	0.653	0.440	CCTA-09-GR-049-0.5-1.0-S
		Cadmium	0.9	2.78	0.52	12 samples above background value
		Chromium	17.3	28.4	11.4	CCTA-09-VCM-Pile9-N CCTA-09-VCM-Pile11-S CCTA-09-VCM-Pile12-N CCTA-09-GR-034-0-0.5-S CCTA-09-GR-045-0-0.5-S CCTA-09-GR-045-0-0.5-DU CCTA-09-GR-045-0.5-1.0-S
	80 environmental, 5 duplicates	Cobalt	5.2	8.61	4.8	24 samples above background value
		Copper	15.4	536 J	33.7	39 samples above background value
	82 environmental, 5 duplicates	Lead	21.4	126	22.6	32 samples above background value
	80 environmental, 5 duplicates	Manganese	NA	409	244.6	(All samples below background value)
	82 environmental, 5 duplicates	Mercury	<0.1	2.09	0.0542	CCTA-09-VCM-Pile7-S CCTA-09-GR-045-0.5-1.0-S CCTA-09-GR-047-0-0.5-S CCTA-09-GR-047-0.5-1.0-S
	80 environmental, 5 duplicates	Nickel	11.5	14.9	10.1	13 samples above background value

Table 10.4.5-11 (Continued)
Summary of COCs for SWMU 9

COC Type	Number of Samples ^a	COCs Greater Than Background	Maximum Background Limit/Coyote Test Field ^b (mg/kg, except where noted)	Maximum Concentration (mg/kg, except where noted)	Average Concentration ^c (mg/kg, except where noted)	Sampling Locations Where Background Concentration Exceeded ^d
Metals (cont.)	82 environmental, 5 duplicates	Selenium	<1	1.08	0.553	CCTA-09-VCM-Pile9-N
		Silver	<1	0.458 J	0.137	(All samples below background value)
	80 environmental, 5 duplicates	Thallium	<1.1	ND (0.221)	0.221	(All samples below background value)
	80 environmental, 5 duplicates	Uranium	3.42	19.5 J	6.17	54 samples above background value
		Vanadium	20.4	24.6	17.0	15 samples above background value
		Zinc	62	354	90	42 samples above background value
VOCs	80 environmental, 5 duplicates	Acetone	NA	13 J $\mu\text{g}/\text{kg}$	9.7 $\mu\text{g}/\text{kg}$	CCTA-09-GR-037-0-0.5-S
		Chloroform	NA	0.97 J $\mu\text{g}/\text{kg}$	0.43 $\mu\text{g}/\text{kg}$	CCTA-09-GR-039-0.5-1.0-S CCTA-09-GR-040-0-0.5-S
		Ethylbenzene	NA	0.52 J $\mu\text{g}/\text{kg}$	0.30 $\mu\text{g}/\text{kg}$	CCTA-09-GR-008-0-0.5-S CCTA-09-GR-040-0-0.5-S CCTA-09-GR-046-0-0.5-S CCTA-09-GR-047-0-0.5-S
		Methylene chloride	NA	44 $\mu\text{g}/\text{kg}$	6.8 $\mu\text{g}/\text{kg}$	Detected in 16 samples
		Toluene	NA	2.8 $\mu\text{g}/\text{kg}$	0.98 $\mu\text{g}/\text{kg}$	Detected in 13 samples
		Trichloroethene	NA	0.58 J $\mu\text{g}/\text{kg}$	0.30 $\mu\text{g}/\text{kg}$	CCTA-09-GR-040-0-0.5-S
		Xylene	NA	6.1 $\mu\text{g}/\text{kg}$	0.96 $\mu\text{g}/\text{kg}$	Detected in 11 samples
		SVOCs	80 environmental, 4 duplicates	2,4-Dinitrotoluene	NA	440 $\mu\text{g}/\text{kg}$
Anthracene	NA			1100 $\mu\text{g}/\text{kg}$	112 $\mu\text{g}/\text{kg}$	CCTA-09-GR-038-0-0.5-S CCTA-09-VCM-Pile12-N CCTA-09-VCM-Pile12-S

Refer to footnotes at end of table.

Table 10.4.5-11 (Continued)
Summary of COCs for SWMU 9

COC Type	Number of Samples ^a	COCs Greater Than Background	Maximum Background Limit/Coyote Test Field ^b (mg/kg, except where noted)	Maximum Concentration (mg/kg, except where noted)	Average Concentration ^c (mg/kg except, where noted)	Sampling Locations Where Background Concentration Exceeded ^d
SVOCs (contd.)	80 environmental, 4 duplicates	Benzo(a)pyrene	NA	120 J $\mu\text{g}/\text{kg}$	79 $\mu\text{g}/\text{kg}$	CCTA-09-GR-045-0-0.5-S
		Benzo(g,h,i)perylene	NA	130 J $\mu\text{g}/\text{kg}$	105 $\mu\text{g}/\text{kg}$	CCTA-09-GR-034-0-0.5-S CCTA-09-GR-045-0-0.5-S
		Chrysene	NA	120 J $\mu\text{g}/\text{kg}$	61 $\mu\text{g}/\text{kg}$	CCTA-09-GR-045-0-0.5-S CCTA-09-GR-045-0-0.5-DU
		Pentachlorophenol	NA	280 J $\mu\text{g}/\text{kg}$	95 $\mu\text{g}/\text{kg}$	CCTA-09-GR-044-0-0.5-S CCTA-09-GR-044-0.5-1.0-S CCTA-09-GR-045-0-0.5-S CCTA-09-GR-045-0-0.5-DU CCTA-09-GR-045-0.5-1.0-S
HE	82 environmental, 7 duplicates	1,3,5-Trinitrobenzene	NA	670 $\mu\text{g}/\text{kg}$	26 $\mu\text{g}/\text{kg}$	CCTA-09-GR-038-0-0.5-S CCTA-09-GR-038-0.5-1.0-S CCTA-09-VCM-Pile12-N CCTA-09-VCM-Pile12-DU
		2,4,6-Trinitrotoluene	NA	18,000 $\mu\text{g}/\text{kg}$	836 $\mu\text{g}/\text{kg}$	Detected in 24 samples
		2,6-Dinitrotoluene	NA	160 $\mu\text{g}/\text{kg}$	11.2 $\mu\text{g}/\text{kg}$	CCTA-09-GR-037-0-0.5-S
		2-Amino-4,6-dinitrotoluene	NA	3,680 $\mu\text{g}/\text{kg}$	199 $\mu\text{g}/\text{kg}$	Detected in 24 samples
		4-Amino-2,6-dinitrotoluene	NA	2,290 $\mu\text{g}/\text{kg}$	148 $\mu\text{g}/\text{kg}$	Detected in 22 samples
		HMX	NA	6,200 J $\mu\text{g}/\text{kg}$	851 $\mu\text{g}/\text{kg}$	Detected in 53 samples
		RDX	NA	26,000 J $\mu\text{g}/\text{kg}$	2,731 $\mu\text{g}/\text{kg}$	Detected in 52 samples
Radionuclides	36 environmental, 9 splits	Cobalt-60	NA	1.1 pCi/g	Not calculated ^e	NA
	90 environmental, 5 duplicates, 9 splits	Cesium-137	0.079 pCi/g ^f	0.8 pCi/g	Not calculated ^e	36 samples above background value
	80 environmental, 5 duplicates	Thorium-232 (Isotopic)	1.01 pCi/g ^f	1.95 pCi/g	Not calculated ^e	11 samples above background value

Refer to footnotes at end of table.

Table 10.4.5-11 (Continued)
Summary of COCs for SWMU 9

COC Type	Number of Samples ^a	COCs Greater Than Background	Maximum Background Limit/Coyote Test Field ^b (mg/kg, except where noted)	Maximum Concentration (mg/kg, except where noted)	Average Concentration ^c (mg/kg, except where noted)	Sampling Locations Where Background Concentration Exceeded ^d
Radionuclides (contd.)	116 environmental, 5 duplicates, 9 splits	Uranium-234 (Isotopic)	1.6 pCi/g ^f	2.51 pCi/g	Not calculated ^e	CCTA-09-VCM-Pile1-N CCTA-09-VCM-Pile2-N CCTA-09-VCM-Pile2-S CCTA-09-VCM-Pile7-S CCTA-09-VCM-Pile8-S CCTA-09-VCM-Pile9-N CCTA-09-VCM-Pile9-S CCTA-09-VCM-Pile11-N CCTA-09-VCM-Pile13-S
		Uranium-235 (Isotopic)	0.18 pCi/g	0.360 pCi/g	Not calculated ^e	CCTA-09-VCM-Pile2-N CCTA-09-VCM-Pile8-S
		Uranium-238 (Isotopic)	1.4 pCi/g ^f	5.84 pCi/g	Not calculated ^e	26 samples above background value
	8 environmental, 2 duplicates	Tritium	NA	721 pCi/L	Not calculated ^e	NA
	54 environmental, 5 duplicates	Gross Alpha	NA	26.4 pCi/g	Not calculated ^e	NA
		Gross Beta	NA	49.4 pCi/g	Not calculated ^e	NA

^aNumber of samples does not include background samples.

^bFrom Dinwiddie September 1997. The minimum background concentration/activity between surface and subsurface is reported.

^cAverage concentration includes all samples, excluding background. For nondetect results, the detection limit is used to calculate the average.

^dMetal and radionuclide samples include nondetect results where the DL or the MDA exceeds the approved background concentration. Organic samples include all detected results.

^eAn average MDA is not calculated because of the variability in instrument counting error and the number of reported nondetectable activities.

^fSouthwest background activities are presented when Coyote Test Field background activities are not available.

CCTA = Central Coyote Test Area.

COC = Constituent of concern.

DL = Detection limit.

DU = Duplicate sample.

GR = Grab sample.

HMX = 1,3,5,7-Tetranitro-1,3,5,7-tetrazacyclooctane.

J = Estimated value.

µg/kg = Microgram(s) per kilogram.

MDA = Minimum detectable activity.

mg/kg = Milligram(s) per kilogram.

NA = Not applicable.

ND () = Not detected above the detection limit, shown in parentheses.

pCi/g = Picocurie(s) per gram.

pCi/L = Picocurie(s) per liter.

Pile-N = North of pile.

Pile-S = South of pile.

RDX = 1,3,5-Trinitro-1,3,5-triazacyclohexane.

SWMU = Solid waste management unit.

S = Soil sample.

VCM = Voluntary corrective measure.

10.5.2 Environmental Fate

The primary source for COCs was the disposal of wastes and debris associated with unknown testing activities in the Schoolhouse Mesa Test Area. Available information indicates that SWMU 9 was used as an unregulated dump site. Mound 1 received the majority of the waste materials, while Mound 2 was an isolated pile of debris in the arroyo channel. Mound 3 was a natural terrace deposit on the south side of the arroyo channel with debris scattered on its surface. All debris associated with Mounds 2 and 3 was removed during the VCM at Mound 1.

Based upon the nature and extent of contamination at the site (Section 10.5.1), the VCM excavation at the south end of Mound 1 contains metals, HE, VOC, SVOC, and radionuclide COCs in the surface and near-surface soil. The burial pit contains metals and radionuclides. The soil piles contain metals, VOCs, SVOCs, HE, and radionuclides. One VOC analyte and HE compounds were detected in the Mound 3 sample. Two VOCs were detected in one arroyo sediment sample.

Because a VCM has removed the primary source materials (debris and radionuclides), only secondary sources of COCs remain at the site in the form of residual metals, VOCs, SVOCs, HE, and radionuclides in the surface and subsurface soils. The secondary release mechanisms at SWMU 9 are suspension and or dissolution of COCs in surface-water runoff and percolation through the soil, direct contact with soil (radionuclides only), VOC vapor emanations, dust emissions, and uptake of COCs in the soil by biota (Figure 10.5.2-1). The depth to groundwater at the site is approximately 95 feet bgs, and the vadose zone is comprised of relatively impermeable carbonate-rich soil horizons and impermeable carbonate-cemented horizons (SNL/NM March 1995). In addition, high-partitioning coefficients and low mobility in the transporting medium would enhance dilution of the COC concentrations. As a result, the nature and extent of COCs as defined in this NFA proposal does not render groundwater a viable contaminant pathway. The pathways to receptors are surface water, soil water, air, and soil. Biota also provides a pathway through food chain transfers. Annex E, Section V, provides additional discussion of the fate and transport of COCs at SWMU 9.

SWMU 9 is along the floor and banks of an unnamed arroyo that flows west and eventually joins Tijeras Arroyo. Only during intense local rainfall or heavy rainfall in the headwaters of the arroyo could runoff actively erode the site. Therefore, surface-water is considered a possible release mechanism.

The current land use for SWMU 9 is industrial. The future land use for SWMU 9 is also industrial (DOE and USAF March 1996); therefore, the potential human receptor at the site is an industrial worker. For all applicable pathways, the exposure route for the industrial worker is dermal contact, external irradiation, and ingestion/inhalation. Ingestion of soil, external irradiation from soil, and ingestion/inhalation of air are considered the major exposure routes for the industrial worker. Potential ecological receptors include plants and wildlife at the site. Uptake of COCs through direct contact with soil is considered to be the major exposure route for plants. Exposures in wildlife can result from the ingestion of COCs through food chain transfers and the incidental ingestion of soil from the site. Annex E, Section V, provides additional discussion of the exposure routes and receptors at SWMU 9.

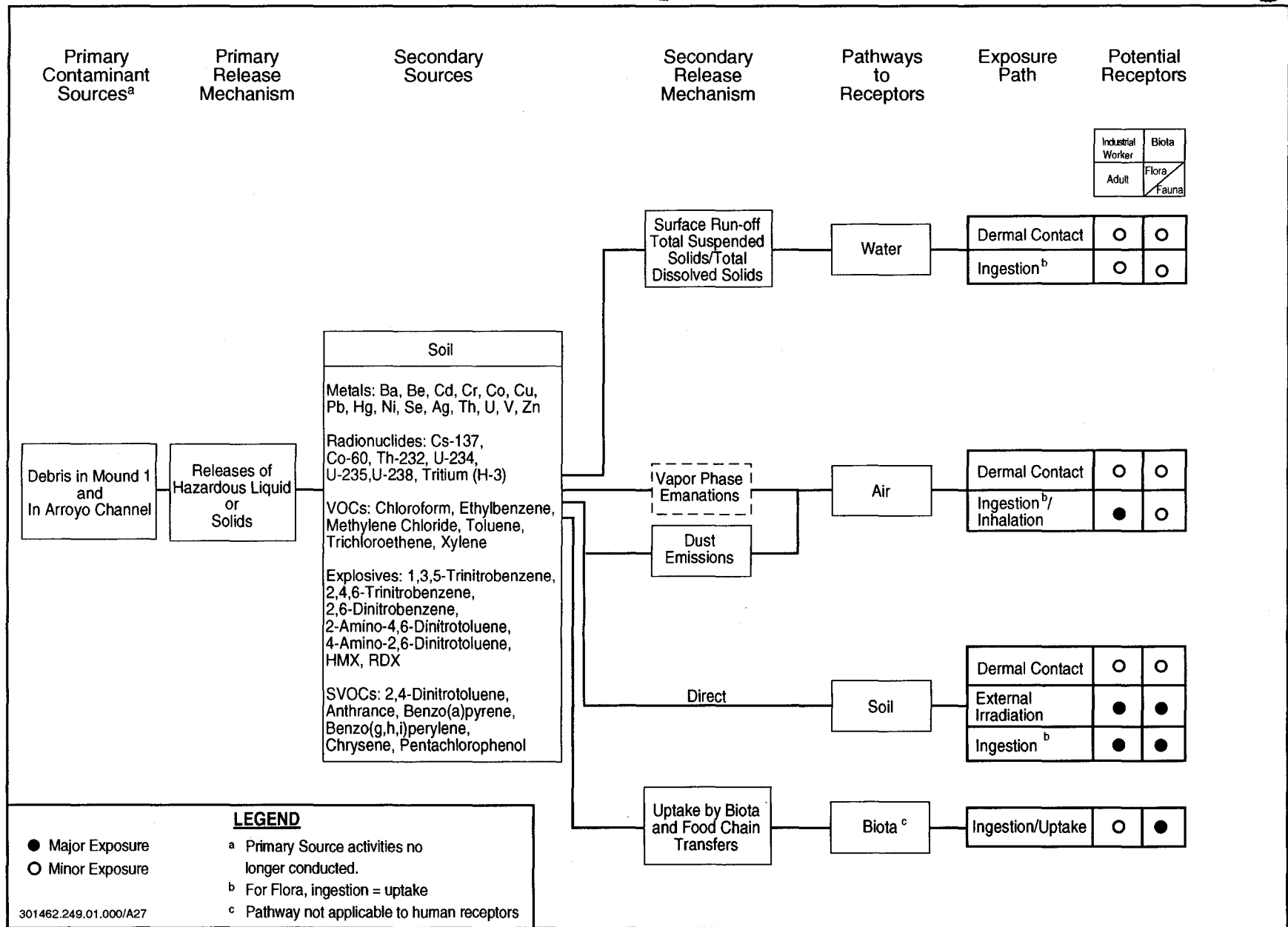


Figure 10.5.2-1
 Conceptual Model Flow Diagram for SWMU 9, Burial Site/Open Dump

10.6 Site Assessments

The site assessment process for SWMU 9 includes risk screening assessments followed by baseline risk assessments (as required) for both human health and ecological risk. This section briefly summarizes the site assessment results. Annex E describes the assessment in detail.

10.6.1 Summary

The site assessment concludes that SWMU 9 does not have the potential to affect human health under an industrial land-use scenario. After considering the uncertainties associated with the available data and modeling assumptions, ecological risks associated with SWMU 9 were found to be low. Section 10.6.2 describes the site screening assessments and Annex E provides details of the site assessment.

10.6.2 Screening Assessments

Risk screening assessments were performed for both human health risk and ecological risk for SWMU 9. This section summarizes the risk screening assessments.

10.6.2.1 Human Health

SWMU 9 has been recommended for industrial land-use (DOE and USAF March 1996). Because COCs are present in concentrations or activities greater than background levels, it was necessary to perform a human health risk analysis for the site. Besides COC metals, this assessment included any VOCs, SVOCs, or HE compounds detected above their reporting limits and any radionuclide compounds detected above background levels and/or MDAs. The risk assessment process evaluates quantitatively the potential adverse human health effects caused by COCs in the site's soil. The Risk Screening Assessment calculated the hazard index (HI) and excess cancer risk for an industrial land-use setting. The excess cancer risk from nonradiological COCs and radiological COCs is not additive (EPA 1989).

In summary, the HI calculated for SWMU 9 nonradiological COCs for an industrial land-use setting is 0.1, which is less than the numerical standard of 1.0 suggested by risk assessment guidance (EPA 1989). Incremental risk is determined by subtracting risk associated with background from potential nonradiological COC risk. The incremental HI is 0.1. The total excess cancer risk for SWMU 9 nonradiological COCs for an industrial land-use setting is $4\text{E-}06$, which is slightly above the acceptable risk value provided by the NMED (NMED March 1998). Guidance from the NMED indicates that excess lifetime risk of developing cancer by an individual must be less than the $1\text{E-}06$ for Class A and B carcinogens and less than $1\text{E-}05$ for Class C carcinogens. The incremental cancer risk for SWMU 9 is $3.83\text{E-}06$. Although the excess cancer risk was above proposed guidelines, the excess cancer risk was conservatively estimated through use of maximum concentrations of the detected COCs. Because the site was adequately characterized, average concentrations would be more representative of actual site conditions. If the upper 95-percent confidence limit of the mean concentration of the organic risk drivers is used in place of the maximum concentration, the total excess cancer risk is reduced to $9.67\text{E-}07$, and the incremental excess cancer risk is calculated to be $9.66\text{E-}07$, both within proposed guidelines.

The incremental total effective dose equivalent for radionuclides for an industrial land-use setting for SWMU 9 is 3.5 millirems (mrem)/year (yr), which is significantly less than the recommended dose limit of 15 mrem/yr found in EPA's OSWER Directive No. 9200.4-18 (EPA 1997a) and reflected in a document entitled "Sandia National Laboratories/New Mexico Environmental Restoration Project-RESRAD Input parameter Assumptions and Justification" (SNL/NM February 1998). The incremental excess cancer risk values calculated from naturally occurring radiation and from intakes considered background concentration values.

The residential land-use scenario for this site are provided only for comparison in the Risk Screening Assessment (Annex E). This report concludes that SWMU 9 does not have the potential to affect human health under an industrial land-use scenario.

10.6.2.2 *Ecological*

An ecological risk assessment that corresponds with the screening procedures in the EPA's Ecological Risk Assessment Guidance for Superfund (EPA 1997b) was performed as set forth by the NMED Risk-Based Decision Tree (NMED March 1998). An early step in the evaluation is comparing COC concentrations and identifying potentially bioaccumulative constituents (see Annex E, Section VII). This methodology also requires developing a site conceptual model and a food web model as well as selecting ecological receptors. Each of these items is presented in the "Predictive Ecological Risk Assessment Methodology for SNL/NM ER Program, Sandia National Laboratories/New Mexico" (IT July 1998) and will not be duplicated here. The screen also includes estimations of exposure and ecological risk.

Tables 15, 16, 17, and 18 of Annex E present the results of the ecological risk assessment screen. Site-specific information was incorporated into the screening assessment when such data were available. Hazard quotients greater than 1 were originally predicted; however, closer examination of the exposure assumptions revealed an overestimation of risk attributable primarily to exposure concentration (maximum COC concentration was used in estimating risk), exposure setting (area use factors of one were assumed), background risk, and using detection limits as exposure concentrations. Based upon an evaluation of these uncertainties, ecological risks associated with this site are expected to be low.

10.6.3 Baseline Risk Assessments

10.6.3.1 *Human Health*

Based upon the fact that human health results of the screening assessment summarized in Section 10.6.2 indicate that SWMU 9 does not have potential to affect human health under an industrial land-use setting, a baseline human health risk assessment is not required for SWMU 9.

10.6.3.2 *Ecological*

Based upon the fact that ecological results of the screening assessment summarized in Section 10.6.2 indicate that SWMU 9 has low ecological risk, a baseline ecological risk assessment is not required for SWMU 9.

10.6.4 Other Applicable Assessments

A Surface Water Assessment was conducted at SWMU 9 in September 1998. The surface water assessment guidance was developed jointly by Los Alamos National Laboratory and the NMED Surface Water Quality Bureau (LANL August 1998). The assessment evaluated the potential for erosion from SWMU 9. SWMU 9 received a score of 67.5 indicating that it has a high erosion potential, primarily due to its location on the banks and floor of the unnamed arroyo that crosses the site.

10.7 No Further Action Proposal

10.7.1 Rationale

Based upon field investigation data and the human health risk assessment analysis, an NFA is being recommended for SWMU 9 because no COCs were present at concentration levels considered hazardous to human health for an industrial land-use scenario.

10.7.2 Criterion

Based upon the evidence provided above, SWMU 9 is proposed for an NFA decision in conformance with Criterion 5, which states that "The SWMU/AOC has been characterized or remediated in accordance with current applicable state or federal regulations and that available data indicate that contaminants pose an acceptable level of risk under current and projected future land use" (NMED March 1998).

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ANNEX 10-A
1996 RFI Sampling Results

Table A-1
 Summary of SWMU 9 RFI Soil Sampling RCRA Metals and Beryllium Analytical Results
 June 1996
 (Off-Site Laboratory)

Sample Attributes				Metals (EPA Method 6010/7000) ^a (mg/kg)								
Record Number ^b	ER Sample ID ^c (Figures 10.4.4-1 and 10.4.4-2)	Date Sampled	Sample Depth (ft)	Arsenic	Barium	Beryllium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
05279	CCTA-09-GR-003-0-0.5-SS	6-11-96	0.0-0.5	4.0	150	0.50 J (0.98)	ND (0.59)	14	9.0	ND (0.10 J)	ND (0.79)	ND (0.20)
05279	CCTA-09-GR-005-0.5-1.0-SS	6-11-96	0.5-1.0	2.2	33 J (39)	ND (0.20)	ND (0.59)	3.0	4.6	ND (0.091 J)	ND (0.79)	ND (0.20)
05279	CCTA-09-GR-008-0-0.5-SS	6-11-96	0.0-0.5	3.1	67	0.26 J (0.97)	ND (0.58)	13	7.3	ND (0.095 J)	ND (0.78)	ND (0.19)
05345	CCTA-09-GR-014-3.0-SS	6-11-96	3	4.6	130	0.59 J (0.99)	ND (0.60)	16	9.2	ND (0.091 J)	ND (0.79)	ND (0.20)
05345	CCTA-09-GR-019-5.0-SS	6-11-96	5	4.4	130	0.44 J (1.0)	ND (0.60)	14	6.4	ND (0.10 J)	ND (0.80)	ND (0.20)
05345	CCTA-09-GR-024-4.0-D	6-11-96	4	4.3	100 J	0.57 J (0.98)	ND (0.59)	16	25	ND (0.10 J)	ND (0.78)	ND (0.20 J)
05345	CCTA-09-GR-028-2.0-SS	6-11-96	2	3.3	46	0.25 J (1.0)	ND (0.60)	8.0	9.5	ND (0.10 J)	ND (0.80)	ND (0.20)
Background Soil Concentrations—Coyote Test Field ^d				5.6	130	0.65	<1	17.3	21.4	<0.1	<1	<1

Note: Values in bold exceed background soil concentrations.

^a EPA November 1986.

^b Analysis request/chain-of-custody record.

^c Bold portion of the Sample ID corresponds to sample location in Figures 10.4.4-1 and 10.4.4-2.

^d Dinwiddie September 1997. The minimum background concentration between surface and subsurface is reported.

CCTA = Central Coyote Test Area.

D = Debris sample.

EPA = U.S. Environmental Protection Agency.

ER = Environmental Restoration.

ft = Foot (feet).

GR = Grab sample.

ID = Identification.

J () = The reported value is greater than or equal to the method detection limit but is less than the reporting limit, shown in parentheses.

J = Estimated value. See Data Validation report.

mg/kg = Milligram(s) per kilogram.

ND () = Not detected above the reported value, shown in parentheses.

RCRA = Resource Conservation and Recovery Act

RFI = RCRA facility investigation.

SS = Soil sample.

SWMU = Solid Waste Management Unit.

Table A-2
 Summary of SWMU 9 RFI Soil Sampling TCLP RCRA Metals Analytical Results
 June 1996
 (Off-Site Laboratory)

Sample Attributes				Metals (EPA 6010/7000) ^a (mg/L)							
Record Number ^b	ER Sample ID ^c (Figure 10.4.4-2)	Date Sampled	Sample Depth (ft)	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
05345	CCTA-09-GR-010-2.0-D	6-11-96	2	0.11	1.3 J (2.0)	ND (0.030)	ND (0.040)	ND (0.020)	ND (0.040)	0.024 J (0.10)	ND (0.0020)
05345	CCTA-09-GR-011-2.0-D	6-11-96	2	ND (0.030)	2.9	ND (0.030)	ND (0.040)	ND (0.020)	ND (0.040)	0.023 J (0.10)	ND (0.0020)
05345	CCTA-09-GR-012-2.0-D	6-11-96	2	ND (0.030)	2.5	ND (0.030)	ND (0.040)	ND (0.020)	ND (0.040)	0.011 J (0.10)	ND (0.0020)
05345	CCTA-09-GR-016-3.0-D	6-11-96	3	ND (0.030)	2.6	ND (0.030)	ND (0.040)	0.044	ND (0.040)	ND (0.010)	ND (0.0020)
05345	CCTA-09-GR-017-3.0-D	6-11-96	3	ND (0.030)	2.6	ND (0.030)	ND (0.040)	ND (0.020)	ND (0.040)	0.021 J (0.10)	ND (0.0020)
05345	CCTA-09-GR-018-2.5-D	6-11-96	2.5	ND (0.030)	2.7	ND (0.030)	ND (0.040)	ND (0.020)	ND (0.040)	0.018 J (0.10)	ND (0.0020)
05345	CCTA-09-GR-022-2.5-D	6-11-96	2.5	ND (0.030)	1.9 J (2.0)	ND (0.030)	ND (0.040)	ND (0.020)	ND (0.040)	ND (0.010)	ND (0.0020)
05345	CCTA-09-GR-023-3.0-D	6-11-96	3	ND (0.030)	1.6 J (2.0)	ND (0.030)	ND (0.040)	ND (0.020)	ND (0.040)	0.015 J (0.10)	ND (0.0020)
05345	CCTA-09-GR-024-4.0-D	6-11-96	4	ND (0.030)	1.7 J (2.0)	ND (0.030)	ND (0.040)	ND (0.020)	ND (0.040)	0.016 J (0.10)	ND (0.0020)
Maximum Concentration of Contaminants for the Toxicity Characteristic ^d				5.0	100.0	1.0	5.0	5.0	0.2	1.0	5.0

^a EPA November 1986.

^b Analysis request/chain-of-custody record.

^c Bold portion of the Sample ID corresponds to the sample location in Figure 10.4.4-2.

^d 40 CFR §261.24, Table 1, Maximum Concentration of Contaminants for the Toxicity Characteristic.

CCTA = Central Coyote Test Area.

CFR = Code of Federal Regulations.

D = Debris sample.

EPA = U.S. Environmental Protection Agency.

ER = Environmental Restoration.

ft = Foot (feet).

GR = Grab sample.

ID = Identification.

J () = The reported value is greater than or equal to the method detection limit but is less than the practical quantitation limit, shown in parentheses.

mg/L = Milligram(s) per liter.

ND () = Not detected above the method detection limit, shown in parentheses.

RFI = RCRA Facility Investigation.

RCRA = Resource Conservation and Recovery Act.

SWMU = Solid Waste Management Unit.

TCLP = Toxicity Characteristic Leaching Procedure.

Table A-3
 Summary of SWMU 9 RFI Soil Sampling VOC Analytical Results
 June 1996
 (Off-Site Laboratory)

Sample Attributes				Analyte (EPA Method 8260) ^a (µg/kg)	
Record Number ^b	ER Sample ID ^c (Figure 10.4.4-2)	Date Sampled	Sample Depth (ft)	Acetone	Tetrachloroethene
05345	CCTA-09-GR- 024 -4.0-D	6-10-96	4.0	ND (3.0)	4.2 J (5.0)
Quality Assurance/Quality Control Samples (µg/L)					
05345	CCTA-09-GR-000-EB-T	6-10-96	NA	ND (4.0)	ND (1.0)
05345	CCTA-09-GR-000-EB-B	6-10-96	NA	ND (4.0)	ND (1.0)
05345	CCTA-09-GR-000-TB	6-10-96	NA	5.7 J (10)	ND (1.0)

Note: Values in **bold** represent detected VOCs.

^aEPA November 1986.

^bAnalysis request/chain-of-custody record.

^c**Bold** portion of the sample ID corresponds to sample location in Figure 10.4.4-2.

CCTA = Central Coyote Test Area.

D = Debris sample.

EB-B = Equipment blank, backhoe.

EB-T = Equipment blank, tools.

EPA = U.S. Environmental Protection Agency.

ER = Environmental Restoration.

ft = Foot (feet).

GR = Grab sample.

ID = Identification.

J () = The reported value is greater than or equal to the method detection limit but is less than the reporting limit, shown in parentheses.

µg/L = Microgram(s) per liter.

µg/kg = Microgram(s) per kilogram.

NA = Not applicable.

ND () = Not detected above the method detection limit, shown in parentheses.

RCRA = Resource Conservation and Recovery Act.

RFI = RCRA facility investigation.

SWMU = Solid Waste Management Unit.

TB = Trip blank.

VOC = Volatile organic compound.

Table A-4
VOC Analytical Method Detection Limits (EPA Method 8260)^a
Used for SWMU 9 RFI Soil Sampling
June 1996
(Off-Site Laboratory)

Analyte	Soil Sample MDL (µg/kg)	Aqueous Sample MDL (µg/L)
Acetone	3.0	4.0
Benzene	1.0	1.0
Bromodichloromethane	1.0	1.0
Bromoform	1.0	1.0
Bromomethane	2.0	3.0
2-Butanone	2.0	2.0
Carbon disulfide	1.0	1.0
Carbon tetrachloride	1.0	1.0
Chlorobenzene	1.0	1.0
Chlorodibromomethane	1.0	1.0
Chloroethane	1.0	3.0
2-Chloroethyl vinyl ether	1.0	2.0
Chloroform	1.0	1.0
Chloromethane	1.0	2.0
Dibromochloromethane	1.0	1.0
1,2-Dichlorobenzene	1.0	1.0
1,3-Dichlorobenzene	1.0	1.0
1,4-Dichlorobenzene	1.0	1.0
Dichlorobromomethane	1.0	1.0
1,1-Dichloroethane	1.0	1.0
1,2-Dichloroethane	1.0	1.0
1,1-Dichloroethene	1.0	1.0
cis-1,2-Dichloroethene	1.0	1.0
trans-1,2-Dichloroethene	1.0	1.0
1,2-Dichloropropane	1.0	1.0
cis-1,3-Dichloropropene	2.0	1.0
trans-1,3-Dichloropropene	2.0	1.0
Ethylbenzene	1.0	1.0
2-Hexanone	3.0	2.0
Methylene chloride	1.0	1.0
4-Methyl-2-pentanone	5.0	2.0
Styrene	1.0	1.0
1,1,2,2-Tetrachloroethane	1.0	1.0
Tetrachloroethene	1.0	1.0
Toluene	2.0	1.0
1,1,1-Trichloroethane	1.0	1.0
1,1,2-Trichloroethane	2.0	1.0
Trichloroethene	1.0	1.0
Trichlorofluoromethane	1.0	1.0
Vinyl acetate	1.0	2.0

Refer to footnotes at end of table.

Table A-4 (Concluded)
 VOC Analytical Method Detection Limits (EPA Method 8260)^a
 Used for SWMU 9 RFI Soil Sampling
 June 1996
 (Off-Site Laboratory)

Analyte	Soil Sample MDL ($\mu\text{g}/\text{kg}$)	Aqueous Sample MDL ($\mu\text{g}/\text{L}$)
Vinyl chloride	2.0	3.0
m,p-Xylene	2.0	2.0
o-Xylene	1.0	1.0

^aEPA November 1986.

EPA = U.S. Environmental Protection Agency.

$\mu\text{g}/\text{kg}$ = Microgram(s) per kilogram.

MDL = Method detection limit.

$\mu\text{g}/\text{L}$ = Microgram(s) per liter.

RCRA = Resource Conservation and Recovery Act.

RFI = RCRA facility investigation.

VOC = Volatile organic compound.

SWMU = Solid Waste Management Unit.

Table A-5
Summary of SWMU 9 RFI Soil Sampling SVOC Analytical Results
June 1996
(Off-Site Laboratory)

Sample Attributes				Analyte (EPA Method 8270) ^a (µg/kg)		
Record Number ^b	ER Sample ID ^c (Figures 10.4.4-1 and 10.4.4-2)	Date Sampled	Sample Depth (ft)	Benzoic Acid	Bis(2-ethylhexyl) phthalate	Di-n-butylphthalate
05279	CCTA-09-GR-007-0-0.5-SS	6-11-96	0.0-0.5	ND (730)	ND (310)	ND (250)
05279	CCTA-09-GR-007-0.5-1.0-SS	6-11-96	0.5-1.0	ND (730)	ND (310)	ND (250)
05279	CCTA-09-GR-008-0-0.5-SS	6-11-96	0.0-0.5	ND (730)	ND (310)	ND (250)
05279	CCTA-09-GR-008-0.5-1.0-SS	6-11-96	0.5-1.0	ND (730)	ND (310)	ND (250)
05279	CCTA-09-GR-009-0-0.5-SS	6-11-96	0.0-0.5	ND (730)	ND (310)	ND (250)
05279	CCTA-09-GR-009-0.5-1.0-SS	6-11-96	0.5-1.0	ND (730)	ND (310)	ND (250)
05345	CCTA-09-GR-013-3.0-SS	6-11-96	3.0	ND (730)	ND (310)	ND (250)
05345	CCTA-09-GR-014-3.0-SS	6-11-96	3.0	ND (730)	ND (310)	ND (250)
05345	CCTA-09-GR-015-4.0-SS	6-11-96	4.0	ND (730)	ND (310)	ND (250)
05345	CCTA-09-GR-015-4.0-DU	6-11-96	4.0	ND (730)	ND (310)	ND (250)
05345	CCTA-09-GR-019-5.0-SS	6-11-96	5.0	ND (730)	ND (310)	ND (250)
05345	CCTA-09-GR-020-4.0-SS	6-11-96	4.0	ND (730)	ND (310)	ND (250)
05345	CCTA-09-GR-021-3.0-SS	6-11-96	3.0	ND (730)	ND (310)	ND (250)
05345	CCTA-09-GR-025-6.0-SS	6-10-96	6.0	ND (730)	ND (310)	ND (250)
05345	CCTA-09-GR-025-6.0-DU	6-10-96	6.0	ND (730)	ND (310)	ND (250)
05345	CCTA-09-GR-026-7.0-SS	6-10-96	7.0	ND (730)	ND (310)	ND (250)
05345	CCTA-09-GR-027-5.0-SS	6-10-96	5.0	ND (730)	ND (310)	ND (250)
05345	CCTA-09-GR-028-2.0-SS	6-11-96	2.0	ND (730)	ND (310)	ND (250)
05345	CCTA-09-GR-029-3.0-SS	6-11-96	3.0	ND (730)	ND (310)	ND (250)
Quality Assurance/Quality Control Samples (µg/L)						
05279	CCTA-09-000-EB	6-11-96	NA	ND (2.0 J)	ND (2.0)	ND (6.0)
05345	CCTA-09-000-EB-T	6-10-96	NA	2.6 J (51)	9.6 J (10)	ND (6.0)
05345	CCTA-09-000-EB-B	6-10-96	NA	ND (2.0 J)	ND (2.0)	66

Note: Values in **bold** represent detected SVOCs.

^aEPA November 1986.

^bAnalysis request/chain-of-custody record.

^c**Bold** portion of the Sample ID corresponds to sample location in Figures 10.4.4-1 and 10.4.4-2.

CCTA = Central Coyote Test Area.

DU = Soil sample duplicate.

EB = Equipment blank.

EB-B = Equipment blank, backhoe.

EB-T = Equipment blank, tools.

EPA = U.S. Environmental Protection Agency.

ER = Environmental Restoration.

ft = Foot (feet).

GR = Grab sample.

ID = Identification.

J () = The reported value is greater than or equal to the method detection limit but is less than the practical quantitation limit, shown in parentheses.

J = Estimated value. See Data Validation report.

µg/kg = Microgram(s) per kilogram.

µg/L = Microgram(s) per liter.

NA = Not applicable.

ND () = Not detected above the method detection limit, shown in parentheses.

RCRA = Resource Conservation and Recovery Act.

RFI = RCRA facility investigation.

SS = Soil sample.

SVOC = Semivolatile organic compound.

SWMU = Solid Waste Management Unit.

Table A-6
SVOC Analytical Method Detection Limits (EPA Method 8270)^a
Used for SWMU 9 RFI Soil Sampling
June 1996
(Off-Site Laboratory)

Analyte	Soil Sample MDL (µg/kg)	Aqueous Sample MDL (µg/L)
Acenaphthene	160	3.0
Acenaphthylene	160	3.0
Anthracene	120	1.0
Benzo(a)anthracene	140	2.0
Benzo(a)pyrene	140	1.0
Benzo(b)fluoranthene	200	2.0
Benzo(g,h,i)perylene	340	2.0
Benzo(k)fluoranthene	370	2.0
Benzoic acid	730	2.0
Benzyl alcohol	320	7.0
4-Bromophenyl phenyl ether	200	2.0
Butylbenzyl phthalate	240	3.0
Carbazole	280	2.0
4-Chloroaniline	440	6.0
Bis(2-chloroethoxy)methane	200	3.0
Bis(2-chloroethyl)ether	160	4.0
Bis(2-chloroisopropyl)ether	180	3.0
4-Chloro-3-methylphenol	530	7.0
2-Chloronaphthalene	190	3.0
2-Chlorophenol	350	6.0
4-Chlorophenyl phenyl ether	180	2.0
Chrysene	110	3.0
Dibenzo(a,h)anthracene	290	2.0
Dibenzofuran	360	3.0
Di-n-butyl phthalate	250	6.0
1,2-Dichlorobenzene	340	3.0
1,3-Dichlorobenzene	330	3.0
1,4-Dichlorobenzene	370	3.0
3,3-Dichlorobenzidine	340	5.0
2,4-Dichlorophenol	500	6.0
Diethylphthalate	330	3.0
2,4-Dimethylphenol	370	6.0
Dimethylphthalate	130	3.0
2-Methyl-4,6-dinitrophenol	250	6.0
2,4-Dinitrophenol	360	7.0
2,4-Dinitrotoluene	370	3.0
2,6-Dinitrotoluene	360	2.0
Di-n-octyl phthalate	180	2.0
Bis(2-ethylhexyl)phthalate	310	2.0
Fluoranthene	180	2.0
Fluorene	160	2.0
Hexachlorobenzene	330	2.0

Refer to footnotes at end of table.

Table A-6 (Concluded)
 SVOC Analytical Method Detection Limits (EPA Method 8270)^a
 Used for SWMU 9 RFI Soil Sampling
 June 1996
 (Off-Site Laboratory)

Analyte	Soil Sample MDL ($\mu\text{g}/\text{kg}$)	Aqueous Sample MDL ($\mu\text{g}/\text{L}$)
Hexachlorobutadiene	520	3.0
Hexachlorocyclopentadiene	420	1.0
Hexachloroethane	400	3.0
Ideno(1,2,3-cd)pyrene	290	2.0
Isophorone	400	3.0
2-Methylnaphthalene	510	3.0
2-Methylphenol	370	7.0
4-Methylphenol	300	7.0
Naphthalene	250	3.0
2-Nitroaniline	300	4.0
3-Nitroaniline	400	4.0
4-Nitroaniline	520	6.0
Nitrobenzene	500	4.0
2-Nitrophenol	500	7.0
4-Nitrophenol	710	7.0
N-nitrosodiphenylamine	140	2.0
N-nitroso-di-n-propylamine	130	4.0
Pentachlorophenol	360	6.0
Phenanthrene	130	1.0
Phenol	330	6.0
Pyrene	140	2.0
1,2,4-Trichlorobenzene	500	3.0
2,4,5-Trichlorophenol	420	7.0
2,4,6-Trichlorophenol	330	6.0

^aEPA November 1986.

EPA = U.S. Environmental Protection Agency.

MDL = Method detection limit.

$\mu\text{g}/\text{kg}$ = Microgram(s) per kilogram.

$\mu\text{g}/\text{L}$ = Microgram(s) per liter.

RCRA = Resource Conservation and Recovery Act.

RFI = RCRA facility investigation.

SVOC = Semivolatile organic compound.

SWMU = Solid Waste Management Unit.

Table A-7
 SVOC TCLP Analytical Method Detection Limits (EPA Method 8270)^a
 Used for SWMU 9 RFI Soil Sampling
 June 1996
 (Off-Site Laboratory)

Analyte	MDL ($\mu\text{g/L}$)
1,4-Dichlorobenzene	0.0030
2-Methylphenol	0.0070
Hexachloroethane	0.0030
Nitrobenzene	0.0040
Hexachlorobutadiene	0.0030
2,4,6-Trichlorophenol	0.0060
2,4,5-Trichlorophenol	0.0070
2,4-Dinitrotoluene	0.0030
Hexachlorobenzene	0.0020
Pentachlorophenol	0.0060
Pyridine	0.013
3,4-Methylphenol	0.0070

^aEPA November 1986.

EPA = U.S. Environmental Protection Agency.

MDL = Method detection limit.

$\mu\text{g/L}$ = Microgram(s) per liter.

RFI = RCRA Facility Investigation.

RCRA = Resource Conservation and Recovery Act.

SVOC = Semivolatile organic compound.

SWMU = Solid Waste Management Unit.

TCLP = Toxicity characteristic leaching procedure.

Table A-8
 Summary of SWMU 9 RFI Soil Sampling HE Analytical Results
 June 1996
 (On-Site Laboratory, except where noted)

Sample Attributes				Analyte (EPA Method 8330) ^a (µg/kg)	
Record Number ^b	ER Sample ID ^c (Figures 10.4.4-1 and 10.4.4-2)	Date Sampled	Sample Depth (ft)	HMX	RDX
05241	CCTA-09-GR-007-0-0.5-SS	6-11-96	0.0-0.5	ND (100)	ND (150)
05241	CCTA-09-GR-007-0.5-1-SS	6-11-96	0.5-1.0	ND (100)	ND (150)
05279	CCTA-09-GR-008-0-0.5-SS (off-site laboratory)	6-11-96	0.0-0.5	ND (420)	ND (190)
05241	CCTA-09-GR-008-0-0.5-SS	6-11-96	0.0-0.5	ND (100)	ND (150)
05241	CCTA-09-GR-008-0.5-1-SS	6-11-96	0.5-1.0	ND (100)	ND (150)
05241	CCTA-09-GR-009-0-0.5-SS	6-11-96	0.0-0.5	ND (100)	ND (150)
05241	CCTA-09-GR-009-0.5-1-SS	6-11-96	0.5-1.0	ND (100)	ND (150)
05342	CCTA-09-GR-010-2.0-D	6-11-96	2.0	ND (100)	ND (150)
05342	CCTA-09-GR-011-2.0-D	6-11-96	2.0	ND (100)	ND (150)
05342	CCTA-09-GR-012-2.0-D	6-11-96	2.0	ND (100)	ND (150)
05342	CCTA-09-GR-013-3.0-SS	6-11-96	3.0	ND (100)	ND (150)
05345	CCTA-09-GR-014-3.0-SS (off-site laboratory)	6-11-96	3.0	ND (420)	ND (190)
05342	CCTA-09-GR-014-3.0-SS	6-11-96	3.0	ND (100)	ND (150)
05342	CCTA-09-GR-015-4.0-SS	6-11-96	4.0	ND (100)	ND (150)
05345	CCTA-09-GR-016-3.0-D (off-site laboratory)	6-11-96	3.0	620 J (2200)	5000 R
05342	CCTA-09-GR-018-2.5-D	6-10-96	2.5	ND (100)	ND (150)
05345	CCTA-09-GR-019-5.0-SS (off-site laboratory)	6-11-96	5.0	ND (420)	ND (190)
05342	CCTA-09-GR-019-5.0-SS	6-10-96	5.0	ND (100)	ND (150)
05342	CCTA-09-GR-021-3.0-SS	6-10-96	3.0	ND (100)	ND (150)
05342	CCTA-09-GR-022-2.5-SS	6-10-96	2.5	ND (100)	ND (150)
05342	CCTA-09-GR-023-2.5-SS	6-10-96	2.5	390	4100
05345	CCTA-09-GR-024-4.0-D (off-site laboratory)	6-11-96	4.0	3200 J	6900 R
05342	CCTA-09-GR-024-4.0-SS	6-10-96	4.0	2500	48000
05342	CCTA-09-GR-025-6.0-SS	6-10-96	6.0	ND (100)	ND (150)
05345	CCTA-09-GR-026-7.0-SS (off-site laboratory)	6-11-96	7.0	530 J (2100) R	5600 R
05342	CCTA-09-GR-027-5.0-SS	6-10-96	5.0	ND (100)	ND (150)
05345	CCTA-09-GR-028-2.0-SS (off-site laboratory)	6-11-96	2.0	ND (420)	ND (190)
05342	CCTA-09-GR-028-2.0-SS	6-11-96	2.0	ND (100)	ND (150)
05342	CCTA-09-GR-029-3.0-SS	6-11-96	3.0	ND (100)	ND (150)
Quality Assurance/Quality Control Samples (µg/L)					
05241	CCTA-09-000-EB	6-11-96	NA	ND (100)	ND (150)
05342	CCTA-09-000-EB-B	6-10-96	NA	ND (100)	ND (150)
05342	CCTA-09-000-EB-T	6-10-96	NA	ND (100)	ND (150)

Note: Values in **bold** represent detected HE analytes.

^aEPA November 1986.

^bAnalysis request/chain-of-custody record.

^c**Bold** portion of the Sample ID corresponds to sample location in Figures 10.4.4-1 and 10.4.4-2.

CCTA = Central Coyote Test Area.

D = Debris (mound) sample.

EB = Equipment blank.

EB-B = Equipment blank, backhoe.

Table A-8 (Concluded)
Summary of SWMU 9 RFI Soil Sampling HE Analytical Results
June 1996
(On-Site Laboratory, except where noted)

EB-T	= Equipment blank, tools.
EPA	= U.S. Environmental Protection Agency.
ER	= Environmental Restoration.
ft	= Foot (feet).
GR	= Grab sample.
HE	= High explosive(s).
HMX	= 1,3,5,7-Tetranitro-1,3,5,7-tetrazacyclooctane.
ID	= Identification.
J ()	= The reported value is greater than or equal to the method detection limit but is less than the practical quantitation limit, shown in parentheses.
J	= Estimated value. See Data Validation report.
$\mu\text{g}/\text{kg}$	= Microgram(s) per kilogram.
$\mu\text{g}/\text{L}$	= Microgram(s) per liter.
NA	= Not applicable.
ND ()	= Not detected above the method detection limit, shown in parentheses.
R	= Rejected value. See Data Validation report.
RCRA	= Resource Conservation Recovery Act.
RDX	= 1,3,5-Trinitro-1,3,5-triazacyclohexane.
RFI	= RCRA facility investigation.
SS	= Soil sample.
SWMU	= Solid Waste Management Unit.

Table A-9
 HE Analytical Method Detection Limits (EPA Method 8330)^a
 Used for SWMU 9 RFI Soil Sampling
 June 1996
 (Off-Site and On-Site Laboratories)

Analyte	Soil Sample MDL ($\mu\text{g}/\text{kg}$)
1,3-Dinitrobenzene	0.10
2-Amino-4,6-dinitrotoluene	0.13
4-Amino-2,6-dinitrotoluene	0.055
2,4-Dinitrotoluene	0.16
2,6-Dinitrotoluene	0.19
HMX	0.42
Nitrobenzene	0.15
m-Nitrotoluene	0.070
o-Nitrotoluene	0.16
p-Nitrotoluene	0.17
RDX	0.19
Tetryl	0.34
1,3,5-Trinitrobenzene	0.070
2,4,6-Trinitrotoluene	0.11

^aEPA November 1986.

EPA = U.S. Environmental Protection Agency.

HE = High explosive(s).

HMX = 1,3,5,7-Tetranitro-1,3,5,7-tetrazacyclooctane.

MDL = Method detection limit.

$\mu\text{g}/\text{kg}$ = Microgram(s) per kilogram.

RCRA = Resource Conservation Recovery Act.

RDX = 1,3,5-Trinitro-1,3,5-triazacyclohexane.

RFI = RCRA facility investigation.

SWMU = Solid Waste Management Unit.

Tetryl = 2,4,6-Trinitrophenylmethylnitramine.

Table A-10
 Summary of SWMU 9 RFI Soil Sampling Isotopic Uranium and Thorium Analytical Results
 June 1996
 (Off-Site Laboratory)

Sample Attributes				Activity (pCi/g)								
Record Number ^a	ER Sample ID ^b (Figure 10.4.4-1)	Date Sampled	Sample Depth (ft)	Thorium-232		Uranium-233/234		Uranium-235		Uranium-238		
				Result	Error ^c	Result	Error ^c	Result	Error ^c	Result	Error ^c	
Site-specific background soil samples (locations 001-003)												
05279	CCTA-09-GR-001-0-0.5-SS	6-11-96	0.0-0.5	1.20E+00 J	1.5E-01	7.15E-01	7.7E-02	5.3E-02 J	1.9E-02	6.93E-01	7.5E-02	
05279	CCTA-09-GR-001-0.5-1.0-SS	6-11-96	0.5-1.0	1.06E+00 J	1.4E-01	6.26E-01	8.1E-02	4.6E-02 J	2.0E-02	6.84E-01	8.6E-02	
05279	CCTA-09-GR-002-0-0.5-SS	6-11-96	0.0-0.5	9.6E-01 J	1.2E-01	5.74E-01	7.7E-02	2.7E-02 J	1.5E-02	6.72E-01	8.3E-02	
05279	CCTA-09-GR-002-0.5-1.0-SS	6-11-96	0.5-1.0	9.7E-01 J	1.3E-01	6.21E-01	7.3E-02	2.2E-02 J	1.2E-02	6.64E-01	7.6E-02	
05279	CCTA-09-GR-003-0-0.5-SS	6-11-96	0.0-0.5	8.3E-01 J	1.3E-01	6.18E-01	7.8E-02	3.3E-02 J	1.7E-02	6.33E-01	7.8E-02	
05279	CCTA-09-GR-003-0.5-1.0-SS	6-11-96	0.5-1.0	8.54E-01	9.0E-02	5.93E-01	6.9E-02	6.5E-02 J	2.1E-02	5.15E-01	6.4E-02	
Site-Specific background arroyo sediment samples (locations 004-006)												
05279	CCTA-09-GR-004-0-0.5-SS	6-11-96	0.0-0.5	1.06E+00	1.0E-01	6.08E-01	8.5E-02	1.7E-02 J	1.4E-02	6.24E-01	8.6E-02	
05279	CCTA-09-GR-004-0.5-1.0-SS	6-11-96	0.5-1.0	1.37E+00 J	1.7E-01	4.34E-01	5.6E-02	2.3E-02 J	1.3E-02	4.34E-01	5.6E-02	
05279	CCTA-09-GR-005-0-0.5-SS	6-11-96	0.0-0.5	1.26E+00	1.2E-01	4.40E-01	5.6E-02	2.1E-02 J	1.2E-02	4.83E-01	5.9E-02	
05279	CCTA-09-GR-005-0.5-1.0-SS	6-11-96	0.5-1.0	1.11E+00 J	1.5E-01	6.68E-01	7.5E-02	4.4E-02 J	1.8E-02	7.59E-01	8.1E-02	
05279	CCTA-09-GR-006-0-0.5-SS	6-11-96	0.0-0.5	1.09E+00	1.1E-01	6.14E-01	7.2E-02	6.3E-02 J	2.1E-02	5.38E-01	6.7E-02	
05279	CCTA-09-GR-006-0.5-1.0-SS	6-11-96	0.5-1.0	1.02E+00	1.2E-01	6.35E-01	7.3E-02	2.5E-02 J	1.3E-02	6.50E-01	7.4E-02	
Quality Assurance/Quality Control Sample (pCi/L)												
05279	CCTA-09-000-EB	6-11-96	NA	2.4E-02	3.1E-02	9.8E-02 J	6.6E-02	3.7E-02	3.7E-02	ND (5.4E-02 J)	--	
Background Soil Activities-Coyote Test Field ^d				1.01E+00 ^e		1.6E+00 ^e		1.8E-01		1.4E+00 ^e		

Note: Values in **bold** exceed background soil activities.

^a Analysis request/chain-of-custody record.

^b **Bold** portion of the Sample ID corresponds to sample location in Figure 10.4.4-1.

^c Two standard deviations about the mean detected activity.

^d Dinwiddie September 1997.

^e Southwest background activities are presented where Coyote Test Field background activities are not available.

CCTA = Central Coyote Test Area.

D = Debris sample.

EB = Equipment blank.

EB-B = Equipment blank, backhoe.

EB-T = Equipment blank, tools.

ER = Environmental Restoration.

ft = Foot (feet).

GR = Grab sample.

ID = Identification.

J = Estimated value. See Data Validation report.

NA = Not applicable.

ND () = Not detected at or above the minimum detectable activity, shown in parentheses.

pCi/g = Picocurie(s) per gram.

pCi/L = Picocurie(s) per liter.

RCRA = Resource Conservation and Recovery Act.

RFI = RCRA facility investigation.

SS = Soil sample.

SWMU = Solid Waste Management Unit.

-- = Error not calculated for nondetectable results.



October 22, 1996

Project No. 301455.405.01.000

Sandia National Laboratories
Attn: Mr. Joe Pavletich
Department 7582
P.O. Box 5800 MS 1147
Albuquerque, NM 87185-1147

Data Validation for Operable Unit 1334,
Environmental Restoration Site 9 Analysis Reports

Dear Mr. Pavletich:

Data validation levels 1, 2, and 3 (DV1, DV2, and DV3) were performed on one laboratory analytical data package containing sample analysis results and raw data for soil and quality control samples collected at Environmental Restoration (ER) Site 9. Data validation was performed in accordance with the SNL/NM Sample Management Office procedure, "Verification and Validation of Chemical and Radiochemical Data, TOP 94-03." These samples were collected at ER Site 9 and recorded on ARCOG 05345. The analyses were performed at Lockheed Analytical Services laboratory and released in report numbered L7235. Any typographical or transcription errors that were identified were either hand corrected, initialed and dated, or corrected analytical reports were requested and obtained from the laboratory. Data validation findings are discussed below.

Lockheed Analytical Report L7235 (ARCOG 05345)

Soil samples analyses for Resource Conservation and Recovery Act (RCRA) regulated metals plus beryllium, toxic characteristic leaching procedure (TCLP) metals, TCLP semi-volatile organic compounds, total semi-volatile organic compounds, volatile organic compounds, and explosives residues were requested. Field quality control samples submitted were limited to aqueous equipment blank and trip blank samples for volatile organic compounds analyses, and equipment blank samples for semi-volatile organic compounds analyses. Field duplicate, matrix spike, and matrix spike duplicate samples were indicated on the ARCOG for selected analyses. Parent samples to those indicated as duplicates could not always be determined from the ARCOG information provided.

Regional Office

5301 Central Avenue, N.E., Suite 700 • Albuquerque, New Mexico 87108-1513
505-262-8800 • FAX: 505-262-8855

Mr. Joe Pavletich

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October 22, 1996

TCLP Metals and RCRA Metals plus Beryllium

TCLP metals were analyzed on nine soil samples. TCLP metals results are acceptable and no qualifiers were assigned during validation. TCLP metals results were reported in units of milligrams per liter (mg/L) in the test generated leachate. The RCRA metals list, plus beryllium, were analyzed on four samples and reported on a total metal, as received (wet weight) basis. Sample analysis results are generally acceptable and usable. Mercury results were reported as undetected above the laboratory reporting limit for the four total metals analyses. These results were qualified during review with "UJ" because of low bias observed in the matrix spikes and laboratory control samples which indicated that the actual detection limits may have been greater than reported. There were no field quality control samples designated on the ARCOG for matrix spike, duplicate, or equipment blank metals analyses.

TCLP Semi-Volatile and Total Semi-Volatile Organic Compounds

Ten soil samples were submitted for the TCLP followed by toxic characteristic semi-volatile organic compound analyses using EPA Method 8270. Thirteen soils samples were submitted for total semi-volatile organic compound analyses. Two water, quality control, samples were also submitted and analyzed for semi-volatile organic compounds. The TCLP semi-volatile data are generally acceptable and were not qualified during review. The total analyses for semi-volatile organic compounds are acceptable. A few quality control indicators in the laboratory control samples, method blanks, or sample surrogates slightly exceeded acceptance criteria, were evaluated, but did require qualification of the data. Mass spectral library searches to identify organic compounds in the samples that were not on the target compound list were performed. Several soil samples contained estimated parts per million concentrations of what was identified as an aldol condensation product, or estimated parts per billion concentrations of hydrocarbons and other unidentified compounds. You may wish to investigate the occurrence and significance of these tentatively identified semi-volatile organic compounds. Additional information including the mass spectra can be provided by the laboratory upon request.

Total Volatile Organic Compounds

One soil sample, two aqueous equipment blank samples, and one aqueous trip blank sample were submitted for total volatile organic compound analyses. Analysis results are acceptable based upon laboratory and field sample quality control results.

Explosives. Method 8330

Four soil samples were submitted for explosives residue analysis by EPA Method 8330. Analysis results are acceptable based upon the laboratory quality control measures reported. Positive analysis results for RDX and HMX were confirmed by the laboratory by re-analysis using a different analytical system.

Reviewer comments and assigned qualifiers (if any) relevant to specific samples are found on the data validation forms. Data qualifiers assigned for the metals analyses are recorded on the data validation level 3 (DV-3) forms. Unless noted otherwise, all analysis results are acceptable as reported. Please review the validation documentation and contact either myself or Pam Puissant,

Mr. Joe Pavletich

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October 22, 1996

Dept. 7513, with any questions. Review comments have been provided to the SMO for inclusion and filing with the laboratory report original.

If you have any questions or require additional information please contact me at 262-8920.

Respectfully submitted,


IT CORPORATION

A handwritten signature in cursive script that reads "Mark Lyon".

Mark Lyon
Project Chemist

ML:glj
Enclosures

MEMORANDUM

DATE: July 19, 1999
TO: File
FROM: Kenneth Salaz 
SUBJECT: Inorganic Data Review and Validation
Central Coyote Test Area, ARCO #05345, Case No. 7215.2201

See the attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and specified methods (EPA6010, EPA7470/1). Problems were identified with the data package that result in the qualification of data.

1. In the method blank, barium (Ba) and silver (Ag) were detected. The Ba and Ag results of samples L7235-1, -3, -5, -12, -15, -17, -26, and -28, as well as the Ba result of sample -24, were positive, <5X the blank concentration, and will be qualified "J,B."
2. The MS and MSD percent recoveries (%RECs) of mercury (Hg) were below QC limits. Results for samples L7235-9, -20, -31, and -38 were ND and will be qualified "UJ,A2."
3. The LCS %REC of Hg was below the QC limit. Results for samples L7235-9, -20, -31, and -38 were ND and will be qualified "UJ,A."

Data are acceptable. QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

All samples were extracted and analyzed within the prescribed holding times.

Calibration

The initial and continuing calibrations met QC acceptance criteria.

Blanks

No target analytes were detected in the method blank, ICB, or CCB above the required acceptance limit except as noted above in the summary section.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

The MS/MSD met QC acceptance criteria except as noted above in the summary section.

Laboratory Control Samples

The LCS/LCSD met QC acceptance criteria except as noted above in the summary section.

Replicates

No replicate analyses were performed. The MSD was used to measure precision.

ICP Interference Check Sample (ICS)

The ICP ICS met QC acceptance criteria.

ICP Serial Dilution

The ICP serial dilution met QC acceptance criteria.

Other QC

A field duplicate was submitted for TCLP metals analysis. However, the sampling location did not match any other samples. Thus, criteria could not be evaluated. No field duplicate was submitted for RCRA metals analysis. No equipment blank (EB) or field blank (FB) were submitted on the ARCOG.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

SAMPLE FINDINGS SUMMARY

Site: Central Coyote Test Area

AR/COC: 05345

Data Classification: Inorganics (EPA 6010 ↓ 7470/1)

Sample Fraction No.	Analysis	DV Qualifiers	Comments
29968-01 CCTA-09-GR-014-30-S	7439-97-6 (Mercury)	U, A, A2	
29974-01	-019-5.0-S	↓	
29979-01	-024-4.0-D	↓	
29984-01	-028-2.0-S	↓	
29964-02	-010-2.0-D	7440-39-3	J, B
65-02	-011-2.0-D	(Barium)	
66-02	-012-2.0-D	↓	
71-02	-016-3.0-D	↓	
72-	-017-3.0-D	↓	
73-	-018-2.5-D	↓	
77-	-022-2.5-S	↓	
78-	-023-3.0-D	↓	
79-	-024-4.0-D	↓	
64-	-010-2.0-D	7440-22-4	
65-	-011-2.0-D	(Silver)	
66-	-012-2.0-D	↓	
71-	-016-3.0-D	↓	
72-	-017-3.0-D	↓	
73-	-018-2.5-D	↓	
78-	-023-3.0-D	↓	
19-	-024-4.0-D	↓	
Data are acceptable.			
QC Measures appear to be adequate			

Sample No./Fraction No. - This value is located on the Chain of Custody in the ER Sample Id field.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470/1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HE, PCBRISC

Reviewed by: [Signature] Date: 7/19/99

of samples: 1
 Matrix: Soil

Sample #s: L 1233 - 4
 - 20
 - 31
 - 38

INORGANIC METALS:

Central Coyote

SITE/PROJECT: Test Area ARCO# : 05345
 LABORATORY: LAS LABORATORY REPORT #: L7235
 METHODS: EPA 6010, EPA 7470 (RCRA metals)

QC Element/ Analyte	ICV	CCV	ICB	CCB	Method Blks	LCS	LCSD	LCSD RPD	MS	MSD	MSD RPD	REP RPD	ICS AB	Serial Dilution	Field Dup RPD	Eq. Blks	Field Blks			
7429-90-5 Al													NA	NA	NA	NA	NA			
7440-39-3 Ba	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓							
7440-41-7 Be	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓							
7440-43-9 Cd	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓							
7440-70-2 Ca																				
7440-47-3 Cr	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓							
7440-48-4 Co																				
7440-50-8 Cu																				
7439-89-6 Fe																				
7439-95-4 Mg																				
7439-96-5 Mn																				
7440-02-0 Ni																				
7440-09-7 K																				
7440-22-4 Ag	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓							
7440-23-5 Na																				
7440-62-2 V																				
7440-66-6 Zn																				
7439-92-1 Pb	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓							
7782-49-2 Se	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓							
7440-38-2 As	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓							
7440-36-0 Sb																				
7440-28-0 Tl																				
7439-97-6 Hg	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓							
Cyanide CN																				

mg/kg = ug/g : [(ug/g) x (sample mass (g) / sample vol. (ml)) x (1000ml / 1liter)] / Dilution Factor = ug/l

NA = Not Applicable

Comments:

- ① No replicate analysis performed. MSD used to measure precision.
- ② Serial dilution criteria only apply to sample results > 50X the RL.
- ③ No field dup., Eq. blank, or field blank submitted on the COC.

* Summary → See back of this page.

REVIEWED BY:

[Signature]

DATE:

7/19/99

Matrix: soil

-3
-5
-12
-15
-17
-24
-26
-28

INORGANIC METALS:

Central Coyote

SITE/PROJECT: Test Area ARCO# : 05345
 LABORATORY: LAS LABORATORY REPORT #: 67235
 METHODS: EPA 6010, EPA 7470 (TCLP metals)

QC Element/ Analyte	ICV	CCV	ICB	CCB	Method Blks	LCS	LCSD	LCSD RPD	MS	MSD	MSD RPD	REP RPD	ICS AB	Serial Dilution	Field Dup RPD	Eq. Blks	Field Blks				
7429-90-5 Al												NA		NA	NA	NA	NA				
7440-39-3 Ba																					
7440-41-7 Be																					
7440-43-9 Cd																					
7440-70-2 Ca																					
7440-47-3 Cr																					
7440-48-4 Co																					
7440-50-8 Cu																					
7439-89-6 Fe																					
7439-95-4 Mg																					
7439-96-5 Mn																					
7440-02-0 Ni																					
7440-09-7 K																					
7440-22-4 Ag																					
7440-23-5 Na																					
7440-62-2 V																					
7440-66-6 Zn																					
7439-92-1 Pb																					
7782-49-2 Se																					
7440-38-2 As																					
7440-36-0 Sb																					
7440-28-0 Tl																					
7439-97-6 Hg																					
Cyanide CN																					

mg/kg = ug/g : [(ug/g) x (sample mass (g) / sample vol. (ml)) x (1000ml / liter)] / Dilution Factor = ug/l

NA = Not Applicable

Comments:

- ① No replicate analysis performed. MS/MSD used to measure precision.
- ② Serial dilution criteria apply only to sample results > SOX to AL.
- ③ A field dup. was submitted, but the sampling location did not match any other samples.
- ④ No Eq. blank or field blank were submitted on the COC.

* Summary → See back of this page.

REVIEWED BY: [Signature] DATE: 7/19/99

MEMORANDUM

DATE: July 22, 1999

TO: File

FROM: Kenneth Salaz ~~KAS~~

SUBJECT: Organic Data Review and Validation
Central Coyote Test Area, ARCO #05345, Case No. 7215.2201

See the attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and specified methods (EPA8260, EPA8270, EPA8330). Problems were identified with the data package that result in the qualification of data.

1. VOC Analysis: The continuing calibration (CCV) percent differences (%Ds) of bromomethane and chloroethane for samples L7235-41, -46, and -49 were >40%. Results were non-detect (ND) and will be qualified "UJ." Trichlorofluoromethane had a CCV %D >60% for sample -32. The result was ND and will be qualified "R" (unusable).

SVOC Analysis: The initial calibration relative standard deviation (RSD) of benzoic acid was >20% and the CCV %D was >40%. The result of sample L7235-45 was positive and will be qualified "J." The result of sample -51 was ND and will be qualified "UJ." 4-nitrophenol had a CCV %D >40% for samples -45 and -51. Results were ND and will be qualified "UJ." Bis(2-chloroisopropyl)ether had a CCV %D >60% for samples -7, -8, -10, -11, -21, -22, -23, -33, -34, -35, -36, -37, and -40. Results were ND and will be qualified "R."

2. VOC Analysis: In the method blanks for samples L7235-32, -41, -46, and -49, an unknown VOC (Tentatively Identified Compound: TIC) was detected. Results were all positive, <10X the blank concentration, and will be qualified "R,B."

SVOC Analysis: In the method blank for sample L7235-51, di-n-butylphthalate was detected. The result was positive, <5X the blank concentration, > the RL, and will be qualified "66U,B." Aldol condensation (TIC) was detected in the blank for samples -7, -8, -10, -11, -21, -22, -23, -33, -34, -35, -36, -37, and -40. The results were positive, <10X the blank concentration, and will be qualified "R,B."

3. HE Analysis: The relative percent differences (RPDs) between the initial and confirmation results of HMX and RDX for sample L7235-35, as well as those of RDX for samples -12 and -30, were >75%. The reported results will be qualified "R." The RPDs of HMX for samples -12 and -30 were >25%. The reported results will be qualified "J."

Data are acceptable except as noted above. QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

VOC/SVOC/HE Analyses: All samples were analyzed within the prescribed holding times.

Calibration

VOC Analysis: The initial and continuing calibrations met QC acceptance criteria except as noted above in the summary section and the following. The initial calibration RSD of vinyl chloride, as well as the CCV %Ds of bromomethane and acetone, were >20%. All associated sample results were ND; no data were qualified.

SVOC Analysis: The initial and continuing calibrations met QC acceptance criteria except for the following. The initial calibration RSDs of 2,4-dinitrophenol, 4,6-dinitro-2-methylphenol, 1,2-dichlorobenzene, 2-methylphenol, pentachlorophenol, and di-n-octylphthalate, as well as the CCV %Ds of 2,4-dinitrophenol, 4-nitrophenol, and pentachlorophenol, were >20%. All associated sample results were ND; no data were qualified.

HE Analysis: The initial and continuing calibrations met QC acceptance criteria.

Blanks

VOC/SVOC Analyses: No target analytes were detected in the method blanks except as noted above in the summary section.

HE Analysis: No target analytes were detected in the method blank.

Surrogates

VOC/SVOC Analyses: The surrogate percent recoveries (%RECs) and met QC acceptance criteria.

HE Analysis: The surrogate %RECs and retention times (RTs) met QC acceptance criteria.

Internal Standard

VOC/SVOC Analyses: The internal standard retention times (RTs) and areas met QC acceptance criteria.

HE Analysis: No internal standards were required for this method.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

VOC Analysis: The MS/MSD met QC acceptance criteria except for the RPDs of benzene and chlorobenzene, which slightly exceeded QC limits. However, both %RECs met QC criteria and all sample results were ND. Thus, no data were qualified.

SVOC/HE Analyses: The MS/MSD met QC acceptance criteria.

Laboratory Control Samples

VOC/HE Analyses: The LCS/LCSD met QC acceptance criteria.

SVOC Analysis: The LCS/LCSD met QC acceptance criteria except for the %RECs of 4-nitrophenol, which exceeded QC limits. However, all associated sample results were ND. Thus, no data were qualified.

Other QC

VOC Analysis: In the trip blank (TB), acetone was detected. The sample result was ND; no data were qualified. The equipment blanks (EBs) met QC acceptance criteria. No field duplicate was submitted on the ARCOC.

SVOC Analysis: The field duplicates met QC acceptance criteria. In the equipment blank, benzoic acid and bis(2-ethylhexyl)phthalate were detected. Sample results were ND; no data were qualified. No field blank (FB) was submitted on the ARCOC.

HE Analysis: The RPDs between the initial and confirmation results met QC acceptance criteria except as noted above in the summary section. No field duplicate, EB, or field blank (FB) were submitted on the ARCOC.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

Site: Central Coyote Test Area

AR/COC: 05345

Data Classification: Organics

(EPA 8260
↓
8270
8330)

Sample Fraction No.	Analysis	DV Qualifiers	Comments
⇒ Note: See attached spreadsheet for data qualifications.			
Data are acceptable (except as noted on spreadsheet).			
QC Measures appear to be adequate.			

Sample No./Fraction No. - This value is located on the Chain of Custody in the ER Sample Id field.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470-1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HE, PCBRISC

Reviewed by: Fred Baly Date: 7/22/99

of samples: 1

Sample IDs: L 7235-32

Matrix: soil

Inst. ID: GC/MS-J

VOLATILE ORGANICS: Page 1 of 2
SW-846 - Method 8260

Central Coyote

SITE/PROJECT: Test Area

ARCO #: 05345

LABORATORY: LAS

LABORATORY REPORT #: L7235

IS	GC/MS	CAS #	Min RF	Intercept	Calib RF	Calib RSD/R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	(2)		TAL
															Field Dup RPD	Eq. Blks	
	Name				>.05	<20% / 0.99	20%										
1	Chloromethane	74-87-3	0.10	NA	✓	✓	✓	✓							NA	✓	✓
1	Bromomethane	74-83-9	0.10		✓	✓	26.1										✓
1	vinyl chloride	75-01-4	0.01		✓	✓											✓
1	Chloroethane	75-00-3	0.01		✓	✓											✓
1	methylene chloride (10xblk)	75-09-2	0.01		✓	✓											✓
1	acetone(10xblk)	67-54-1	0.01		✓	✓											✓
1	carbon disulfide	75-15-0	0.10		✓	✓											✓
1	1,1-dichloroethene	75-35-4	0.20		✓	✓											✓
1	1,1-dichloroethane	75-34-3	0.10		✓	✓											✓
1	Chloroform	67-66-3	0.20		✓	✓											✓
1	1,2-dichloroethane	107-06-2	0.10		✓	✓											✓
1	2-butanone(10xblk)	78-93-3	0.01		✓	✓											✓
2	1,1,1-trichloroethane	71-55-6	0.10		✓	✓											✓
2	carbon tetrachloride	56-23-5	0.10		✓	✓											✓
2	Bromodichloromethane	75-27-4	0.20		✓	✓											✓
2	1,2-dichloropropane	78-87-5	0.01		✓	✓											✓
2	cis-1,3-dichloropropene	10061-01-5	0.20		✓	✓											✓
2	Trichloroethene	79-01-6	0.30		✓	✓											✓
2	Dibromochloromethane	124-48-1	0.10		✓	✓											✓
2	1,1,2-trichloroethane	79-00-5	0.10		✓	✓											✓
2	Benzene	71-43-2	0.50		✓	✓											✓
2	trans-1,3-dichloropropene	10061-02-6	0.10		✓	✓											✓
2	Bromoform	75-25-2	0.10		✓	✓											✓
3	4-methyl-2-pentanone	108-10-1	0.10		✓	✓											✓
3	2-hexanone	591-78-6	0.01		✓	✓											✓
3	Tetrachloroethene	127-18-4	0.20		✓	✓											✓
3	1,1,2,2-tetrachloroethane	79-34-5	0.30		✓	✓											✓
3	toluene(10xblk)	108-88-3	0.40		✓	✓		✓	NA	NA	✓	✓	✓				✓
3	Chlorobenzene	108-90-7	0.50		✓	✓											✓
3	Ethylbenzene	100-41-4	0.10		✓	✓											✓
3	Styrene	100-42-5	0.30		✓	✓											✓
3	xylenes(total)	1330-20-7	0.30		✓	✓											✓
3	1,2-dichloroethylene(total)	590-59-0	0.01		✓	✓											✓
	2-chloroethyl vinyl ether	110-75-8			✓	✓											✓
	Trichlorofluoromethane	75-69-4			✓	✓	67.5										✓
	Vinyl Acetate	108-05-4			✓	✓											✓
	1,2,3,4-dichlorobenzene				✓	✓		30								✓	✓

Comments: Unknown TIC

① No LCSO analyzed.

② No field dup. submitted on the CCC.

NA = Not Analyzed

See back
* Summary → of this

VOLATILE ORGANICS: Page 1 of 2
SW-846 - Method 8260

Central Coyote

SITE/PROJECT: Test Area

ARCOC #: 05345

LABORATORY: LAS

LABORATORY REPORT #: L7235

or samples: 3

Matrix: aps
Inst. ID: GLMS-E

Sample IDs: L7235 - 11
- 46
- 49 (TA)

IS	GC/MS		Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Trip Blks	TAL
	Name	CAS #			>.05	<20% / 0.99	20%											
1	Chloromethane	74-87-3	0.10	NA	✓	✓	✓	✓							NA	NA	NA	✓
1	Bromomethane	74-83-9	0.10		✓	✓	42.1											✓
1	vinyl chloride	75-01-4	0.10		✓	✓	54.9											✓
1	Chloroethane	75-00-3	0.01		✓	✓												✓
1	methylene chloride (10xblk)	75-09-2	0.01		✓	✓												✓
1	acetone(10xblk)	67-54-1	0.01		✓	✓												✓
1	carbon disulfide	75-15-0	0.10		✓	✓												✓
1	1,1-dichloroethene	75-35-4	0.20		✓	✓												✓
1	1,1-dichloroethane	75-34-3	0.10		✓	✓												✓
1	Chloroform	67-66-3	0.20		✓	✓												✓
1	1,2-dichloroethane	107-06-2	0.10		✓	✓												✓
1	2-butanone(10xblk)	78-93-3	0.01		✓	✓												✓
2	1,1,1-trichloroethane	71-55-6	0.10		✓	✓	✓											✓
2	carbon tetrachloride	56-23-5	0.10		✓	✓	✓											✓
2	Bromodichloromethane	75-27-4	0.20		✓	✓	✓											✓
2	1,2-dichloropropane	78-87-3	0.01		✓	✓	✓											✓
2	cis-1,3-dichloropropene	10061-01-5	0.20		✓	✓	✓											✓
2	Trichloroethene	79-01-6	0.30		✓	✓	✓											✓
2	Dibromochloromethane	124-48-1	0.10		✓	✓	✓											✓
2	1,1,2-trichloroethane	79-00-5	0.10		✓	✓	✓											✓
2	Benzene	71-43-2	0.50		✓	✓	✓											✓
2	trans-1,3-dichloropropene	10061-02-6	0.10		✓	✓	✓											✓
2	Bromoform	75-25-2	0.10		✓	✓	NA											✓
3	4-methyl-2-pentanone	108-10-1	0.10		✓	✓	✓											✓
3	2-hexanone	591-78-6	0.01		✓	✓	✓											✓
3	Tetrachloroethene	127-18-4	0.20		✓	✓	✓											✓
3	1,1,2,2-tetrachloroethane	79-34-5	0.30		✓	✓	NA											✓
3	toluene(10xblk)	108-88-3	0.40		✓	✓	✓		✓	✓	✓	✓	✓	✓				✓
3	Chlorobenzene	108-90-7	0.50		✓	✓	✓											✓
3	Ethylbenzene	100-41-4	0.10		✓	✓	✓											✓
3	Styrene	100-42-5	0.30		✓	✓	NA											✓
3	xylenes(total)	1330-20-7	0.30		✓	✓	✓											✓
3	1,2-dichloroethylene(total)	540-59-0	0.01		✓	✓	✓											✓
	2-chloroethyl vinyl ether	110-75-8			✓	✓	✓											✓
	Trichlorofluoromethane	75-69-4			✓	✓	✓											✓
	Vinyl Acetate	108-05-4			✓	✓	✓											✓
	1,2,3,4-dichlorobenzene				✓	✓	NA											✓
	Comments: Unknown TIC				✓	NA	NA	10										✓

Comments: Unknown TIC

CCV results not reported for NA compounds; could not evaluate.
② No field dup.; samples are EBs and TIS.

NA = Not Applicable

REVIEWED BY:

[Signature]

DATE:

7/22/99

* Summary → See back of this page.

Central Coyote

SITE/PROJECT: Test Area

ARCO# : 05345

LABORATORY: LAS

LABORATORY REPORT #: L7235

Surrogate Recovery and Internal Standard Outliers

Sample	SMC 1	SMC 2	SMC 3	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3- area	IS 3- RT			
All Passed												

SMC 1: 4-Bromofluorobenzene
 SMC 2: 1,2-Dichloroethane-d4
 SMC 3: Toluene-d8

IS 1: Bromochloromethane Pentafluorobenzene
 IS 2: 1,4-Difluorobenzene
 IS 3: Chlorobenzene-d5
 IS4: 1,4-Dichlorobenzene-d4

LAS
7/19/99

Comments:

Number of samples: 13
 Matrix: Soil

Sample IDs: L7235-1, -8, -10, -11, -21, -22, -23, -33, -34, -35, -36, -37, -40

SEMI-VOLATILE ORGANICS: Page 1 of 3
 SW-846 - Method 8270

Central Coyote

SITE/PROJECT: Test Area ARCO# : 05345
 LABORATORY: LAS LABORATORY REPORT #: L7235

(1)

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL		
						>.05	<20% / 0.99	20%													
1	A	108-95-2	Phenol	0.80	NA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓		
1	BN	111-44-4	bis(2-Chloroethyl)ether	0.70		✓	✓												✓		
1	A	95-57-8	2-Chlorophenol	0.80		✓	✓			✓	✓	✓	✓	✓	✓				✓		
1	BN	541-73-1	1,3-Dichlorobenzene	0.60		✓	✓												✓		
1	BN	106-46-7	1,4-Dichlorobenzene	0.50		✓	✓														
1	BN	95-50-1	1,2-Dichlorobenzene	0.40		✓	✓														
1	A	95-48-7	2-Methylphenol	0.70		✓	✓														
1	BN	108-60-1	bis(2-chloroisopropyl)ether	0.01		✓	✓	74.5													
1	A	106-44-5	4-Methylphenol	0.60		✓	✓	✓													
1	BN	621-64-7	N-Nitroso-di-n-propylamine	0.50		✓	✓			✓	✓	✓	✓	✓	✓						
1	BN	67-72-1	Hexachlorocyclopentadiene	0.10		✓	✓														
1	BN	94-95-3	Nitrobenzene	0.20		✓	✓														
2	BN	78-59-1	Isophorone	0.40		✓	✓														
2	A	88-75-5	2-Nitrophenol	0.10		✓	✓														
2	A	105-67-9	2,4-Dimethylphenol	0.20		✓	✓														
2	BN	111-91-1	bis(2-Chloroethoxy)methane	0.30		✓	✓														
2	A	120-83-2	2,4-Dichlorophenol	0.20		✓	✓														
2	BN	120-82-1	1,2,4-Trichlorobenzene	0.20		✓	✓			✓	✓	✓	✓	✓	✓						
2	BN	91-20-3	Naphthalene	0.70		✓	✓														
2	BN	106-47-8	4-Chloroaniline	0.01		✓	✓														
2	BN	87-68-3	Hexachlorobutadiene	0.01		✓	✓														
2	A	59-50-7	4-Chloro-3-methylphenol	0.20		✓	✓			✓	✓	✓	✓	✓	✓						
2	BN	91-57-6	2-Methylnaphthalene	0.40		✓	✓														
3	BN	77-47-4	Hexachlorocyclopentadiene	0.01		✓	✓														
3	A	88-06-2	2,4,6-Trichlorophenol	0.20		✓	✓														
3	A	95-95-4	2,4,5-Trichlorophenol	0.20		✓	✓														

Comments:
 0 No field blank submitted on the COC.

NA = Not Applicable

Central Coyote

SITE/PROJECT: Test AreaARCOC #: 05345LABORATORY: LASLABORATORY REPORT #: L7235

①

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL		
						>.05	<20% / 0.99	20%													
3	BN	91-58-7	2-Chloronaphthalene	0.80	NA	✓	✓	✓	✓							✓	✓	NA	✓		
3	BN	88-74-4	2-Nitroaniline	0.01		✓	✓												✓		
3	BN	131-11-3	Dimethylphthalate	0.01		✓	✓												✓		
3	BN	208-96-8	Acenaphthylene	0.90		✓	✓												✓		
3	BN	606-20-2	2,6-Dinitrotoluene	0.20		✓	✓												✓		
3	BN	99-09-2	3-Nitroaniline	0.01		✓	✓												✓		
3	BN	83-32-9	Acenaphthene	0.90		✓	✓			✓	✓	✓	✓	✓	✓				✓		
3	A	51-28-5	2,4-Dinitrophenol	0.01		✓	26.687	↓		✓	✓	✓	✓	✓	✓				✓		
3	A	100-02-7	4-Nitrophenol	0.01		✓	✓	34.4		✓	✓	✓	✓	✓	✓				✓		
3	BN	132-64-9	Dibenzofuran	0.80		✓	✓	✓											✓		
3	BN	121-14-2	2,4-Dinitrotoluene	0.20		✓	✓														
3	BN	84-66-2	Diethylphthalate	0.01		✓	✓												✓		
3	BN	7005-72-3	4-Chlorophenyl-phenylether	0.40		✓	✓												✓		
3	BN	86-73-7	Fluorene	0.90		✓	✓												✓		
3	BN	100-01-6	4-Nitroaniline	0.01		✓	✓												✓		
4	A	534-52-1	4,6-Dinitro-2-methylphenol	0.01		✓	21.354												✓		
4	BN	86-30-6	N-Nitrosodiphenylamine (1)	0.01		✓	✓												✓		
4	BN	101-55-3	4-Bromophenyl-phenylether	0.10		✓	✓												✓		
4	BN	118-74-1	Hexachlorobenzene	0.10		✓	✓														
4	BN	81-85-0	Perchloroethylene	0.05		✓	✓														
4	BN	85-01-8	Phenanthrene	0.70		✓	✓												✓		
4	BN	120-12-7	Anthracene	0.70		✓	✓												✓		
4	BN	86-74-8	Carbazole	0.01		✓	✓												✓		
4	BN	84-74-2	Di-n-butylphthalate	0.01		✓	✓												✓		
4	BN	206-44-0	Fluoranthene	0.60		✓	✓												✓		
5	BN	129-00-0	Pyrene	0.60		✓	✓			✓	✓	✓	✓	✓	✓				✓		
5	BN	85-68-7	Butylbenzylphthalate	0.01		✓	✓												✓		
5	BN	91-94-1	3,3'-Dichlorobenzidine	0.01		✓	✓												✓		
5	BN	56-55-3	Benzo(a)anthracene	0.80	↓	✓	✓	↓	↓							↓	↓	↓	✓		

Comments:

① No field blank submitted on the COC.

NA = Not Applicable

SW 846 - Method 8270

Central Cayote

SITE/PROJECT: Test Area ARCO# 05345

LABORATORY: LAS LABORATORY REPORT #: L7235

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL		
						>.05	<20% / 0.99	20%													
5	BN	218-01-9	Chrysene	0.70	NA	✓	✓	✓	✓							✓	✓	NA	✓		
5	BN	117-81-7	bis(2-Ethylhexyl)phthalate	0.01	↓	✓	✓	↓	↓								9.6 J	↓	✓		
6	BN	117-84-0	Di-n-octylphthalate	0.01	↓	✓	✓	↓	↓								✓	↓	✓		
6	BN	205-99-2	Benzo(b)fluoranthene	0.70	↓	✓	✓	↓	↓									↓	✓		
6	BN	207-08-9	Benzo(k)fluoranthene	0.70	↓	✓	✓	↓	↓									↓	✓		
6	BN	50-32-8	Benzo(a)pyrene	0.70	↓	✓	✓	↓	↓									↓	✓		
6	BN	193-39-5	Indeno(1,2,3-cd)pyrene	0.50	↓	✓	✓	↓	↓									↓	✓		
6	BN	53-70-3	Dibenz(a,h)anthracene	0.40	↓	✓	✓	↓	↓									↓	✓		
6	BN	191-24-2	Benzo(g,h,i)perylene	0.50	↓	✓	✓	↓	↓									↓	✓		
		100-51-6	Benzyl Alcohol		↓	✓	✓	↓	↓									↓	✓		
		65-85-0	Benzoic Acid		↓	✓	✓	↓	↓									2.6 J	↓	✓	
			Alkyl Condensation (TIC)		↓	NA	NA	NA	50,000									↓	✓		

NA = Not Applicable

Surrogate Recovery Outliers

Sample	SMC 1	SMC 2	SMC 3	SMC 4	SMC 5	SMC 6	SMC 7	SMC 8
All Passed								

Comments:

① No field blank submitted on the COC.

- SMC 1: Nitrobenzene-d5 (BN)
- SMC 2: 2-Fluorobiphenyl (BN)
- SMC 3: p-Terphenyl-d14 (BN)
- SMC 4: Phenol-d5 (A)
- SMC 5: 2-Fluorophenol (A)
- SMC 6: 2,4,6-Tribromophenol (A)
- SMC 7: 2,2-Chlorophenol-d4 (A)
- SMC 8: 1,2-Dichlorobenzene-d4 (BN)

MS 7/12/14
* Sample Summary → See back of this page.

Internal Standard Outliers

Sample	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3-area	IS 3-RT	IS 4-area	IS 4-RT	IS 5-area	IS 5-RT	IS 6-area	IS 6-RT
All Passed												

- IS 1: 1,4-Dichlorobenzene-d4 (BN)
- IS 2: Naphthalene-d8 (BN)
- IS 3: Acenaphthene-d10 (BN)
- IS 4: Phenanthrene-d10 (BN)
- IS 5: Chrysene-d12 (BN)
- IS 6: Perylene-d12 (BN)

SEMI-VOLATILE ORGANICS: Page 1 of 3
 SW-846 - Method 8270

Sample #: 1
 Matrix: soil (TCLP)

Sample IDs: L7235-2, -4, -6, -13, -16, -18, -25,
 ↓ -27, -29

SITE/PROJECT: Central Coyote Test Area ARCO# : 05345
 LABORATORY: LAS LABORATORY REPORT #: L7235

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL		
						>.05	<20% / 0.99	20%													
1	A	108-95-2	Phenol	0.80	NA	✓	✓									NA	NA	NA	✓		
1	BN	111-44-4	bis(2-Chloroethyl)ether	0.70	↓	↓	↓									↓	↓	↓	↓		
1	A	95-57-8	2-Chlorophenol	0.80	↓	↓	↓									↓	↓	↓	↓		
1	BN	541-73-1	1,3-Dichlorobenzene	0.60	↓	↓	↓									↓	↓	↓	↓		
1	BN	106-44-5	4-Methylphenol	0.50	↓	↓	↓									↓	↓	↓	↓		
1	BN	95-50-1	1,2-Dichlorobenzene	0.40	↓	↓	↓									↓	↓	↓	↓		
1	A	95-48-7	2-Methylphenol	0.70	↓	↓	↓	✓	✓	✓	NA	NA	✓	✓	✓	↓	↓	↓	↓		
1	BN	108-60-1	bis(2-chloroisopropyl)ether	0.01	↓	↓	↓									↓	↓	↓	↓		
1	A	106-44-5	4-Methylphenol	0.60	↓	↓	↓									↓	↓	↓	↓		
1	BN	621-64-7	N-Nitroso-di-n-propylamine	0.50	↓	↓	↓									↓	↓	↓	↓		
1	BN	67-72-7	Hexachlorocyclopentadiene	0.01	↓	↓	↓									↓	↓	↓	↓		
1	BN	98-95-3	Nitrobenzene	0.50	↓	↓	↓									↓	↓	↓	↓		
2	BN	78-59-1	Isophorone	0.40	↓	↓	↓									↓	↓	↓	↓		
2	A	88-75-5	2-Nitrophenol	0.10	↓	↓	↓									↓	↓	↓	↓		
2	A	105-67-9	2,4-Dimethylphenol	0.20	↓	↓	↓									↓	↓	↓	↓		
2	BN	111-91-1	bis(2-Chloroethoxy)methane	0.30	↓	↓	↓									↓	↓	↓	↓		
2	A	120-83-2	2,4-Dichlorophenol	0.20	↓	↓	↓									↓	↓	↓	↓		
2	BN	120-82-1	1,2,4-Trichlorobenzene	0.20	↓	↓	↓									↓	↓	↓	↓		
2	BN	91-20-3	Naphthalene	0.70	↓	↓	↓									↓	↓	↓	↓		
2	BN	106-47-8	4-Chloroaniline	0.01	↓	↓	↓									↓	↓	↓	↓		
2	BN	87-68-3	Hexachlorobutadiene	0.01	↓	↓	↓	✓	✓	✓	NA	NA	✓	✓	✓	↓	↓	↓	↓		
2	A	59-50-7	4-Chloro-3-methylphenol	0.20	↓	↓	↓									↓	↓	↓	↓		
2	BN	91-57-6	2-Methylnaphthalene	0.40	↓	↓	↓									↓	↓	↓	↓		
3	BN	77-47-4	Hexachlorocyclopentadiene	0.01	↓	↓	↓									↓	↓	↓	↓		
3	A	88-06-2	2,4,6-Trichlorophenol	0.20	↓	↓	↓	✓	✓	✓	NA	NA	✓	✓	✓	↓	↓	↓	↓		
3	A	95-95-4	2,4,5-Trichlorophenol	0.20	↓	↓	↓	✓	✓	✓	NA	NA	✓	✓	✓	↓	↓	↓	↓		

Comments:

- ① No LSD performed for TCLP SVOCs.
- ② A field dup was submitted. However, sampling location did not match any other samples.
- ③ No Eq. blank or field blank submitted on the COC.

NA = Not Applicable

REVIEWED BY:

[Signature]

DATE:

7/22/99

SITE/PROJECT: Central Coyote Test Area ARCO# : 05345
 LABORATORY: LAS LABORATORY REPORT #: L7235

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL		
						>.05	<20% / 0.99	20%													
3	BN	91-58-7	2-Chloronaphthalene	0.80	NA											NA	NA	NA	✓		
3	BN	88-74-4	2-Nitroaniline	0.01																	
3	BN	131-11-3	Dimethylphthalate	0.01																	
3	BN	208-96-8	Acenaphthylene	0.90																	
3	BN	606-20-2	2,6-Dinitrotoluene	0.20																	
3	BN	99-09-2	3-Nitroaniline	0.01																	
3	BN	83-32-9	Acenaphthene	0.90																	
3	A	51-28-5	2,4-Dinitrophenol	0.01																	
3	A	100-02-7	4-Nitrophenol	0.01																	
3	BN	132-64-9	Dibenzofuran	0.80																	
3	BN	121-14-2	2,4-Dinitrotoluene	0.20																	
3	BN	84-66-2	Diethylphthalate	0.01																	
3	BN	7005-72-3	4-Chlorophenyl-phenylether	0.40																	
3	BN	86-73-7	Fluorene	0.90																	
3	BN	100-01-6	4-Nitroaniline	0.01																	
4	A	534-52-1	4,6-Dinitro-2-methylphenol	0.01																	
4	BN	86-30-6	N-Nitrosodiphenylamine (I)	0.01																	
4	BN	101-55-3	4-Bromophenyl-phenylether	0.10																	
4	BN	118-74-1	Hexachlorobenzene	0.10																	
4	NA	87-86-5	Pentachlorobenzene	0.05																	
4	BN	85-01-8	Phenanthrene	0.70																	
4	BN	120-12-7	Anthracene	0.70																	
4	BN	86-74-8	Carbazole	0.01																	
4	BN	84-74-2	Di-n-butylphthalate	0.01																	
4	BN	206-44-0	Fluoranthene	0.60																	
5	BN	129-00-0	Pyrene	0.60																	
5	BN	85-68-7	Butylbenzylphthalate	0.01																	
5	BN	91-94-1	3,3'-Dichlorobenzidine	0.01																	
5	BN	56-55-3	Benzo(a)anthracene	0.80	↓											↓	↓	↓	↓		

Comments:

- ① No LCSD performed for TCLD SVOCs.
- ② A field dup. was submitted. However, the sampling location did not match any other samples.
- ③ No Eq. blank or field blank submitted on the COC.

NA = Not Applicable

SITE/PROJECT: Central Coyote Test Area ARCO# : 05345
 LABORATORY: LAS LABORATORY REPORT #: L7235

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL	
						>.05	<20% / 0.99	20%												
5	BN	218-01-9	Chrysene	0.70	NA											NA	NA	NA	✓	
5	BN	117-81-7	bis(2-Ethylhexyl)phthalate	0.01	↓															
6	BN	117-84-0	Di-n-octylphthalate	0.01																
6	BN	205-99-2	Benzo(b)fluoranthene	0.70																
6	BN	207-08-9	Benzo(k)fluoranthene	0.70																
6	BN	50-32-8	Benzo(a)pyrene	0.70																
6	BN	193-39-5	Indeno(1,2,3-cd)pyrene	0.50																
6	BN	53-70-3	Dibenz(a,h)anthracene	0.40																
6	BN	191-24-2	Benzo(g,h,i)perylene	0.50																
		110-86-1	Pyridine			✓	✓	✓	✓	✓	NA	NA	✓	✓	✓					
		108-39-4	3+4-Methylphenol			✓	✓	✓	✓	✓	NA	NA	✓	✓	✓					

NA = Not Applicable

Surrogate Recovery Outliers

Sample	SMC 1	SMC 2	SMC 3	SMC 4	SMC 5	SMC 6	SMC 7	SMC 8
All Passed								

Comments:

- ① No USB performed for TCLP SVOCs.
- ② A field dup. was submitted. However, the sampling location did not match any other samples.
- ③ No Eq. blank or field blank submitted on the COC.

- SMC 1: Nitrobenzene-d5 (BN)
- SMC 2: 2-Fluorobiphenyl (BN)
- SMC 3: p-Terphenyl-d14 (BN)
- SMC 4: Phenol-d5 (A)
- SMC 5: 2-Fluorophenol (A)
- SMC 6: 2,4,6-Tribromophenol (A)
- SMC 7: 2,2-Chlorophenol-d4 (A)
- SMC 8: 1,2-Dichlorobenzene-d4 (BN)

* Summary

Internal Standard Outliers

Sample	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3-area	IS 3-RT	IS 4-area	IS 4-RT	IS 5-area	IS 5-RT	IS 6-area	IS 6-RT
All Passed												

- IS 1: 1,4-Dichlorobenzene-d4 (BN)
- IS 2: Naphthalene-d8 (BN)
- IS 3: Acenaphthene-d10 (BN)
- IS 4: Phenanthrene-d10 (BN)
- IS 5: Chrysene-d12 (BN)
- IS 6: Perylene-d12 (BN)

⇒ All QC criteria were met.
 No data were qualified.

SEMI-VOLATILE ORGANICS: Page 1 of 3

SW-846 - Method 8270

Central Coyote

SITE/PROJECT: Test Area ARCO# : 05345

LABORATORY: LAS LABORATORY REPORT #: L7235

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL
						>.05	<20% / 0.99	20%											
1	A	108-95-2	Phenol	0.80	NA	✓	✓	✓	✓	✓	✓	✓	NA	NA	NA	NA	NA	NA	✓
1	BN	111-44-4	bis(2-Chloroethyl)ether	0.70		✓	✓												
1	A	95-57-8	2-Chlorophenol	0.80		✓	✓			✓	✓	✓	NA	NA	NA				
1	BN	541-73-1	1,3-Dichlorobenzene	0.60		✓	✓												
1	BN	106-46-7	1,2-Dichlorobenzene	0.50		✓	✓												
1	BN	95-50-1	1,2-Dichlorobenzene	0.40		✓	21.246												
1	A	95-48-7	2-Methylphenol	0.70		✓	21.604												
1	BN	108-60-1	bis(2-chloroisopropyl)ether	0.01		✓	✓												
1	A	106-44-5	4-Methylphenol	0.60		✓	✓												
1	BN	621-64-7	N-Nitroso-di-n-propylamine	0.50		✓	✓			✓	✓	✓	NA	NA	NA				
1	BN	67-72-1	Hexachlorocyclopentadiene	0.30		✓	✓												
1	BN	98-95-7	Nitrobenzene	0.20		✓	✓												
2	BN	78-59-1	Isophorone	0.40		✓	✓												
2	A	88-75-5	2-Nitrophenol	0.10		✓	✓												
2	A	105-67-9	2,4-Dimethylphenol	0.20		✓	✓												
2	BN	111-91-1	bis(2-Chloroethoxy)methane	0.30		✓	✓												
2	A	120-83-2	2,4-Dichlorophenol	0.20		✓	✓												
2	BN	120-82-1	1,2,4-Trichlorobenzene	0.20		✓	✓			✓	✓	✓	NA	NA	NA				
2	BN	91-20-3	Naphthalene	0.70		✓	✓												
2	BN	106-47-8	4-Chloroaniline	0.01		✓	✓												
2	BN	87-68-3	Hexachlorobutadiene	0.01		✓	✓												
2	A	59-50-7	4-Chloro-3-methylphenol	0.20		✓	✓			✓	✓	✓	NA	NA	NA				
2	BN	91-57-6	2-Methylnaphthalene	0.40		✓	✓												
3	BN	77-47-4	Hexachlorocyclopentadiene	0.01		✓	✓												
3	A	88-06-2	2,4,6-Trichlorophenol	0.20		✓	✓												
3	A	95-95-4	2,4,5-Trichlorophenol	0.20		✓	✓												

Comments:
 ① No MS/MSD performed for EBS.
 ② Samples are EBS. No field dup. or field blank submitted on the COC.

NA = Not Applicable

REVIEWED BY: [Signature] DATE: 7/22/99

SW 846 - Method 8270

Central Coyote

SITE/PROJECT: Test AreaARCOC #: 05345LABORATORY: LASLABORATORY REPORT #: L7235

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	①			②			TAL			
													MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks				
						>.05	<20% / 0.99	20%														
3	BN	91-58-7	2-Chloronaphthalene	0.80	NA	✓	✓	✓	✓								NA	NA	NA	✓		
3	BN	88-74-4	2-Nitroaniline	0.01		✓	✓															
3	BN	131-11-3	Dimethylphthalate	0.01		✓	✓															
3	BN	208-96-8	Acenaphthylene	0.90		✓	✓															
3	BN	606-20-2	2,6-Dinitrotoluene	0.20		✓	✓															
3	BN	99-09-2	3-Nitroaniline	0.01		✓	✓															
3	BN	83-32-9	Acenaphthene	0.90		✓	✓			✓	✓	✓	NA	NA	NA							
3	A	51-28-5	2,4-Dinitrophenol	0.01		✓	38.422	26.4														
3	A	100-02-7	4-Nitrophenol	0.01		✓	✓	46.2		202	194	✓	NA	NA	NA							
3	BN	132-64-9	Dibenzofuran	0.80		✓	✓	✓														
3	BN	121-74-2	2,4-Dinitrotoluene	0.20		✓	✓	✓														
3	BN	84-66-2	Diethylphthalate	0.01		✓	✓															
3	BN	7005-72-3	4-Chlorophenyl-phenylether	0.40		✓	✓															
3	BN	86-73-7	Fluorene	0.90		✓	✓															
3	BN	100-01-6	4-Nitroaniline	0.01		✓	✓															
4	A	534-52-1	4,6-Dinitro-2-methylphenol	0.01		✓	28.017															
4	BN	86-30-6	N-Nitrosodiphenylamine (I)	0.01		✓	✓															
4	BN	101-55-3	4-Bromophenyl-phenylether	0.10		✓	✓															
4	BN	118-74-1	Hexachlorobenzene	0.10		✓	✓	✓														
4	BN	87-86-3	Pentachlorophenol	0.05		✓	✓	✓														
4	BN	85-01-8	Phenanthrene	0.70		✓	✓	✓														
4	BN	120-12-7	Anthracene	0.70		✓	✓															
4	BN	86-74-8	Carbazole	0.01		✓	✓		✓													
4	BN	84-74-2	Di-n-butylphthalate	0.01		✓	✓		33													
4	BN	206-44-0	Fluoranthene	0.60		✓	✓		✓													
5	BN	129-00-0	Pyrene	0.60		✓	✓			✓	✓	✓	NA	NA	NA							
5	BN	85-68-7	Butylbenzylphthalate	0.01		✓	✓															
5	BN	91-94-1	3,3'-Dichlorobenzidine	0.01		✓	✓															
5	BN	56-55-3	Benzo(a)anthracene	0.80	✓	✓	✓															

Comments:

① No MS/MSD performed for Ebs.

② Samples are Ebs. No field dup., or field blank submitted on the COC.

NA = Not Applicable

Central Coyote

SITE/PROJECT: Test Area ARCO# : 05345

LABORATORY: LAS LABORATORY REPORT #: L7235

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL
						>.05	<20% / 0.99	20%											
5	BN	218-01-9	Chrysene	0.70	NA	✓	✓	✓	✓							NA	NA	NA	✓
5	BN	117-81-7	bis(2-Ethylhexyl)phthalate	0.01	↓	✓	✓	↓	↓							↓	↓	↓	↓
6	BN	117-84-0	Di-n-octylphthalate	0.01	↓	✓	22.45	↓	↓							↓	↓	↓	↓
6	BN	205-99-2	Benzo(b)fluoranthene	0.70	↓	✓	✓	↓	↓							↓	↓	↓	↓
6	BN	207-08-9	Benzo(k)fluoranthene	0.70	↓	✓	✓	↓	↓							↓	↓	↓	↓
6	BN	50-32-8	Benzo(a)pyrene	0.70	↓	✓	✓	↓	↓							↓	↓	↓	↓
6	BN	193-39-5	Indeno(1,2,3-cd)pyrene	0.50	↓	✓	✓	↓	↓							↓	↓	↓	↓
6	BN	53-70-3	Dibenz(a,h)anthracene	0.40	↓	✓	✓	↓	↓							↓	↓	↓	↓
6	BN	191-24-2	Benzo(g,h,i)perylene	0.50	↓	✓	✓	↓	↓							↓	↓	↓	↓
		100-51-6	Benzyl Alcohol		↓	✓	✓	↓	↓							↓	↓	↓	↓
		65-85-0	Benzoic Acid		↓	✓	24.341	44.5	↓							↓	↓	↓	↓
			Unknown Carboxylic Acid (TIC)		↓	NA	NA	NA	6							↓	↓	↓	↓

NA = Not Applicable

Surrogate Recovery Outliers

Sample	SMC 1	SMC 2	SMC 3	SMC 4	SMC 5	SMC 6	SMC 7	SMC 8
All Passed								

Comments:

- ① No MS/MSD performed for Ebs.
- ② Samples are Ebs, no field dup. or field blank submitted on the COC.

- SMC 1: Nitrobenzene-d5 (BN)
- SMC 2: 2-Fluorobiphenyl (BN)
- SMC 3: p-Terphenyl-d14 (BN)
- SMC 4: Phenol-d5 (A)
- SMC 5: 2-Fluorophenol (A)
- SMC 6: 2,4,6-Tribromophenol (A)
- SMC 7: 2,2-Chlorophenol-d4 (A)
- SMC 8: 1,2-Dichlorobenzene-d4 (BN)

Internal Standard Outliers

Sample	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3-area	IS 3-RT	IS 4-area	IS 4-RT	IS 5-area	IS 5-RT	IS 6-area	IS 6-RT
All Passed												

- IS 1: 1,4-Dichlorobenzene-d4 (BN)
- IS 2: Naphthalene-d8 (BN)
- IS 3: Acenaphthene-d10 (BN)
- IS 4: Phenanthrene-d10 (BN)
- IS 5: Chrysene-d12 (BN)
- IS 6: Perylene-d12 (BN)

* Summary → See back of H.T. page.

of Samples: 6
 Matrix: Soil

Sample IDs: L7235-12
 -14
 -19
 -30
 -35
 -39
 ↓

HIGH EXPLOSIVES:
 SW846 Method 8330

Central Coyote

SITE/PROJECT: Test Area ARCO# : 05345
 LABORATORY: LAS LABORATORY REPORT #: L7235

NAME	CAS #	Intercept	Curve R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks
			.99	20%	U			20%			20%		U	U
HMX	2691-41-0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	NA	NA
RDX	121-82-4	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
1,3,5-Trinitrobenzene	99-35-4	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
1,3-dinitrobenzene	99-65-0	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Nitrobenzene	98-95-3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Tetryl	479-45-8	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
2,4,6-trinitrotoluene	118-96-7	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
2-amino-4,6-dinitrotoluene	35572-78-2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
4-amino-2,6-dinitrotoluene	19406-51-0	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
2,4-dinitrotoluene	121-14-2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
2,6-dinitrotoluene	606-20-2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
2-nitrotoluene	88-72-2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
4-nitrotoluene	99-99-0	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
3-nitrotoluene	99-08-1	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
PETN	78-11-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	↓	↓	↓

NA = Not Applicable

Sample	SMC %REC	SMC RT	Sample	SMC %REC	SMC RT
All Passed					

Comments:
 (1) No field blank or eq. blank submitted on the Cox. A field dup. was submitted, but the sampling location did not match any other samples.

Confirmation

Sample	CAS #	RPD > 25%	Sample	CAS #	RPD > 25%
L7235-12	2691-41-0	51.9	L7235-12	121-82-4	123.5
↓ -30	↓	65.8	↓ -30	↓	123.6
↓ -35	↓	76.6	↓ -35	↓	123.9

mg/kg = ug/g : [(ug/g) x (sample mass (g) / sample vol. (ml))] x (1000ml / liter) / Dilution Factor = ug/l

* Summary → See back of this page.

Central Coyote

DATA VALIDATION SUMMARY:

SITE/PROJECT: Test Area CASE #: 7215.2201
 ARCO#: 05345
 LABORATORY: LAS
 LABORATORY REPORT #: L7235

OF SAMPLES: 45 MATRIX: 40 soil / 5 aqueous
 LAB SAMPLE IDS: L7235-1 thru -41
↓ -44, -46, -49, -50

ANALYSIS/ QC ELEMENT	VOC	SVOC	PEST/ PCB	HPLC (HE)	ICP/AES	GRAV AA	CVAA (Hg)	GN	RAD	OTHER
1. HOLDING TIMES/ PRESERVATION	✓	✓	NA	✓	✓	NA	✓	NA	NA	NA
2. CALIBRATIONS	R; UJ	R; J; UJ		✓	✓		✓			
3. METHOD BLANKS	R, B	U, B R, B		✓	J, B		✓			
4. MS/MSD	✓	✓		✓	✓		UJ, A2			
5. LABORATORY CONTROL SAMPLES	✓	✓		✓	✓		UJ, A			
6. REPLICATES					NA		NA			
7. SURROGATES	✓	✓		✓						
8. INTERNAL STDS	✓	✓								
9. TCL COMPOUND IDENTIFICATION	✓	✓								
10. ICP INTERFERENCE CHECK SAMPLE					✓					
11. ICP SERIAL DILUTION					NA					
12. CARRIER/CHEM TRACER RECOVERIES										
13. OTHER QC	✓	✓	↓	R; J	NA	↓	NA	↓	↓	↓

CHECK MARK (✓) - ACCEPTABLE
 J - ESTIMATED
 U - NOT DETECTED

SHADED CELLS - NOT APPLICABLE
 UJ - NOT DETECTED, ESTIMATED
 R - UNUSABLE

NA = Not Applicable

REVIEWED BY: [Signature] DATE: 7/22/99

David H. G.

DOCUMENTATION COMPLETENESS CHECKLIST
(DATA VERIFICATION/VALIDATION LEVEL 1 - DV1)

Project Leader J. Pavletch Project Name Central ^{Coyote} Canyon ^{elg} Test Area Case No. 3634.400
AR/COC No. 05345 Analytical Lab LAS SDG No. L7235

In the tables below, mark any information that is missing or incorrect and give an explanation.

1.0 Analysis Request and Chain of Custody Record

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
1.1	All items on COC complete - data entry clerk initialed and dated	✓				
1.2	Container type(s) correct for analyses requested	✓				
1.3	Sample volume adequate for # and types of analyses requested	✓				
1.4	Preservative correct for analyses requested	✓				
1.5	Custody records continuous and complete	✓				
1.6	Lab sample number(s) provided	✓				
1.7	Condition upon receipt information provided	✓				
1.8	Tritium Screen data provided (Rad labs)	✓		Released by 05347 (COC#).		

2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
2.1	Data reviewed, signature	✓				
2.2	Date samples received	✓				
2.3	Method reference number(s) complete and correct	✓				
2.4	Quality control data provided (MB, LCS, LCD, Detection Limit)		✓	LCS/LCD were inadvertently not analyzed for organics;		
2.5	Matrix spike/matrix spike duplicate data provided(if requested)		✓	use MS/MSD for OR.		
2.6	Narrative provided	✓		No MS/MSD was done for sample 029975-005.		
2.7	TAT met		✓	Due 7/14/96, Final Rec'd 7/29/96		
2.8	Hold times met	✓				
2.9	All requested result data provided		✓	Missing MS/MSD		

Based on the review, this data package is complete Yes No

If no, provide: correction request tracking # _____ and date correction request was submitted: _____

Reviewed by: Nelly O'Grady Date: 10/14/96 Closed by: _____ Date: _____

ANALYSIS REQUEST AND CHAIN OF CUSTODY

AR/COC- 05345

SF 2001-COD (9-94)

Project Name: Central Composite Test Area Project / Task Manager: Joe Ruelicke Case No.: 3623.H00

Location: Building 2F Room NA Tech Area NA

Reference LOV (available at SMO)

Sample Matrix	Container		Preservative	Sample Collection Method	Sample Type
	Type	Volume			

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Type	Volume	Preservative	Sample Collection Method	Sample Type
029970-05	CCIA-09-GR-015-4.0-D	4	9	6/10/06 1507	S	6	250	HC	G	D4
029971-02	CCIA-09-GR-016-3.0-D	3		6/10/06 1507						
029971-06	CCIA-09-GR-016-3.0-D	3		6/10/06 1507						
029968-03	CCIA-09-GR-014-3.0-S	3		6/11/06 0933						SP
029972-02	CCIA-09-GR-017-3.0-D	3		6/10/06 1502						SA
029972-06	CCIA-09-GR-017-3.0-0	3		1502						
029973-02	CCIA-09-GR-018-2.5-D	2.5		1500						
029973-06	CCIA-09-GR-018-2.5-D	2.5		1500						
029974-03	CCIA-09-GR-019-5.0-S	5		1503						SP
029974-01	CCIA-09-GR-019-5.0-S	5		1505						SP
029974-05	CCIA-09-GR-019-5.0-S	5		1505						SA
029975-05	CCIA-09-GR-020-4.0-S	4		1501						MS/MS
029976-05	CCIA-09-GR-021-3.0-S	3		1455						SA
029977-02	CCIA-09-GR-022-2.5-S	2.5		1330						
029977-06	CCIA-09-GR-022-2.5-S	2.5		1330						
029978-02	CCIA-09-GR-023-3.0-D	3		1345						
029978-06	CCIA-09-GR-023-2.5-D	2.5		1345						
029979-02	CCIA-09-GR-024-4.0-D	4		1357						

Parameter & Method Requested										Lab Sample ID
TCLP MET	TCLP S.VOC	S.VOC	H.E.	RCRA Met + Be	MS/MSD					
		X								
X			X							
	X									
			X							
X										
	X									
			X							
				X						
	X									
			X							
X										
	X									
	X									
X										

Abnormal Conditions on Receipt

Recipient Initials: LR

WHITE - To Accompany Samples, Laboratory Copy BLUE - To Accompany Samples, Return to SMO YELLOW - SMO Suspense Copy PINK - Field Copy

ANALYSIS REQUEST AND CHAIN OF CUSTODY

SF 2001 COD (9-94)

AR/COC- 05345

Project Name: Central Caye Test Area Project/Task Manager: Joe Pavletich Case No.: 3624,400

Location		Tech Area <u>NA</u>		Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)					Parameter & Method Requested					Lab Sample ID		
Building <u>NA</u> Room <u>NA</u>		Sample No. - Fraction	ER Sample ID or Sample Location Detail				Sample Matrix	Container		Preservative	Sample Collection Method	Sample Type	TCLP S.VOC	H.E.	RCRA MET + BE	VOC		S.VOC	
Type	Volume																		
		029979-06	CCIA-09-GR-024-4.0-0	4	09	6-10-96 1357	S	G	250	40C	G	SA	X						
		029979-03	CCIA-09-GR-024-4.0-0	4		1357						SP	X						
		029979-01	CCIA-09-GR-024-4.0-0	4		1357								X					
		029979-04	CCIA-09-GR-024-4.0-0	4		1357			125						X				
		029980-05	CCIA-09-GR-025-6.0-5	6		1355			250			SA				X			
		029981-05	CCIA-09-GR-025-6.0-5	6		1355						D4				X			
		029982-05	CCIA-09-GR-026-7.0-5	7		1340						SA	X			X			
		029983-05	CCIA-09-GR-027-5.0-5	5		1320										X			
		029984-05	CCIA-09-GR-028-2.0-5	2		6/11/96 1035										X			
		029984-01	CCIA-09-GR-028-2.0-5	2		1035						6P			X				
		029984-03	CCIA-09-GR-028-2.0-5	2		1035						6P	X						
		030001-05	CCIA-09-GR-029-3.0-5	3		1040						SA				X			
		030002-04	CCIA-09-OCU-EB-T	-		6/10/96 0900	PIW		3xuo ml	HCl		EB			X				
		030002-08	CCIA-09-OCU-EB-T	-		0900			0x 1000	HCl	AG	EB				X			
		030003-04	CCIA-09-OCU-EB-B	-		0915			5xuo ml	HCl		EB			X				
		030003-1	CCIA-09-OCU-EB-B	-		0900			1xuo ml	HCl		EB			X				
		030003-05	CCIA-09-OCU-EB-B	-		0915			0.25 1000 ml	None		EB				X			

8330 added per M. Lynn Conroy

Abnormal Conditions on Receipt

Recipient Initials: _____

WHITE - To Accompany Samples, Laboratory Copy BLUE - To Accompany Samples, Return to SMO YELLOW - SMO Suspense Copy PINK - Field Copy

7235 PAGE **3**
AR/COC-1 **05345**

Lab
Batch No. _____

Dept. No./Mail Stop: **7565 / 1148**
 Project/Task Manager: **Sue Paulettch**
 Project Name: **Central Coyote Test Area**
 Record Center Code: **ER/134/09 / DAT**
 Logbook Ref No: **#42**
 Service Order No.: **CFO182**

Date Samples Shipped: **6-13-96**
 Carrier/Waybill No.: **A59954**
 Lab Contact: **Mary Ford**
 Lab Destination: **Lockheed**
 SMO Contact/Phone: **Mark Lyon 262-8800**
 Send Report to SMO: **Kathy Becker**

Contract No.: **AS-240A**
 Case No.: **3624.400**
 SMO Authorization: *[Signature]*
 Bill to: Sandia National Laboratories
 Supplier Services Department
 P.O. Box 5800 MS 0154
 Albuquerque, NM 87185-0154

Parameter & Method Requested

Location		Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)					TCLP met.	TCLP S-UOC	S-UOC	RCRA met + Re	Lab Sample ID
Building	Tech Area				Room	Sample Matrix	Container Type	Volume	Preservative					
029964-07	NA	2	9	6-13-96 0925	S	G	260 ml	4cc	G	SA	X	X		
029964-06	NA	2		0925								X		
029965-02		2		0931							X			
029965-03		2		0931							X			
029966-02		2		0934							X			
029966-03		2		0934							X			
029967-05		3		0930								X		
029968-05		3		0933								X		
029968-01		3		0933							SP		X	
029969-05		4		0936							SA	X		

RMMA Yes No Ref. No. _____

Sample Disposal Return to Client Disposal by lab

Turnaround Time Normal Rush Required Report Date per contract QC Inits. _____

Sample Team Members: Name **S. Bop** Signature *[Signature]* Title **IR** Company/Organization/Phone **IT/ 7565/ 844-9081**

Special Instructions/QC Requirements

COC# 05347 releases
 COC# 05345
 Raw Data Package
 NUO-DUP required
 Send as separate report

Abnormal Conditions on Receipt

1. Relinquished by <i>[Signature]</i> Org. IT/7564 Date 6-13-96 Time 1312	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> Org. IT/7513 Date 6-13-96 Time 1312	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <i>[Signature]</i> Org. 7513 Date 6/13/96 Time 1430	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <i>[Signature]</i> Org. _____ Date 6-14-96 Time 9:00	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____



October 22, 1996

Project No. 301455.405.01.000

Sandia National Laboratories
Attn: Mr. Joe Pavletich
Department 6682
P.O. Box 5800, M/S 1147
Albuquerque, NM 87185-1147

Data Validation for Operable Unit 1334
Central Coyote Test Area
Environmental Restoration Site 9 Analysis Report

Dear Mr. Pavletich:

Data validation levels 1, 2, and 3 (DV1, DV2, and DV3) were performed on one laboratory analytical data package containing sample analysis results and raw data for soil and quality control samples collected at Environmental Restoration (ER) Site 9. Data validation was performed in accordance with the SNL/NM Sample Management Office procedure, "Verification and Validation of Chemical and Radiochemical Data, TOP 94-03." These samples were collected at ER Site 9 and recorded on ARCOG 05279. The analyses were performed by Lockheed Analytical Services laboratory and released in report numbered L7237. Any typographical or transcription errors that were identified were either hand corrected, initialed and dated, or corrected analytical reports were requested and obtained from the laboratory. Data validation findings are discussed below.

Soil samples were analyzed for Resource Conservation and Recovery Act (RCRA) regulated metals plus beryllium, semi-volatile organic compounds, high explosives, isotopic uranium and isotopic thorium. Field quality control samples submitted were limited to an aqueous equipment blank for semi-volatile organic compounds, and isotopic uranium and thorium analyses. Field duplicate and matrix spike/matrix spike duplicate samples were indicated on the ARCOG for selected analyses.

RCRA Metals plus Beryllium

RCRA metals plus beryllium were analyzed for in three soil samples (030008, 030013, and 030019). Metals results were reported in units of milligrams per kilogram and reported on a total metal, as received (wet weight) basis. Sample analysis results are acceptable and no qualifiers were assigned during validation. Mercury results were reported as undetected below the laboratory reporting limit for the three metals analyses. These results were qualified during review with "UJ" because of low bias observed in the matrix spikes and laboratory control samples which indicated that the actual detection limits may have been greater than those reported. There were no field quality control samples designated on the ARCOG for matrix spike, duplicate, or equipment blank metals analyses.

Semi-Volatile Organic Compounds

Seven soil samples (6 environmental plus 1 duplicate sample) were submitted for semi-volatile organic compound analyses using EPA Method 8270. One equipment blank quality control sample was also submitted and analyzed for semi-volatile organic compounds. The analyses for semi-volatile organic compounds are acceptable. Mass spectral library searches to identify organic compounds in the samples that

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505-262-8800 • FAX: 505-262-8855

were not on the target compound list were performed. Quality control results associated with the analytical batches containing the samples were acceptable. Several soil samples contained estimated parts per million

concentrations of what was identified as an aldol condensation product. This component was also found in the associated method blank but not in the equipment blank. You may wish to investigate the occurrence and significance of these tentatively identified semi-volatile organic compounds. Additional information including the mass spectra can be provided by the laboratory upon request.

No target analytes were detected in the equipment blank (030023) indicating that contamination was not transferred to the samples during the sampling process. The duplicate sample was collected at sampling site CCTA-09-GR-007-0-0.5-5. Target analytes were not detected in either sample; therefore, estimates of sampling precision could not be made from these data.

Explosives, Method 8330

One soil sample (030019) was submitted for explosives residue analysis by EPA Method 8330. Analysis results are acceptable based upon the laboratory quality control measures reported. No analyte was detected during sample analysis.

Isotopic Thorium and Isotopic Uranium


Ten samples were analyzed for isotopic thorium and uranium content. cursory review of the data shows that the isotopic ratios are roughly equivalent to those for naturally occurring uranium and thorium. An equipment blank sample (030023) was also submitted with the soil samples. Low concentrations of U-233/234, U-235, and Th-232 were detected in the sample. However the statistical error associated with the reported values indicates that the values may well be below the laboratory's Lc and therefore the results should be considered to be insignificant relative to the soil sample results. A sample (030015 from sampling location CCTA-09-GR-006-06-1.0-5) for matrix spike/matrix spike duplicate analyses was also submitted. Laboratory control sample and matrix spike sample analysis results were within the laboratory's control limits for accuracy and precision measures. Based on the review of the analytical results and associated QC data, sample results reported for isotopic uranium and thorium analyses are judged to be valid.

Reviewer comments and assigned qualifiers (if any) relevant to specific samples are found on the data validation forms. Data qualifiers assigned for the metals analyses are recorded on the data validation level 3 (DV-3) forms. Unless noted otherwise, all analysis results are acceptable as reported. Please review the validation documentation and contact either myself or Pam Puissant, Dept. 7513, with any questions. Review comments have been provided to the SMO for inclusion and filing with the laboratory report original.

If you have any questions or require additional information please contact Mark Lyon at 262-8920.

Respectfully submitted,

IT CORPORATION


Wyatt Booher
Project Chemist

WFB:

Enclosures

**DATA QUALITY INDICATOR CHECKLIST
(DATA VERIFICATION/VALIDATION LEVEL 2—DV2)**

Project Name Central Coyote Test Area

Page 1 of 5

Case Number 3634.400

Sample Numbers _____

AR/COC No. 05279 Analytical laboratory LAS SDG No. L 7237

AR/COC No. _____ Analytical laboratory _____ SDG No. _____

AR/COC No. _____ Analytical laboratory _____ SDG No. _____

AR/COC No. _____ Analytical laboratory _____ SDG No. _____

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		
2) Holding times met for all samples?	✓		
3) Reporting units appropriate for the matrix and meet project-specific requirements?	✓		
4) Quantitation limit met for all samples?	✓		
5) Accuracy			
a) Laboratory control sample accuracy reported and met for all samples?		✓	LCS for Hg was recovered ^(✓) outside QC limits, but it was well within manufacturer's acceptance limits.
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	✓		LCS for 4 inorganic were outside 90% Rec limits. ^(✓)

Reviewed by: Nally O'Grady

Date: 10/16/96

**DATA QUALITY INDICATOR CHECKLIST
(DATA VERIFICATION/VALIDATION LEVEL 2—DV2)**

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?			
6) Precision			
a) Laboratory control sample precision reported and met for all samples?		✓	LCS for 4-nitrophenol was outside % Rec limits ^{10/16/96}
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?			
7) Blank data			
a) Method or reagent blank data reported and met for all samples?		✓	MB had di-n-butylphthalate contamination ^{10/16/96} MB had Ag contamination MB had Aldol Condensation contamination in SVOC
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?			
8) Narrative included, correct, and complete?		✓	Narrative ^{stated incorrectly} said LCS/LCP for 4-nitrophenol ^{10/16/96} outside % Rec limits. Narrative incorrectly stated MB had di-n-butylphthalate

2.0 COMMENTS: All items marked "No" above must be explained in this section. For each item, give SNL/NM ID No. and the analysis, if appropriate, of all samples affected by the finding.

Not in narrative {
~~LCS for Hg was recovered < QC limits, but it was well within manufacturer acceptance window.~~
~~MB had Ag contamination.~~
~~MB had Aldol Condensation contamination in SVOC.~~

Reviewed by: Nelby O'Shady

Date: 10/16/96

DATA QUALITY INDICATOR CHECKLIST
(DATA VERIFICATION/VALIDATION LEVEL 2—DV2)

2.0 COMMENTS CONTINUATION SHEET

LC5/100 for 4-nitrophenol was outside 90 Rec limits was stated incorrectly in the narrative.

MB had di-n-butyl phthalate contamination was stated incorrectly in the narrative.

Reviewed by: Holly O'Haly

Date: 10/16/96

**DATA QUALITY INDICATOR CHECKLIST
(DATA VERIFICATION/VALIDATION LEVEL 2—DV2)**

3.0 SUMMARY: Summarize the findings in the table below. List only samples/fractions for which deficiencies have been noted. Use the qualifiers given at the end of the table if possible. Explain any other qualifiers in the comments column.

Sample/ Fraction No.	Analysis	Qualifiers	Comments
030023-003	U-235	J	Result > Lc + < 2σ error
030023-004	Th-232	J	↓

Attach continuation sheet for additional samples

QUALIFIERS:

- | | |
|--|--|
| J = Estimated quantity (provide reason) | Q = Quantitation limit does not meet criteria |
| B = Contamination in blank (indicate which blank) | A = Laboratory accuracy does not meet criteria |
| P = Laboratory precision does not meet criteria | U = Analyte is undetected (indicate which analyte and reason for qualification) |
| R = Reporting units inappropriate | NJ = There is presumptive evidence of the presence of the material at an estimated quantity. |
| N = There is presumptive evidence of the presence of the material | |
| UJ = The material was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise. | |

Reviewed by: Holly O'Grady

Date: 10/16/96

DATA QUALITY INDICATOR CHECKLIST (DATA VERIFICATION/VALIDATION LEVEL 2—DV2)

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments

Reviewed by: Nelly O'Leary Approved by: _____
 Date: 10/16/96 Date: _____

*Task/Project Leader must approve data package.

MEMORANDUM

DATE: June 28, 1999

TO: File

FROM: Kenneth Salaz ~~KAS~~

SUBJECT: Inorganic Data Review and Validation
Central Coyote Test Area, ARCO #05279, Case No. ~~5634.400~~ ^{7215.2201 KAS} -7/8/99

See the attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and specified methods (EPA6010, EPA7471). Problems were identified with the data package that result in the qualification of data.

1. The MS/MSD percent recoveries (%RECs) of mercury (Hg) were below QC limits. Results for samples L7237-11, -22, and -31 were non-detect (ND) and will be qualified "UJ,A2."

Data are acceptable. QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

All samples were extracted and analyzed within the prescribed holding times.

Calibration

The initial and continuing calibrations met QC acceptance criteria.

Blanks

No target analytes were detected in the method blank, ICB, or CCB above the required acceptance limit except silver (Ag), which was detected in the method blank. All sample results were ND; no data were qualified.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

The MS/MSD met QC acceptance criteria except as noted above in the summary section.

Laboratory Control Samples

The LCS/LCSD met QC acceptance criteria except for the LCS %REC of Hg, which was <80%, but within laboratory derived limits. Thus, no data were qualified.

Replicates

No replicate analysis was performed. The MS/MSD and LCS/LCSD were used to measure laboratory precision.

ICP Interference Check Sample (ICS)

The ICP ICS met QC acceptance criteria.

ICP Serial Dilution

The ICP serial dilution met QC acceptance criteria.

Other QC

No field duplicate, equipment blank (EB), or field blank (FB) were submitted on the ARCOC.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

of Samples: 3

Sample IDs: L7237-11

Matrix: Soil

↓
-22
-31

INORGANIC METALS:

SITE/PROJECT: Central Coyote Test Area ARCO# : 05279
LABORATORY: LAS LABORATORY REPORT #: L7237
METHODS: EPA 6010, EPA 7471

QC Element/ Analyte	ICV	CCV	ICB	CCB	Method Blks	LCS	LCSD	LCSD RPD	MS	MSD	MSD RPD	REP RPD	ICS AB	Serial Dilution	Field Dup RPD	Eq. Blks	Field Blks				
7429-90-5 Al												NA			NA	NA	NA				
7440-39-3 Ba	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓								
7440-41-7 Bc	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓								
7440-43-9 Cd	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓								
7440-70-2 Ca																					
7440-47-3 Cr	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		NA								
7440-48-4 Co																					
7440-50-8 Cu																					
7439-89-6 Fe																					
7439-95-4 Mg																					
7439-96-5 Mn																					
7440-02-0 Ni																					
7440-09-7 K																					
7440-22-4 Ag	✓	✓	✓	✓	0.215	✓	✓	✓	✓	✓	✓		NA								
7440-23-5 Na																					
7440-62-2 V																					
7440-66-6 Zn																					
7439-92-1 Pb	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		NA								
7482-49-2 Se	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		NA								
7440-38-2 As	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		NA								
7440-36-0 Sb																					
7440-28-0 Tl																					
7439-97-6 Hg	✓	✓	✓	✓	✓	76	✓	✓	70	70	✓		NA	NA	NA	✓	✓	✓	✓	✓	✓
Cyanide CN																					

mg/kg = ug/g : [(ug/g) x (sample mass (g) / sample vol. (ml)) x (1000ml / 1liter)] / Dilution Factor = ug/l

NA = Not Applicable

Comments:

- ① Hg LCS < 80%, but w/in laboratory control limits.
- ② No replicate analysis performed. LCS/LCSD and MS/MSD used to measure precision.
- ③ Serial dilution criteria apply only to sample results > 50X the RL.
- ④ No field dup., Eq. blank, or field blank submitted on the COC.

* Summary → See back of this page.

⇒ Hg was detected in the method blank. All sample results were ND; no data were qualified.

MS/MSD:

⇒ Hg had MS and MSD %R&C below QC limits. Sample results were ND and will be qualified "UJ, A2"

INORGANIC DATA ASSESSMENT SUMMARY FORM
(Data Verification/Validation Level 3—DV3)

Page 1 of 16

SITE OR PROJECT CENTRAL COVOTE TEST AREA CASE NO. 3634.400
 ANALYTICAL LABORATORY _____ SAMPLE IDS 030008, 030013, 030018¹²
 LABORATORY REPORT # _____ 030019
 TASK LEADER _____
 NO. OF SAMPLES _____

DATA ASSESSMENT SUMMARY

	ICP	AA	MERCURY	CYANIDE
1. HOLDING TIMES	✓		✓	
2. CALIBRATIONS	✓		✓	
3. BLANKS	✓		✓	
4. ICS	✓			
5. LCS	✓			
6. DUPLICATE ANALYSIS	✓		✓	
7. MATRIX SPIKE	✓		✓	
8. MSA				
9. SERIAL DILUTION	✓			
10. SAMPLE VERIFICATION	✓		✓	
11. OTHER QC	✓		✓	
12. OVERALL ASSESSMENT	✓		✓	

✓ (check mark) — Acceptable

Other — Qualified:

J - Estimate

UJ - Undetected, estimated

R - Unusable (analyte may or may not be present)

ACTION ITEMS: NONE

AREAS OF CONCERN: The matrix spikes and laboratory control sample results for mercury were recovered slightly below the control limit of 80 percent recovery. This is not considered to have a significant impact on the data since all mercury results were reported as not detected.

REVIEWED BY: Wigatt Booker

DATE REVIEWED: 10/14/96

INORGANIC DATA ASSESSMENT SUMMARY FORM
(Data Verification/Validation Level 3—DV3)

ACTION ITEMS: NONE

AREAS OF CONCERN: Matrix spike recoveries for the mercury soil spikes were 70 and 70 percent recovery. The ^{lower} control limit is 80%. One of the laboratory control samples was recovered below the 80% recovery control limit at 76% recovery. These slightly low results are not considered to have impacted the data because all soil sample results for mercury were reported as not detected. Since the quantitation limit is approximately 5 times greater than the detection limit, mercury, if present, would have been detected but the results may have been biased low. Because no mercury was detected, no biased results were reported.

OVERALL DATA QUALITY ASSESSMENT Based on review of the raw data and the associated QC data are judged to be valid and usable as reported.

Reviewed By: Wyatt Broker Date: October 14, 1996

INORGANIC DATA ASSESSMENT SUMMARY FORM
 (Data Verification/Validation Level 3—DV3)

1.0 HOLDING TIMES

List holding time criteria used to evaluate samples, indicating which samples exceed the holding time. Holding time begins with validated time of sample collection.

Parameter	Holding Time Criteria	Sample ID	Days Holding Time was Exceeded	Action
<i>ALL HOLDING TIMES WERE MET</i>				

Were the correct preservatives used? Yes No

List below samples that were incorrectly preserved.

Sample No.	Type of Samples	Deficiency	Action
<i>ALL SAMPLES WERE CORRECTLY PRESERVED</i>			

Reviewed By: Wyatt Booker Date: 10/14/96

INORGANIC DATA ASSESSMENT SUMMARY FORM
 (Data Verification/Validation Level 3—DV3)

2.0 INSTRUMENT CALIBRATION

2.1 Percent Recovery Criteria

Indicate %Recovery (%R) criteria used to evaluate calibration standards:

Metals: 80-120 90-110
 Mercury: 80-120
 Cyanide: N/A
 Other: N/A

List below the analytes which did not meet %R criteria for initial and continuing calibration standards:

Analysis Date	ICV/CCV #	Analyte	%R	Action	Samples Affected
ALL ICV/CCV WERE INSIDE CONTROL LIMITS					

2.2 Analytical Sequence

Did the laboratory use the proper number of standards for calibration as described in the EPA method? Yes No

Have initial calibrations been performed at the beginning of each analysis and at the frequency indicated by the EPA method? Yes No

Have continuing calibration standards been analyzed at the beginning of sample analysis and at a minimum frequency indicated by the EPA method and at the end of the analysis sequence? Yes No

If no for any of the above, outline deviations and actions taken below:

~~N/A~~

Reviewed By: Wyatt Booker Date: 10/14/96

INORGANIC DATA ASSESSMENT SUMMARY FORM
 (Data Verification/Validation Level 3—DV3)

Were the correlation coefficients for the calibration curves for AA, Hg, CN, and other spectrophotometric methods ≥ 0.995 ? (Check calculations performed for calibration curves.) Yes No

If no, list: _____

Date	Analyte	Coefficient	Action	Samples Affected
<i>The correlation coeff. for mercury was acceptable.</i>				

Check for transcription and calculation errors involving calibration summary forms and raw data. Briefly summarize errors and associated actions when data quality might have been affected.

3.0 BLANK ANALYSIS

3.1 Initial and Continuing Calibration Blanks

Have Initial and Continuing Calibration Blanks (ICB/CCB) been analyzed at the frequency required in the EPA method? Yes No

If no, summarize problems and resolutions in the narrative report.

List analytes detected in ICB and CCBs below:

NOTE: For soil samples, convert blank values to mg/kg using digestion weights and volumes.

Analysis Date	ICB/CCB No.	Analyte	Conc.	Required Detection Limits	Action Level	Samples Affected
<i>NO ANALYTES WERE DETECTED</i>						

Reviewed By: Wyatt Booker Date: 10/14/96

INORGANIC DATA ASSESSMENT SUMMARY FORM
 (Data Verification/Validation Level 3—DV3)

3.2 Method Blank

Was one method blank analyzed for:

- Each of 20 samples? Yes No
 Each digestion batch? Yes No
 Each matrix type? Yes No
 Both AA and ICP when both are used for the same analyte? Yes No
 or
 At the frequency indicated in the EPA method or QAPjP? Yes No

NOTE: Method blank is the same as the calibration blank for mercury and for wet chemistry analysis.

List analytes detected in method blank samples below. NOTE: For soil samples, be sure to calculate blank values using digestion weights and volumes.

Preparation Date	Analyte	Conc.	Required Detection Limits	Action Level	Samples Affected
6/25/96	SILVER	0.21 mg/kg	2.0 mg/kg	2.0 mg/kg	030008 030013 030019

Is concentration in the method blank below the detection limit? Yes No

Affected samples: Because values was detected ^{in the method blank} at a relatively low concentration, this is not considered to be a problem.

Reviewed By: Whit Booker Date: 10/14/96

INORGANIC DATA ASSESSMENT SUMMARY FORM
 (Data Verification/Validation Level 3—DV3)

3.3 Field/Rinse/Equipment Blanks

Was a field/equipment blank analyzed as required by the EPA method or QAPP? Yes No

List below analytes detected in the field blanks. NOTE: For soil samples, calculate blank values using digestion weights and volumes.

Collection Date	Blank ID	Analyte	Conc.	Required Detection Limits	Action Level	Samples Affected

4.0 ICP INTERFERENCE CHECK SAMPLE ANALYSIS

Was an ICP interference check sample (ICS) analyzed at the beginning and end of a run or at least twice every 8 hours? (Not required for Ca, Mg, K, and Na) Yes No

Samples affected: NONE

Are the values of the ICS for solution AB within 80-120%R? Yes No

If no, is the concentration of Al, Ca, Fe, or Mg lower than in ICS? Yes No

Reviewed By: Wyatt Booker Date: 10/14/96

INORGANIC DATA ASSESSMENT SUMMARY FORM
(Data Verification/Validation Level 3—DV3)

If no, list below all analytes which did not meet %R criteria and in which the concentration of Al, Ca, Fe, or Mg is higher than in the ICS:

Date	Analyte	%R	Action	Samples Affected
<i>%R not met for all standards</i>				

Are any results > IDL for those analytes which are not present in the ICS solution A? Yes No

If yes, results >2 (absolute value of the IDL) indicate either a positive or negative interference and must be qualified.

Samples affected: NONE

Check for transcription/calculation errors. Briefly summarize errors and associated actions when data quality might have been affected.

5.0 LABORATORY CONTROL SAMPLES (LCS)

Was an LCS analyzed at required frequency? Yes No

Samples affected: NONE

(This section is crossed out with a diagonal line)

Reviewed By: Wyatt Booker Date: 10/14/96

INORGANIC DATA ASSESSMENT SUMMARY FORM
 (Data Verification/Validation Level 3—DV3)

List below any LCS recoveries not within limits.

Preparation Date	Analyte	%R	Action	Samples Affected
<i>Analyzed 7/14/94</i>	<i>Hg</i>	<i>76</i>	<i>NONE</i>	<i>030008</i>
				<i>030013</i>
				<i>030019</i>

6.0 LABORATORY DUPLICATE ANALYSIS

Were laboratory duplicates analyzed at required frequency? Yes No

Samples affected: *Duplicates were the LCS/DCS and the MS/MSD mercury recovery was slightly below the control limit for both MS/MSD.*

Was laboratory duplicate analysis performed on field or equipment blanks? Yes No

Samples affected: *NONE*

Is any value for sample duplicate pair <PQL and the other value >10xPQL? Yes No

Samples affected: *NONE*

Reviewed By: *Wyatt Booker* Date: *10/14/94*

INORGANIC DATA ASSESSMENT SUMMARY FORM
 (Data Verification/Validation Level 3—DV3)

List below concentrations of any analyte that did not meet criteria for duplicate precision:

Sample ID	Matrix	Preparation Date	Analyte	PQL	RPD	Action	Samples Affected

Check for transcription/calculation errors. Briefly summarize errors and associated actions when data quality might have been affected.

No calculation errors were noted during data review

7.0 FIELD DUPLICATE SAMPLE ANALYSIS

Were field duplicates collected at the frequency indicated in the EPA method or QAPjP?

Yes No

If yes, qualify data associated only with the field duplicate pair. Calculate RPDs for each analyte in which both values are greater than the IDL.

Is any value for sample duplicate < practical quantitation limit (PQL) and other value > 10xPQL? Yes No

Reviewed By: Wyatt Booker

Date: 10/14/96

INORGANIC DATA ASSESSMENT SUMMARY FORM
 (Data Verification/Validation Level 3—DV3)

Samples affected: _____

List below the analytes that do not meet RPD or PQL criteria. Use the same criteria as those used for laboratory duplicate analysis or criteria specified in EPA method or sampling plan.

Sample ID	Matrix	Collection Date	RPD	Control Limit	Action	Samples Affected
02 9968	Soil	10/9/96				

Check for transcription/calculation errors. Briefly summarize errors and associated actions when data quality might have been affected.

No transcription or calculation errors were noted.

8.0 MATRIX SPIKE ANALYSIS

NOTE: *This matrix spike is a predigestion/predistillation spike.*

Was a matrix spike prepared and analyzed at the required frequency? Yes No

Reviewed By: Wyatt Booker Date: 10/14/96

INORGANIC DATA ASSESSMENT SUMMARY FORM
 (Data Verification/Validation Level 3—DV3)

Were matrix spikes performed at the concentrations specified by the EPA method? Yes No

Samples affected: 030008, 030013, 030019

Was matrix spike analysis performed on field or equipment blanks? Yes No

If equipment or field blanks are the only aqueous samples, matrix spike analysis may be performed; however, matrix spike samples must be present for the other matrices.

Samples affected: NONE

List below the % recoveries for analytes that did not meet the criteria:

Sample ID	Matrix	Preparation Date	Analyte	%R	Action	Samples Affected
029968	SOIL		Hg	70	NONE	030008
				70		030013
						030019

Check for transcription/calculation errors. Also check to ensure matrix spike concentrations are not affected by sample dilutions performed. If matrix spike concentrations are diluted below or close to IDL based on sample dilutions performed, use professional judgment in qualifying data. Ensure that the laboratory performed sample dilutions only when necessary as indicated by QA/QC requirements. Briefly summarize errors and associated actions when data quality might have been affected.

Reviewed By: Wyatt Booker Date: 10/14/96

INORGANIC DATA ASSESSMENT SUMMARY FORM
(Data Verification/Validation Level 3—DV3)

NOTE: If preparation blank spikes are analyzed, evaluate recoveries. These recoveries can indicate whether excursions in matrix spike recovery are caused by sample matrix effects or poor digestion efficiencies and/or problems with matrix spike solution. For example, if matrix spike recovery for selenium is 0% and preparation blank spike recovery for selenium is 92%, this may indicate sample matrix effects.

9.0 FURNACE ATOMIC ABSORPTION ANALYSIS

Were duplicate injections present for each sample, including required QC analyses (not required if MSA is done)? Yes No

Samples affected: _____

Were postdigestion spikes analyzed for samples, including QC samples? Yes No

Were postdigestion spikes analyzed at the required concentration? Yes No

Samples affected: _____
N A

Was a dilution analyzed for samples with postdigestion spike recovery <40%? Yes No

Samples affected: _____

MSA Analysis (Method of Standard Additions)—MSA is required when serial dilutions are not within $\pm 10\%$. Was MSA required for any sample but not performed? Yes No

Are MSA calculations outside the linear range of the calibration curve? Yes No

Reviewed By: Wyatt Booker Date: 10/14/96

INORGANIC DATA ASSESSMENT SUMMARY FORM
 (Data Verification/Validation Level 3—DV3)

NOTE: Ensure the spiking concentrations used for MSA analysis were at 50–100% and 150% of sample concentration or absorbance.

Samples affected: _____

10.0 SERIAL DILUTION ANALYSIS

NOTE: Serial dilution analysis (ICP) is required only for initial concentrations equal to or greater than 10xIDL.

If applicable, was a serial dilution performed for:

Each 20 samples? Yes No
 Each matrix type? Yes No

Samples affected: _____

List below results which did not meet criteria of %D < 10% for analyte concentrations greater than 50xIDL before dilution:

Analysis Date	Sample ID	Analyte	IDL	%D	Action	Samples Affected

Check for calculation errors and negative interferences.

Reviewed By: Wyatt Booker Date: 10/14/96

INORGANIC DATA ASSESSMENT SUMMARY FORM
(Data Verification/Validation Level 3—DV3)

11.0 SAMPLE RESULT VERIFICATION

11.1 Verification of Instrumental Parameters

Are instrument detection limits present and verified on a quarterly basis? Yes No

Are IDLs present for each analyte and each instrument used? Yes No

Is the IDL greater than the required detection limits for any analyte? Yes No
(If IDL > required detection limits, flag values less than 5xIDL.)

Samples affected: NONE

Are ICP Interelement Correction Factors established and verified annually? Yes No

Are ICP Linear Ranges established and verified quarterly? Yes No

If no for any of the above, review problems and resolutions in narrative report. N/A

11.2 Reporting Requirements

Were sample results reported down to the PQL? Yes No

If no, indicate necessary corrections. N/A

Were sample results that were analyzed by ICP for Se, Ti, As, or Pb at least 5xIDL? Yes No

Were sample weights, volumes, and dilutions taken into account when reporting sample results and detection limits? Yes No

Reviewed By: Wynne Booker Date: 10/14/96

INORGANIC DATA ASSESSMENT SUMMARY FORM
(Data Verification/Validation Level 3—DV3)

If no for any of the above, sample results may be inaccurate. Note necessary changes and if errors are present, request resubmittal of laboratory package.

NA

Were any sample results higher than the linear range of calibration curve and not subsequently reanalyzed at the appropriate dilution? Yes No

Samples affected: NA

11.3 Sample Quantitation

Check a minimum of 10% of positive sample results for transcription/calculation errors. Summarize necessary corrections. If errors are large, request resubmittal of laboratory package.

Comments:

No calculation or transcription errors were identified

Approved By: _____

Date: _____

*Task/Project Leader is responsible for approval of data set.

Reviewed By: Wyatt Becker

Date: 10/14/96

MEMORANDUM

DATE: July 2, 1999

TO: File

FROM: Kenneth Salaz ^{KAS}

SUBJECT: Organic Data Review and Validation
Central Coyote Test Area, ARCO #05279, Case No. ~~3634-400~~ ⁷²¹⁵⁻²²⁰¹ ^{KAS} ^{7/16/99}

See the attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and specified methods (EPA8270, EPA8330). Problems were identified with the data package that result in the qualification of data.

1. SVOC Analysis: The initial calibration relative standard deviation (RSD) of benzoic acid was >20%, and the continuing calibration percent differences (CCV %Ds) of 4-nitrophenol and benzoic acid were >40%. The results of sample L7237-39 for these compounds were non-detect (ND) and will be qualified "UJ." Bis(2-chloroisopropyl)ether had a CCV %D >60%. Results for samples L7237-27, -28, -29, and -30 were positive and will be qualified "R" (unusable).
2. SVOC Analysis: In the method blank, aldol condensation (TIC) was detected. Results for samples L7237-27, -28, -29, -30, -33, -34, and -35 were positive, <10X the blank concentration, and will be qualified "R,B." An unknown carboxylic acid (TIC) was detected in the method blank for sample -39 (EB). The sample result was positive, <10X the blank concentration, and will be qualified "R,B."

No HE data were qualified. Data are acceptable except as noted above. QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

SVOC/HE Analyses: All samples were analyzed within the prescribed holding times.

Calibration

SVOC Analysis: The initial and continuing calibrations met QC acceptance criteria except as noted above in the summary section and the following. The initial calibration RSDs of 1,2-dichlorobenzene, 2-methylphenol, 2,4-dinitrophenol, 4,6-dinitro-2-methylphenol, pentachlorophenol, and di-n-octylphthalate were >20%. The CCV %Ds of 2,4-dinitrophenol, pentachlorophenol, 4-nitrophenol, and di-n-octylphthalate were >20%. All associated sample results were ND; no data were qualified.

HE Analysis: The initial and continuing calibrations met QC acceptance criteria.

Blanks

SVOC Analysis: No target analytes were detected in the method blanks except as noted above in the summary section and di-n-butylphthalate. The associated sample result was ND; no data were qualified.

HE Analysis: No target analytes were detected in the method blanks.

Surrogates

SVOC/HE Analyses: The surrogate %RECs and retention times (RTs) met QC acceptance criteria.

Internal Standards

SVOC Analysis: The internal standard RTs and areas met QC acceptance criteria.

HE Analysis: No internal standards were required for this method.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

SVOC/HE Analyses: The MS/MSD met QC acceptance criteria.

Laboratory Control Samples

SVOC Analysis: The LCS/LCSD %RECs of 4-nitrophenol exceeded QC limits. Sample results were ND; no data were qualified.

HE Analysis: The LCS/LCSD met QC acceptance criteria.

Other QC

SVOC Analysis: The equipment blank (EB) met QC acceptance criteria. No field duplicate or field blank (FB) were submitted on the ARCOC.

HE Analysis: No filed duplicate, EB, or FB were submitted on the COC.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

SAMPLE FINDINGS SUMMARY

Site: Central Coyote Test Area

AR/COC: 05279

Data Classification: Organics (EPA 8270 ↓ 8330)

030023-06

030016-06

17-

18-

19-

16-

17-

18-

19-

20-

21-

22-

Sample Fraction No.	Analysis	DV Qualifiers	Comments
CCTA-09-000-EB	100-02-7 (4-nitrophenol)	UJ	
	65-85-0 (Benzoic Acid)	↓	
	Unknown Carboxylic Acid (TIC)	R, B	
CCTA-09-GR-007-0-0.5-S	108-60-1	R	
-007-0-0.5-S	(bis(2-chloroisopropyl)ether)	↓	
-007-0.5-1.0-S	↓	↓	
-008-0-0.5-S	↓	↓	
-007-0-0.5-S	Aldol Condensation (TIC)	R, B	
-007-0-0.5-S	↓	↓	
-007-0.5-1.0-S	↓	↓	
-008-0-0.5-S	↓	↓	
-008-0.5-1.0-S	↓	↓	
-009-0-0.5-S	↓	↓	
-009-0.5-1.0-S	↓	↓	
Data are acceptable (except as noted above).			
QC Measures appear to be adequate.			

Sample No./Fraction No. - This value is located on the Chain of Custody in the ER Sample Id field.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470/1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HE, PCBRISC

Reviewed by: [Signature] Date: 7/2/99

SEMI-VOLATILE ORGANICS: Page 1 of 3
SW-846 - Method 8270

of Samples: 7
Matrix: soil
Inst. ID: GCMS K

Sample IDs: L7237-27
-28
-29
-30
-33
-34
-35

SITE/PROJECT: Central Coyote Test Area ARCO# : 12/11/99 L7237 05279
LABORATORY: LAS LABORATORY REPORT #: L7237

IS	BNA	CAS #	NAME	Min RF	Intercept	①	①	①	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL	②	③
						Calib RF	Calib RSD / R ²	CCV %D												CCV %D	
						>.05	<20% / 0.99	20%												20%	
1	A	108-95-2	Phenol	0.80	NA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA		✓	
1	BN	111-44-4	bis(2-Chloroethyl)ether	0.70		✓	✓	✓												✓	
1	A	95-57-8	2-Chlorophenol	0.80		✓	✓	✓		✓	✓	✓	✓	✓	✓					✓	
1	BN	541-73-1	1,3-Dichlorobenzene	0.60		✓	✓	✓		✓	✓	✓	✓	✓	✓					✓	
1	BN	106-46-7	1,4-Dichlorobenzene	0.50		✓	✓	✓		✓	✓	✓	✓	✓	✓					✓	
1	BN	95-50-1	1,2-Dichlorobenzene	0.40		✓	✓	✓												✓	
1	A	95-48-7	2-Methylphenol	0.70		✓	✓	✓												✓	
1	BN	108-60-1	bis(2-chloroisopropyl)ether	0.01		✓	✓	74.5												✓	
1	A	106-44-5	4-Methylphenol	0.60		✓	✓	✓												✓	
1	BN	621-64-7	N-Nitroso-di-n-propylamine	0.50		✓	✓	✓		✓	✓	✓	✓	✓	✓					✓	
1	BN	67-72-1	Hexachloroethane	0.30		✓	✓	✓												✓	
2	BN	98-95-3	Nitrobenzene	0.20		✓	✓	✓												✓	
2	BN	78-59-1	Isophorone	0.40		✓	✓	✓												✓	
2	A	88-75-5	2-Nitrophenol	0.10		✓	✓	✓												✓	
2	A	105-67-9	2,4-Dimethylphenol	0.20		✓	✓	✓												✓	
2	BN	111-91-1	bis(2-Chloroethoxy)methane	0.30		✓	✓	✓												✓	
2	A	120-83-2	2,4-Dichlorophenol	0.20		✓	✓	✓												✓	
2	BN	120-82-1	1,2,4-Trichlorobenzene	0.20		✓	✓	✓		✓	✓	✓	✓	✓	✓					✓	
2	BN	91-20-3	Naphthalene	0.70		✓	✓	✓												✓	
2	BN	106-47-8	4-Chloroaniline	0.01		✓	✓	✓												✓	
2	BN	87-68-3	Hexachlorobutadiene	0.01		✓	✓	✓												✓	
2	A	59-50-7	4-Chloro-3-methylphenol	0.20		✓	✓	✓		✓	✓	✓	✓	✓	✓					✓	
2	BN	91-57-6	2-Methylnaphthalene	0.40		✓	✓	✓												✓	
3	BN	77-47-4	Hexachlorocyclopentadiene	0.01		✓	✓	✓												✓	
3	A	88-06-2	2,4,6-Trichlorophenol	0.20		✓	✓	✓												✓	
3	A	95-95-4	2,4,5-Trichlorophenol	0.20		✓	✓	✓												✓	

Comments: ① CCV %D applies to samples -27, -28, -29, and -30 only.
② No field blank submitted on the COC.
③ CCV %D applies to samples -33, -34, and -35 only.

NA = Not Applicable

REVIEWED BY:

[Signature]

DATE:

7/2/99

SEMI-VOLATILE ORGANICS: Page 2 of 3

SW 846 - Method 8270

Central Coyote

SITE/PROJECT: Test AreaARCO# #: 05279LABORATORY: LASLABORATORY REPORT #: L7237

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCS D	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL	①	②
																				>.05	<20% / 0.99
3	BN	91-58-7	2-Chloronaphthalene	0.80	NA	✓	✓	✓	✓							✓	✓	NA		20%	✓
3	BN	88-74-4	2-Nitroaniline	0.01		✓	✓	✓													✓
3	BN	131-11-3	Dimethylphthalate	0.01		✓	✓	✓													✓
3	BN	208-96-8	Acenaphthylene	0.90		✓	✓	✓													✓
3	BN	606-20-2	2,6-Dinitrotoluene	0.20		✓	✓	✓													✓
3	BN	99-09-2	3-Nitroaniline	0.01		✓	✓	✓													✓
3	BN	83-32-9	Acenaphthene	0.90		✓	✓	✓		✓	✓	✓	✓	✓	✓						✓
3	A	51-28-5	2,4-Dinitrophenol	0.01		✓	26.687	✓		✓	✓	✓	✓	✓	✓						✓
3	A	100-02-7	4-Nitrophenol	0.01		✓	✓	344		✓	✓	✓	✓	✓	✓						✓
3	BN	132-64-9	Dibenzofuran	0.80		✓	✓	✓		✓	✓	✓	✓	✓	✓						✓
3	BN	121-14-2	2,4-Dinitrotoluene	0.20		✓	✓	✓		✓	✓	✓	✓	✓	✓						✓
3	BN	84-66-2	Diethylphthalate	0.01		✓	✓	✓													✓
3	BN	7005-72-3	4-Chlorophenyl-phenylether	0.40		✓	✓	✓													✓
3	BN	86-73-7	Fluorene	0.90		✓	✓	✓													✓
3	BN	100-01-6	4-Nitroaniline	0.01		✓	✓	✓													✓
4	A	534-52-1	4,6-Dinitro-2-methylphenol	0.01		✓	21.359	✓													✓
4	BN	86-30-6	N-Nitrosodiphenylamine (1)	0.01		✓	✓	✓													✓
4	BN	101-55-3	4-Bromophenyl-phenylether	0.10		✓	✓	✓													✓
4	BN	118-74-1	Hexachlorobenzene	0.10		✓	✓	✓		✓	✓	✓	✓	✓	✓						✓
4	A	87-86-5	Pentachlorophenol	0.05		✓	✓	✓		✓	✓	✓	✓	✓	✓						✓
4	BN	85-01-8	Phenanthrene	0.70		✓	✓	✓													✓
4	BN	120-12-7	Anthracene	0.70		✓	✓	✓													✓
4	BN	86-74-8	Carbazole	0.01		✓	✓	✓													✓
4	BN	84-74-2	Di-n-butylphthalate	0.01		✓	✓	✓													✓
4	BN	206-44-0	Fluoranthene	0.60		✓	✓	✓													✓
5	BN	129-00-0	Pyrene	0.60		✓	✓	✓		✓	✓	✓	✓	✓	✓						✓
5	BN	85-68-7	Butylbenzylphthalate	0.01		✓	✓	✓													✓
5	BN	91-94-1	3,3'-Dichlorobenzidine	0.01		✓	✓	✓													✓
5	BN	56-55-3	Benzo(a)anthracene	0.80	✓	✓	✓	✓	✓												✓

Comments: ① CCV %D applies to samples -27, -28, -29, and -30 only.

② No field blank submitted on the COC.

③ CCV %D applies to samples -33, -34, and -35 only.

NA = Not Applicable

SITE/PROJECT: Central Coyote Test Area ARCOG #: 05279
 LABORATORY: LAS LABORATORY REPORT #: L7237

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL	CCV %D
						>.05	<20% / 0.99	20%												20%
5	BN	218-01-9	Chrysene	0.70	NA	✓	✓	✓	✓							✓	✓	NA		✓
5	BN	117-81-7	bis(2-Ethylhexyl)phthalate	0.01	↓	✓	✓	✓	↓							↓	↓	↓		✓
6	BN	117-84-0	Di-n-octylphthalate	0.01	↓	✓	✓	✓	↓							↓	↓	↓		22.2
6	BN	205-99-2	Benzo(b)fluoranthene	0.70	↓	✓	✓	✓	↓							↓	↓	↓		✓
6	BN	207-08-9	Benzo(k)fluoranthene	0.70	↓	✓	✓	✓	↓							↓	↓	↓		✓
6	BN	50-32-8	Benzo(a)pyrene	0.70	↓	✓	✓	✓	↓							↓	↓	↓		✓
6	BN	193-39-5	Indeno(1,2,3-cd)pyrene	0.50	↓	✓	✓	✓	↓							↓	↓	↓		✓
6	BN	53-70-3	Dibenz(a,h)anthracene	0.40	↓	✓	✓	✓	↓							↓	↓	↓		✓
6	BN	191-24-2	Benzo(g,h,i)perylene	0.50	↓	✓	✓	✓	↓							↓	↓	↓		✓
		100-51-6	Benzyl Alcohol		↓	✓	✓	✓	↓							↓	↓	↓		✓
		65-85-0	Benzoic Acid		↓	✓	✓	✓	↓							↓	↓	↓		✓
			Aldol Condensation(TIC)						50,000								NA	↓		

NA = Not Applicable

Surrogate Recovery Outliers

Sample	SMC 1	SMC 2	SMC 3	SMC 4	SMC 5	SMC 6	SMC 7	SMC 8
All Passed								

Comments:
 ① CCV %D applies to samples -27, -28, -29, and -30 only.
 ② No field blank submitted on the COC.
 ③ CCV %D applies to samples -33, -34, and -35.

- SMC 1: Nitrobenzene-d5 (BN)
- SMC 2: 2-Fluorobiphenyl (BN)
- SMC 3: p-Terphenyl-d14 (BN)
- SMC 4: Phenol-d5 (A)
- SMC 5: 2-Fluorophenol (A)
- SMC 6: 2,4,6-Tribromophenol (A)
- SMC 7: 2-Chlorophenol-d4 (A)
- SMC 8: 1,2-Dichlorobenzene-d4 (BN)

Internal Standard Outliers

Sample	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3-area	IS 3-RT	IS 4-area	IS 4-RT	IS 5-area	IS 5-RT	IS 6-area	IS 6-RT
All Passed												

* Summary → See back of this page.

- IS 1: 1,4-Dichlorobenzene-d4 (BN)
- IS 2: Naphthalene-d8 (BN)
- IS 3: Acenaphthene-d10 (BN)
- IS 4: Phenanthrene-d10 (BN)
- IS 5: Chrysene-d12 (BN)
- IS 6: Perylene-d12 (BN)

⇒ 2,4-dinitrophenol and 4,6-dinitro-3-methylphenol had initial calib. RSDs > 20%. All sample results were ND; no data were qualified.

⇒ bis(2-chloroisopropyl) ether had a CCV %D > 60%. Sample results were ND and will be qualified "R" by -27, -28, -29, and -30

⇒ 4-nitrophenol and Di-n-octylphthalate had CCV %Ds > 20%. Sample results were ND; no data were qualified.

Method Blank:

⇒ Aldol condensation (TIC) was detected in the method blank. Sample results were ^{positive,} < 10X the blank conc., and will be qualified "R, B."

SEMI-VOLATILE ORGANICS: Page 1 of 3
SW-846 - Method 8270

of Samples: 1
Matrix: Aqueous
Instr. ID: gms9

Sample IDs: L7237-39 (EB)

SITE/PROJECT: Central Coyote Test Area ARCO# : 05279
LABORATORY: LAS LABORATORY REPORT #: L7237

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL			
						>.05	<20% / 0.99	20%														
1	A	108-95-2	Phenol	0.80	NA	✓	✓	✓	✓	✓	✓	✓	NA	NA	NA	NA	NA	NA	✓			
1	BN	111-44-4	bis(2-Chloroethyl)ether	0.70		✓	✓	✓											✓			
1	A	95-57-8	2-Chlorophenol	0.80		✓	✓	✓		✓	✓	✓								✓		
1	BN	541-73-1	1,3-Dichlorobenzene	0.60		✓	✓	✓												✓		
1	BN	106-16-7	1,4-Dichlorobenzene	0.50		✓	✓	✓		✓	✓	✓								✓		
1	BN	95-50-1	1,2-Dichlorobenzene	0.40		✓	21.246	✓												✓		
1	A	95-48-7	2-Methylphenol	0.70		✓	21.604	✓												✓		
1	BN	108-60-1	bis(2-chloroisopropyl)ether	0.01		✓	✓	✓												✓		
1	A	106-41-5	1-Methylphenol	0.60		✓	✓	✓												✓		
1	BN	621-61-7	N-Nitroso-di-n-propylamine	0.50		✓	✓	✓		✓	✓	✓								✓		
1	BN	67-72-1	Hexachloroethane	0.30		✓	✓	✓												✓		
2	BN	98-95-3	Nitrobenzene	0.20		✓	✓	✓												✓		
2	BN	78-59-1	Isophorone	0.40		✓	✓	✓												✓		
2	A	88-75-5	2-Nitrophenol	0.10		✓	✓	✓												✓		
2	A	105-67-9	2,4-Dimethylphenol	0.20		✓	✓	✓												✓		
2	BN	111-91-1	bis(2-Chloroethoxy)methane	0.30		✓	✓	✓												✓		
2	A	120-83-2	2,4-Dichlorophenol	0.20	✓	✓	✓												✓			
2	BN	120-82-1	1,2,4-Trichlorobenzene	0.20	✓	✓	✓		✓	✓	✓								✓			
2	BN	91-20-3	Naphthalene	0.70	✓	✓	✓												✓			
2	BN	106-47-8	4-Chloroaniline	0.01	✓	✓	✓												✓			
2	BN	87-68-3	Hexachlorobutadiene	0.01	✓	✓	✓												✓			
2	A	59-50-7	4-Chloro-3-methylphenol	0.20	✓	✓	✓		✓	✓	✓								✓			
2	BN	91-57-6	2-Methylnaphthalene	0.40	✓	✓	✓												✓			
3	BN	77-47-4	Hexachlorocyclopentadiene	0.01	✓	✓	✓												✓			
3	A	88-06-2	2,4,6-Trichlorophenol	0.20	✓	✓	✓												✓			
3	A	95-95-4	2,4,5-Trichlorophenol	0.20	✓	✓	✓												✓			

Comments:

- ① No MS/MSD required for EB.
- ② Sample is an EB; No field dup. or field blank submitted on the COC.

NA = Not Applicable

REVIEWED BY:

[Signature]

DATE:

7/2/99

SEMI-VOLATILE ORGANICS: Page 2 of 3

SW 846 - Method 8270

Central Coyote

SITE/PROJECT: Test AreaARCOG #: 05279LABORATORY: LASLABORATORY REPORT #: L7237

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL		
						>.05	<20% / 0.99	20%													
3	BN	91-58-7	2-Chloronaphthalene	0.80	NA	✓	✓	✓	✓				NA	NA	NA	NA	NA	NA	✓		
3	BN	88-74-4	2-Nitroaniline	0.01		✓	✓	✓											✓		
3	BN	131-11-3	Dimethylphthalate	0.01		✓	✓	✓											✓		
3	BN	208-96-8	Acenaphthylene	0.90		✓	✓	✓											✓		
3	BN	606-20-2	2,6-Dinitrotoluene	0.20		✓	✓	✓											✓		
3	BN	99-09-2	3-Nitroaniline	0.01		✓	✓	✓											✓		
3	BN	83-32-9	Acenaphthene	0.90		✓	✓	✓		✓	✓	✓							✓		
3	A	84-28-2	2,4-Dinitrophenol	0.01		✓	38.422	26.4											✓		
3	A	100-02-7	4-Nitrophenol	0.01		✓	✓	46.2		202	194	✓							✓		
3	BN	132-64-9	Dibenzofuran	0.80		✓	✓	✓											✓		
3	BN	121-14-2	2,4-Dinitrotoluene	0.20		✓	✓	✓		✓	✓	✓							✓		
3	BN	84-66-2	Diethylphthalate	0.01		✓	✓	✓											✓		
3	BN	7005-72-3	4-Chlorophenyl-phenylether	0.40		✓	✓	✓											✓		
3	BN	86-73-7	Fluorene	0.90		✓	✓	✓											✓		
3	BN	100-01-6	4-Nitroaniline	0.01		✓	✓	✓											✓		
4	A	534-52-1	4,6-Dinitro-2-methylphenol	0.01		✓	28.017	✓											✓		
4	BN	86-30-6	N-Nitrosodiphenylamine (1)	0.01		✓	✓	✓											✓		
4	BN	101-55-3	4-Bromophenyl-phenylether	0.10		✓	✓	✓											✓		
4	BN	118-74-1	Hexachlorobenzene	0.10		✓	✓	✓											✓		
4	A	87-86-5	Pentachlorophenol	0.05		✓	23.083	29.6		✓	✓	✓							✓		
4	BN	85-01-8	Phenanthrene	0.70		✓	✓	✓											✓		
4	BN	120-12-7	Anthracene	0.70		✓	✓	✓											✓		
4	BN	86-74-8	Carbazole	0.01		✓	✓	✓											✓		
4	BN	84-74-2	Di-n-butylphthalate	0.01		✓	✓	✓	33										✓		
4	BN	206-44-0	Fluoranthene	0.60		✓	✓	✓	✓										✓		
5	BN	129-00-0	Pyrene	0.60		✓	✓	✓		✓	✓	✓							✓		
5	BN	85-68-7	Butylbenzylphthalate	0.01		✓	✓	✓											✓		
5	BN	91-94-1	3,3'-Dichlorobenzidine	0.01		✓	✓	✓											✓		
5	BN	56-55-3	Benzo(a)anthracene	0.80	↓	✓	✓	✓	↓				↓	↓	↓	↓	↓	↓	↓	✓	

Comments:

① No MS/MSD required for EB.

② Sample is an EB; No field dup. or field blank submitted on the COC.

NA = Not Applicable

7/2/99

SEMI-VOLATILE ORGANICS: Page 3 of 3

SW 846 - Method 8270

SITE/PROJECT: Central Coyote Test Area ARCO# : 05279
 LABORATORY: LAS LABORATORY REPORT #: L7237

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL
						>.05	<20% / 0.99	20%											
5	BN	218-01-9	Chrysene	0.70	NA	✓	✓	✓	✓				NA	NA	NA	NA	NA	NA	✓
5	BN	117-81-7	bis(2-Ethylhexyl)phthalate	0.01	↓	✓	✓	✓	↓				↓	↓	↓	↓	↓	↓	✓
6	BN	117-84-0	D-n-octylphthalate	0.01	↓	✓	22.450	✓	↓				↓	↓	↓	↓	↓	↓	✓
6	BN	205-99-2	Benzo(b)fluoranthene	0.70	↓	✓	✓	✓	↓				↓	↓	↓	↓	↓	↓	✓
6	BN	207-08-9	Benzo(k)fluoranthene	0.70	↓	✓	✓	✓	↓				↓	↓	↓	↓	↓	↓	✓
6	BN	50-32-8	Benzo(a)pyrene	0.70	↓	✓	✓	✓	↓				↓	↓	↓	↓	↓	↓	✓
6	BN	193-39-5	Indeno(1,2,3-cd)pyrene	0.50	↓	✓	✓	✓	↓				↓	↓	↓	↓	↓	↓	✓
6	BN	191-24-2	Benzo(g)hperylene	0.50	↓	✓	✓	✓	↓				↓	↓	↓	↓	↓	↓	✓
	BN	100-51-6	Benzyl Alcohol		↓	✓	✓	✓	↓				↓	↓	↓	↓	↓	↓	
	A	65-85-0	Benzoic Acid		↓	✓	24.341	44.5	↓				↓	↓	↓	↓	↓	↓	
			Unknown Carbonylic Acid (TIC)						6.0										

NA = Not Applicable

Surrogate Recovery Outliers

Sample	SMC 1	SMC 2	SMC 3	SMC 4	SMC 5	SMC 6	SMC 7	SMC 8
All Passed	✓	✓	✓	✓	✓	✓	NA	NA

Comments:
 ① No MS/MSD required for this method EB.
 ② Sample is an EB. No field dup. or field blank submitted on the COC.

- SMC 1: Nitrobenzene-d5 (BN)
- SMC 2: 2-Fluorobiphenyl (BN)
- SMC 3: p-Terphenyl-d14 (BN)
- SMC 4: Phenol-d5 (A)
- SMC 5: 2-Fluorophenol (A)
- SMC 6: 2,4,6-Tribromophenol (A)
- SMC 7: 2,3-Dichlorophenol-d4 (A)
- SMC 8: 1,2-Dichlorobenzene-d4 (BN)

Internal Standard Outliers

Sample	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3-area	IS 3-RT	IS 4-area	IS 4-RT	IS 5-area	IS 5-RT	IS 6-area	IS 6-RT
All Passed	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

- IS 1: 1,4-Dichlorobenzene-d4 (BN)
- IS 2: Naphthalene-d8 (BN)
- IS 3: Acenaphthene-d10 (BN)
- IS 4: Phenanthrene-d10 (BN)
- IS 5: Chrysene-d12 (BN)
- IS 6: Perylene-d12 (BN)

* Summary → See back of this page.

of Samples: 1
 Matrix: Soil

Sample ID: L7237-32

HIGH EXPLOSIVES:
 SW846 Method 8330

SITE/PROJECT: Central Coyote
Test Area

ARCOG #: 05279

LABORATORY: LAS

LABORATORY REPORT #: L7237

NAME	CAS #	Intercept	Curve R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks		
			.99	20%	U			20%			20%		U	U		
HMX	2691-41-0	NA	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	NA	NA		
RDX	121-82-4															
1,3,5-Trinitrobenzene	99-35-4															
1,3-dinitrobenzene	99-65-0															
Nitrobenzene	98-95-3															
Tetryl	479-45-8															
2,4,6-trinitrotoluene	118-96-7															
2-amino-4,6-dinitrotoluene	35572-78-2															
4-amino-2,6-dinitrotoluene	19406-51-0															
2,4-dinitrotoluene	121-14-2															
2,6-dinitrotoluene	606-20-2															
2-nitrotoluene	88-72-2															
4-nitrotoluene	99-99-0															
3-nitrotoluene	99-08-1															
PETN	78-11-5	↓	NA	NA	NA	NA	NA	NA	NA	NA	NA	↓	↓	↓		

①

NA = Not Applicable

Sample	SMC %REC	SMC RT	Sample	SMC %REC	SMC RT
All Passed					

Confirmation

Sample	CAS #	RPD > 25%	Sample	CAS #	RPD > 25%
NA					

mg/kg = ug/g : [(ug/g) x (sample mass (g) / sample vol. (ml)) x (1000ml / 1liter)] / Dilution Factor = ug/l

Comments:
 ① No Field dup, Eq. blank, or field blank submitted on the COC.
 ② All sample results were ND; No confirmation necessary.

* Summary

⇒ All QC criteria were met. No data were qualified.

REVIEWED BY: [Signature]

DATE: 7/2/99

ORGANIC DATA ASSESSMENT SUMMARY FORM
 (Data Verification/Validation Level 3 DV-3)

SITE OR PROJECT Central QUOTE TEST AREA SAMPLE IDS ←
 ANALYTICAL LABORATORY Lock/Port Analytical NO. OF SAMPLES 030016, 030017, 030018
 LABORATORY REPORT # L7237 030019, 030020, 030021, 030022,
 CASE NO. 3634.400

DATA ASSESSMENT SUMMARY

Describe problems/qualifications below (Action Items and Areas of Concern)

	VOC	SVOC	PEST/PCB	EXPLOSIVES OTHER
1. HOLDING TIMES/PRESERVATION	_____	✓	_____	✓
2. GC/MS INST. PERFORM.	_____	✓	_____	N/A
3. CALIBRATIONS/WINDOWS	_____	✓	_____	✓
4. BLANKS	_____	✓	_____	✓
5. SURROGATES	_____	✓	_____	✓
6. MATRIX SPIKE/DUP	_____	✓	_____	✓
7. LABORATORY CONTROL SAMPLES	_____	✓	_____	✓
8. INTERNAL STANDARDS	_____	✓	_____	N/A
9. COMPOUND IDENTIFICATION	_____	✓	_____	N/A
10. SYSTEM PERFORMANCE	_____	✓	_____	✓
11. OVERALL ASSESSMENT	_____	✓	_____	✓

✓ (check mark) — Acceptable: Data had no problems or qualified due to minor problems
 N - Data qualified due to major problems
 X - Problems, but do not affect data
 Qualifiers: J - Estimate
 UJ - Undetected, estimated

ACTION ITEMS: NONE

AREAS OF CONCERN: NONE

Reviewed By: Wyatt Booker
 Date: 10/15/96

ORGANIC DATA ASSESSMENT SUMMARY FORM
(Data Verification/Validation Level 3 DV-3)

PROJECT/TASK LEADER: JOE PAVLETICH

ACTION ITEMS: NONE

AREAS OF CONCERN: NONE

OVERALL DATA QUALITY ASSESSMENT ACCEPTABLE

Reviewed By: Wayne Booker

Date: 10/15/96

ORGANIC DATA ASSESSMENT SUMMARY FORM
 (Data Verification/Validation Level 3 DV-3)

1.0 HOLDING TIMES AND PRESERVATION

Indicate the holding time criteria below that was used to evaluate the samples.

SW-846, 3rd. ed.

Other: SW-846

List below samples that were over holding time criteria.

Sample ID	VTSR	Date Analyzed	HOLDING TIMES	Action
ALL SAMPLES WERE EXTRACTED AND ANALYZED WITHIN THE REQUIRED HOLDING TIMES				

NOTE: VTSR = Validated time of sample receipt.

Were the correct preservatives used? Yes No

List below samples that were incorrectly preserved.

Sample No.	Type of Sample	Deficiency	Action
ALL SAMPLES WERE COOLED ON ICE UPON COLLECTION			

Reviewed By: Wright/Solyn
 Date: 10/13/96

ORGANIC DATA ASSESSMENT SUMMARY FORM
(Data Verification/Validation Level 3 DV-3)

2.0 GC/MS TUNING CRITERIA

Has a GC/MS tuning performance been analyzed for every twelve hours of sample analysis for each GC/MS instrument used? Yes No

Was the correct standard (listed in the EPA Method) used? Yes No

Have the ion abundance criteria been met for each tune? Yes No

NOTE: GC/MS abundance criteria is specified by EPA method for GC/MS analysis (EPA 8240A or 8270A).

If no for any of the above, list all the data associated with the tune that either failed criteria or in which there was no tune.

Date/Time	Problem	Sample Affected (Action)
<i>ALL TUNES WERE ACCEPTABLE</i>		

Check for transcription/calculation errors. If errors are present, briefly summarize necessary changes:

Is the spectra of the mass calibration acceptable? Yes No

Reviewed By: W. J. Beck
Date: 10/15/96

ORGANIC DATA ASSESSMENT SUMMARY FORM
(Data Verification/Validation Level 3 DV-3)

3.0 GC INSTRUMENT PERFORMANCE.

3.1 DDT Retention Time

Is DDT retention time for packed columns >12 minutes (except for OV-1 and OV-101)?

Yes No

If no, list below the DDT standards that failed criteria: _____

Affected samples and compounds: _____

3.2 Retention Time Windows

List below compounds that were not within the retention time windows. N A

Date/Time	Compound	RT	RT Window	Action	Affected Samples

Reviewed By: Wyatt Booker
Date: 10/15/96

ORGANIC DATA ASSESSMENT SUMMARY FORM
 (Data Verification/Validation Level 3 DV-3)

3.3 DDT and Endrin Degradation

List below the standards that have a DDT or Endrin breakdown of >20% (or a combined breakdown of >20%).

Date/Time	Standard ID	DDT/Endrin	% Breakdown	Action	Affected Samples

3.4 DBC Retention Time Check

Is the %D between EVAL A and each analysis (quantitation and confirmation) DBC retention time within QC limits (2% for packed column, 0.3% capillary ID <0.32 mm, and 1% for megabore)?

Yes No

Date	Sample ID	DBC %D	Action
	N		
	A		

For the above criteria outlined in Sections 8.1-8.4, check for transcription/calculation errors.

If errors are found, list below with necessary corrections: _____

Reviewed By: Wynat Booker
 Date: 10/15/96
 AL2-94/WP/SNL:SOP304C.R1

ORGANIC DATA ASSESSMENT SUMMARY FORM
(Data Verification/Validation Level 3 DV-3)

4.0 INITIAL CALIBRATION

Has initial calibration been performed as required in the EPA method? Yes No

Were the correct number of standards used to calibrate the instrument? Yes No

For GC analyses of PCBs and Pesticides, did the laboratory follow the correct 72-hour sequence of analysis?
Yes No NA

List below compounds which did not meet initial calibration criteria outlined by the EPA method.

Instrument ID	Date	Compound	RF/%RSD	Action	Samples Affected

Check for transcription/calculation errors. If errors are present, summarize necessary corrections below:

No transcription errors

Reviewed By: *Watt Booker*
Date: *10/15/96*

ORGANIC DATA ASSESSMENT SUMMARY FORM
(Data Verification/Validation Level 3 DV-3)

5.0 CONTINUING CALIBRATION

Have continuing calibration standards been analyzed at the frequency specified in the EPA method?

Yes No

List below all compounds which did not meet continuing calibration requirements.

Instrument ID	Date	Compound	RF/%D	Action	Samples Affected
<i>all relevant continuing calibration standards were inside limits.</i>					

Check for transcription and calculation errors. If errors are found, briefly summarize necessary corrections below:

No transcription or calculation errors were identified.

Reviewed By: W. Baker

Date: 10/15/96

ORGANIC DATA ASSESSMENT SUMMARY FORM
 (Data Verification/Validation Level 3 DV-3)

6.0 BLANK ANALYSES

6.1 Method/Reagent and Instrument Blanks

Has a method/reagent blank been analyzed for each set of samples or for every 20 samples of similar matrix, whichever is more frequent? Yes No

Has an instrument blank been analyzed at least once every twelve hours for each GC/MS system used? Yes No

6.2 Field/Rinse/Equipment Blanks.

Are there field/rinse/equipment blanks associated with each sampling day or at frequency specified in the sampling plan. Yes No

List below compounds for which analyses were requested that were detected in any of the blanks analyzed:

Date	Blank ID	Compound	Conc. (ug/L)	PQL ()	Action Level	Samples Affected (Action)
6-11-96	000023	UNKNOWN CARBOXYLIC ACID (TIC)	7	N/A	N/A	NONE

PQL = Practical Quantitation Limit from EPA Method.

Di-n-butyl phthalate was detected at a concentration ~~below~~ above the quantitation limit in the method blank (33 ug/L MDL = 6.0 ug/L PQL = 10 ug/L). However, this compound was not detected in the associated sample. Therefore, data were not affected.

Reviewed By: Wright Berkey
 Date: 10/15/96

ORGANIC DATA ASSESSMENT SUMMARY FORM
 (Data Verification/Validation Level 3 DV-3)

Are there any TICs present in the blanks that are also present in the samples? Yes No
 If yes, list below.

~~N
A~~

7.0 SURROGATE RECOVERY

Were surrogate recoveries evaluated for each of the samples analyzed by GC or GC/MS?
 Yes No

If surrogate standards other than those presented by SW-846 are used, list below with reference to applicat control limits used to evaluate the percent recoveries.

Surrogate Compound

Control Limits

~~SW-846~~

List below the percent recoveries which did not meet either SW-846 criteria or criteria listed above.

Date	Sample ID/Matrix	Surrogate Compound	Rec	Action
ALL SURROGATE RECOVERIES NOTED INSIDE CONTROL LIMITS				

Reviewed By: W. Booker
 Date: 10/18/96

ORGANIC DATA ASSESSMENT SUMMARY FORM

(Data Verification/Validation Level 3 DV-3)

If surrogate recovery was outside of control limits, were the samples or method blank reanalyzed?

Yes No NA

Are method blank surrogate recoveries outside of limits upon reanalysis? Yes No NA

Are transcription/calculation errors present? Yes No

If yes, note necessary corrections. N/A

Reviewed By: W. Boyer
Date: 10/15/96

ORGANIC DATA ASSESSMENT SUMMARY FORM
(Data Verification/Validation Level 3 DV-3)

8.0 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSIS

Were MS/MSDs analyzed at the frequency required by the EPA method or QAPjP for each matrix type?

Yes No

List below % recoveries and RPDs of compounds which did not meet criteria. Indicate on chart criteria used to evaluate recoveries and RPDs.

Date	Sample ID/Matrix	Compound	%Rec RPD	Action
<i>ALL MS/MSD'S WERE WITHIN CONTROL LIMITS</i>				

Reviewed By: W Booher
Date: 10/15/96

ORGANIC DATA ASSESSMENT SUMMARY FORM
 (Data Verification/Validation Level 3 DV-3)

9.0 LABORATORY CONTROL SAMPLE ANALYSIS

Have laboratory control samples containing a representative number of the compounds of interest been analyzed at the frequency specified in the EPA method or QAPJP?

Yes No

Evaluate percent recoveries based on control limits established in individual EPA methods, or use established laboratory control limits. List below recoveries of compounds which did not meet criteria with reference to control limits used.

Date	Compound	%Rec	Control Limits	Action	Samples Affected
20 JUNE 96	4-NITROPHENOL	202	10-125		
20 JUNE 96	4-NITROPHENOL	194	10-125		

Control Limit Reference: EPA SW-846

Evaluate RPD based on control limits established in individual EPA methods, or use established laboratory control limits. List below recoveries of compounds which did not meet criteria with reference to control limits used.

Date	Compound	%Rec	Control Limits	Action	Samples Affected
ALL RPD'S BETWEEN DUPLICATE SAMPLES WERE WITHIN CONTROL LIMITS					

Control Limit Reference: SW-846

Reviewed By: W. Broberg
 Date: 10/15/96

ORGANIC DATA ASSESSMENT SUMMARY FORM
(Data Verification/Validation Level 3 DV-3)

10.0 INTERNAL STANDARDS EVALUATION

List below the internal standard areas of samples or blanks which did not meet criteria.

Date	Sample ID	Internal Out	Acceptable Range	Action
<i>All internal standards are within RT and recovery limits.</i>				

Are retention times of the internal standards within 30 seconds of the associated calibration standard?

Yes No

11.0 TARGET COMPOUND LIST ANALYTES

11.1 GC/MS Analyses

Are the reconstructed ion chromatograms, the mass spectra for the identified compounds, and the data system printouts included? Yes No

Is chromatographic performance acceptable with respect to:

Baseline stability? Yes No

Resolution? Yes No

Peak shape? Yes No

Full-scale graph (attenuation)? Yes No

Reviewed By: W. Boshu
Date: 10/15/96

ORGANIC DATA ASSESSMENT SUMMARY FORM
(Data Verification/Validation Level 3 DV-3)

Page 15 of 18

Other: N/A

Is the RRT of each reported compound within the limits given in the method of the standard RRT in the continuing calibration? Yes No

Are all the ions present in the standard mass spectrum at a relative intensity greater than 10% also present in the mass spectrum? Yes No

Do sample and standard relative intensities agree within 20%? Yes No

If no for any of the above, indicate below problems and qualifications made to data:

N/A

^{HPLC}
11.2 ~~GC~~ Analyses

Are there any transcription/calculation errors between the raw data and the reporting forms?
Yes No

If yes, review errors and necessary corrections below; if errors are large, resubmittal of laboratory package may be necessary.

N/A

Are retention times of sample compounds within the calculated retention time windows for both quantitation and confirmation analysis? Yes No ~~NA~~ MS

Was GC/MS confirmation performed when required by the EPA method? Yes No ~~NA~~

If no for any of the above, reject positive results except for retention time windows if associated standard compounds are similarly shifted.

Reviewed By: W. Booker
Date: 10/15/96

ORGANIC DATA ASSESSMENT SUMMARY FORM
(Data Verification/Validation Level 3 DV-3)

Samples affected: N/A

Check chromatograms for false negatives, especially for the multiple peak components (toxaphene and PCBs). If false negatives are apparent and the appropriate PCB standards were not analyzed, or if confirmed analysis was not present, flag the affected data.

Samples affected: N/A

NOTE: Due to the complexities of PCB/pesticide analysis, each analytical run should be reviewed to verify identification and column performance.

12.0 FIELD DUPLICATE ANALYSIS

Were field duplicates submitted for analysis? Yes No 030016/030017 (SVOC)

If yes, calculate RPD and use professional judgment to determine if the data needs to be qualified. List results below.

Date	Sample ID	Compound	Sample Result	Duplicate Result	RPD	Affected Samples
All results were ND - could not calculate RPD						

13.0 COMPOUND QUANTITATION/REPORTED DETECTION LIMITS

Are there any transcription/calculation errors from raw data to reported results (check at least 10% of positive results)? Yes No

In addition, verify that the correct internal standard, quantitation ion, and RRF were used to calculate the result for a minimum of 10% of sample data.

Reviewed By: Wyatt Booker
Date: 10/13/96

ORGANIC DATA ASSESSMENT SUMMARY FORM
(Data Verification/Validation Level 3 DV-3)

13.1 Chromatogram Quality

Were baselines stable? Yes No

Were any negative peaks or unusual peaks present? Yes No

Were early eluting peaks resolved to baseline? Yes No

If incorrect quantitations are evident, note corrections necessary below: N/A

Are the required quantitation limits (detection limits) adjusted to reflect sample dilutions and for soils, sample moisture? Yes No

If no, make necessary corrections and note below.

N/A

14.0 TENTATIVELY IDENTIFIED COMPOUNDS

Are Tentatively Identified Compounds (TIC) properly identified with scan number or retention time, estimated concentration, and J qualifier? Yes No

Are the mass spectra for TICs and associated "best match" spectra included? Yes No

Are any TCL compounds listed as TIC compounds? Yes No

Are each of the ions present in the reference mass spectra with a relative intensity greater than 10% also present in the sample mass spectrum? Yes No

Reviewed By: W Bophey
Date: 10/15/96

ORGANIC DATA ASSESSMENT SUMMARY FORM
(Data Verification/Validation Level 3 DV-3)

Do TIC and "best match" standard relative ion intensities agree within 20%? Yes No

Comments All data reviewed were acceptable. With exceptions noted
the laboratory was in control during sample preparation
and analysis. Based on review of the associated raw
data and QC results, sample results are judged to be
usable.

Reviewed By: W. H. Booker
Date: 10/15/96
Approved By: _____
Date: _____

*Data package must be approved by Project/Task Leader.

DATA VALIDATION SUMMARY:

Central Coyote
 SITE/PROJECT: Test Area CASE #: 7215.2201 ^{MS} 3634.400 ^{7/16/99}
 ARCO #: 05279
 LABORATORY: LAS
 LABORATORY REPORT #: L7237

OF SAMPLES: 38 MATRIX: 35 soil / 3 aqueous
 LAB SAMPLE IDS: L7237-1 thru -38

ANALYSIS/ QC ELEMENT	VOC	SVOC	PEST/ PCB	HPLC (HE)	ICP/AES	GFAA/ AA	CVAA (Hg)	CN	RAD	OTHER
1. HOLDING TIMES/ PRESERVATION	NA	✓	NA	✓	✓	NA	✓	NA	✓	NA
2. CALIBRATIONS		R;UJ		✓	✓		✓		✓	
3. METHOD BLANKS		R,B		✓	✓		✓		J,B	
4. MS/MSD		✓		✓	✓		UJ,A2		✓	
5. LABORATORY CONTROL SAMPLES		✓		✓	✓		✓		✓	
6. REPLICATES	shaded	shaded	shaded	shaded	✓	shaded	✓	shaded	✓	shaded
7. SURROGATES	shaded	✓	shaded	✓	shaded	shaded	shaded	shaded	shaded	shaded
8. INTERNAL STDS	shaded	✓	shaded	shaded	shaded	shaded	shaded	shaded	shaded	shaded
9. TCL COMPOUND IDENTIFICATION	shaded	✓	shaded	shaded	shaded	shaded	shaded	shaded	shaded	shaded
10. ICP INTERFERENCE CHECK SAMPLE	shaded	shaded	shaded	shaded	✓	shaded	shaded	shaded	shaded	shaded
11. ICP SERIAL DILUTION	shaded	shaded	shaded	shaded	✓	shaded	shaded	shaded	shaded	shaded
12. CARRIER/CHEM TRACER RECOVERIES	shaded	shaded	shaded	shaded	shaded	shaded	shaded	shaded	J	shaded
13. OTHER QC	↓	✓	↓	NA	NA	↓	NA	↓	✓	↓

CHECK MARK (✓) - ACCEPTABLE
 J - ESTIMATED
 U - NOT DETECTED

SHADED CELLS - NOT APPLICABLE
 UJ - NOT DETECTED, ESTIMATED
 R - UNUSABLE

NA = Not Applicable

REVIEWED BY: [Signature] DATE: 7/2/99

David 11-9-96

**DOCUMENTATION COMPLETENESS CHECKLIST
(DATA VERIFICATION/VALIDATION LEVEL 1 - DV1)**

Project Leader J. Pauletich

Project Name Central Coyote Test Area

Case No. 3634.400

AR/COC No. 05279

Analytical Lab LAS

SDG No. 47237

In the tables below, mark any information that is missing or incorrect and give an explanation.

1.0 Analysis Request and Chain of Custody Record

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
1.1	All items on COC complete - data entry clerk initialed and dated	✓				
1.2	Container type(s) correct for analyses requested	✓				
1.3	Sample volume adequate for # and types of analyses requested	✓				
1.4	Preservative correct for analyses requested	✓				
1.5	Custody records continuous and complete	✓				
1.6	Lab sample number(s) provided	✓				
1.7	Condition upon receipt information provided	✓				
1.8	Tritium Screen data provided (Rad labs)	✓		Released by coc # 05280		

2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
2.1	Data reviewed, signature	✓				
2.2	Date samples received	✓				
2.3	Method reference number(s) complete and correct	✓				
2.4	Quality control data provided (MB, LCS, LCD, Detection Limit)	✓				
2.5	Matrix spike/matrix spike duplicate data provided(if requested)	✓				
2.6	Narrative provided	✓				
2.7	TAT met		✓	Due 7/14/96, Final Rec'd 7/25/96		
2.8	Hold times met	✓				
2.9	All requested result data provided	✓				

Based on the review, this data package is complete

Yes

No

If no, provide : correction request tracking # _____ and date correction request was submitted: _____

Reviewed by: Holly O'Grady

Date: 10/15/96

Closed by: _____

Date: _____

ANALYSIS REQUEST AND CHAIN OF CUSTODY

SF 2001-COD (9-94)

AR/COC- 05279

Project Name: Central Coyle Test Area Project/Task Manager: Joe Pavletich Case No.: 3634.400

Location		Tech Area	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)					Parameter & Method Requested								
						Building		Room		Sample Matrix	Container		Preservative	Sample Collection Method	Sample Type	PRA	Met	Be	
						Type	Volume	Type	Volume										
Building <u>NA</u> Room <u>NA</u>																			
Sample No. - Fraction			ER Sample ID or Sample Location Detail																
✓	030008	-01	CCTA-09-GR-003-0-06-5	0-0.5	09	6-11-96	1220	S	G	250	40C	G	SP	X					
✓	030009	-03	CCTA-09-GR-003-06-10	0.5-1.0			1225						SA		X				
✓	030009	-04	CCTA-09-GR-003-06-10	0.6-1.0			1225									X			
✓	030010	-03	CCTA-09-GR-004-0-06-5	0-0.5			1310								X				
✓	030010	-04	CCTA-09-GR-004-0-06-5	0-0.5			1310									X			
✓	030011	-03	CCTA-09-GR-004-06-10	0.6-1.0			1315								X				
✓	030011	-04	CCTA-09-GR-004-06-10	0.6-1.0			1315									X			
✓	030012	-03	CCTA-09-GR-005-0-06-5	0-0.5			1316								X				
✓	030012	-04	CCTA-09-GR-005-0-06-5	0-0.5			1316									X			
✓	030013	-03	CCTA-09-GR-006-06-10	0.6-1.0			1319								X				
✓	030013	-04	CCTA-09-GR-006-06-10	0.6-1.0			1319							↓		X			
✓	030013	-01	CCTA-09-GR-006-05-10	0.5-1.0			1319						GP	X	X				
✓	030014	-03	CCTA-09-GR-006-0-06-5	0-0.5			1325						SA		X				
✓	030014	-04	CCTA-09-GR-006-0-06-5	0-0.5			1325							↓		X			
✓	030015	-03	CCTA-09-GR-006-06-10	0.6-1.0			1330								X		X		
✓	030015	-04	CCTA-09-GR-006-06-10	0.6-1.0			1330									X	X		
✓	030016	-06	CCTA-09-GR-007-0-06-5	0-0.5			1416						SA					X	
✓	030017	-06	CCTA-09-GR-007-0-06-5	0-0.5			1416						DU					X	

Parameter & Method Requested				
PRA	Met	Be	ISO U	ISO Th
MS/MSD	S.U.C.			

030017



LAB USE

ANALYSIS REQUEST AND CHAIN OF CUSTODY

SF 2001-COD (9-94)

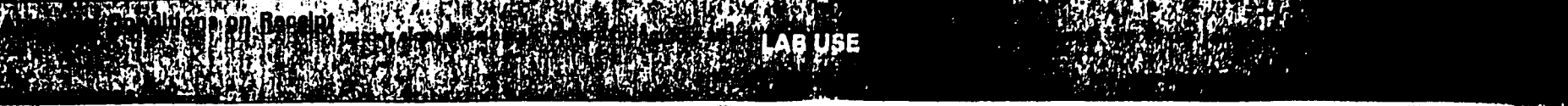
AR/COC- 05279

Project Name: Central Core Test Area Project/Task Manager: Joe Pavletich Case No.: 3634.400

Location		Tech Area <u>NA</u>		Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)												
Building <u>NA</u> Room <u>NA</u>		ER Sample ID or Sample Location Detail	Sample Matrix				Container		Preservative	Sample Collection Method	Sample Type								
Sample No. - Fraction	ER Sample ID or Sample Location Detail						Type	Volume											
✓ 030008-01	CC1A-09-GR-003-0-06-5	0-0.5	09	6-11-96	1320	S	G	250	40C	G	SP	X							
✓ 030009-03	CC1A-09-GR-003-06-10	0.5-1.0			1325						SA		X						
✓ 030009-04	CC1A-09-GR-003-06-10	0.6-1.0			1325									X					
✓ 030010-03	CC1A-09-GR-004-0-06-5	0-0.5			1310								X						
✓ 030010-04	CC1A-09-GR-004-0-06-5	0-0.6			1310										X				
✓ 030011-03	CC1A-09-GR-004-06-10	0.6-1.0			1315								X						
✓ 030011-04	CC1A-09-GR-004-06-10	0.6-1.0			1315									X					
✓ 030012-03	CC1A-09-GR-005-0-06-5	0-0.5			1316								X						
✓ 030012-04	CC1A-09-GR-005-0-06-5	0-0.5			1316										X				
✓ 030013-03	CC1A-09-GR-006-06-10	0.6-1.0			1319								X						
✓ 030013-04	CC1A-09-GR-006-06-10	0.6-1.0			1319							↓	X						
✓ 030013-01	CC1A-09-GR-006-06-10	0.6-1.0			1319						SP	X	X						
✓ 030014-03	CC1A-09-GR-006-0-06-5	0-0.5			1325						SA		X						
✓ 030014-04	CC1A-09-GR-006-0-06-5	0-0.6			1325						↓			X					
✓ 030015-03	CC1A-09-GR-006-06-10	0.6-1.0			1330						MS		X	X					
✓ 030015-04	CC1A-09-GR-006-06-10	0.6-1.0			1330						MS		X	X					
✓ 030016-06	CC1A-09-GR-007-0-06-5	0-0.5			1416						SA				X				
✓ 030017-06	CC1A-09-GR-007-0-06-5	0-0.5			1416						DU				X				

Parameter & Method Requested									
PRAmet+Be	ISO U	ISO Th	MS/MSD	S-JOC					

030010-01



ANALYSIS REQUEST AND CHAIN OF CUSTODY

SP 2001-COD (8-94)

AR/COC- 05279

Project Name: Coyote Test Project/Task Manager: J. Pauley Case No.: 3634.400

Location: _____ Tech Area: _____
 Building: _____ Room: _____
 Sample No. - Fraction: _____ ER Sample ID or Sample Location Detail: _____
 Beginning Depth in Ft.: _____ ER Site No.: _____ Date/Time Collected: _____
 Reference LOV (available at SMO): _____

Parameter & Method Requested									
S.VOC	H.E.	PCRA M.M. + Be	ISO 4	ISO 1A					

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container		Preservative	Sample Collection Method	Sample Type	S.VOC	H.E.	PCRA M.M. + Be	ISO 4	ISO 1A
						Type	Volume								
✓ 030018-06	CCTA-09-GR-007-06-10	05-10	09	6-19-06 1416	S	G	250	4°C	G	SA	X				
✓ 030019-06	CCTA-09-GR-008-0-0.5	0-0.5		1420							X				
✓ 030019-01				1420						SP			X		
✓ 030019-01				1420						SP		X			
✓ 030020-06	CCTA-09-GR-006-06-10	06-10		1423	↓	↓	↓	↓	↓	SA	X				
✓ 030021															
✓ 030021-06	CCTA-09-GR-009-0-0.5	0-0.5		1424	S	G	250	4°C	G	SA	X				
✓ 030022-06	CCTA-09-GR-009-06-10	06-10		1427	↓	↓	↓	↓	↓		X				
✓ 030023-03	CCTA-09-GR-000-EB	NA		0855	SLW	P	1000	HNO ₃		EB			X		
✓ 030023-04				0855	↓	↓	↓	↓	↓				X		
✓ 030023-06				0855	↓	G	2000	4°C	↓	↓	X				

0101

Conditions on Receipt

ANNEX 10-B
1998, 1999, and 2000 VCM Soil Pile Sampling Results

Table B-1
 Summary of SWMU 9 Soil Pile Sampling TAL Metals Analytical Results
 March 1999
 (Off-Site Laboratory)

Sample Attributes				Metals (EPA Method 6010/7000) ^a (mg/kg)									
Record Number ^b	ER Sample ID	Date Sampled	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese
601666	CCTA-09-VCM-Pile1-N	3-15-99	NA	0.729 J (0.990)	3.50	138	0.484 J (0.495)	0.612	11.1	4.89	19.7 J	21.9	217
601666	CCTA-09-VCM-Pile1-S	3-15-99	NA	ND (0.191) R	3.92	120	0.516	0.601	11.3	4.91	18.8 J	19.7	241
601666	CCTA-09-VCM-Pile2-N	3-15-99	NA	ND (0.191) R	2.83	103	0.380 J (0.463)	1.16	11.4	4.45	57.0 J	28.6	225
601666	CCTA-09-VCM-Pile2-S	3-15-99	NA	0.415 J (0.952)	3.25	127	0.437 J (0.476)	1.63	10.6	4.20	35.9 J	34.5	209
601666	CCTA-09-VCM-Pile3-N	3-15-99	NA	ND (0.191) R	2.42	65.2	0.312 J (0.481)	0.458 J (0.481)	8.36	3.76	10.1 J	13.3	203
601666	CCTA-09-VCM-Pile3-S	3-15-99	NA	1.02 J	3.31	93.4	0.474	0.518	9.78	4.86	10.7 J	16.4	247
601666	CCTA-09-VCM-Pile4-N	3-15-99	NA	0.391 J (0.926)	3.73	103	0.521	0.464	10.6	4.91	11.6 J	12.6	244
601666	CCTA-09-VCM-Pile4-S	3-15-99	NA	ND (0.191) R	3.26	96.7	0.493	0.569	11.3	5.11	13.5 J	21.7	275
601666	CCTA-09-VCM-Pile5-N	3-15-99	NA	ND (0.191) R	3.34	93.7	0.439 J (0.472)	1.55	12.3	5.06	13.6 J	14.2	248
601666	CCTA-09-VCM-Pile5-S	3-15-99	NA	ND (0.191) R	3.08	94.4	0.484 J (0.485)	0.759	9.80	4.65	15.2 J	13.3	240
601666	CCTA-09-VCM-Pile6-N	3-15-99	NA	ND (0.191) R	3.52	98.6	0.433 J (0.472)	0.808	10.5	5.22	33.4 J	14.2	225
601666	CCTA-09-VCM-Pile6-S	3-15-99	NA	ND (0.191) R	2.90	109	0.366 J (0.485)	0.655	9.02	4.20	25.4 J	20.9	206
601666	CCTA-09-VCM-Pile7-N	3-15-99	NA	ND (0.191) R	3.44	117	0.517	0.575	10.3	5.11	13.2 J	18.6	258
601666	CCTA-09-VCM-Pile7-S	3-15-99	NA	ND (0.191) R	3.44	112	0.509	2.23	16.3	5.19	164 J	61.3	409
601666	CCTA-09-VCM-Pile8-N	3-15-99	NA	ND (0.191) R	4.41	107	0.625	0.797	12.9	5.25	13.7 J	27.1	239
601666	CCTA-09-VCM-Pile8-S	3-15-99	NA	ND (0.191) R	3.73	118	0.508	0.493	10.7	5.06	12.2 J	12.8	261
601666	CCTA-09-VCM-Pile9-N	3-15-99	NA	ND (0.191) R	4.52	113	0.423 J (0.481)	1.06	19.6	8.61	30.4 J	107	307
601666	CCTA-09-VCM-Pile9-S	3-15-99	NA	ND (0.191) R	2.90	88.8	0.354 J (0.490)	0.782	12.5	4.57	16.7 J	46.5	257
601666	CCTA-09-VCM-Pile10-N	3-15-99	NA	ND (0.191) R	3.67	107	0.517	0.913	12.0	5.11	59.1 J	18.3	270
601666	CCTA-09-VCM-Pile10-S	3-15-99	NA	ND (0.191) R	3.78	110	0.553	0.552	10.1	5.34	15.7 J	12.4	277
601667	CCTA-09-VCM-Pile11-N	3-15-99	NA	0.866 J (0.962)	3.60	130 J	0.460 J (0.481)	0.976 J (1.20)	15.0	6.18	66.8	34.1	297
601667	CCTA-09-VCM-Pile11-S	3-15-99	NA	0.594 J (0.971)	3.63	155 J	0.463 J (0.485)	1.39	28.4	6.49	39.3	22.8	272
601667	CCTA-09-VCM-Pile12-N	3-15-99	NA	1.91 J	3.44	158 J	0.449 J (0.481)	1.44	19.5	5.75	194	71.2	277
601667	CCTA-09-VCM-Pile12-S	3-15-99	NA	ND (0.191 J)	3.84	120 J	0.419 J (0.476)	2.78	17.1	5.41	39.1	33.4	260
601667	CCTA-09-VCM-Pile13-N	3-15-99	NA	ND (0.191 J)	3.95	152 J	0.588	0.587 J (1.23)	12.1	5.50	10.3	13.9	260
601667	CCTA-09-VCM-Pile13-S	3-15-99	NA	0.519 J (0.971)	3.75	128 J	0.502	0.878 J (1.21)	14.7	4.97	16.3	24.1	246
Quality Assurance/Quality Control Sample (mg/L)													
601667	CCTA-09-VCM-EB	3-15-99	NA	ND (0.00394 J)	ND (0.00451 J)	ND (0.00051 J)	ND (0.00026 J)	ND (0.00044 J)	0.00228 J (0.00500)	ND (0.00069 J)	ND (0.00104 J)	0.00239 J (0.00500)	ND (0.00448 J)
Background Soil Concentrations—Coyote Test Field ^c				3.9	5.6	130	0.65	0.9	17.3	5.2	15.4	21.4	NA

Refer to footnotes at end of table.

Table B-1 (Continued)
 Summary of SWMU 9 Soil Pile Sampling TAL Metals Analytical Results
 March 1999
 (Off-Site Laboratory)

Sample Attributes				Metals (EPA Method 6010/7000) ^a (mg/kg)							
Record Number ^b	ER Sample ID	Date Sampled	Sample Depth (ft)	Mercury	Nickel	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc
601666	CCTA-09-VCM-Pile1-N	3-15-99	NA	0.0131 J (0.0267)	10.0	0.673	0.0935 J (0.495)	ND (0.221)	4.47	20.4	98.4 J
601666	CCTA-09-VCM-Pile1-S	3-15-99	NA	0.0211 J (0.0302)	10.0	0.699	ND (0.031)	ND (0.221)	5.63	20.7	74.3 J
601666	CCTA-09-VCM-Pile2-N	3-15-99	NA	0.0208 J (0.0317)	9.71	0.636	0.352 J (0.463)	ND (0.221)	6.40	15.8	145 J
601666	CCTA-09-VCM-Pile2-S	3-15-99	NA	0.0314 J (0.0331)	9.15	0.821	0.104 J (0.476)	ND (0.221)	12.6	17.9	199 J
601666	CCTA-09-VCM-Pile3-N	3-15-99	NA	0.00882 J (0.0312)	8.12	0.671	ND (0.031)	ND (0.221)	5.04	13.4	79.8 J
601666	CCTA-09-VCM-Pile3-S	3-15-99	NA	0.0106 J (0.0314)	10.0	0.819	ND (0.031)	ND (0.221)	5.03	19.4	138 J
601666	CCTA-09-VCM-Pile4-N	3-15-99	NA	0.0180 J (0.0311)	9.86	0.797	ND (0.031)	ND (0.221)	4.22	20.5	76.6 J
601666	CCTA-09-VCM-Pile4-S	3-15-99	NA	0.0199 J (0.0271)	9.91	0.753	ND (0.031)	ND (0.221)	5.23	18.9	209 J
601666	CCTA-09-VCM-Pile5-N	3-15-99	NA	0.0114 J (0.0316)	11.1	0.660	ND (0.031)	ND (0.221)	3.11	18.7	69.0 J
601666	CCTA-09-VCM-Pile5-S	3-15-99	NA	0.00996 J (0.0316)	9.68	0.684	ND (0.031)	ND (0.221)	4.38	18.2	72.6 J
601666	CCTA-09-VCM-Pile6-N	3-15-99	NA	0.0119 J (0.0306)	11.7	0.604	0.187 J (0.472)	ND (0.221)	2.87	17.6	75.8 J
601666	CCTA-09-VCM-Pile6-S	3-15-99	NA	0.0105 J (0.0315)	8.69	0.530	0.218 J (0.485)	ND (0.221)	5.83	14.8	92.2 J
601666	CCTA-09-VCM-Pile7-N	3-15-99	NA	0.0360 (0.0319)	9.86	0.758	ND (0.031)	ND (0.221)	5.67	19.4	80.4 J
601666	CCTA-09-VCM-Pile7-S	3-15-99	NA	2.09	10.5	0.807	0.186 J (0.472)	ND (0.221)	11.8	20.7	354 J
601666	CCTA-09-VCM-Pile8-N	3-15-99	NA	0.0247 J (0.0317)	11.5	0.791	ND (0.031)	ND (0.221)	6.79	21.8	53.7 J
601666	CCTA-09-VCM-Pile8-S	3-15-99	NA	0.0107 J (0.0330)	9.57	0.852	ND (0.031)	ND (0.221)	2.52	19.1	51.9 J
601666	CCTA-09-VCM-Pile9-N	3-15-99	NA	0.0172 J (0.0318)	12.6	1.08	ND (0.031)	ND (0.221)	7.48	17.9	148 J
601666	CCTA-09-VCM-Pile9-S	3-15-99	NA	0.00977 J (0.0301)	9.61	0.675	ND (0.031)	ND (0.221)	5.97	14.7	123 J
601666	CCTA-09-VCM-Pile10-N	3-15-99	NA	0.0892	10.6	0.619	0.187 J (0.495)	ND (0.221)	3.27	19.0	98.2 J
601666	CCTA-09-VCM-Pile10-S	3-15-99	NA	0.0278 J (0.0318)	10.0	0.806	ND (0.031)	ND (0.221)	ND (2.19 J)	20.1	69.7 J
601667	CCTA-09-VCM-Pile11-N	3-15-99	NA	ND (0.00225 J)	12.2	0.869	0.105 J (0.481)	ND (0.221)	5.49 J	20.4	145
601667	CCTA-09-VCM-Pile11-S	3-15-99	NA	ND (0.00225 J)	14.9	0.691	0.167 J (0.485)	ND (0.221)	6.11 J	21.8	115
601667	CCTA-09-VCM-Pile12-N	3-15-99	NA	ND (0.00225 J)	14.0	0.776	0.283 J (0.481)	ND (0.221)	10.4 J	19.4	303
601667	CCTA-09-VCM-Pile12-S	3-15-99	NA	ND (0.00225 J)	11.3	0.898	0.113 J (0.476)	ND (0.221)	4.56 J	18.6	158
601667	CCTA-09-VCM-Pile13-N	3-15-99	NA	ND (0.00225 J)	11.1	0.853	ND (0.031)	ND (0.221)	2.85 J	24.6	38.3
601667	CCTA-09-VCM-Pile13-S	3-15-99	NA	ND (0.00225 J)	10.1	0.775	0.0844 J (0.485)	ND (0.221)	11.3 J	20.7	61.1
Quality Assurance/Quality Control Sample (mg/L)											
601667	CCTA-09-VCM-EB	3-15-99	NA	ND (0.000035 J)	ND (0.00129 J)	ND (0.00271 J)	ND (0.00073 J)	ND (0.00308 J)	0.0000310 J (0.000200)	ND (0.00059 J)	0.0622 J
Background Soil Concentrations—Coyote Test Field ^c				<0.1	11.5	<1	<1	<1.1	3.42	20.4	62

Refer to footnotes at end of table.

Table B-1 (Continued)
Summary of SWMU 9 Soil Pile Sampling TAL Metals Analytical Results
March 1999
(Off-Site Laboratory)

Note: Values in **bold** exceed background soil concentrations.

^a EPA November 1986.

^b Analysis request/chain-of-custody record.

^c Dinwiddie September 1997. The minimum background concentration between surface and subsurface is reported.

CCTA = Central Coyote Test Area.

EB = Equipment blank.

EPA = U.S. Environmental Protection Agency.

ER = Environmental Restoration.

ft = Foot (feet).

ID = Identification.

J = Estimated value. See Data Validation report.

J () = The reported value is greater than or equal to the method detection limit but is less than the practical quantitation limit, shown in parentheses.

mg/kg = Milligram(s) per kilogram.

mg/L = Milligram(s) per liter.

N = North side of pile.

NA = Not applicable.

ND () = Not detected above the method detection limit, shown in parentheses.

R = Rejected value. See Data Validation report.

S = South side of pile.

SWMU = Solid Waste Management Unit.

TAL = Target analyte list.

VCM = Voluntary corrective measure.

Table B-2
 Summary of SWMU 9 Soil Pile Sampling TCLP Metals Plus Zinc and Copper Analytical Results
 September 1998
 (Off-Site Laboratory)

Sample Attributes				Metals (EPA 6010/7000) ^a (mg/L)				
Record Number ^b	ER Sample ID	Date Sampled	Sample Depth (ft)	Arsenic	Barium	Cadmium	Chromium	Copper
600792	CCTA-09-VCM-Pile1-N	9-2-98	NA	ND (0.037325)	1.08	ND (0.002752)	ND (0.001985)	ND (0.004854)
600792	CCTA-09-VCM-Pile1-S	9-2-98	NA	ND (0.037325)	1.24	ND (0.002752)	0.00218 J (0.01)	ND (0.004854)
600792	CCTA-09-VCM-Pile2-N	9-2-98	NA	ND (0.037325)	0.834	0.0104	ND (0.001985)	0.00596 J (0.05)
600792	CCTA-09-VCM-Pile2-S	9-2-98	NA	ND (0.037325)	0.590	0.00543 J (0.01)	ND (0.001985)	ND (0.004854)
600792	CCTA-09-VCM-Pile3-N	9-2-98	NA	ND (0.037325)	0.913	ND (0.002752)	ND (0.001985)	ND (0.004854)
600792	CCTA-09-VCM-Pile3-S	9-2-98	NA	ND (0.037325)	0.874	ND (0.002752)	ND (0.001985)	ND (0.004854)
600792	CCTA-09-VCM-Pile4-N	9-2-98	NA	ND (0.037325)	0.947	ND (0.002752)	ND (0.001985)	ND (0.004854)
600792	CCTA-09-VCM-Pile4-S	9-2-98	NA	ND (0.037325)	1.09	ND (0.002752)	ND (0.001985)	ND (0.004854)
600792	CCTA-09-VCM-Pile5-N	9-2-98	NA	ND (0.037325)	0.914	0.00404 J (0.01)	ND (0.001985)	ND (0.004854)
600792	CCTA-09-VCM-Pile5-S	9-2-98	NA	ND (0.037325)	0.766	0.00464 J (0.01)	ND (0.001985)	ND (0.004854)
600792	CCTA-09-VCM-Pile6-N	9-2-98	NA	ND (0.037325)	0.804	0.00502 J (0.01)	ND (0.001985)	0.0302 J (0.05)
600792	CCTA-09-VCM-Pile6-S	9-2-98	NA	ND (0.037325)	0.924	0.00557 J (0.01)	ND (0.001985)	ND (0.004854)
600792	CCTA-09-VCM-Pile7-N	9-2-98	NA	ND (0.037325)	1.29	0.0286	ND (0.001985)	0.00894 J (0.05)
600792	CCTA-09-VCM-Pile7-S	9-2-98	NA	ND (0.037325)	1.17	0.00845 J (0.01)	ND (0.001985)	0.0336 J (0.05)
600792	CCTA-09-VCM-Pile8-N	9-2-98	NA	ND (0.037325)	1.54	0.0190	ND (0.001985)	ND (0.004854)
600792	CCTA-09-VCM-Pile8-S	9-2-98	NA	ND (0.037325)	1.20	0.00966 J (0.01)	0.00343 J (0.01)	0.0184 J (0.05)
600792	CCTA-09-VCM-Pile9-N	9-2-98	NA	ND (0.037325)	1.26	0.0118	ND (0.001985)	ND (0.004854)
600792	CCTA-09-VCM-Pile9-S	9-2-98	NA	ND (0.037325)	1.17	0.0178	0.00354 J (0.01)	0.0328 J (0.05)
600792	CCTA-09-VCM-Pile10-N	9-2-98	NA	ND (0.037325)	1.29	0.0126	0.00274 J (0.01)	0.0757
600792	CCTA-09-VCM-Pile10-S	9-2-98	NA	ND (0.037325)	1.14	0.0116	ND (0.001985)	0.0243 J (0.05)
600792	CCTA-09-VCM-Pile11-N	9-2-98	NA	ND (0.037325)	1.85	0.0301	ND (0.001985)	0.0406 J (0.05)
600792	CCTA-09-VCM-Pile11-S	9-2-98	NA	ND (0.037325)	1.12	0.0273	0.00289 J (0.01)	0.0297 J (0.05)
600792	CCTA-09-VCM-Pile12-N	9-2-98	NA	ND (0.037325)	1.43	0.0264	ND (0.001985)	0.0831
600792	CCTA-09-VCM-Pile12-S	9-2-98	NA	ND (0.037325)	1.54	0.0262	0.00422 J (0.01)	0.281
600792	CCTA-09-VCM-Pile13-N	9-2-98	NA	ND (0.037325)	1.52	0.00356 J (0.01)	ND (0.001985)	ND (0.004854)
600792	CCTA-09-VCM-Pile13-S	9-2-98	NA	0.0530	1.70	0.0186	ND (0.001985)	ND (0.004854)
Maximum Concentration of Contaminants for the Toxicity Characteristic ^d				5.0	100.0	1.0	5.0	NE

Refer to footnotes at end of table.

Table B-2 (Continued)
 Summary of SWMU 9 Soil Pile Sampling TCLP Metals Plus Zinc and Copper Analytical Results
 September 1998
 (Off-Site Laboratory)

Sample Attributes				Metals (EPA 6010/7000) ^a (mg/L)				
Record Number ^b	ER Sample ID	Date Sampled	Sample Depth (ft)	Lead	Mercury	Selenium	Silver	Zinc
600792	CCTA-09-VCM-Pile1-N	9-2-98	NA	ND (0.022847)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.0356 J (0.4)
600792	CCTA-09-VCM-Pile1-S	9-2-98	NA	ND (0.022847)	ND (0.000047)	0.0718 J (0.1)	ND (0.003007)	0.0455 J (0.4)
600792	CCTA-09-VCM-Pile2-N	9-2-98	NA	ND (0.022847)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.241 J (0.4)
600792	CCTA-09-VCM-Pile2-S	9-2-98	NA	ND (0.022847)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.139 J (0.4)
600792	CCTA-09-VCM-Pile3-N	9-2-98	NA	ND (0.022847)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.326 J (0.4)
600792	CCTA-09-VCM-Pile3-S	9-2-98	NA	ND (0.022847)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.377 J (0.4)
600792	CCTA-09-VCM-Pile4-N	9-2-98	NA	ND (0.022847)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.575
600792	CCTA-09-VCM-Pile4-S	9-2-98	NA	ND (0.022847)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.600
600792	CCTA-09-VCM-Pile5-N	9-2-98	NA	ND (0.022847)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.378 J (0.4)
600792	CCTA-09-VCM-Pile5-S	9-2-98	NA	ND (0.022847)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.388 J (0.4)
600792	CCTA-09-VCM-Pile6-N	9-2-98	NA	ND (0.022847)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.228 J (0.4)
600792	CCTA-09-VCM-Pile6-S	9-2-98	NA	ND (0.022847)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.397 J (0.4)
600792	CCTA-09-VCM-Pile7-N	9-2-98	NA	ND (0.022847)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.426
600792	CCTA-09-VCM-Pile7-S	9-2-98	NA	ND (0.022847)	ND (0.000047)	ND (0.065761)	ND (0.003007)	1.01
600792	CCTA-09-VCM-Pile8-N	9-2-98	NA	ND (0.022847)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.0509 J (0.4)
600792	CCTA-09-VCM-Pile8-S	9-2-98	NA	0.0416 J (0.05)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.116 J (0.4)
600792	CCTA-09-VCM-Pile9-N	9-2-98	NA	0.124	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.561
600792	CCTA-09-VCM-Pile9-S	9-2-98	NA	0.115	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.498
600792	CCTA-09-VCM-Pile10-N	9-2-98	NA	0.0620	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.491
600792	CCTA-09-VCM-Pile10-S	9-2-98	NA	ND (0.022847)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.341 J (0.4)
600792	CCTA-09-VCM-Pile11-N	9-2-98	NA	ND (0.022847)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.993
600792	CCTA-09-VCM-Pile11-S	9-2-98	NA	0.0468 J (0.05)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.597
600792	CCTA-09-VCM-Pile12-N	9-2-98	NA	0.883	ND (0.000047)	ND (0.065761)	ND (0.003007)	2.56
600792	CCTA-09-VCM-Pile12-S	9-2-98	NA	0.107	ND (0.000047)	ND (0.065761)	ND (0.003007)	3.33
600792	CCTA-09-VCM-Pile13-N	9-2-98	NA	ND (0.022847)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.0379 J (0.4)
600792	CCTA-09-VCM-Pile13-S	9-2-98	NA	0.0448 J (0.05)	ND (0.000047)	ND (0.065761)	ND (0.003007)	0.102 J (0.4)
Maximum Concentration of Contaminants for the Toxicity Characteristic ^c				5.0	0.2	1.0	5.0	NE

Refer to footnotes at end of table.

Table B-2 (Concluded)
Summary of SWMU 9 Soil Pile Sampling TCLP Metals Analytical Results
September 1998
(Off-Site Laboratory)

^a EPA November 1986.

^b Analysis request/chain-of-custody record.

^c 40 CFR §261.24, Table 1, Maximum Concentration of Contaminants for the Toxicity Characteristic.

CCTA = Central Coyote Test Area.

CFR = Code of Federal Regulations.

EPA = U.S. Environmental Protection Agency.

ER = Environmental Restoration.

ft = Foot (feet).

ID = Identification.

J () = The reported value is greater than or equal to the method detection limit but is less than the practical quantitation limit, shown in parentheses.

mg/L = Milligram(s) per liter.

N = North side of pile.

NA = Not applicable.

NE = Not established for TCLP Analyses.

ND () = Not detected above the method detection limit, shown in parentheses.

RCRA = Resource Conservation and Recovery Act.

S = South side of pile.

SWMU = Solid Waste Management Unit.

TCLP = Toxicity Characteristic Leaching Procedure.

VCM = Voluntary Corrective Action.

Table B-3
 SWMU 9 Soil Pile Sampling VOC Analytical Results (EPA Method 8260)^a
 September 1998 and March 1999
 (Off-Site Laboratory)

Sample Attributes				Analyte ($\mu\text{g}/\text{kg}$)
Record Number ^b	ER Sample ID	Sample Date	Sample Depth	Methylene Chloride
601666	CCTA-09-VCM-Pile1-N	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile1-S	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile2-N	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile2-S	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile3-N	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile3-S	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile4-N	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile4-S	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile5-N	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile5-S	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile6-N	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile6-S	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile7-N	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile7-S	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile8-N	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile8-S	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile9-N	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile9-S	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile10-N	3-15-99	NA	ND (1.4)
601666	CCTA-09-VCM-Pile10-S	3-15-99	NA	ND (1.4)
601667	CCTA-09-VCM-Pile11-N	3-15-99	NA	ND (0.25)
601667	CCTA-09-VCM-Pile11-S	3-15-99	NA	2.4 J (5.00)
601667	CCTA-09-VCM-Pile12-N	3-15-99	NA	3.0 J (5.00)
601667	CCTA-09-VCM-Pile12-S	3-15-99	NA	3.6 J (5.00)
601667	CCTA-09-VCM-Pile13-N	3-15-99	NA	ND (0.25)
601667	CCTA-09-VCM-Pile13-S	3-15-99	NA	ND (0.25)
Quality Assurance/Quality Control Samples ($\mu\text{g}/\text{L}$)				
601667	CCTA-09-VCM-EB	3-15-99	NA	ND (1.2)
601667	CCTA-09-VCM-TB	3-15-99	NA	ND (1.2)
600792	CCTA-09-VCM-TB	9-2-98	NA	--

Note: Values in **bold** represent detected VOCs.

^aEPA November 1986.

^bAnalysis request/chain-of-custody record.

CCTA = Central Coyote Test Area.

EB = Equipment blank.

EPA = U.S. Environmental Protection Agency.

ER = Environmental restoration.

ID = Identification.

J = The reported value is greater than or equal to the method detection limit but is less than the practical quantitation limit, shown in parentheses.

$\mu\text{g}/\text{kg}$ = Microgram(s) per kilogram.

$\mu\text{g}/\text{L}$ = Microgram(s) per liter.

N = North side of pile.

NA = Not applicable.

ND () = Not detected above the method detection limit, shown in parentheses.

S = South side of pile.

SWMU = Solid Waste Management Unit.

TB = Trip blank.

VCM = Voluntary corrective measure.

VOC = Volatile organic compound.

-- = Not analyzed for.

Table B-4
 VOC Analytical Method Detection Limits (EPA Method 8260)^a
 Used for SWMU 9 Soil Pile Sampling
 September 1998 and March 1999
 (Off-Site Laboratory)

Analyte	Soil Sample MDL ($\mu\text{g}/\text{kg}$)	Aqueous Sample MDL ($\mu\text{g}/\text{L}$)
Acetone	2.2-10.3	3.7
Benzene	0.25-0.5	0.3-2.1
Bromoform	0.27-0.3	0.4
2-Butanone	2.1-3.2	5.9-9.3
Carbon disulfide	0.3-2.2	1.8
Carbon tetrachloride	0.22-0.5	0.2-1.6
Chlorobenzene	0.25-0.3	0.3-0.68
Chlorodibromomethane	0.2-0.21	0.3
Chloroethane	0.3-0.72	0.3
Chloroform	0.1-0.24	0.7-1.8
1,4-Dichlorobenzene	--	1.3
Dichlorobromomethane	0.1-0.24	0.4
1,1-Dichloroethane	0.1-0.2	0.4-1.4
1,2-Dichloroethane	0.2-0.23	0.2-2.2
1,1-Dichloroethylene	0.25-0.3	0.7-2.9
cis-1,2-Dichloroethylene	0.1-0.19	0.3
trans-1,2-Dichloroethylene	0.1-0.25	0.7-1.1
1,2-Dichloropropane	0.2-0.23	0.2-3.1
cis-1,3-Dichloropropylene	0.2-0.25	0.3
trans-1,3-Dichloropropylene	0.22-0.3	0.3
Ethylbenzene	0.23-0.3	0.3
2-Hexanone	2.8-4.4	3.2
Methyl bromide	0.3-0.67	0.4
Methyl chloride	0.2-0.43	0.2
Methylene chloride	0.25-1.4	1.2
4-Methyl-2-pentanone	2.9-3.1	1.6
Styrene	0.22-0.3	0.2
1,1,2,2-Tetrachloroethane	0.46-0.6	0.5
Tetrachloroethylene	0.23-0.4	0.7-1.9
Toluene	0.22-0.9	0.5
1,1,1-Trichloroethane	0.1-0.18	0.2-2.2
1,1,2-Trichloroethane	0.24-0.3	0.4
Trichloroethylene	0.27-0.3	0.6-1.9
Trichlorofluoromethane	--	2.1
Vinyl acetate	1.8-2.1	1.8
Vinyl chloride	0.4	0.4-3.3
Xylenes (total)	0.62-0.7	1.1

^aEPA November 1986.

EPA = U.S. Environmental Protection Agency.

MDL = Method detection limit.

$\mu\text{g}/\text{kg}$ = Microgram(s) per kilogram.

$\mu\text{g}/\text{L}$ = Microgram(s) per liter.

SWMU = Solid Waste Management Unit.

VOC = Volatile organic compound.

-- = Not analyzed for.

Table B-5
 VOC TCLP Analytical Method Detection Limits (EPA Method 8240)^a
 Used for SWMU 9 Soil Pile Sampling
 September 1998
 (Off-Site Laboratory)

Analyte	MDL ($\mu\text{g/L}$)
Benzene	0.66–2.1
Carbon tetrachloride	1.0–1.6
Chlorobenzene	0.68–0.73
Chloroform	0.74–1.8
1,4-Dichlorobenzene	0.61–1.3
1,1-Dichloroethane	0.85–1.4
1,2-Dichloroethane	0.48–2.2
1,1-Dichloroethene	1.2–2.9
1,2-Dichloropropane	0.73–3.1
cis-1,2-Dichloroethene	0.88–1.1
Methyl ethyl ketone (2-Butanone)	9.3–9.7
Tetrachloroethene	1.2–1.9
1,1,1-Trichloroethane	1.1–2.2
Trichloroethene	1.1–1.9
Trichlorofluoromethane	1.9–2.1
Vinyl chloride	2.7–3.3

^aEPA November 1986.

EPA = U.S. Environmental Protection Agency.

MDL = Method detection limit.

$\mu\text{g/L}$ = Microgram(s) per liter.

VOC = Volatile organic compound.

SWMU = Solid Waste Management Unit.

TCLP = Toxicity characteristic leaching procedure.

Table B-6
 Summary of SWMU 9 Soil Pile Sampling SVOC (EPA Method 8270)^a Analytical Results
 March 1999
 (Off-Site Laboratory)

Sample Attributes				Analyte ($\mu\text{g}/\text{kg}$)
Record Number ^b	ER Sample ID	Sample Date	Sample Depth	Anthracene
601666	CCTA-09-VCM-Pile1-N	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile1-S	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile2-N	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile2-S	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile3-N	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile3-S	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile4-N	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile4-S	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile5-N	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile5-S	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile6-N	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile6-S	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile7-N	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile7-S	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile8-N	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile8-S	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile9-N	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile9-S	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile10-N	3-15-99	NA	ND (88)
601666	CCTA-09-VCM-Pile10-S	3-15-99	NA	ND (88)
601667	CCTA-09-VCM-Pile11-N	3-15-99	NA	ND (88)
601667	CCTA-09-VCM-Pile11-S	3-15-99	NA	ND (88)
601667	CCTA-09-VCM-Pile12-N	3-15-99	NA	1100
601667	CCTA-09-VCM-Pile12-S	3-15-99	NA	140 J (333)
601667	CCTA-09-VCM-Pile13-N	3-15-99	NA	ND (88)
601667	CCTA-09-VCM-Pile13-S	3-15-99	NA	ND (88)
Quality Assurance/Quality Control Sample ($\mu\text{g}/\text{L}$)				
601667	CCTA-09-VCM-EB	3-15-99	NA	ND (2.3)

Note: Values in **bold** represent detected SVOCs.

^aEPA November 1986.

^bAnalysis request/chain-of-custody record.

CCTA = Central Coyote Test Area.

EB = Equipment blank.

EPA = U.S. Environmental Protection Agency.

ER = Environmental Restoration.

ID = Identification.

J = The reported value is greater than or equal to the method detection limit but is less than the practical quantitation limit, shown in parentheses.

$\mu\text{g}/\text{kg}$ = Microgram(s) per kilogram.

$\mu\text{g}/\text{L}$ = Microgram(s) per liter.

N = North side of pile.

NA = Not applicable.

ND () = Not detected above the method detection limit, shown in parentheses.

S = South side of pile.

SVOC = Semivolatile organic compound.

SWMU = Solid Waste Management Unit.

VCM = Voluntary corrective measure.

Table B-7
SVOC Analytical Method Detection Limits (EPA Method 8270)^a
Used for SWMU 9 Soil Pile Sampling
March 1999
(Off-Site Laboratory)

Analyte	Soil Sample MDL ($\mu\text{g}/\text{kg}$)	Aqueous Sample MDL ($\mu\text{g}/\text{L}$)
Acenaphthene	160	2.2
Acenaphthylene	147	1.3
Anthracene	88	2.3
Benzo(a)anthracene	68	2.8
Benzo(a)pyrene	72	2
Benzo(b)fluoranthene	142	4.7
Benzo(g,h,i)perylene	81	2.5
Benzo(k)fluoranthene	132	2.6
Benzoic acid	893	9.3
Benzyl alcohol	230	2.5
4-Bromophenyl phenyl ether	118	0.03
Butylbenzyl phthalate	90	3.7
4-Chloroaniline	155	1.5
Bis(2-chloroethoxy)methane	169	2.5
Bis(2-chloroethyl)ether	53	2
Bis(2-chloroisopropyl)ether	105	0.61
4-Chloro-3-methyl phenol	128	3.1
2-Chloronaphthalene	173	2.4
2-Chlorophenol	157	2.1
4-Chlorophenyl phenyl ether	146	2.8
Chrysene	55	2.2
m,p-Cresol	153	1.8
o-Cresol	63	2.1
Dibenzo(a,h)anthracene	83	2.2
Dibenzofuran	134	4.3
Di-n-butylphthalate	73	2.9
1,2-Dichlorobenzene	171	2.7
1,3-Dichlorobenzene	129	2.5
1,4-Dichlorobenzene	61	2.3
3,3'-Dichlorobenzidine	278	4.2
2,4-Dichlorophenol	176	1.4
Diethylphthalate	76	2.1
2,4-Dimethylphenol	109	6.1
Dimethylphthalate	109	2.1
2,4-Dinitrophenol	368	7.9
2,4-Dinitrotoluene	117	1.4
2,6-Dinitrotoluene	140	1.1
Di-n-octylphthalate	174	4.2
1,2-Diphenylhydrazine	57	2.3
Bis(2-ethylhexyl)phthalate	299	3.7
Fluoranthene	65	3.1
Fluorene	114	2.1
Hexachlorobenzene	70	2.9
Hexachlorobutadiene	153	3.8

Refer to footnotes at end of table.

Table B-7 (Concluded)
 SVOC Analytical Method Detection Limits (EPA Method 8270)^a
 Used for SWMU 9 Soil Pile Sampling
 March 1999
 (Off-Site Laboratory)

Analyte	Soil Sample MDL ($\mu\text{g}/\text{kg}$)	Aqueous Sample MDL ($\mu\text{g}/\text{L}$)
Hexachlorocyclopentadiene	193	4.4
Hexachloroethane	132	3.4
Ideno(1,2,3-cd)pyrene	80	3.4
Isophorone	146	2.6
2-Methyl-4,6-dinitrophenol	101	0.67
2-Methylnaphthalene	204	3.2
Naphthalene	157	2
m-Nitroaniline	83	1.8
o-Nitroaniline	67	2.8
p-Nitroaniline	103	1
Nitrobenzene	132	3.3
2-Nitrophenol	181	2.9
4-Nitrophenol	109	3.5
n-Nitrosodiphenylamine	21	5
n-Nitrosodipropylamine	129	5
Pentachlorophenol	57	2.8
Phenanthrene	60	1.8
Phenol	57	0.8
Pyrene	72	2.5
1,2,4-Trichlorobenzene	186	2.4
2,4,5-Trichlorophenol	154	2.5
2,4,6-Trichlorophenol	77	0.96

^aEPA November 1986.

EPA = U.S. Environmental Protection Agency.

MDL = Method detection limit.

$\mu\text{g}/\text{kg}$ = Microgram(s) per kilogram.

$\mu\text{g}/\text{L}$ = Microgram(s) per liter.

SVOC = Semivolatile organic compound.

SWMU = Solid Waste Management Unit.

Table B-8
SVOC TCLP Analytical Method Detection Limits (EPA Method 8270)^a
Used for SWMU 9 Soil Pile Sampling
September 1998
(Off-Site Laboratory)

Analyte	MDL ($\mu\text{g/L}$)
1,4-Dichlorobenzene	0.6-1.3
2,4-Dinitrotoluene	0.5-0.7
Hexachlorobenzene	0.5-0.9
Hexachlorobutadiene	0.5-0.9
Hexachloroethane	0.8-1.1
Nitrobenzene	0.5-1.0
Pyridine	1.4-10
m,p-Cresol	0.5-1.0
o-Cresol	0.6-3.0
Pentachlorophenol	2.3-3.7
2,4,5-Trichlorophenol	0.8-0.9
2,4,6-Trichlorophenol	0.6-2.3

^aEPA November 1986.

EPA = U.S. Environmental Protection Agency.

MDL = Method detection limit.

$\mu\text{g/L}$ = Microgram(s) per liter.

SVOC = Semivolatile organic compound.

SWMU = Solid Waste Management Unit.

TCLP = Toxicity characteristic leaching procedure.

Table B-9
Summary of SWMU 9 Soil Pile Sampling HE (EPA Method 8330)^a Analytical Results
May 2000
(Off-Site Laboratory)

Sample Attributes				Analyte ($\mu\text{g}/\text{kg}$)		
Record Number ^b	ER Sample ID	Date Sampled	Sample Depth	2-Amino-4,6-dinitrotoluene	4-Amino-2,6-dinitrotoluene	HMX
603272	CCTA-09-VCM-Pile1-N	5-1-00	NA	ND (13.4)	ND (10.1)	ND (16.8)
603272	CCTA-09-VCM-Pile1-S	5-1-00	NA	247	137	1690
603272	CCTA-09-VCM-Pile2-N	5-1-00	NA	481	277	1150
603272	CCTA-09-VCM-Pile2-S	5-1-00	NA	170	104	2530
603272	CCTA-09-VCM-Pile3-N	5-1-00	NA	ND (13.4)	ND (10.1)	1080
603272	CCTA-09-VCM-Pile3-S	5-1-00	NA	ND (13.4)	ND (10.1)	1690
603272	CCTA-09-VCM-Pile4-N	5-1-00	NA	104	ND (10.1)	1670
603272	CCTA-09-VCM-Pile4-N-DU	5-1-00	NA	214	132	1780
603272	CCTA-09-VCM-Pile4-S	5-1-00	NA	ND (13.4)	ND (10.1)	1080
603272	CCTA-09-VCM-Pile5-N	5-1-00	NA	479	255	3340
603272	CCTA-09-VCM-Pile5-S	5-1-00	NA	ND (13.4)	ND (10.1)	1100
603272	CCTA-09-VCM-Pile6-N	5-1-00	NA	ND (13.4)	ND (10.1)	937
603272	CCTA-09-VCM-Pile6-S	5-1-00	NA	82.1	ND (10.1)	623
603272	CCTA-09-VCM-Pile7-N	5-1-00	NA	ND (13.4)	ND (10.1)	278
603272	CCTA-09-VCM-Pile7-S	5-1-00	NA	ND (13.4)	ND (10.1)	2320
603272	CCTA-09-VCM-Pile8-N	5-1-00	NA	ND (13.4)	ND (10.1)	ND (16.8)
603272	CCTA-09-VCM-Pile8-N-DU	5-1-00	NA	ND (13.4)	ND (10.1)	ND (16.8)
603272	CCTA-09-VCM-Pile8-S	5-1-00	NA	ND (13.4)	ND (10.1)	147
603272	CCTA-09-VCM-Pile9-N	5-1-00	NA	ND (13.4)	ND (10.1)	992
603272	CCTA-09-VCM-Pile9-S	5-1-00	NA	199	178	2620
603273	CCTA-09-VCM-Pile10-N	5-1-00	NA	ND (13.4)	ND (10.1)	2350 J
603273	CCTA-09-VCM-Pile10-S	5-1-00	NA	ND (13.4)	ND (10.1)	891 J
603273	CCTA-09-VCM-Pile11-N	5-1-00	NA	1090	707	1670 J
603273	CCTA-09-VCM-Pile11-S	5-1-00	NA	184	133	1140 J
603273	CCTA-09-VCM-Pile12-N	5-1-00	NA	3120	1930	2350 J
603273	CCTA-09-VCM-Pile12-N-DU	5-1-00	NA	3680	2290	2220 J
603273	CCTA-09-VCM-Pile12-S	5-1-00	NA	143	140 J	664 J
603273	CCTA-09-VCM-Pile13-N	5-1-00	NA	ND (13.4)	ND (10.1)	578 J
603273	CCTA-09-VCM-Pile13-S	5-1-00	NA	ND (13.4)	ND (10.1)	532 J
Quality Assurance/Quality Control Sample ($\mu\text{g}/\text{L}$)						
603273	CCTA-09-VCM-EB	5-1-00	NA	ND (0.0777)	ND (0.0438)	ND (0.0261)

Refer to footnotes at end of table.

Table B-9 (Continued)
 Summary of SWMU 9 Soil Pile Sampling HE (EPA Method 8330)^a Analytical Results
 May 2000
 (Off-Site Laboratory)

Sample Attributes				Analyte ($\mu\text{g}/\text{kg}$)		
Record Number ^b	ER Sample ID	Date Sampled	Sample Depth	RDX	1,3,5-Trinitrobenzene	2,4,6-Trinitrotoluene
603272	CCTA-09-VCM-Pile1-N	5-1-00	NA	ND (12.5)	ND (11.9)	ND (14.1)
603272	CCTA-09-VCM-Pile1-S	5-1-00	NA	13000	ND (11.9)	84.9
603272	CCTA-09-VCM-Pile2-N	5-1-00	NA	1340	ND (11.9)	249
603272	CCTA-09-VCM-Pile2-S	5-1-00	NA	23200	ND (11.9)	97.5
603272	CCTA-09-VCM-Pile3-N	5-1-00	NA	255	ND (11.9)	ND (14.1)
603272	CCTA-09-VCM-Pile3-S	5-1-00	NA	2280	ND (11.9)	ND (14.1)
603272	CCTA-09-VCM-Pile4-N	5-1-00	NA	6770	ND (11.9)	ND (14.1)
603272	CCTA-09-VCM-Pile4-N-DU	5-1-00	NA	1810	ND (11.9)	ND (14.1)
603272	CCTA-09-VCM-Pile4-S	5-1-00	NA	1780	ND (11.9)	ND (14.1)
603272	CCTA-09-VCM-Pile5-N	5-1-00	NA	8840	ND (11.9)	138
603272	CCTA-09-VCM-Pile5-S	5-1-00	NA	1040	ND (11.9)	ND (14.1)
603272	CCTA-09-VCM-Pile6-N	5-1-00	NA	2460	ND (11.9)	ND (14.1)
603272	CCTA-09-VCM-Pile6-S	5-1-00	NA	948	ND (11.9)	ND (14.1)
603272	CCTA-09-VCM-Pile7-N	5-1-00	NA	300	ND (11.9)	ND (14.1)
603272	CCTA-09-VCM-Pile7-S	5-1-00	NA	6970	ND (11.9)	ND (14.1)
603272	CCTA-09-VCM-Pile8-N	5-1-00	NA	ND (12.5)	ND (11.9)	ND (14.1)
603272	CCTA-09-VCM-Pile8-N-DU	5-1-00	NA	ND (12.5)	ND (11.9)	ND (14.1)
603272	CCTA-09-VCM-Pile8-S	5-1-00	NA	193	ND (11.9)	ND (14.1)
603272	CCTA-09-VCM-Pile9-N	5-1-00	NA	3260	ND (11.9)	ND (14.1)
603272	CCTA-09-VCM-Pile9-S	5-1-00	NA	7920	ND (11.9)	120
603273	CCTA-09-VCM-Pile10-N	5-1-00	NA	513	ND (11.9)	88
603273	CCTA-09-VCM-Pile10-S	5-1-00	NA	4450	ND (11.9)	ND (14.1)
603273	CCTA-09-VCM-Pile11-N	5-1-00	NA	5450	ND (11.9)	704
603273	CCTA-09-VCM-Pile11-S	5-1-00	NA	4500	ND (11.9)	178
603273	CCTA-09-VCM-Pile12-N	5-1-00	NA	8550	137 J	2460
603273	CCTA-09-VCM-Pile12-N-DU	5-1-00	NA	22700	196	4800
603273	CCTA-09-VCM-Pile12-S	5-1-00	NA	2920	ND (11.9)	176
603273	CCTA-09-VCM-Pile13-N	5-1-00	NA	144	ND (11.9)	ND (14.1)
603273	CCTA-09-VCM-Pile13-S	5-1-00	NA	472	ND (11.9)	ND (14.1)
Quality Assurance/Quality Control Sample ($\mu\text{g}/\text{L}$)						
603273	CCTA-09-VCM-EB	5-1-00	NA	ND (0.0221)	ND (0.0555)	ND (0.0197)

Refer to footnotes at end of table.

Table B-9 (Concluded)
Summary of SWMU 9 Soil Pile Sampling HE (EPA Method 8330)^a Analytical Results
May 2000
(Off-Site Laboratory)

Note: Values in **bold** represent detected HE analytes.

^aEPA November 1986.

^bAnalysis request/chain-of-custody record.

CCTA = Central Coyote Test Area.

DU = Duplicate sample.

EB = Equipment blank.

EPA = U.S. Environmental Protection Agency.

ER = Environmental Restoration.

HE = High explosive(s).

HMX = 1,3,5,7-Tetranitro-1,3,5,7-tetrazacyclooctane.

ID = Identification.

J = Estimated value. See Data Validation Report.

$\mu\text{g}/\text{kg}$ = Microgram(s) per kilogram.

$\mu\text{g}/\text{L}$ = Microgram(s) per liter.

N = North side of pile.

NA = Not applicable.

ND () = Not detected above the method detection limit, shown in parentheses.

RDX = 1,3,5-Trinitro-1,3,5-triazacyclohexane.

S = South side of pile.

SWMU = Solid Waste Management Unit.

Tetryl = 2,4,6-Trinitrophenylmethylnitramine

VCM = Voluntary corrective measure.

Table B-10
 HE Analytical Method Detection Limits (EPA Method 8330)^a
 Used for SWMU 9 Soil Pile Sampling
 May 2000
 (Off-Site Laboratory)

Analyte	Soil Sample MDL ($\mu\text{g}/\text{kg}$)
1,3-Dinitrobenzene	13.4
2-Amino-4,6-dinitrotoluene	13.4
4-Amino-2,6-dinitrotoluene	10.1
2,4-Dinitrotoluene	12.0
2,6-Dinitrotoluene	15.7
HMX	16.8
Nitrobenzene	14.0
m-Nitrotoluene	11.6
o-Nitrotoluene	15.2
p-Nitrotoluene	11.6
RDX	12.5
Tetryl	15.5
1,3,5-Trinitrobenzene	11.9
2,4,6-Trinitrotoluene	14.1

^aEPA November 1986.

EPA = U.S. Environmental Protection Agency.

HE = High explosive(s).

HMX = 1,3,5,7-Tetranitro-1,3,5,7-tetrazacyclooctane.

MDL = Method detection limit.

$\mu\text{g}/\text{kg}$ = Microgram(s) per kilogram.

SWMU = Solid Waste Management Unit.

RDX = 1,3,5-Trinitro-1,3,5-triazacyclohexane.

Tetryl = 2,4,6-Trinitrophenylmethylnitramine.

Table B-11
 Summary of SWMU 9 Soil Pile Sampling Gamma Spectroscopy Analytical Results
 September 1998 and March 1999
 (Off-Site Laboratory, except where indicated)

Sample Attributes				Activity (pCi/g)							
Record Number ^a	ER Sample ID	Date Sampled	Sample Depth	Cesium-137		Cobalt-60		Uranium-235		Uranium-238	
				Result	Error ^b	Result	Error ^b	Result	Error ^b	Result	Error ^b
600793	CCTA-09-VCM-Pile1-N	9-2-98	NA	3E-01	2E-01	ND (0.0 J)	--	1E-01	1E-01	9.1E+00	3.4E+00
600795	CCTA-09-VCM-Pile1-N (on-site laboratory)	9-2-98	NA	7.90E-02	3.89E-02	ND (4.67E-02)	--	2.00E-01	1.16E-01	4.38E+00	9.24E-01
600793	CCTA-09-VCM-Pile1-S	9-2-98	NA	1E-01	1E-01	3E-01 J	1E-01	1E-01	1E-01	6.8E+00	2.8E+00
600793	CCTA-09-VCM-Pile2-N	9-2-98	NA	3E-01	2E-01	2E-01 J	1E-01	2E-01	1E-01	9.2E+00	1.7E+00
601668	CCTA-09-VCM-Pile2-N (on-site laboratory)	3-15-99	NA	5.47E-02	2.95E-02	ND (3.32E-02)	--	1.36E-01	1.78E-01	3.11E+00	2.90E+00
600793	CCTA-09-VCM-Pile2-S	9-2-98	NA	2E-01	1E-01	1E-01 J	1E-01	2E-01	1E-01	6.1E+00	4.3E+00
600793	CCTA-09-VCM-Pile3-N	9-2-98	NA	4E-01	2E-01	6E-01 J	3E-01	2E-01	1E-01	7.4E+00	3.0E+00
600793	CCTA-09-VCM-Pile3-S	9-2-98	NA	5E-01	1E-01	3E-01 J	1E-01	2E-01	1E-01	2.4E+00	4.2E+00
600793	CCTA-09-VCM-Pile4-N	9-2-98	NA	6E-01	2E-01	1E-01 J	1E-01	2E-01	1E-01	7.9E+00	2.4E+00
600793	CCTA-09-VCM-Pile4-S	9-2-98	NA	2E-01	1E-01	ND (1E-01 J)	--	3E-01	1E-01	9.3E+00 J	5.4E+00
600793	CCTA-09-VCM-Pile5-N	9-2-98	NA	4E-01	1E-01	3E-01 J	1E-01	2E-01	1E-01	7.4E+00	3.0E+00
600793	CCTA-09-VCM-Pile5-S	9-2-98	NA	4E-01	3E-01	ND (E+00 J)	--	4E-01	1E-01	3.8E+00	4.3E+00
600793	CCTA-09-VCM-Pile6-N	9-2-98	NA	4E-01	2E-01	1.1E+00 J	7E-01	5E-01	2E-01	2.42E+01	6.4E+00
601668	CCTA-09-VCM-Pile6-N (on-site laboratory)	3-15-99	NA	5.05E-02	3.82E-02	ND (3.52E-02)	--	1.26E-01	1.75E-01	ND (8.25E-01)	--
600795	CCTA-09-VCM-Pile6-N (on-site laboratory)	9-2-98	NA	7.85E-02	2.78E-02	ND (3.89E-02)	--	1.05E-01	9.19E-02	2.64E+00	5.98E-01
600793	CCTA-09-VCM-Pile6-S	9-2-98	NA	4E-01	3E-01	1E-01 J	1E-01	2E-01	1E-01	1.07E+01	6.7E+00
600793	CCTA-09-VCM-Pile7-N	9-2-98	NA	2E-01	1E-01	3E-01 J	1E-01	4E-01	1E-01	7.4E+00	2.3E+00
600793	CCTA-09-VCM-Pile7-S	9-2-98	NA	4E-01	2E-01	2E-01 J	1E-01	2E-01	1E-01	1.27E+01	3.3E+00
600793	CCTA-09-VCM-Pile8-N	9-2-98	NA	2E-01	1E-01	ND (E+00 J)	--	1E-01	1E-01	7.6E+00	1.9E+00
601668	CCTA-09-VCM-Pile8-N (on-site laboratory)	3-15-99	NA	1.61E-02	1.02E-02	ND (3.49E-02)	--	ND (2.50E-01)	--	1.57E+00	1.58E+00
600793	CCTA-09-VCM-Pile8-S	9-2-98	NA	3E-01	1E-01	2E-01 J	1E-01	1E-01	1E-01	5.0E+00	5.0E+00
601668	CCTA-09-VCM-Pile8-S (on-site laboratory)	3-15-99	NA	5.74E-02	3.90E-02	ND (3.46E-02)	--	ND (2.30E-01)	--	1.43E+00	6.42E-01
600793	CCTA-09-VCM-Pile9-N	9-2-98	NA	8E-01	2E-01	5E-01 J	3E-01	3E-01	1E-01	9.3E+00	2.6E+00
602867	CCTA-09-VCM-Pile9-N	10-18-99	NA	9.30E-02	2.34E-02	ND (2.96E-02)	--	ND (1.86E-01)	--	3.59E+00	3.12E+00
600793	CCTA-09-VCM-Pile9-S	9-2-98	NA	4E-01	1E-01	4E-01 J	1E-01	2E-01	1E-01	7.1E+00	6.3E+00
600793	CCTA-09-VCM-Pile10-N	9-2-98	NA	5E-01	4E-01	3E-01 J	2E-01	1E-01	1E-01	8.9E+00	3.2E+00
600793	CCTA-09-VCM-Pile10-S	9-2-98	NA	2E-01	1E-01	1E-01 J	1E-01	3E-01	1E-01	6.0E+00	3.6E+00
601668	CCTA-09-VCM-Pile10-S (on-site laboratory)	3-15-99	NA	4.79E-02	4.47E-02	ND (3.52E-02)	--	1.35E-01	1.79E-01	ND (8.50E-01)	--
600793	CCTA-09-VCM-Pile11-N	9-2-98	NA	4E-01	1E-01	2E-01	1E-01	1E-01	1E-01	8.1E+00	1.6E+00
600793	CCTA-09-VCM-Pile11-S	9-2-98	NA	1E-01	0.0	2E-01	1E-01	1E-01	1E-01	5.3E+00	4.8E+00
600793	CCTA-09-VCM-Pile12-N	9-2-98	NA	6E-01	3E-01	7E-01	3E-01	2E-01	1E-01	7.4E+00	2.1E+00
600793	CCTA-09-VCM-Pile12-S	9-2-98	NA	4E-01	2E-01	2E-01	1E-01	1E-01	1E-01	5.9E+00	5.3E+00
600793	CCTA-09-VCM-Pile13-N	9-2-98	NA	2E-01	1E-01	3E-01	1E-01	2E-01	1E-01	6.6E+00	1.6E+00

Refer to footnotes at end of table.

Table B-11 (Concluded)
 Summary of SWMU 9 Soil Pile Sampling Gamma Spectroscopy Analytical Results
 September 1998 and March 1999
 (Off-Site Laboratory, except where indicated)

Sample Attributes				Activity (pCi/g)							
Record Number ^a	ER Sample ID	Date Sampled	Sample Depth	Cesium-137		Cobalt-60		Uranium-235		Uranium-238	
				Result	Error ^b	Result	Error ^b	Result	Error ^b	Result	Error ^b
600795	CCTA-09-VCM-Pile13-N (on-site laboratory)	9-2-98	NA	ND (3.19E-02)	--	ND (5.38E-02)	--	ND (1.65E-01)	--	3.22E+00	7.39E-01
600793	CCTA-09-VCM-Pile13-S	9-2-98	NA	3E-01	2E-01	1E-01	0.0	2E-01	1E-01	8.3E+00	3.8E+00
601668	CCTA-09-VCM-Pile13-S (on-site laboratory)	3-15-99	NA	6.76E-02	3.84E-02	ND (3.37E-02)	--	ND (2.27E-01)	--	4.86E+00	4.88E+00
Background Soil Activities – Coyote Test Field ^c				7.9E-02 ^{d,e}		NE		1.8E-01		1.4E+00 ^d	
Quality Assurance/Quality Control Samples (pCi/mL)											
601668	CCTA-09-VCM-EB (on-site laboratory)	3-15-99	NA	ND (1.73E-02)	--	ND (2.11E-02)	--	ND (3.33E-01)	--	ND (1.27E-01)	--
602867	CCTA-09-VCM-000-EB	10-18-99	NA	ND (3.44E-01)	--	ND (1.85E-02)	--	ND (1.19E-01)	--	ND (3.08E-01)	--

Note: Values in **bold** exceed background soil activities.

^a Analysis request/chain-of-custody record.

^b Two standard deviations about the mean detected activity.

^c From Dinwiddie September 1997.

^d Southwest background activities are presented where Coyote Test Field background activities are not available.

^e The more conservative, lower subsurface background activity is used as a benchmark for consistency with current risk screening assessment methodology.

CCTA = Central Coyote Test Area.

EB = Equipment blank.

ER = Environmental Restoration.

ID = Identification.

J = Estimated value. See Data Validation report.

N = North side of soil pile.

NA = Not applicable.

ND () = Not detected at or above the method detection limit, shown in parentheses.

NE = Not established.

pCi/g = Picocurie(s) per gram.

pCi/mL = Picocurie(s) per milliliter.

S = South side of soil pile.

SWMU = Solid Waste Management Unit.

VCM = Voluntary corrective measure.

-- = Error not provided for nondetectable results.

Table B-12
Summary of SWMU 9 Soil Pile Sampling Isotopic Uranium and Thorium Analytical Results
September 1998
(Off-Site Laboratory)

Sample Attributes				Activity (pCi/g)							
Record Number ^a	ER Sample ID	Date Sampled	Sample Depth	Thorium-232		Uranium-234		Uranium-235		Uranium-238	
				Result	Error ^b	Result	Error ^b	Result	Error ^b	Result	Error ^b
600793	CCTA-09-VCM-Pile1-N	9-2-98	NA	8.80E-01	3.30E-01	1.71E+00	4.50E-01	ND (4.00E-02 J)	--	3.51E+00	7.20E-01
600793	CCTA-09-VCM-Pile1-S	9-2-98	NA	7.30E-01	2.80E-01	1.29E+00	1.23E+00	6.00E-02 J	7.00E-02	3.52E+00	6.90E-01
600793	CCTA-09-VCM-Pile2-N	9-2-98	NA	1.42E+00	5.00E-01	2.51E+00	3.80E-01	3.60E-01 J	1.70E-01	5.84E+00	1.05E+00
600793	CCTA-09-VCM-Pile2-S	9-2-98	NA	1.29E+00 J	4.80E-01	1.70E+00	2.40E-01	8.00E-02 J	8.00E-02	3.72E+00	7.10E-01
600793	CCTA-09-VCM-Pile3-N	9-2-98	NA	1.74E+00	5.70E-01	1.00E+00	3.70E-01	9.00E-02 J	8.00E-02	2.15E+00	4.90E-01
600793	CCTA-09-VCM-Pile3-S	9-2-98	NA	9.00E-01	3.60E-01	1.24E+00	2.70E-01	3.00E-02 J	6.00E-02	2.50E+00	5.80E-01
600793	CCTA-09-VCM-Pile4-N	9-2-98	NA	6.50E-01	3.10E-01	8.70E-01	4.30E-01	5.00E-02 J	6.00E-02	2.11E+00	4.80E-01
600793	CCTA-09-VCM-Pile4-S	9-2-98	NA	1.08E+00	3.80E-01	1.31E+00 J	3.00E-01	6.00E-02 J	7.00E-02	2.58E+00 J	5.60E-01
600793	CCTA-09-VCM-Pile5-N	9-2-98	NA	6.00E-01	2.60E-01	1.08E+00	4.40E-01	2.00E-02 J	6.00E-02	2.47E+00	5.60E-01
600793	CCTA-09-VCM-Pile5-S	9-2-98	NA	7.10E-01	3.50E-01	1.38E+00	3.50E-01	9.00E-02 J	1.00E-01	2.65E+00	6.00E-01
600793	CCTA-09-VCM-Pile6-N	9-2-98	NA	1.08E+00 J	4.90E-01	1.18E+00	3.20E-01	5.00E-02 J	6.00E-02	2.74E+00	5.70E-01
600793	CCTA-09-VCM-Pile6-S	9-2-98	NA	1.00E+00	3.60E-01	1.13E+00	4.30E-01	7.00E-02 J	9.00E-02	2.81E+00	6.50E-01
600793	CCTA-09-VCM-Pile7-N	9-2-98	NA	1.11E+00	4.10E-01	1.31E+00	5.60E-01	1.10E-01 J	9.00E-02	3.68E+00	7.20E-01
600793	CCTA-09-VCM-Pile7-S	9-2-98	NA	1.37E+00	6.80E-01	2.04E+00	2.40E-01	1.00E-01 J	1.10E-01	5.62E+00	1.02E+00
600793	CCTA-09-VCM-Pile8-N	9-2-98	NA	1.27E+00	4.10E-01	9.70E-01	6.10E-01	2.00E-02 J	6.00E-02	3.57E+00	7.40E-01
600793	CCTA-09-VCM-Pile8-S	9-2-98	NA	1.00E+00	3.40E-01	1.79E+00	5.30E-01	2.60E-01 J	1.50E-01	4.44E+00	9.10E-01
600793	CCTA-09-VCM-Pile9-N	9-2-98	NA	5.70E-01 J	3.50E-01	1.96E+00	3.70E-01	1.30E-01 J	9.00E-02	5.00E+00	8.60E-01
600793	CCTA-09-VCM-Pile9-S	9-2-98	NA	1.14E+00	5.50E-01	1.63E+00	2.50E-01	1.30E-01 J	1.00E-01	3.68E+00	7.10E-01
600793	CCTA-09-VCM-Pile10-N	9-2-98	NA	1.22E+00	5.20E-01	9.90E-01	3.60E-01	4.00E-02 J	6.00E-02	1.85E+00	4.70E-01
600793	CCTA-09-VCM-Pile10-S	9-2-98	NA	1.95E+00 J	7.50E-01	1.12E+00	4.00E-02	5.00E-02 J	7.00E-02	2.86E+00	6.10E-01
600793	CCTA-09-VCM-Pile11-N	9-2-98	NA	6.20E-01	3.30E-01	2.08E+00 J	2.40E-01	1.10E-01	1.00E-01	3.85E+00	7.70E-01
600793	CCTA-09-VCM-Pile11-S	9-2-98	NA	8.70E-01	3.90E-01	1.34E+00 J	1.34E+00	5.00E-02	6.00E-02	2.86E+00	5.80E-01
600793	CCTA-09-VCM-Pile12-N	9-2-98	NA	1.01E+00	4.20E-01	1.50E+00 J	3.80E-01	1.20E-01	1.10E-01	3.44E+00	7.40E-01
600793	CCTA-09-VCM-Pile12-S	9-2-98	NA	9.50E-01 J	4.20E-01	1.34E+00 J	2.90E-01	2.00E-02	5.00E-02	3.35E+00	6.40E-01
600793	CCTA-09-VCM-Pile13-N	9-2-98	NA	7.70E-01	2.90E-01	1.09E+00 J	5.60E-01	4.00E-02	6.00E-02	2.05E+00 J	4.70E-01
600793	CCTA-09-VCM-Pile13-S	9-2-98	NA	8.70E-01	3.30E-01	1.93E+00 J	3.42E+00	3.00E-02	9.00E-02	4.95E+00	9.30E-01
Background Soil Activities – Coyote Test Field ^c				1.01E+00 ^d	NA	1.6E+00 ^d	NA	1.8E-01	NA	1.4E+00 ^d	NA

Note: Values in **bold** exceed background soil activities.

^a Analysis request/chain-of-custody record.

^b Two standard deviations about the mean detected activity.

^c From Dinwiddie, September 1997.

^d Southwest background activities are presented where Coyote Test Field background activities are not available.

CCTA = Central Coyote Test Area.

ER = Environmental Restoration.

ID = Identification.

J = Estimated value. See Data Validation report.

N = North side of soil pile.

NA = Not applicable.

ND () = Not detected above the minimum detectable activity, shown in parentheses.

pCi/g = Picocurie(s) per gram.

S = South side of soil pile.

SWMU = Solid Waste Management Unit.

VCM = Voluntary corrective measure.

-- = Error not provided for nondetectable results.

Table B-13
 Summary of SWMU 9 Soil Pile Sampling Tritium Analytical Results
 September 1998 and October 1999
 (Off-Site Laboratory)

Sample Attributes				Activity (pCi/L)	
Record Number ^a	ER Sample ID	Date Sampled	Sample Depth	Result	Error ^b
600793	CCTA-09-VCM-Pile1-S	9-2-98	NA	342	175
600793	CCTA-09-VCM-Pile2-N	9-2-98	NA	679	273
602866	CCTA-09-VCM-Pile2-S	10-18-99	NA	300	195
602866	CCTA-09-VCM-Pile2-S-DU	10-18-99	NA	514	202
600793	CCTA-09-VCM-Pile3-S	9-2-98	NA	486	351
602866	CCTA-09-VCM-Pile9-N	10-18-99	NA	40.3	182
602866	CCTA-09-VCM-Pile9-N-DU	10-18-99	NA	241	194
600793	CCTA-09-VCM-Pile10-S	9-2-98	NA	721	351
Quality Assurance/Quality Control Sample (pCi/L)					
602866	CCTA-09-VCM-000-EB	10-18-99	NA	ND (87.6)	--

^aAnalysis request/chain-of-custody record.

^bTwo standard deviations about the mean detected activity.

CCTA = Central Coyote Test Area.

DU = Duplicate sample.

EB = Equipment blank.

ER = Environmental restoration.

ID = Identification.

N = North side of pile.

NA = Not applicable.

ND () = Not detected at or above the minimum detectable activity, shown in parentheses.

pCi/L = Picocurie(s) per liter.

S = South side of pile.

SWMU = Solid Waste Management Unit.

VCM = Voluntary corrective measure.

-- = Error not provided for nondetectable results.

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

9-04-98 8:00:31 AM

Analyzed by: *J* 9/4/98

Reviewed by: *JAM* 9/4/98

Customer : J.PAVLETICH/D.PERRY (6134/SMO)
 Customer Sample ID : 042430-001
 Lab Sample ID : 80181701

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 698.000 gram
 Sample Date/Time : 9-02-98 9:35:00 AM
 Acquire Start Date/Time : 9-03-98 12:53:31 PM
 Detector Name : LAR03
 Elapsed Live/Real Time : 6000 / 6003 seconds

File 1-N

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	4.38E+00	9.24E-01	4.75E-01
RA-226	Not Detected	-----	5.91E-01
PB-214	7.02E-01	2.82E-01	5.56E-02
BI-214	6.57E-01	3.33E-01	5.29E-02
PB-210	Not Detected	-----	5.31E+00
TH-232	9.72E-01	5.14E-01	1.76E-01
RA-228	9.81E-01	7.56E-01	1.81E-01
AC-228	9.34E-01	2.42E-01	1.21E-01
TH-228	9.78E-01	3.13E-01	4.88E-01
RA-224	1.11E+00	4.25E-01	3.18E-01
PB-212	9.48E-01	1.59E-01	4.08E-02
BI-212	1.03E+00	5.03E-01	3.44E-01
TL-208	9.31E-01	2.22E-01	7.77E-02
U-235	2.00E-01	1.16E-01	1.74E-01
TH-231	1.64E+00	1.73E+00	2.50E+00
PA-231	Not Detected	-----	4.09E+00
TH-227	Not Detected	-----	4.13E-01
RA-223	Not Detected	-----	1.67E-01
RN-219	Not Detected	-----	4.50E-01
PB-211	Not Detected	-----	1.04E+00
TL-207	Not Detected	-----	1.70E+01
AM-241	Not Detected	-----	1.87E-01
PU-239	Not Detected	-----	3.82E+02
NP-237	Not Detected	-----	2.11E-01
PA-233	Not Detected	-----	6.65E-02
TH-229	Not Detected	-----	2.23E-01

not detected
J 9/4/98

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	5.02E-02
AG-110m	Not Detected	-----	4.80E-02
BA-133	Not Detected	-----	7.06E-02
BE-7	Not Detected	-----	3.00E-01
CD-109	Not Detected	-----	7.16E-01
CD-115	Not Detected	-----	1.15E-01
CE-139	Not Detected	-----	3.00E-02
CE-141	Not Detected	-----	5.14E-02
CE-144	Not Detected	-----	2.24E-01
CO-56	Not Detected	-----	3.81E-02
CO-57	Not Detected	-----	2.67E-02
CO-58	Not Detected	-----	3.85E-02
CO-60	Not Detected	-----	4.67E-02
CR-51	Not Detected	-----	2.79E-01
CS-134	Not Detected	-----	6.22E-02
CS-137	7.90E-02	3.89E-02	3.09E-02
EU-152	Not Detected	-----	8.00E-02
EU-154	Not Detected	-----	2.33E-01
EU-155	Not Detected	-----	1.07E-01
FE-59	Not Detected	-----	8.71E-02
GD-153	Not Detected	-----	9.04E-02
HG-203	Not Detected	-----	3.49E-02
I-131	Not Detected	-----	3.65E-02
IR-192	Not Detected	-----	3.19E-02
K-40	2.16E+01	3.36E+00	3.39E-01
KR-85	Not Detected	-----	9.59E+00
MN-52	Not Detected	-----	4.06E-02
MN-54	Not Detected	-----	4.29E-02
MO-99	Not Detected	-----	3.96E-01
NA-22	Not Detected	-----	5.39E-02
NA-24	Not Detected	-----	1.50E-01
NB-95	Not Detected	-----	2.26E-01
ND-147	Not Detected	-----	2.41E-01
NI-57	Not Detected	-----	1.04E-01
NP-239	Not Detected	-----	1.12E-01
RU-103	Not Detected	-----	3.28E-02
RU-106	Not Detected	-----	3.50E-01
SB-122	Not Detected	-----	6.76E-02
SB-124	Not Detected	-----	3.96E-02
SB-125	Not Detected	-----	1.01E-01
SN-113	Not Detected	-----	4.28E-02
TA-182	Not Detected	-----	1.87E-01
TA-183	Not Detected	-----	1.84E-01
TC-99m	Not Detected	-----	6.71E-01
TL-201	Not Detected	-----	1.32E-01
XE-133	Not Detected	-----	1.38E-01
Y-88	Not Detected	-----	3.34E-02
ZN-65	Not Detected	-----	1.27E-01
ZR-95	Not Detected	-----	7.36E-02

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

9-04-98 8:25:38 AM

Analyzed by: *J 9/4/98* Reviewed by: *JM 9/4/98*

Customer : J.PAVLETICH/D.PERRY (6134/SMO)
 Customer Sample ID : 042440-001
 Lab Sample ID : 80181702

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 833.000 gram
 Sample Date/Time : 9-02-98 10:40:00 AM
 Acquire Start Date/Time : 9-03-98 2:53:03 PM
 Detector Name : LAB03
 Elapsed Live/Real Time : 6000 / 6003 seconds

Pile 6-N

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	2.64E+00	5.98E-01	4.20E-01
RA-226	Not Detected	-----	4.73E-01
PB-214	6.38E-01	1.22E-01	4.60E-02
BI-214	5.53E-01	1.27E-01	4.51E-02
PB-210	Not Detected	-----	4.48E+00
TH-232	8.01E-01	4.33E-01	1.51E-01
RA-228	9.18E-01	3.32E-01	1.62E-01
AC-228	8.61E-01	2.39E-01	8.56E-02
TH-228	7.04E-01	2.42E-01	4.81E-01
RA-224	8.53E-01	3.39E-01	2.70E-01
PB-212	8.64E-01	1.94E-01	3.45E-02
EI-212	9.65E-01	5.16E-01	3.87E-01
TL-208	7.68E-01	1.64E-01	6.28E-02
U-235	1.05E-01	9.19E-02	1.38E-01
TH-231	Not Detected	-----	2.20E+00
PA-231	Not Detected	-----	3.64E+00
TH-227	Not Detected	-----	3.58E-01
RA-223	Not Detected	-----	1.43E-01
RN-219	Not Detected	-----	3.97E-01
PB-211	Not Detected	-----	9.14E-01
TL-207	Not Detected	-----	1.55E+01
AM-241	Not Detected	-----	1.63E-01
PU-239	Not Detected	-----	3.49E+02
NP-237	Not Detected	-----	1.91E-01
PA-233	Not Detected	-----	6.01E-02
TH-229	Not Detected	-----	1.93E-01

[Summary Report] - Sample ID: : 80181702

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	4.42E-02
AG-110m	Not Detected	-----	4.24E-02
BA-133	Not Detected	-----	6.06E-02
BE-7	Not Detected	-----	2.69E-01
CD-109	2.96E+00	4.51E-01	6.49E-01
CD-115	Not Detected	-----	9.74E-02
CE-139	Not Detected	-----	2.66E-02
CE-141	Not Detected	-----	4.65E-02
CE-144	Not Detected	-----	1.96E-01
CO-56	Not Detected	-----	3.32E-02
CO-57	Not Detected	-----	2.41E-02
CO-58	Not Detected	-----	3.52E-02
CO-60	Not Detected	-----	3.89E-02
CR-51	Not Detected	-----	2.53E-01
CS-134	Not Detected	-----	5.23E-02
CS-137	7.85E-02	2.78E-02	2.46E-02
EU-152	Not Detected	-----	7.29E-02
EU-154	Not Detected	-----	2.05E-01
EU-155	Not Detected	-----	1.10E-01
FE-59	Not Detected	-----	8.31E-02
GD-153	Not Detected	-----	8.05E-02
HG-203	Not Detected	-----	3.12E-02
I-131	Not Detected	-----	3.21E-02
IR-192	Not Detected	-----	2.88E-02
K-40	2.25E+01	3.37E+00	2.77E-01
KR-85	Not Detected	-----	8.35E+00
MN-52	Not Detected	-----	3.79E-02
MN-54	Not Detected	-----	3.76E-02
MO-99	Not Detected	-----	3.51E-01
NA-22	Not Detected	-----	5.19E-02
NA-24	Not Detected	-----	1.31E-01
NB-95	Not Detected	-----	1.98E-01
ND-147	Not Detected	-----	2.16E-01
NI-57	Not Detected	-----	8.65E-02
NP-239	Not Detected	-----	1.01E-01
RU-103	Not Detected	-----	3.03E-02
RU-106	Not Detected	-----	3.12E-01
SB-122	Not Detected	-----	5.79E-02
SB-124	Not Detected	-----	3.28E-02
SB-125	Not Detected	-----	8.55E-02
SN-113	Not Detected	-----	3.62E-02
TA-182	Not Detected	-----	1.63E-01
TA-183	Not Detected	-----	1.63E-01
TC-99m	Not Detected	-----	6.87E-01
TL-201	Not Detected	-----	1.16E-01
XE-133	Not Detected	-----	1.23E-01
Y-88	Not Detected	-----	2.60E-02
ZN-65	Not Detected	-----	1.09E-01
ZR-95	Not Detected	-----	6.38E-02

not detected
J 9/4/58

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 9-03-98 6:21:10 PM *

* Analyzed by: *J* *9/4/98* Reviewed by: *JAM 9/4/98*

Customer : J.PAVLETICH/D.PERRY (613A SMO)
 Customer Sample ID : 042454-001
 Lab Sample ID : 80181703

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 581.000 gram
 Sample Date/Time : 9-02-98 12:10:00 PM
 Acquire Start Date/Time : 9-03-98 4:38:21 PM
 Detector Name : LAB03
 Elapsed Live/Real Time : 6000 / 6003 seconds

Pile 13-N

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	3.22E+00	7.39E-01	5.14E-01
RA-226	2.94E+00	9.19E-01	6.57E-01
PB-214	8.31E-01	1.51E-01	5.15E-02
BI-214	7.94E-01	2.31E-01	6.34E-02
PB-210	Not Detected	-----	5.64E+00
TH-232	1.12E+00	5.63E-01	1.99E-01
RA-228	1.03E+00	3.61E-01	2.31E-01
AC-228	1.04E+00	2.97E-01	1.04E-01
TH-228	1.12E+00	3.40E-01	5.63E-01
RA-224	9.47E-01	5.42E-01	3.86E-01
PB-212	1.09E+00	1.88E-01	4.86E-02
BI-212	1.11E+00	4.92E-01	4.13E-01
TL-208	9.98E-01	2.30E-01	9.22E-02
U-235	Not Detected	-----	1.65E-01
TH-231	Not Detected	-----	2.74E+00
PA-231	Not Detected	-----	4.44E+00
TH-227	Not Detected	-----	4.81E-01
RA-223	Not Detected	-----	1.84E-01
RN-219	Not Detected	-----	5.21E-01
PB-211	Not Detected	-----	1.20E+00
TL-207	Not Detected	-----	1.97E+01
AM-241	Not Detected	-----	2.03E-01
PU-239	Not Detected	-----	4.29E+02
NP-237	Not Detected	-----	2.36E-01
PA-233	Not Detected	-----	7.59E-02
TH-229	Not Detected	-----	2.38E-01

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	5.54E-02
AG-110m	Not Detected	-----	5.06E-02
BA-133	Not Detected	-----	8.19E-02
BE-7	7.99E-02	3.61E-02	1.65E-01
CD-109	2.22E+00	5.60E-01	7.99E-01
CD-115	Not Detected	-----	1.30E-01
CE-139	Not Detected	-----	3.31E-02
CE-141	Not Detected	-----	5.64E-02
CE-144	Not Detected	-----	2.42E-01
CO-56	Not Detected	-----	4.35E-02
CO-57	Not Detected	-----	2.93E-02
CO-58	Not Detected	-----	4.18E-02
CO-60	Not Detected	-----	5.38E-02
CR-51	Not Detected	-----	3.13E-01
CS-134	Not Detected	-----	7.36E-02
CS-137	Not Detected	-----	3.19E-02
EU-152	Not Detected	-----	8.73E-02
EU-154	Not Detected	-----	2.54E-01
EU-155	Not Detected	-----	1.37E-01
FE-59	Not Detected	-----	1.09E-01
GD-153	Not Detected	-----	9.76E-02
HG-203	Not Detected	-----	3.93E-02
I-131	Not Detected	-----	4.09E-02
IR-192	Not Detected	-----	3.51E-02
K-40	2.30E+01	3.58E+00	3.63E-01
KR-85	Not Detected	-----	1.11E+01
MN-52	Not Detected	-----	4.97E-02
MN-54	Not Detected	-----	2.02E-02
MO-99	Not Detected	-----	4.48E-01
NA-22	Not Detected	-----	6.27E-02
NA-24	Not Detected	-----	1.75E-01
NB-95	Not Detected	-----	2.66E-01
ND-147	Not Detected	-----	2.82E-01
NI-57	Not Detected	-----	1.21E-01
NP-239	Not Detected	-----	1.23E-01
RU-103	Not Detected	-----	3.64E-02
RU-106	Not Detected	-----	4.01E-01
SB-122	Not Detected	-----	7.62E-02
SB-124	Not Detected	-----	4.32E-02
SB-125	Not Detected	-----	1.12E-01
SN-113	Not Detected	-----	4.85E-02
TA-182	Not Detected	-----	2.19E-01
TA-183	Not Detected	-----	2.00E-01
TC-99m	Not Detected	-----	8.50E-01
TL-201	Not Detected	-----	1.48E-01
XE-133	Not Detected	-----	1.55E-01
Y-88	Not Detected	-----	3.87E-02
ZN-65	Not Detected	-----	1.48E-01
ZR-95	Not Detected	-----	8.23E-02

not detected
J 5/4/78

* Analyzed by: *J 9/3/98* Reviewed by: *SW 9/3/98* *

Customer : J.PAVLETICH/D.PERRY (6134/SMO)
 Customer Sample ID : LAB CONTROL SAMPLE USING CG134
 Lab Sample ID : 80181706

Sample Description : MIXED GAMMA STANDARD CG134
 Sample Quantity : 1.000 Each
 Sample Date/Time : 11-01-90 12:00:00 PM
 Acquire Start Date/Time : 9-03-98 12:40:07 PM
 Detector Name : LAB03
 Elapsed Live/Real Time : 600 / 606 seconds

Comments:

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	-----	2.99E+03
RA-226	Not Detected	-----	5.99E+03
PB-214	Not Detected	-----	7.63E+02
BI-214	Not Detected	-----	7.27E+02
PB-210	Not Detected	-----	4.46E+04
TH-232	Not Detected	-----	2.43E+03
RA-228	Not Detected	-----	3.05E+03
AC-228	Not Detected	-----	1.81E+03
TH-228	Not Detected	-----	1.23E+05
RA-224	Not Detected	-----	5.79E+03
PB-212	Not Detected	-----	8.49E+03
BI-212	Not Detected	-----	8.26E+04
TL-208	Not Detected	-----	1.82E+04
U-235	Not Detected	-----	1.46E+03
TH-231	Not Detected	-----	2.08E+04
PA-231	Not Detected	-----	3.40E+04
TH-227	Not Detected	-----	2.43E+03
RA-223	Not Detected	-----	1.00E+26
RN-219	Not Detected	-----	6.85E+03
PB-211	Not Detected	-----	1.54E+04
TL-207	Not Detected	-----	2.64E+05
AM-241	8.62E+04	1.42E+04	9.98E+02
PU-239	Not Detected	-----	2.32E+06
NP-237	Not Detected	-----	1.46E+03
PA-233	Not Detected	-----	6.78E+02
TH-229	Not Detected	-----	1.24E+03

[Summary Report] - Sample ID: : 80181706

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	-----	3.70E+02
AG-110m	Not Detected	-----	5.38E+06
BA-133	Not Detected	-----	7.95E+02
BE-7	Not Detected	-----	5.68E+19
CD-109	5.10E+05	5.84E+05	2.31E+05
CD-115	Not Detected	-----	1.00E+26
CE-139	Not Detected	-----	3.94E+08
CE-141	Not Detected	-----	1.00E+26
CE-144	Not Detected	-----	1.55E+06
CO-56	Not Detected	-----	6.41E+13
CO-57	Not Detected	-----	2.57E+05
CO-58	Not Detected	-----	5.80E+14
CO-60	7.94E+04	1.10E+04	4.75E+02
CR-51	Not Detected	-----	1.00E+26
CS-134	Not Detected	-----	4.73E+03
CS-137	7.04E+04	9.42E+03	3.18E+02
EU-152	Not Detected	-----	7.79E+02
EU-154	Not Detected	-----	3.08E+03
EU-155	Not Detected	-----	2.31E+03
FE-59	Not Detected	-----	2.19E+22
GD-153	Not Detected	-----	1.82E+06
HG-203	Not Detected	-----	9.83E+20
I-131	Not Detected	-----	1.00E+26
IR-192	Not Detected	-----	1.47E+14
K-40	Not Detected	-----	1.60E+03
KR-85	Not Detected	-----	1.29E+05
MN-52	Not Detected	-----	1.00E+26
MN-54	Not Detected	-----	2.36E+05
MO-99	Not Detected	-----	1.00E+26
NA-22	Not Detected	-----	2.04E+03
NA-24	Not Detected	-----	1.00E+26
NE-95	Not Detected	-----	1.00E+26
ND-147	Not Detected	-----	1.00E+26
NI-57	Not Detected	-----	1.00E+26
NP-239	Not Detected	-----	6.54E+02
RU-103	Not Detected	-----	1.00E+26
RU-106	Not Detected	-----	7.54E+05
SB-122	Not Detected	-----	1.00E+26
SB-124	Not Detected	-----	7.16E+16
SB-125	Not Detected	-----	9.42E+03
SN-113	Not Detected	-----	1.49E+10
TA-182	Not Detected	-----	4.24E+10
TA-183	Not Detected	-----	1.00E+26
TC-99m	Not Detected	-----	1.00E+26
TL-201	Not Detected	-----	1.00E+26
TE-133	Not Detected	-----	1.00E+26
Tl-88	Not Detected	-----	2.25E+10
TN-65	Not Detected	-----	3.45E+06
TR-95	Not Detected	-----	1.94E+16

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program *
 * Quality Assurance Report *

Report Date : 9-03-98 12:52:44 PM
 QA File : C:\GENIEPC\CAMFILES\LCS3.QAF
 Analyst : FCD
 Sample ID : 80181706
 Sample Quantity : 1.00 Each
 Sample Date : 11-01-90 12:00:00 PM
 Measurement Date : 9-03-98 12:40:07 PM
 Elapsed Live Time : 600 seconds
 Elapsed Real Time : 606 seconds

Parameter	Mean	1S Error	New Value	<	LU	:	SD	:	UD	:	BS	>
AM-241 Activity	8.695E-02	1.976E-03	8.619E-02	<	:	:	:	:	:	:	:	>
CS-137 Activity	6.901E-02	1.996E-03	7.044E-02	<	:	:	:	:	:	:	:	>
CO-60 Activity	7.911E-02	2.256E-03	8.044E-02	<	:	:	:	:	:	:	:	>

Flags Key: LU = Boundary Test (Ab = Above , Be = Below)
 SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
 UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
 BS = Measurement Bias Test (In = Investigate, Ac = Action)

Reviewed by: *J* *9/3/98*

 • Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 9-04-98 7:24:47 AM *

* Analyzed by: *J 9/4/98* Reviewed by: *JAM 9/4/98* *

Customer : J.PAVLETICH/D.PERRY (6134/SMO)
 Customer Sample ID : LAB CONTROL SAMPLE USING CG134
 Lab Sample ID : 80181707

Sample Description : MIXED GAMMA STANDARD CG134
 Sample Quantity, : 1.000 Each
 Sample Date/Time : 11-01-90 12:00:00 PM
 Acquire Start Date/Time : 9-04-98 7:12:47 AM
 Detector Name : LAB03
 Elapsed Live/Real Time : . 600 / 606 seconds

Comments:

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	-----	3.10E+03
RA-226	Not Detected	-----	6.00E+03
PB-214	Not Detected	-----	7.56E+02
BI-214	Not Detected	-----	7.18E+02
PB-210	Not Detected	-----	4.60E+04
TH-232	Not Detected	-----	2.44E+03
RA-228	Not Detected	-----	3.13E+03
AC-228	Not Detected	-----	1.84E+03
TH-228	Not Detected	-----	1.25E+05
RA-224	Not Detected	-----	5.20E+03
PB-212	Not Detected	-----	8.58E+03
BI-212	Not Detected	-----	8.40E+04
TL-208	Not Detected	-----	1.89E+04
U-235	Not Detected	-----	1.46E+03
TH-231	Not Detected	-----	2.06E+04
PA-231	Not Detected	-----	3.41E+04
TH-227	Not Detected	-----	2.49E+03
RA-223	Not Detected	-----	1.00E+26
RN-219	Not Detected	-----	6.85E+03
PB-211	Not Detected	-----	1.55E+04
TL-207	Not Detected	-----	2.62E+05
AM-241	8.77E+04	1.45E+04	9.79E+02
PU-239	Not Detected	-----	2.41E+06
NP-237	Not Detected	-----	1.49E+03
PA-233	Not Detected	-----	6.89E+02
TH-229	Not Detected	-----	1.26E+03

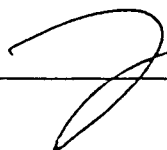
Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	-----	3.80E+02
AG-110m	Not Detected	-----	5.40E+06
BA-133	Not Detected	-----	7.87E+02
BE-7	Not Detected	-----	5.59E+19
CD-109	5.07E+05	2.13E+05	2.26E+05
CD-115	Not Detected	-----	1.00E+26
CE-139	Not Detected	-----	3.88E+08
CE-141	Not Detected	-----	1.00E+26
CE-144	Not Detected	-----	1.52E+06
CO-56	Not Detected	-----	6.43E+13
CO-57	Not Detected	-----	2.63E+05
CO-58	Not Detected	-----	5.71E+14
CO-60	8.05E+04	1.12E+04	6.08E+02
CR-51	Not Detected	-----	1.00E+26
CS-134	Not Detected	-----	4.73E+03
CS-137	7.07E+04	9.50E+03	3.21E+02
EU-152	Not Detected	-----	8.00E+02
EU-154	Not Detected	-----	3.15E+03
EU-155	Not Detected	-----	2.36E+03
FE-59	Not Detected	-----	2.23E+22
GD-153	Not Detected	-----	1.86E+06
HG-203	Not Detected	-----	9.85E+20
I-131	Not Detected	-----	1.00E+26
IR-192	Not Detected	-----	1.51E+14
K-40	Not Detected	-----	1.62E+03
KR-85	Not Detected	-----	1.31E+05
MN-52	Not Detected	-----	1.00E+26
MN-54	Not Detected	-----	2.31E+05
MO-99	Not Detected	-----	1.00E+26
NA-22	Not Detected	-----	1.99E+03
NA-24	Not Detected	-----	1.00E+26
NB-95	Not Detected	-----	1.00E+26
ND-147	Not Detected	-----	1.00E+26
NI-57	Not Detected	-----	1.00E+26
NP-239	Not Detected	-----	6.63E+02
RU-103	Not Detected	-----	1.00E+26
RU-106	Not Detected	-----	7.11E+05
SB-122	Not Detected	-----	1.00E+26
SB-124	Not Detected	-----	6.97E+16
SB-125	Not Detected	-----	9.06E+03
SN-113	Not Detected	-----	1.55E+10
TA-182	Not Detected	-----	4.06E+10
TA-183	Not Detected	-----	1.00E+26
TC-99m	Not Detected	-----	1.00E+26
TL-201	Not Detected	-----	1.00E+26
XE-133	Not Detected	-----	1.00E+26
Y-88	Not Detected	-----	2.30E+10
ZN-65	Not Detected	-----	3.34E+06
ZR-95	Not Detected	-----	1.89E+16

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program *
 * Quality Assurance Report *

Report Date : 9-04-98 7:25:26 AM
 QA File : C:\GENIEPC\CAMFILES\LCS3.QAF
 Analyst : KIC
 Sample ID : 80181707
 Sample Quantity, : 1.00 Each
 Sample Date : 11-01-90 12:00:00 PM
 Measurement Date : 9-04-98 7:12:47 AM
 Elapsed Live Time : 600 seconds
 Elapsed Real Time : 606 seconds

Parameter	Mean	1S Error	New Value	< LU	: SD	: UD	: BS	>
AM-241 Activity	8.695E-02	1.974E-03	8.772E-02	<	:	:	:	>
CS-137 Activity	6.902E-02	1.995E-03	7.071E-02	<	:	:	:	>
CO-60 Activity	7.911E-02	2.253E-03	8.074E-02	<	:	:	:	>

Flags Key: LU = Boundary Test (Ab = Above, Be = Below)
 SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
 UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
 BS = Measurement Bias Test (In = Investigate, Ac = Action)

Reviewed by:  9/4/98

3/17/99 8:20:43 AM

Analyzed by: *J*

3/17/99

Reviewed by: *W*

3/17/99

Customer : C.BYRD/D.PERRY (6134/SMO)
 Customer Sample ID : 045148-001
 Lab Sample ID : 90059301

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 665.000 gram
 Sample Date/Time : 3/15/99 11:30:00 AM
 Acquire Start Date/Time : 3/16/99 3:31:04 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	3.11E+000	2.90E+000	6.41E-001
RA-226	2.14E+000	8.45E-001	5.44E-001
PB-214	5.49E-001	1.12E-001	4.62E-002
BI-214	5.11E-001	8.42E-002	4.92E-002
PB-210	Not Detected	-----	3.64E+001
TH-232	8.19E-001	4.54E-001	1.62E-001
RA-228	8.93E-001	2.96E-001	1.42E-001
AC-228	7.79E-001	2.15E-001	8.16E-002
TH-228	8.46E-001	2.86E-001	4.51E-001
RA-224	7.52E-001	1.92E-001	6.97E-002
PB-212	7.77E-001	2.98E-001	3.95E-002
BI-212	8.81E-001	4.02E-001	2.98E-001
TL-208	7.29E-001	1.76E-001	5.93E-002
U-235	1.36E-001	1.78E-001	2.28E-001
TH-231	Not Detected	-----	1.93E+000
PA-231	Not Detected	-----	1.34E+000
TH-227	Not Detected	-----	3.57E-001
RA-223	Not Detected	-----	2.12E-001
RN-219	Not Detected	-----	3.51E-001
PB-211	Not Detected	-----	7.92E-001
TL-207	Not Detected	-----	1.32E+001
AM-241	Not Detected	-----	5.02E-001
PU-239	Not Detected	-----	4.16E+002
NP-237	Not Detected	-----	2.99E-001
PA-233	Not Detected	-----	5.38E-002
TH-229	Not Detected	-----	2.74E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 90059301

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.29E-002
AG-110m	Not Detected	-----	3.26E-002
BA-133	Not Detected	-----	5.68E-002
BE-7	Not Detected	-----	2.35E-001
CD-109	Not Detected	-----	1.01E+000
CD-115	Not Detected	-----	9.24E-002
CE-139	Not Detected	-----	2.85E-002
CE-141	Not Detected	-----	5.00E-002
CE-144	Not Detected	-----	2.22E-001
CO-56	Not Detected	-----	3.20E-002
CO-57	Not Detected	-----	3.00E-002
CO-58	Not Detected	-----	3.05E-002
CO-60	Not Detected	-----	3.32E-002
CR-51	Not Detected	-----	2.18E-001
CS-134	Not Detected	-----	3.32E-002
CS-137	5.47E-002	2.95E-002	2.49E-002
EU-152	Not Detected	-----	9.03E-002
EU-154	Not Detected	-----	1.62E-001
EU-155	Not Detected	-----	1.47E-001
FE-59	Not Detected	-----	6.75E-002
GD-153	Not Detected	-----	1.18E-001
HG-203	Not Detected	-----	2.89E-002
I-131	Not Detected	-----	3.01E-002
IR-192	Not Detected	-----	2.65E-002
K-40	2.07E+001	2.97E+000	2.45E-001
MN-52	Not Detected	-----	3.12E-002
MN-54	Not Detected	-----	3.40E-002
MO-99	Not Detected	-----	3.14E-001
NA-22	Not Detected	-----	3.98E-002
NA-24	Not Detected	-----	1.18E-001
NB-95	Not Detected	-----	1.94E-001
ND-147	Not Detected	-----	1.98E-001
NI-57	Not Detected	-----	4.15E-002
RU-103	Not Detected	-----	2.78E-002
RU-106	Not Detected	-----	2.62E-001
SB-122	Not Detected	-----	4.96E-002
SB-124	Not Detected	-----	2.74E-002
SB-125	Not Detected	-----	8.03E-002
SN-113	Not Detected	-----	3.49E-002
SR-85	Not Detected	-----	3.37E-002
TA-182	Not Detected	-----	1.45E-001
TA-183	Not Detected	-----	5.01E-001
TC-99m	Not Detected	-----	7.55E-001
TL-201	Not Detected	-----	2.31E-001
XE-133	Not Detected	-----	2.08E-001
Y-88	Not Detected	-----	2.24E-002
ZN-65	Not Detected	-----	9.32E-002
ZR-95	Not Detected	-----	5.28E-002

* Analyzed by:  3/17/99 Reviewed by:  3/17/99 *

Customer : C.BYRD/D.PERRY (6134/SMO)
 Customer Sample ID : 045156-001
 Lab Sample ID : 90059302

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 688.000 gram
 Sample Date/Time : 3/15/99 12:10:00 PM
 Acquire Start Date/Time : 3/16/99 5:12:51 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	8.25E-001
RA-226	1.98E+000	8.33E-001	5.04E-001
PB-214	5.86E-001	1.25E-001	4.00E-002
BI-214	5.57E-001	1.24E-001	4.41E-002
PB-210	Not Detected	-----	3.51E+001
TH-232	9.02E-001	4.58E-001	1.27E-001
RA-228	7.45E-001	2.67E-001	1.31E-001
AC-228	8.11E-001	2.18E-001	8.19E-002
TH-228	7.85E-001	6.71E-001	4.93E-001
RA-224	9.07E-001	2.24E-001	6.10E-002
PB-212	8.08E-001	4.15E-001	3.58E-002
BI-212	9.46E-001	4.47E-001	3.02E-001
TL-208	7.27E-001	1.65E-001	6.44E-002
U-235	1.26E-001	1.75E-001	2.23E-001
TH-231	Not Detected	-----	1.90E+000
PA-231	Not Detected	-----	1.31E+000
TH-227	Not Detected	-----	3.61E-001
RA-223	Not Detected	-----	2.04E-001
RN-219	Not Detected	-----	3.53E-001
PB-211	Not Detected	-----	7.87E-001
TL-207	Not Detected	-----	1.29E+001
AM-241	Not Detected	-----	5.04E-001
PU-239	Not Detected	-----	4.18E+002
NP-237	Not Detected	-----	3.81E-001
PA-233	Not Detected	-----	5.52E-002
TH-229	Not Detected	-----	2.74E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 90059302

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.38E-002
AG-110m	Not Detected	-----	3.27E-002
BA-133	Not Detected	-----	5.60E-002
BE-7	Not Detected	-----	2.33E-001
CD-109	Not Detected	-----	8.01E-001
CD-115	Not Detected	-----	9.16E-002
CE-139	Not Detected	-----	2.83E-002
CE-141	Not Detected	-----	4.93E-002
CE-144	Not Detected	-----	2.22E-001
CO-56	Not Detected	-----	3.10E-002
CO-57	Not Detected	-----	2.99E-002
CO-58	Not Detected	-----	2.91E-002
CO-60	Not Detected	-----	3.52E-002
CR-51	Not Detected	-----	2.18E-001
CS-134	Not Detected	-----	3.34E-002
CS-137	5.05E-002	3.82E-002	2.23E-002
EU-152	Not Detected	-----	8.87E-002
EU-154	Not Detected	-----	1.62E-001
EU-155	Not Detected	-----	1.39E-001
FE-59	Not Detected	-----	7.16E-002
GD-153	Not Detected	-----	1.13E-001
HG-203	Not Detected	-----	2.96E-002
I-131	Not Detected	-----	2.99E-002
IR-192	Not Detected	-----	2.57E-002
K-40	2.09E+001	2.96E+000	2.41E-001
MN-52	Not Detected	-----	3.05E-002
MN-54	Not Detected	-----	3.38E-002
MO-99	Not Detected	-----	2.97E-001
NA-22	Not Detected	-----	3.87E-002
NA-24	Not Detected	-----	1.22E-001
NE-95	Not Detected	-----	1.97E-001
ND-147	Not Detected	-----	1.87E-001
NI-57	Not Detected	-----	7.90E-002
RU-103	Not Detected	-----	2.69E-002
RU-106	Not Detected	-----	2.53E-001
SB-122	Not Detected	-----	5.22E-002
SB-124	Not Detected	-----	2.56E-002
SB-125	Not Detected	-----	8.08E-002
SN-113	Not Detected	-----	3.68E-002
SR-85	Not Detected	-----	3.46E-002
TA-182	Not Detected	-----	1.36E-001
TA-183	Not Detected	-----	5.06E-001
TC-99m	Not Detected	-----	8.11E-001
TL-201	Not Detected	-----	2.40E-001
XE-133	Not Detected	-----	2.01E-001
Y-88	Not Detected	-----	2.20E-002
ZN-65	Not Detected	-----	8.95E-002
ZR-95	Not Detected	-----	5.32E-002

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 3/16/99 8:34:52 PM *

* Analyzed by: *J* 3/17/99 Reviewed by: *W* 3/17/99 *

Customer : C.BYRD/D.PERRY (6134/SMO)
 Customer Sample ID : 045160-001
 Lab Sample ID : 90059303

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 588.000 gram
 Sample Date/Time : 3/15/99 12:30:00 PM
 Acquire Start Date/Time : 3/16/99 6:54:38 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	1.57E+000	1.58E+000	6.86E-001
RA-226	2.13E+000	9.89E-001	6.51E-001
PB-214	6.07E-001	1.69E-001	4.47E-002
BI-214	5.74E-001	1.48E-001	4.87E-002
PB-210	Not Detected	-----	3.92E+001
TH-232	9.38E-001	5.31E-001	1.64E-001
RA-228	9.98E-001	3.56E-001	1.40E-001
AC-228	9.61E-001	2.48E-001	9.62E-002
TH-228	9.49E-001	7.41E-001	5.45E-001
RA-224	1.09E+000	2.68E-001	6.74E-002
PB-212	9.34E-001	1.71E-001	4.29E-002
BI-212	1.15E+000	6.85E-001	3.44E-001
TL-208	8.62E-001	1.95E-001	6.91E-002
U-235	Not Detected	-----	2.50E-001
TH-231	Not Detected	-----	2.18E+000
PA-231	Not Detected	-----	1.48E+000
TH-227	Not Detected	-----	4.13E-001
RA-223	Not Detected	-----	2.26E-001
RN-219	Not Detected	-----	3.90E-001
PB-211	Not Detected	-----	8.45E-001
TL-207	Not Detected	-----	1.32E+001
AM-241	Not Detected	-----	5.44E-001
PU-239	Not Detected	-----	4.69E+002
NP-237	Not Detected	-----	3.51E-001
PA-233	Not Detected	-----	5.88E-002
TH-229	Not Detected	-----	2.85E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 90059303

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.94E-002
AG-110m	Not Detected	-----	3.31E-002
BA-133	Not Detected	-----	6.10E-002
BE-7	Not Detected	-----	2.55E-001
CD-109	2.25E+000	1.72E+000	1.19E+000
CD-115	Not Detected	-----	1.06E-001
CE-139	Not Detected	-----	3.01E-002
CE-141	Not Detected	-----	5.56E-002
CE-144	Not Detected	-----	2.51E-001
CO-56	Not Detected	-----	3.65E-002
CO-57	Not Detected	-----	3.24E-002
CO-58	Not Detected	-----	3.30E-002
CO-60	Not Detected	-----	3.49E-002
CR-51	Not Detected	-----	2.42E-001
CS-134	Not Detected	-----	3.73E-002
CS-137	1.61E-002	1.02E-002	2.24E-002
EU-152	Not Detected	-----	9.69E-002
EU-154	Not Detected	-----	1.92E-001
EU-155	Not Detected	-----	1.65E-001
FE-59	Not Detected	-----	7.40E-002
GD-153	Not Detected	-----	1.23E-001
HG-203	Not Detected	-----	3.34E-002
I-131	Not Detected	-----	3.28E-002
IR-192	Not Detected	-----	2.83E-002
K-40	1.98E+001	2.87E+000	2.60E-001
MN-52	Not Detected	-----	3.86E-002
MN-54	Not Detected	-----	3.52E-002
MO-99	Not Detected	-----	3.23E-001
NA-22	Not Detected	-----	4.52E-002
NA-24	Not Detected	-----	1.34E-001
NB-95	Not Detected	-----	2.29E-001
ND-147	Not Detected	-----	2.10E-001
NI-57	Not Detected	-----	8.40E-002
RU-103	Not Detected	-----	2.85E-002
RU-106	Not Detected	-----	2.89E-001
SB-122	Not Detected	-----	5.76E-002
SB-124	Not Detected	-----	3.11E-002
SB-125	Not Detected	-----	8.72E-002
SN-113	Not Detected	-----	3.71E-002
SR-85	Not Detected	-----	3.95E-002
TA-182	Not Detected	-----	1.50E-001
TA-183	Not Detected	-----	5.51E-001
TC-99m	Not Detected	-----	1.07E+000
TL-201	Not Detected	-----	2.58E-001
XE-133	Not Detected	-----	2.30E-001
Y-88	Not Detected	-----	3.04E-002
ZN-65	Not Detected	-----	1.01E-001
ZR-95	Not Detected	-----	6.03E-002

Not detected
J 3/17/55

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 3/17/99 9:09:52 AM *

* Analyzed by:  3/17/99 Reviewed by:  3/17/99 *

Customer : C.BYRD/D.PERRY (6134/SMO)
 Customer Sample ID : 045161-001
 Lab Sample ID : 90059304

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 648.000 gram
 Sample Date/Time : 3/15/99 12:35:00 PM
 Acquire Start Date/Time : 3/16/99 8:36:25 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	1.43E+000	6.42E-001	6.44E-001
RA-226	1.82E+000	9.97E-001	5.58E-001
PB-214	6.36E-001	1.37E-001	4.66E-002
BI-214	5.49E-001	1.20E-001	4.51E-002
PB-210	Not Detected	-----	3.75E+001
TH-232	8.42E-001	4.34E-001	1.55E-001
RA-228	9.21E-001	3.22E-001	1.28E-001
AC-228	8.69E-001	6.01E-001	7.92E-002
TH-228	1.01E+000	3.86E-001	4.40E-001
RA-224	8.58E-001	2.15E-001	5.70E-002
PB-212	8.25E-001	1.53E-001	3.91E-002
BI-212	7.95E-001	5.68E-001	3.00E-001
TL-208	7.63E-001	1.80E-001	6.77E-002
U-235	Not Detected	-----	2.30E-001
TH-231	Not Detected	-----	1.92E+000
PA-231	Not Detected	-----	1.35E+000
TH-227	Not Detected	-----	3.73E-001
RA-223	Not Detected	-----	2.19E-001
RN-219	Not Detected	-----	3.51E-001
PB-211	Not Detected	-----	8.10E-001
TL-207	Not Detected	-----	1.24E+001
AM-241	Not Detected	-----	5.16E-001
FU-239	Not Detected	-----	4.29E+002
NP-237	Not Detected	-----	3.09E-001
PA-233	Not Detected	-----	5.53E-002
TH-229	Not Detected	-----	2.70E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.43E-002
AG-110m	Not Detected	-----	3.42E-002
BA-133	Not Detected	-----	5.84E-002
BE-7	Not Detected	-----	2.36E-001
CD-109	1.62E+000	7.61E-001	1.05E+000
CD-115	Not Detected	-----	9.78E-002
CE-139	Not Detected	-----	2.91E-002
CE-141	Not Detected	-----	5.10E-002
CE-144	Not Detected	-----	2.31E-001
CO-56	Not Detected	-----	3.28E-002
CO-57	Not Detected	-----	2.96E-002
CO-58	Not Detected	-----	3.08E-002
CO-60	Not Detected	-----	3.46E-002
CR-51	Not Detected	-----	2.32E-001
CS-134	Not Detected	-----	3.49E-002
CS-137	5.74E-002	3.90E-002	2.37E-002
EU-152	Not Detected	-----	8.86E-002
EU-154	Not Detected	-----	1.68E-001
EU-155	Not Detected	-----	1.46E-001
FE-59	Not Detected	-----	6.95E-002
GD-153	Not Detected	-----	1.14E-001
HG-203	Not Detected	-----	3.20E-002
I-131	Not Detected	-----	3.25E-002
IR-192	Not Detected	-----	2.64E-002
K-40	1.95E+001	2.82E+000	2.55E-001
MN-52	Not Detected	-----	3.62E-002
MN-54	Not Detected	-----	3.30E-002
MO-99	Not Detected	-----	3.15E-001
NA-22	Not Detected	-----	4.01E-002
NA-24	Not Detected	-----	1.25E-001
NB-95	Not Detected	-----	2.09E-001
ND-147	Not Detected	-----	2.05E-001
NI-57	Not Detected	-----	8.41E-002
RU-103	Not Detected	-----	2.83E-002
RU-106	Not Detected	-----	2.62E-001
SB-122	Not Detected	-----	5.28E-002
SB-124	Not Detected	-----	2.99E-002
SB-125	Not Detected	-----	8.01E-002
SN-113	Not Detected	-----	3.64E-002
SR-85	Not Detected	-----	3.35E-002
TA-182	Not Detected	-----	1.54E-001
TA-183	Not Detected	-----	5.27E-001
TC-99m	Not Detected	-----	1.19E+000
TL-201	Not Detected	-----	2.47E-001
XE-133	Not Detected	-----	2.14E-001
Y-88	Not Detected	-----	2.54E-002
ZN-65	Not Detected	-----	9.74E-002
ZR-95	Not Detected	-----	5.25E-002

not detected
J 3/17/99

* Analyzed by: *J* 3/17/99 Reviewed by: *J* 3/17/99 *

Customer : C.BYRD/D.PERRY (6134/SMO)
 Customer Sample ID : 045165-001
 Lab Sample ID : 90059305

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 703.000 gram
 Sample Date/Time : 3/15/99 12:55:00 PM
 Acquire Start Date/Time : 3/16/99 10:18:13 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	8.50E-001
RA-226	2.15E+000	8.26E-001	5.30E-001
PB-214	6.70E-001	1.35E-001	4.70E-002
BI-214	6.08E-001	1.34E-001	4.25E-002
PB-210	Not Detected	-----	3.66E+001
TH-232	9.44E-001	4.95E-001	1.39E-001
RA-228	9.23E-001	2.87E-001	1.26E-001
AC-228	9.03E-001	2.46E-001	8.54E-002
TH-228	1.08E+000	3.36E-001	4.42E-001
RA-224	1.00E+000	2.44E-001	6.93E-002
PB-212	9.11E-001	2.84E-001	3.89E-002
BI-212	9.81E-001	6.23E-001	2.98E-001
TL-208	8.08E-001	1.83E-001	6.03E-002
U-235	1.35E-001	1.79E-001	2.28E-001
TH-231	Not Detected	-----	1.95E+000
PA-231	Not Detected	-----	1.34E+000
TH-227	Not Detected	-----	3.72E-001
RA-223	Not Detected	-----	2.16E-001
RN-219	Not Detected	-----	3.61E-001
PB-211	Not Detected	-----	8.07E-001
TL-207	Not Detected	-----	1.28E+001
AM-241	Not Detected	-----	5.03E-001
PU-239	Not Detected	-----	4.29E+002
NP-237	6.68E-001	2.38E-001	3.04E-001
PA-233	Not Detected	-----	5.48E-002
TH-229	Not Detected	-----	2.62E-001

not detected
J 3/17/99

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 90059305

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.52E-002
AG-110m	Not Detected	-----	3.22E-002
BA-133	Not Detected	-----	5.77E-002
BE-7	Not Detected	-----	2.42E-001
CD-109	Not Detected	-----	1.03E+000
CD-115	Not Detected	-----	9.96E-002
CE-139	Not Detected	-----	2.96E-002
CE-141	Not Detected	-----	5.03E-002
CE-144	Not Detected	-----	2.29E-001
CO-56	Not Detected	-----	2.98E-002
CO-57	Not Detected	-----	3.03E-002
CO-58	Not Detected	-----	3.03E-002
CO-60	Not Detected	-----	3.52E-002
CR-51	Not Detected	-----	2.28E-001
CS-134	Not Detected	-----	3.40E-002
CS-137	4.79E-002	4.47E-002	2.18E-002
EU-152	Not Detected	-----	9.07E-002
EU-154	Not Detected	-----	1.73E-001
EU-155	Not Detected	-----	1.50E-001
FE-59	Not Detected	-----	6.85E-002
GD-153	Not Detected	-----	1.11E-001
HG-203	Not Detected	-----	3.02E-002
I-131	Not Detected	-----	3.07E-002
IR-192	Not Detected	-----	2.59E-002
K-40	2.13E+001	3.03E+000	2.44E-001
MN-52	Not Detected	-----	3.44E-002
MN-54	Not Detected	-----	1.88E-002
MO-99	Not Detected	-----	3.14E-001
NA-22	Not Detected	-----	4.11E-002
NA-24	Not Detected	-----	1.47E-001
NB-95	Not Detected	-----	2.13E-001
ND-147	Not Detected	-----	1.94E-001
NI-57	Not Detected	-----	5.11E-002
RU-103	Not Detected	-----	2.70E-002
RU-106	Not Detected	-----	2.58E-001
SB-122	Not Detected	-----	5.56E-002
SB-124	Not Detected	-----	2.88E-002
SB-125	Not Detected	-----	8.11E-002
SN-113	Not Detected	-----	3.45E-002
SR-85	Not Detected	-----	3.51E-002
TA-182	Not Detected	-----	1.43E-001
TA-183	Not Detected	-----	5.20E-001
TC-99m	Not Detected	-----	1.35E+000
TL-201	Not Detected	-----	2.42E-001
XE-133	Not Detected	-----	2.23E-001
Y-88	Not Detected	-----	2.40E-002
ZN-65	Not Detected	-----	9.20E-002
ZR-95	Not Detected	-----	5.36E-002

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 3/17/99 1:40:12 AM *

* Analyzed by: *J* 3/17/99 Reviewed by: *W* 3/17/99 *

Customer : C.BYRD/D.PERRY (6134/SMO)
 Customer Sample ID : 045171-001
 Lab Sample ID : 90059306

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 710.000 gram
 Sample Date/Time : 3/15/99 1:25:00 PM
 Acquire Start Date/Time : 3/16/99 11:59:58 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	4.86E+000	4.88E+000	6.43E-001
RA-226	2.87E+000	1.04E+000	5.49E-001
PB-214	6.34E-001	1.33E-001	4.01E-002
BI-214	5.72E-001	1.49E-001	3.96E-002
PB-210	Not Detected	-----	3.61E+001
TH-232	8.29E-001	4.48E-001	1.45E-001
RA-228	8.92E-001	3.06E-001	1.43E-001
AC-228	8.24E-001	2.16E-001	8.00E-002
TH-228	7.02E-001	7.65E-001	4.42E-001
RA-224	8.49E-001	2.11E-001	6.81E-002
PB-212	8.10E-001	5.07E-001	3.64E-002
BI-212	8.48E-001	5.01E-001	2.96E-001
TL-208	7.58E-001	1.71E-001	5.86E-002
U-235	Not Detected	-----	2.27E-001
TH-231	Not Detected	-----	1.91E+000
PA-231	Not Detected	-----	1.26E+000
TH-227	Not Detected	-----	3.54E-001
RA-223	Not Detected	-----	2.16E-001
RN-219	Not Detected	-----	3.50E-001
PB-211	Not Detected	-----	7.72E-001
TL-207	Not Detected	-----	1.26E+001
AM-241	Not Detected	-----	5.13E-001
PJ-239	Not Detected	-----	4.24E+002
NP-237	Not Detected	-----	2.79E-001
PA-233	Not Detected	-----	5.34E-002
TH-229	Not Detected	-----	2.78E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.32E-002
AG-110m	Not Detected	-----	3.32E-002
BA-133	Not Detected	-----	5.51E-002
BE-7	Not Detected	-----	2.32E-001
CD-109	Not Detected	-----	9.45E-001
CD-115	Not Detected	-----	9.91E-002
CE-139	Not Detected	-----	2.95E-002
CE-141	Not Detected	-----	5.09E-002
CE-144	Not Detected	-----	2.23E-001
CO-56	Not Detected	-----	3.11E-002
CO-57	Not Detected	-----	2.93E-002
CO-58	Not Detected	-----	2.88E-002
CO-60	Not Detected	-----	3.37E-002
CR-51	Not Detected	-----	2.20E-001
CS-134	Not Detected	-----	3.29E-002
CS-137	6.76E-002	3.84E-002	2.00E-002
EU-152	Not Detected	-----	8.72E-002
EU-154	Not Detected	-----	1.59E-001
EU-155	Not Detected	-----	1.48E-001
FE-59	Not Detected	-----	6.67E-002
GD-153	Not Detected	-----	1.16E-001
HG-203	Not Detected	-----	2.93E-002
I-131	Not Detected	-----	2.95E-002
IR-192	Not Detected	-----	2.55E-002
K-40	1.83E+001	2.62E+000	2.28E-001
MN-52	Not Detected	-----	3.38E-002
MN-54	Not Detected	-----	3.31E-002
MO-99	Not Detected	-----	3.07E-001
NA-22	Not Detected	-----	3.97E-002
NA-24	Not Detected	-----	1.54E-001
NB-95	Not Detected	-----	2.02E-001
ND-147	Not Detected	-----	1.91E-001
NI-57	Not Detected	-----	8.76E-002
RU-103	Not Detected	-----	2.62E-002
RU-106	Not Detected	-----	2.62E-001
SB-122	Not Detected	-----	5.47E-002
SB-124	Not Detected	-----	2.74E-002
SB-125	Not Detected	-----	7.86E-002
SN-113	Not Detected	-----	3.40E-002
SR-85	Not Detected	-----	3.34E-002
TA-182	Not Detected	-----	1.42E-001
TA-183	Not Detected	-----	5.29E-001
TC-99m	Not Detected	-----	1.56E+000
TL-201	Not Detected	-----	2.49E-001
XE-133	Not Detected	-----	2.26E-001
Y-88	Not Detected	-----	2.57E-002
ZN-65	Not Detected	-----	9.13E-002
ZR-95	Not Detected	-----	5.05E-002

 • Sandia National Laboratories *
 • Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 3/17/99 3:21:55 AM *

• Analyzed by: *J* 3/17/99 Reviewed by: *W* 3/17/99 *

Customer : C.BYRD/D.PERRY (6134/SMO)
 Customer Sample ID : 045172-001
 Lab Sample ID : 90059307

Sample Description : WATER MARINELLI SAMPLE
 Sample Quantity : 500.000 mL
 Sample Date/Time : 3/15/99 10:40:00 AM
 Acquire Start Date/Time : 3/17/99 1:41:46 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6001 seconds

Comments:

Nuclide Name	Activity (pCi/mL)	2-sigma Error	MDA (pCi/mL)
U-238	Not Detected	-----	3.33E-001
RA-226	Not Detected	-----	3.90E-001
PB-214	Not Detected	-----	3.99E-002
BI-214	Not Detected	-----	4.49E-002
PB-210	Not Detected	-----	1.25E+001
TH-232	Not Detected	-----	1.16E-001
RA-228	Not Detected	-----	9.62E-002
AC-228	Not Detected	-----	6.30E-002
TH-228	Not Detected	-----	3.88E-001
RA-224	Not Detected	-----	1.07E-001
PB-212	Not Detected	-----	2.93E-002
BI-212	Not Detected	-----	2.39E-001
TL-208	Not Detected	-----	5.27E-002
U-235	Not Detected	-----	1.27E-001
TH-231	Not Detected	-----	1.01E+000
PA-231	Not Detected	-----	7.51E-001
TH-227	Not Detected	-----	1.13E-001
RA-223	Not Detected	-----	9.26E-002
RN-219	Not Detected	-----	2.07E-001
PB-211	Not Detected	-----	4.78E-001
TL-207	Not Detected	-----	6.37E+000
AM-241	Not Detected	-----	2.00E-001
PU-239	Not Detected	-----	2.22E+002
NP-237	Not Detected	-----	1.45E-001
PA-233	Not Detected	-----	3.55E-002
TH-229	Not Detected	-----	1.31E-001

[Summary Report] - Sample ID: : 90059307

Nuclide Name	Activity (pCi/mL)	2-sigma Error	MDA (pCi/mL)
AG-108m	Not Detected	-----	1.60E-002
AG-110m	Not Detected	-----	1.62E-002
BA-133	Not Detected	-----	2.46E-002
BE-7	Not Detected	-----	1.47E-001
CD-109	Not Detected	-----	5.00E-001
CD-115	Not Detected	-----	4.67E-002
CE-139	Not Detected	-----	1.63E-002
CE-141	Not Detected	-----	2.89E-002
CE-144	Not Detected	-----	1.15E-001
CO-56	Not Detected	-----	2.37E-002
CO-57	Not Detected	-----	1.64E-002
CO-58	Not Detected	-----	1.67E-002
CO-60	Not Detected	-----	2.11E-002
CR-51	Not Detected	-----	1.45E-001
CS-134	Not Detected	-----	2.00E-002
CS-137	Not Detected	-----	1.73E-002
EU-152	Not Detected	-----	4.94E-002
EU-154	Not Detected	-----	7.27E-002
EU-155	Not Detected	-----	7.11E-002
FE-59	Not Detected	-----	2.91E-002
GD-153	Not Detected	-----	5.29E-002
HG-203	Not Detected	-----	1.83E-002
I-131	Not Detected	-----	1.90E-002
IR-192	Not Detected	-----	1.63E-002
K-40	Not Detected	-----	3.41E-001
MN-52	Not Detected	-----	2.12E-002
MN-54	Not Detected	-----	1.76E-002
MO-99	Not Detected	-----	1.96E-001
NA-22	Not Detected	-----	1.61E-002
NA-24	Not Detected	-----	1.20E-001
NB-95	Not Detected	-----	7.07E-002
ND-147	Not Detected	-----	1.17E-001
NI-57	Not Detected	-----	5.80E-002
RU-103	Not Detected	-----	1.57E-002
RU-106	Not Detected	-----	1.79E-001
SB-122	Not Detected	-----	2.94E-002
SB-124	Not Detected	-----	2.00E-002
SB-125	Not Detected	-----	5.12E-002
SN-113	Not Detected	-----	2.06E-002
SR-85	Not Detected	-----	2.39E-002
TA-182	Not Detected	-----	6.09E-002
TA-183	Not Detected	-----	2.21E-001
TC-99m	Not Detected	-----	1.58E+000
TL-201	Not Detected	-----	1.05E-001
XE-133	Not Detected	-----	1.00E-001
Y-88	Not Detected	-----	1.66E-002
ZN-65	Not Detected	-----	3.81E-002
ZR-95	Not Detected	-----	2.73E-002

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 3/17/99 6:20:56 AM *

* Analyzed by: *J 3/17/99* Reviewed by: *~~W~~ 3/17/99*

Customer : C.BYRD/D.PERRY (6134/SMO)
 Customer Sample ID : LAB CONTROL SAMPLE USING CG134
 Lab Sample ID : 90059308

Sample Description : MIXED GAMMA STANDARD CG134
 Sample Quantity : 1.000 Each
 Sample Date/Time : 11/01/90 12:00:00 PM
 Acquire Start Date/Time : 3/17/99 6:10:41 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 600 / 606 seconds

Comments:

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	-----	4.28E+003
RA-226	Not Detected	-----	5.87E+003
PB-214	Not Detected	-----	6.45E+002
BI-214	Not Detected	-----	5.76E+002
PB-210	Not Detected	-----	2.63E+005
TH-232	Not Detected	-----	1.94E+003
RA-228	Not Detected	-----	2.26E+003
AC-228	Not Detected	-----	1.30E+003
TH-228	Not Detected	-----	1.26E+005
RA-224	Not Detected	-----	4.29E+003
PB-212	Not Detected	-----	9.86E+003
BI-212	Not Detected	-----	7.46E+004
TL-208	Not Detected	-----	1.74E+004
U-235	Not Detected	-----	1.58E+003
TH-231	Not Detected	-----	1.28E+004
PA-231	Not Detected	-----	1.28E+004
TH-227	Not Detected	-----	2.38E+003
PA-223	Not Detected	-----	1.00E+026
RN-219	Not Detected	-----	5.32E+003
PB-211	Not Detected	-----	1.22E+004
TL-207	Not Detected	-----	1.93E+005
AM-241	8.03E+004	1.46E+004	2.91E+003
PU-239	Not Detected	-----	2.74E+006
NP-237	Not Detected	-----	2.15E+003
PA-233	Not Detected	-----	5.57E+002
TH-229	Not Detected	-----	1.73E+003

[Summary Report] - Sample ID: : 90059308

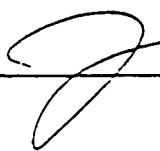
Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	-----	2.79E+002
AG-110m	Not Detected	-----	6.94E+006
BA-133	Not Detected	-----	7.00E+002
BE-7	Not Detected	-----	5.71E+020
CD-109	Not Detected	-----	6.89E+005
CD-115	Not Detected	-----	1.00E+026
CE-139	Not Detected	-----	1.07E+009
CE-141	Not Detected	-----	1.00E+026
CE-144	Not Detected	-----	2.66E+006
CO-56	Not Detected	-----	2.66E+014
CO-57	Not Detected	-----	4.97E+005
CO-58	Not Detected	-----	2.87E+015
CO-60	8.09E+004	1.09E+004	3.62E+002
CR-51	Not Detected	-----	1.00E+026
CS-134	Not Detected	-----	4.39E+003
CS-137	7.18E+004	9.52E+003	2.45E+002
EU-152	Not Detected	-----	9.42E+002
EU-154	Not Detected	-----	2.41E+003
EU-155	Not Detected	-----	3.43E+003
FE-59	Not Detected	-----	1.00E+026
GD-153	Not Detected	-----	4.65E+006
HG-203	Not Detected	-----	1.51E+022
I-131	Not Detected	-----	1.00E+026
IR-192	Not Detected	-----	7.61E+014
K-40	Not Detected	-----	1.39E+003
MN-52	Not Detected	-----	1.00E+026
MN-54	Not Detected	-----	2.67E+005
MO-99	Not Detected	-----	1.00E+026
NA-22	Not Detected	-----	1.74E+003
NA-24	Not Detected	-----	1.00E+026
NB-95	Not Detected	-----	1.00E+026
ND-147	Not Detected	-----	1.00E+026
NI-57	Not Detected	-----	1.00E+026
RU-103	Not Detected	-----	1.00E+026
RU-106	Not Detected	-----	8.26E+005
SB-122	Not Detected	-----	1.00E+026
SB-124	Not Detected	-----	5.18E+017
SB-125	Not Detected	-----	8.59E+003
SN-113	Not Detected	-----	4.02E+010
SR-85	Not Detected	-----	5.16E+016
TA-182	Not Detected	-----	9.91E+010
TA-183	Not Detected	-----	1.00E+026
TC-99m	Not Detected	-----	1.00E+026
TL-201	Not Detected	-----	1.00E+026
XE-133	Not Detected	-----	1.00E+026
Y-88	Not Detected	-----	6.00E+010
ZN-65	Not Detected	-----	4.42E+006
ZR-95	Not Detected	-----	1.13E+017

 * Sandia National Laboratories
 * Radiation Protection Sample Diagnostics Program
 * Quality Assurance Report

Report_Date : 3/17/99 6:20:59 AM
 QA File : C:\GENIE2K\CAMFILES\LCS2.QAF
 Analyst : FCD
 Sample ID : 90059308
 Sample Quantity : 1.00 Each
 Sample Date : 11/01/90 12:00:00 PM
 Measurement Date : 3/17/99 6:10:41 AM
 Elapsed Live Time : 600 seconds
 Elapsed Real Time : 606 seconds

Parameter	Mean	1S Error	New Value	<	LU	:	SD	:	UD	:
AM-241 Activity	8.181E-002	3.996E-003	8.028E-002	<	:	:	:	:	:	:
CS-137 Activity	7.061E-002	1.952E-003	7.177E-002	<	:	:	:	:	:	:
CO-60 Activity	7.860E-002	2.150E-003	8.099E-002	<	:	:	:	:	:	:

Flags Key: LU = Boundary Test (Ab = Above, Be = Below)
 SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Act)
 UD = User Driven N-Sigma Test (In = Investigate, Ac = Act)
 BS = Measurement Bias Test (In = Investigate, Ac = Act)

Reviewed by:  3/17/99

Sandia National Laboratories
 Radiation Protection Sample Diagnostics Program [806 Laboratory]
 10/19/99 1:01:11 PM

Analyzed by: *K. Kelly* 10/19/99

Reviewed by: *SA* 10/20/99

COPY

Customer : BYRD/YANISKO (6134/SMO)
 Customer Sample ID : 050321-001
 Lab Sample ID : 90217801 *File 9N*

Sample Description : SOIL MARINELLI SAMPLE Note: Ra-226 and U-235 gamma peak
 Sample Quantity : 819.000 gram interfere. Either isotope
 Sample Date/Time : 10/18/99 10:15:00 AM may be over-estimated.
 Acquire Start Date/Time : 10/19/99 11:20:58 AM
 Detector Name : LAB02
 elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	3.59E+000	3.12E+000	5.73E-001
RA-226	2.02E+000	3.80E+000	4.17E-001
PB-214	4.79E-001	5.19E-001	3.66E-002
EI-214	4.56E-001	9.97E-002	3.82E-002
PB-210	Not Detected	-----	3.04E+001
TH-232	6.89E-001	3.70E-001	1.23E-001
KA-228	7.10E-001	2.32E-001	1.18E-001
AC-228	7.47E-001	2.02E-001	6.46E-002
TH-228	7.01E-001	5.79E-001	3.87E-001
RA-224	7.38E-001	1.63E-001	4.71E-002
PB-212	7.03E-001	3.59E-001	3.22E-002
BI-212	7.56E-001	4.15E-001	2.91E-001
TL-208	6.40E-001	1.55E-001	5.22E-002
U-235	Not Detected	-----	1.86E-001
TH-231	Not Detected	-----	1.11E+001
PA-231	Not Detected	-----	1.11E+000
TH-227	Not Detected	-----	3.01E-001
RA-223	Not Detected	-----	1.82E-001
RN-219	Not Detected	-----	3.02E-001
PB-211	Not Detected	-----	6.59E-001
TL-207	Not Detected	-----	1.07E+001
AM-241	Not Detected	-----	4.43E-001
PU-239	Not Detected	-----	3.59E+002
NP-237	Not Detected	-----	2.01E+000
PA-233	Not Detected	-----	4.60E-002
TH-229	Not Detected	-----	2.16E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected		3.00E-002
AG-110m	Not Detected		3.29E-002
BA-133	Not Detected		3.65E-002
BE-7	Not Detected		1.94E-001
CD-115	Not Detected		7.26E-002
CE-139	Not Detected		2.26E-002
CE-141	Not Detected		4.16E-002
CE-144	Not Detected		1.92E-001
CO-56	Not Detected		2.75E-002
CO-57	Not Detected		2.55E-002
CO-58	Not Detected		2.68E-002
CO-60	Not Detected		2.96E-002
CR-51	Not Detected		1.90E-001
CS-134	Not Detected		3.32E-002
CS-137	9.30E-002	2.34E-002	1.82E-002
EU-152	Not Detected		7.68E-002
EU-154	Not Detected		1.44E-001
EU-155	Not Detected		1.20E-001
FE-59	Not Detected		6.00E-002
GD-153	Not Detected		8.95E-002
HG-203	Not Detected		2.52E-002
I-131	Not Detected		2.28E-002
IR-192	Not Detected		2.20E-002
K-40	1.99E+001	2.66E+000	1.88E-001
MN-52	Not Detected		2.82E-002
MN-54	Not Detected		2.81E-002
MO-99	Not Detected		2.49E-001
NA-22	Not Detected		3.38E-002
NA-24	Not Detected		8.35E-002
NB-95	Not Detected		1.62E-001
ND-147	Not Detected		1.62E-001
NI-57	Not Detected		6.15E-002
RU-103	Not Detected		2.32E-002
RU-106	Not Detected		2.22E-001
SB-122	Not Detected		4.11E-002
SB-124	Not Detected		2.24E-002
SB-125	Not Detected		6.39E-002
SN-113	Not Detected		2.92E-002
SR-85	Not Detected		2.82E-002
TA-182	Not Detected		1.22E-001
TA-183	Not Detected		4.38E-001
TL-201	Not Detected		2.03E-001
XE-133	Not Detected		1.75E-001
Y-88	Not Detected		1.85E-002
ZN-65	Not Detected		8.25E-002
ZR-95	Not Detected		4.40E-002

COPY

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
10/19/99 2:42:52 PM

Analyzed by: *JK* 10/20/99

Reviewed by: *BJ* 10/20/99

Customer : BYRD/YANISKO (6134/SMO)
Customer Sample ID : 050323-109
Lab Sample ID : 90217802

- 000 - EB (equip. blank)

COPY

Sample Description : LIQUID MARINELLI SAMPLE
Sample Quantity : 523.000 mL
Sample Date/Time : 10/18/99 9:45:00 AM
Acquire Start Date/Time : 10/19/99 1:02:42 PM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6001 seconds

Comments:

Nuclide Name	Activity (pCi/mL)	2-sigma Error	MDA (pCi/mL)
U-238	Not Detected	-----	3.08E-001
RA-226	Not Detected	-----	3.44E-001
PB-214	Not Detected	-----	3.58E-002
BI-214	Not Detected	-----	4.08E-002
PB-210	Not Detected	-----	1.02E+001
TH-232	Not Detected	-----	1.21E-001
RA-228	Not Detected	-----	1.11E-001
AC-228	Not Detected	-----	5.84E-002
TH-228	Not Detected	-----	3.85E-001
RA-224	Not Detected	-----	8.12E-002
PB-212	Not Detected	-----	3.04E-002
BI-212	Not Detected	-----	2.45E-001
TL-208	Not Detected	-----	5.18E-002
U-235	Not Detected	-----	1.19E-001
TH-231	Not Detected	-----	5.35E+000
PA-231	Not Detected	-----	7.46E-001
TH-227	Not Detected	-----	1.14E-001
RA-223	Not Detected	-----	8.84E-002
RN-219	Not Detected	-----	2.16E-001
PB-211	Not Detected	-----	4.93E-001
TL-207	Not Detected	-----	7.46E+000
AM-241	Not Detected	-----	2.09E-001
PU-239	Not Detected	-----	2.06E+002
NP-237	Not Detected	-----	1.11E+000
PA-233	Not Detected	-----	3.60E-002
TH-229	Not Detected	-----	1.15E-001

Nuclide Name	Activity (pCi/mL)	2-sigma Error	MDA (pCi/mL)
AG-108m	Not Detected	-----	1.78E-002
AG-110m	Not Detected	-----	1.67E-002
BA-133	Not Detected	-----	2.11E-002
BE-7	Not Detected	-----	1.25E-001
CD-115	Not Detected	-----	4.26E-002
CE-139	Not Detected	-----	1.60E-002
CE-141	Not Detected	-----	2.60E-002
CE-144	Not Detected	-----	1.22E-001
CO-56	Not Detected	-----	1.97E-002
CO-57	Not Detected	-----	1.59E-002
CO-58	Not Detected	-----	1.89E-002
CO-60	Not Detected	-----	1.85E-002
CR-51	Not Detected	-----	1.20E-001
CS-134	Not Detected	-----	1.87E-002
CS-137	Not Detected	-----	1.62E-002
EU-152	Not Detected	-----	4.85E-002
EU-154	Not Detected	-----	8.09E-002
EU-155	Not Detected	-----	6.67E-002
FE-59	Not Detected	-----	3.28E-002
GD-153	Not Detected	-----	4.98E-002
HG-203	Not Detected	-----	1.72E-002
I-131	Not Detected	-----	1.91E-002
IR-192	Not Detected	-----	1.54E-002
K-40	1.48E-001	1.28E-001	1.98E-001
MN-52	Not Detected	-----	2.23E-002
MN-54	Not Detected	-----	1.83E-002
MO-99	Not Detected	-----	1.57E-001
NA-22	Not Detected	-----	1.91E-002
NA-24	Not Detected	-----	7.41E-002
NB-95	Not Detected	-----	6.57E-002
ND-147	Not Detected	-----	1.19E-001
NI-57	Not Detected	-----	3.82E-002
RU-103	Not Detected	-----	1.70E-002
RU-106	Not Detected	-----	1.49E-001
SB-122	Not Detected	-----	2.94E-002
SB-124	Not Detected	-----	1.76E-002
SB-125	Not Detected	-----	4.77E-002
SN-113	Not Detected	-----	2.21E-002
SR-85	Not Detected	-----	2.36E-002
TA-182	Not Detected	-----	5.25E-002
TA-183	Not Detected	-----	2.06E-001
TL-201	Not Detected	-----	9.50E-002
XE-133	Not Detected	-----	8.79E-002
Y-88	Not Detected	-----	1.93E-002
ZN-65	Not Detected	-----	3.44E-002
ZR-95	Not Detected	-----	2.76E-002

COPY

LSC Windows Analysis Program - Version 1.0

Client : BYRD
 Organization : 6134
 Building :
 Room :
 Other Info : CCTA-09 05321-001 10/18

Analyst : KIC
 Batch Number : 90217803
 LSC System ID : UNIT03 - 419272
 Protocol Number : 26
 Protocol Name : H3 -- SOLIDS
 No. of Samples : 1
 Count Date : 19-Oct-99
 Count Time (min) : 60.00
 Background cpm : 5.97E+00
 Background tSIE : 4.28E+02
 Background Eff : 3.64E-01
 Sample Aliquot : 5.00E-01 gram

 Sandia National Laboratories
 Albuquerque, NM 87185-5080

OCT 20 1999

H3 MDA = 3.76E+00 pCi/gram
 H3 CL = 1.82E+00 pCi/gram

Reviewed by *[Signature]* 10/20/99

RPSD ID	Client ID	cpm	tSIE	Eff	H3 Activity pCi/gram	Error	Flag
001	050321-001	8.73E+00	181	0.180	1.38E+01	7.13E+00	>CL



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042430-003
 Laboratory Sample ID: 982529-1

Pile 1-W

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 09:35
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238						1				
	Uranium-234, Solid	1.71					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 234, error +/-, Solid	0.450					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Activity, Solid	0.00					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 235, error +/-, Solid	0.0300					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Activity, Solid	3.51					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 238, error +/-, Solid	0.720					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, MDA, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, MDA, Solid	0.0400					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Lc, Solid	0.0300					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, MDA, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
CA-GLR 5.0R4	Thorium-228, 230, 232						1				
	Thorium-228, Solid	0.890					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Solid	1.21					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Solid	0.880					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Error +/-, Solid	0.320					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Error +/-, Solid	0.410					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Error +/-, Solid	0.330					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, MDA, Solid	0.0100					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Lc, Solid	0.0100					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, MDA, Solid	0.110		JB			1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Lc, Solid	0.0900					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, MDA, Solid	0.0400					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Lc, Solid	0.0300					1	pCi/g	10147	09/28/98 1134	plj
EPA 901.1	Gamma Scan (HPGe gamma)						1				
	Actinium-228, Activity, Solid	2.1		J			1	pCi/g	10176	09/23/98 1832	mdg
	Actinium-228, error +/-, Solid	0.4					1	pCi/g	10176	09/23/98 1832	mdg
	Actinium-228, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042430-003
Laboratory Sample ID: 982529-1

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 09:35
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Actinium-228, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Americium-241, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Americium-241, error +/-, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Americium-241, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Americium-241, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 1832	mdg
	Cerium-144, Activity, Solid	0.8					1	pCi/g	10176	09/23/98 1832	mdg
	Cerium-144, Error, +/-, Solid	0.5					1	pCi/g	10176	09/23/98 1832	mdg
	Cerium-144, MDA, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg
	Cerium-144, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg
	Cobalt-60, Activity, Solid	0.0		J			1	pCi/g	10176	09/23/98 1832	mdg
	Cobalt-60, Error, +/-, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Cobalt-60, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Cobalt-60, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Chromium-51, Activity, Solid	1.7					1	pCi/g	10176	09/23/98 1832	mdg
	Chromium-51, Error, +/-, Solid	1.1					1	pCi/g	10176	09/23/98 1832	mdg
	Chromium-51, MDA, Solid	0.4					1	pCi/g	10176	09/23/98 1832	mdg
	Chromium-51, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg
	Cesium-134, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Cesium-134, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Cesium-134, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Cesium-134, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg
	Cesium-137, Activity, Solid	0.3					1	pCi/g	10176	09/23/98 1832	mdg
	Cesium-137, Error, +/-, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg
	Cesium-137, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Cesium-137, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg
	Iron-59, Activity, Solid	0.1		J			1	pCi/g	10176	09/23/98 1832	mdg
	Iron-59, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Iron-59, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Potassium-40, Activity, Solid	23.3					1	pCi/g	10176	09/23/98 1832	mdg
	Potassium-40, error +/-, Solid	3.1					1	pCi/g	10176	09/23/98 1832	mdg
	Potassium-40, MDA, Solid	0.3					1	pCi/g	10176	09/23/98 1832	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Lead-212, Activity, Solid	0.8					1	pCi/g	10176	09/23/98 1832	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042430-003
Laboratory Sample ID: 982529-1

Date Sampled.....: 09/02/98 Time Sampled.....: 09:35
Date Received.....: 09/09/98 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Lead-212, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 1832	mdg
	Lead-214, Activity, Solid	1.5					1	pCi/g	10176	09/23/98 1832	mdg
	Lead-214, error +/-, Solid	0.4					1	pCi/g	10176	09/23/98 1832	mdg
	Lead-214, MDA, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg
	Lead-214, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 1832	mdg
	Radium-226, Activity, Solid	1.0					1	pCi/g	10176	09/23/98 1832	mdg
	Radium-226, Error, +/-, Solid	0.3					1	pCi/g	10176	09/23/98 1832	mdg
	Radium-226, MDA, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg
	Radium-226, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg
	Radium-228, Activity, Solid	2.1		J			1	pCi/g	10176	09/23/98 1832	mdg
	Radium-228, Error, +/-, Solid	0.4					1	pCi/g	10176	09/23/98 1832	mdg
	Radium-228, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Radium-228, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Ruthenium-103, Activity, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg
	Ruthenium-103, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Ruthenium-103, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Ruthenium-103, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Ruthenium-106, Activity, Solid	1.0					1	pCi/g	10176	09/23/98 1832	mdg
	Ruthenium-106, Error, +/-, Solid	0.9					1	pCi/g	10176	09/23/98 1832	mdg
	Ruthenium-106, MDA, Solid	0.9					1	pCi/g	10176	09/23/98 1832	mdg
	Ruthenium-106, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg
	Thorium-231, Activity, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Thorium-231, error +/-, Solid	1.1					1	pCi/g	10176	09/23/98 1832	mdg
	Thorium-231, MDA, Solid	0.7					1	pCi/g	10176	09/23/98 1832	mdg
	Thorium-231, Lc, Solid	0.6					1	pCi/g	10176	09/23/98 1832	mdg
	Thorium-232, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Thorium-232, Error +/-, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Thorium-232, MDA, Solid	19.0					1	pCi/g	10176	09/23/98 1832	mdg
	Thorium-232, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 1832	mdg
	Uranium-235, Activity, Solid	0.1		J			1	pCi/g	10176	09/23/98 1832	mdg
	Uranium-235, error +/-, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Uranium-235, Lc, Solid	0.5					1	pCi/g	10176	09/23/98 1832	mdg
	Uranium-238, Activity, Solid	9.1					1	pCi/g	10176	09/23/98 1832	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042430-003
Laboratory Sample ID: 982529-1

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 09:35
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	3.4					1	pCi/g	10176	09/23/98 1832	mdg
	Uranium-238, MDA, Solid	1.5		OK			1	pCi/g	10176	09/23/98 1832	mdg
	Uranium-238, Lc, Solid	0.7					1	pCi/g	10176	09/23/98 1832	mdg
	Zirconium-95, Activity, Solid	0.3					1	pCi/g	10176	09/23/98 1832	mdg
	Zirconium-95, Error, +/-, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg
	Zirconium-95, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Zirconium-95, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 12/03/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Jensen

Customer Sample ID...: 042431-003
 Laboratory Sample ID: 982529-2

PILE1-S

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 09:40
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH	
	Thorium-230, Lc, Solid	0.0800					1	pCi/g	10147	09/28/98 1134	plj	
	Thorium-232, MDA, Solid	0.0400					1	pCi/g	10147	09/28/98 1134	plj	
	Thorium-232, Lc, Solid	0.0200					1	pCi/g	10147	09/28/98 1134	plj	
EPA 901.1	Gamma Scan (HPGe gamma)											
	Actinium-228, Activity, Solid	1.6		J			1	pCi/g	10176	09/23/98 1832	mdg	
	Actinium-228, error +/-, Solid	0.4					1	pCi/g	10176	09/23/98 1832	mdg	
	Actinium-228, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg	
	Actinium-228, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg	
	Americium-241, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg	
	Americium-241, error +/-, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg	
	Americium-241, MDA, Solid	0.3					1	pCi/g	10176	09/23/98 1832	mdg	
	Americium-241, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg	
	Cerium-144, Activity, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg	
	Cerium-144, Error, +/-, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg	
	Cerium-144, MDA, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg	
	Cerium-144, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg	
	Cobalt-60, Activity, Solid	0.3			J			1	pCi/g	10176	09/23/98 1832	mdg
	Cobalt-60, Error, +/-, Solid	0.1						1	pCi/g	10176	09/23/98 1832	mdg
	Cobalt-60, MDA, Solid	0.0						1	pCi/g	10176	09/23/98 1832	mdg
	Cobalt-60, Lc, Solid	0.0						1	pCi/g	10176	09/23/98 1832	mdg
	Chromium-51, Activity, Solid	0.2						1	pCi/g	10176	09/23/98 1832	mdg
	Chromium-51, Error, +/-, Solid	0.3						1	pCi/g	10176	09/23/98 1832	mdg
	Chromium-51, MDA, Solid	0.4						1	pCi/g	10176	09/23/98 1832	mdg
	Chromium-51, Lc, Solid	0.1						1	pCi/g	10176	09/23/98 1832	mdg
	Cesium-134, Activity, Solid	0.1						1	pCi/g	10176	09/23/98 1832	mdg
	Cesium-134, Error, +/-, Solid	0.1						1	pCi/g	10176	09/23/98 1832	mdg
	Cesium-134, MDA, Solid	0.0						1	pCi/g	10176	09/23/98 1832	mdg
	Cesium-134, Lc, Solid	0.1						1	pCi/g	10176	09/23/98 1832	mdg
	Cesium-137, Activity, Solid	0.1						1	pCi/g	10176	09/23/98 1832	mdg
	Cesium-137, Error, +/-, Solid	0.1						1	pCi/g	10176	09/23/98 1832	mdg
	Cesium-137, MDA, Solid	0.1						1	pCi/g	10176	09/23/98 1832	mdg
	Cesium-137, Lc, Solid	0.1						1	pCi/g	10176	09/23/98 1832	mdg
	Iron-59, Activity, Solid	0.2			J			1	pCi/g	10176	09/23/98 1832	mdg
	Iron-59, Error, +/-, Solid	0.1						1	pCi/g	10176	09/23/98 1832	mdg



LABORATORY TEST RESULTS

Job Number: 982529

Date: 12/03/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Jensen

Customer Sample ID.: 042431-003
Laboratory Sample ID: 982529-2Date Sampled.....: 09/02/98
Date Received.....: 09/09/98Time Sampled.....: 09:40
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Iron-59, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Potassium-40, Activity, Solid	22.8					1	pCi/g	10176	09/23/98 1832	mdg
	Potassium-40, error +/-, Solid	3.5					1	pCi/g	10176	09/23/98 1832	mdg
	Potassium-40, MDA, Solid	0.5					1	pCi/g	10176	09/23/98 1832	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Lead-212, Activity, Solid	1.0					1	pCi/g	10176	09/23/98 1832	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Lead-212, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg
	Lead-214, Activity, Solid	1.0					1	pCi/g	10176	09/23/98 1832	mdg
	Lead-214, error +/-, Solid	0.3					1	pCi/g	10176	09/23/98 1832	mdg
	Lead-214, MDA, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg
	Lead-214, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg
	Radium-226, Activity, Solid	1.3					1	pCi/g	10176	09/23/98 1832	mdg
	Radium-226, Error, +/-, Solid	0.3					1	pCi/g	10176	09/23/98 1832	mdg
	Radium-226, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Radium-226, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Radium-228, Activity, Solid	1.6		J			1	pCi/g	10176	09/23/98 1832	mdg
	Radium-228, Error, +/-, Solid	0.4					1	pCi/g	10176	09/23/98 1832	mdg
	Radium-228, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Radium-228, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Ruthenium-103, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Ruthenium-103, Error, +/-, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Ruthenium-103, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Ruthenium-103, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Ruthenium-106, Activity, Solid	1.4					1	pCi/g	10176	09/23/98 1832	mdg
	Ruthenium-106, Error, +/-, Solid	0.6					1	pCi/g	10176	09/23/98 1832	mdg
	Ruthenium-106, MDA, Solid	0.9					1	pCi/g	10176	09/23/98 1832	mdg
	Ruthenium-106, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Thorium-231, Activity, Solid	1.8					1	pCi/g	10176	09/23/98 1832	mdg
	Thorium-231, error +/-, Solid	1.2					1	pCi/g	10176	09/23/98 1832	mdg
	Thorium-231, MDA, Solid	0.8					1	pCi/g	10176	09/23/98 1832	mdg
	Thorium-231, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 1832	mdg
	Thorium-232, Solid	76.5					1	pCi/g	10176	09/23/98 1832	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 12/03/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Jensen

Customer Sample ID.: 042431-003

Date Sampled.....: 09/02/98

Time Sampled.....: 09:40

Sample Matrix.....: Soil

Laboratory Sample ID: 982529-2

Date Received.....: 09/09/98

Time Received.....: 09:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Thorium-232, Error +/-, Solid	69.6					1	pCi/g	10176	09/23/98 1832	mdg
	Thorium-232, MDA, Solid	48.2					1	pCi/g	10176	09/23/98 1832	mdg
	Thorium-232, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg
	Uranium-235, Activity, Solid	0.1 - J					1	pCi/g	10176	09/23/98 1832	mdg
	Uranium 235, error +/-, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1832	mdg
	Uranium-235, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 1832	mdg
	Uranium-238, Activity, Solid	6.8					1	pCi/g	10176	09/23/98 1832	mdg
	Uranium 238, error +/-, Solid	2.8					1	pCi/g	10176	09/23/98 1832	mdg
	Uranium-238, MDA, Solid	2.0					1	pCi/g	10176	09/23/98 1832	mdg
	Uranium-238, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1832	mdg
	Zirconium-95, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Zirconium-95, Error, +/-, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Zirconium-95, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg
	Zirconium-95, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1832	mdg

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LABORATORY TEST RESULTS

Job Number: 982529

Date: 12/03/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Jensen

Customer Sample ID.: 042432-003
Laboratory Sample ID: 982529-3

FILE 2-N

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 09:45
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 901.1	Thorium-230, Lc, Solid	0.110					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, MDA, Solid	0.0500					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Lc, Solid	0.0300					1	pCi/g	10147	09/28/98 1134	plj
	Gamma Scan (HPGe gamma)										
	Actinium-228, Activity, Solid	1.8		J			1	pCi/g	10176	09/23/98 1934	mdg
	Actinium-228, error +/-, Solid	0.4					1	pCi/g	10176	09/23/98 1934	mdg
	Actinium-228, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Actinium-228, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Americium-241, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Americium-241, error +/-, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg
	Americium-241, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Americium-241, Lc, Solid	0.6					1	pCi/g	10176	09/23/98 1934	mdg
	Cerium-144, Activity, Solid	1.0					1	pCi/g	10176	09/23/98 1934	mdg
	Cerium-144, Error, +/-, Solid	0.4					1	pCi/g	10176	09/23/98 1934	mdg
	Cerium-144, MDA, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg
	Cerium-144, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg
	Cobalt-60, Activity, Solid	0.2			J		1	pCi/g	10176	09/23/98 1934	mdg
	Cobalt-60, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Cobalt-60, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Cobalt-60, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Chromium-51, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Chromium-51, Error, +/-, Solid	0.7					1	pCi/g	10176	09/23/98 1934	mdg
	Chromium-51, MDA, Solid	0.5					1	pCi/g	10176	09/23/98 1934	mdg
	Chromium-51, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 1934	mdg
	Cesium-134, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Cesium-134, Error, +/-, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Cesium-134, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Cesium-134, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg
	Cesium-137, Activity, Solid	0.3					1	pCi/g	10176	09/23/98 1934	mdg
	Cesium-137, Error, +/-, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg
	Cesium-137, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Cesium-137, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg
	Iron-59, Activity, Solid	0.0			J		1	pCi/g	10176	09/23/98 1934	mdg
	Iron-59, Error, +/-, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg

LABORATORY TEST RESULTS

Job Number: 982529

Date: 12/03/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Jensen

Customer Sample ID...: 042432-003
Laboratory Sample ID: 982529-3

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 09:45
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Iron-59, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Potassium-40, Activity, Solid	24.2					1	pCi/g	10176	09/23/98 1934	mdg
	Potassium-40, error +/-, Solid	3.1					1	pCi/g	10176	09/23/98 1934	mdg
	Potassium-40, MDA, Solid	0.3					1	pCi/g	10176	09/23/98 1934	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Lead-212, Activity, Solid	0.9					1	pCi/g	10176	09/23/98 1934	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Lead-212, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 1934	mdg
	Lead-214, Activity, Solid	1.1					1	pCi/g	10176	09/23/98 1934	mdg
	Lead-214, error +/-, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg
	Lead-214, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Lead-214, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg
	Radium-226, Activity, Solid	1.4					1	pCi/g	10176	09/23/98 1934	mdg
	Radium-226, Error, +/-, Solid	0.9					1	pCi/g	10176	09/23/98 1934	mdg
	Radium-226, MDA, Solid	0.3					1	pCi/g	10176	09/23/98 1934	mdg
	Radium-226, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 1934	mdg
	Radium-228, Activity, Solid	1.8		5			1	pCi/g	10176	09/23/98 1934	mdg
	Radium-228, Error, +/-, Solid	0.4					1	pCi/g	10176	09/23/98 1934	mdg
	Radium-228, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Radium-228, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Ruthenium-103, Activity, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Ruthenium-103, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Ruthenium-103, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Ruthenium-103, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Ruthenium-106, Activity, Solid	1.7					1	pCi/g	10176	09/23/98 1934	mdg
	Ruthenium-106, Error, +/-, Solid	1.2					1	pCi/g	10176	09/23/98 1934	mdg
	Ruthenium-106, MDA, Solid	1.0					1	pCi/g	10176	09/23/98 1934	mdg
	Ruthenium-106, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg
	Thorium-231, Activity, Solid	1.5					1	pCi/g	10176	09/23/98 1934	mdg
	Thorium-231, error +/-, Solid	1.0					1	pCi/g	10176	09/23/98 1934	mdg
	Thorium-231, MDA, Solid	0.8					1	pCi/g	10176	09/23/98 1934	mdg
	Thorium-231, Lc, Solid	0.5					1	pCi/g	10176	09/23/98 1934	mdg
	Thorium-232, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 12/03/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Jensen

Customer Sample ID.: 042432-003
 Laboratory Sample ID: 982529-3

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 09:45
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Thorium-232, Error +/-, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Thorium-232, MDA, Solid	18.7					1	pCi/g	10176	09/23/98 1934	mdg
	Thorium-232, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 1934	mdg
	Uranium-235, Activity, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg
	Uranium 235, error +/-, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Uranium-235, MDA, Solid	0.1		5			1	pCi/g	10176	09/23/98 1934	mdg
	Uranium-235, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 1934	mdg
	Uranium-238, Activity, Solid	9.2					1	pCi/g	10176	09/23/98 1934	mdg
	Uranium 238, error +/-, Solid	1.7					1	pCi/g	10176	09/23/98 1934	mdg
	Uranium-238, MDA, Solid	0.9					1	pCi/g	10176	09/23/98 1934	mdg
	Uranium-238, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 1934	mdg
	Zirconium-95, Activity, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Zirconium-95, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Zirconium-95, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Zirconium-95, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 12/03/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Jensen

Customer Sample ID.: 042433-003
Laboratory Sample ID: 982529-4

File 2-5

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 09:52
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 901.1	Thorium-230, Lc, Solid	0.120					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, MDA, Solid	0.0500					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Lc, Solid	0.0300					1	pCi/g	10147	09/28/98 1134	plj
	Gamma Scan (HPGe gamma)										
	Actinium-228, Activity, Solid	1.8 - J					1	pCi/g	10176	09/23/98 1934	mdg
	Actinium-228, error +/-, Solid	0.5					1	pCi/g	10176	09/23/98 1934	mdg
	Actinium-228, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Actinium-228, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Americium-241, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Americium-241, error +/-, Solid	0.3					1	pCi/g	10176	09/23/98 1934	mdg
	Americium-241, MDA, Solid	0.3					1	pCi/g	10176	09/23/98 1934	mdg
	Americium-241, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg
	Cerium-144, Activity, Solid	0.4					1	pCi/g	10176	09/23/98 1934	mdg
	Cerium-144, Error, +/-, Solid	0.4					1	pCi/g	10176	09/23/98 1934	mdg
	Cerium-144, MDA, Solid	0.3					1	pCi/g	10176	09/23/98 1934	mdg
	Cerium-144, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg
	Cobalt-60, Activity, Solid	0.1 - J					1	pCi/g	10176	09/23/98 1934	mdg
	Cobalt-60, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Cobalt-60, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Cobalt-60, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Chromium-51, Activity, Solid	1.6					1	pCi/g	10176	09/23/98 1934	mdg
	Chromium-51, Error, +/-, Solid	1.2					1	pCi/g	10176	09/23/98 1934	mdg
	Chromium-51, MDA, Solid	0.5					1	pCi/g	10176	09/23/98 1934	mdg
	Chromium-51, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg
	Cesium-134, Activity, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Cesium-134, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Cesium-134, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Cesium-134, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Cesium-137, Activity, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg
	Cesium-137, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Cesium-137, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Cesium-137, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Iron-59, Activity, Solid	0.3 - J					1	pCi/g	10176	09/23/98 1934	mdg
	Iron-59, Error, +/-, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg

LABORATORY TEST RESULTS

Job Number: 982529

Date: 12/03/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Jensen

Customer Sample ID...: 042433-003
Laboratory Sample ID: 982529-4

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 09:52
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Iron-59, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Potassium-40, Activity, Solid	18.0					1	pCi/g	10176	09/23/98 1934	mdg
	Potassium-40, error +/-, Solid	3.2					1	pCi/g	10176	09/23/98 1934	mdg
	Potassium-40, MDA, Solid	0.5					1	pCi/g	10176	09/23/98 1934	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Lead-212, Activity, Solid	1.0					1	pCi/g	10176	09/23/98 1934	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Lead-212, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg
	Lead-214, Activity, Solid	1.1					1	pCi/g	10176	09/23/98 1934	mdg
	Lead-214, error +/-, Solid	0.2					1	pCi/g	10176	09/23/98 1934	mdg
	Lead-214, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Lead-214, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Radium-226, Activity, Solid	1.6					1	pCi/g	10176	09/23/98 1934	mdg
	Radium-226, Error, +/-, Solid	0.3					1	pCi/g	10176	09/23/98 1934	mdg
	Radium-226, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Radium-226, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Radium-228, Activity, Solid	1.8 - J					1	pCi/g	10176	09/23/98 1934	mdg
	Radium-228, Error, +/-, Solid	0.5					1	pCi/g	10176	09/23/98 1934	mdg
	Radium-228, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Radium-228, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Ruthenium-103, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Ruthenium-103, Error, +/-, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Ruthenium-103, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Ruthenium-103, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Ruthenium-106, Activity, Solid	2.1					1	pCi/g	10176	09/23/98 1934	mdg
	Ruthenium-106, Error, +/-, Solid	0.7					1	pCi/g	10176	09/23/98 1934	mdg
	Ruthenium-106, MDA, Solid	1.2					1	pCi/g	10176	09/23/98 1934	mdg
	Ruthenium-106, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Thorium-231, Activity, Solid	0.8					1	pCi/g	10176	09/23/98 1934	mdg
	Thorium-231, error +/-, Solid	1.0					1	pCi/g	10176	09/23/98 1934	mdg
	Thorium-231, MDA, Solid	1.0					1	pCi/g	10176	09/23/98 1934	mdg
	Thorium-231, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 1934	mdg
	Thorium-232, Solid	17.8					1	pCi/g	10176	09/23/98 1934	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 12/03/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Jensen

Customer Sample ID.: 042433-003
Laboratory Sample ID: 982529-4

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 09:52
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Thorium-232, Error +/-, Solid	60.0					1	pCi/g	10176	09/23/98 1934	mdg
	Thorium-232, MDA, Solid	71.3					1	pCi/g	10176	09/23/98 1934	mdg
	Thorium-232, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 1934	mdg
	Uranium-235, Activity, Solid	0.2 <i>5</i>					1	pCi/g	10176	09/23/98 1934	mdg
	Uranium 235, error +/-, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Uranium-235, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 1934	mdg
	Uranium-238, Activity, Solid	6.1					1	pCi/g	10176	09/23/98 1934	mdg
	Uranium 238, error +/-, Solid	4.3					1	pCi/g	10176	09/23/98 1934	mdg
	Uranium-238, MDA, Solid	3.4					1	pCi/g	10176	09/23/98 1934	mdg
	Uranium-238, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 1934	mdg
	Zirconium-95, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 1934	mdg
	Zirconium-95, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Zirconium-95, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg
	Zirconium-95, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 1934	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042434-003
 Laboratory Sample ID: 982529-5

Pile 3 - N

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 10:00
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TEC
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238										
	Uranium-234, Solid	1.00					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 234, error +/-, Solid	0.370					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Activity, Solid	0.0900					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 235, error +/-, Solid	0.0800					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Activity, Solid	2.15					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 238, error +/-, Solid	0.490					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, MDA, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, MDA, Solid	0.0400					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Lc, Solid	0.0300					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, MDA, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	CA-GLR 5.0R4	Thorium-228, 230, 232									
Thorium-228, Solid		0.870					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, Solid		0.950		J6			1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, Solid		1.74					1	pCi/g	10147	09/28/98 1134	plj
Thorium-228, Error +/-, Solid		0.480					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, Error +/-, Solid		0.390					1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, Error +/-, Solid		0.570					1	pCi/g	10147	09/28/98 1134	plj
Thorium-228, MDA, Solid		0.0200					1	pCi/g	10147	09/28/98 1134	plj
Thorium-228, Lc, Solid		0.0100					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, MDA, Solid		0.130					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, Lc, Solid		0.110					1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, MDA, Solid		0.0500					1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, Lc, Solid		0.0300					1	pCi/g	10147	09/28/98 1134	plj
EPA 901.1		Gamma Scan (HPGe gamma)									
	Actinium-228, Activity, Solid	1.8 - J					1	pCi/g	10176	09/23/98 2036	mdr
	Actinium-228, error +/-, Solid	0.4					1	pCi/g	10176	09/23/98 2036	mdr
	Actinium-228, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdr



LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042434-003
Laboratory Sample ID: 982529-5Date Sampled.....: 09/02/98
Date Received.....: 09/09/98Time Sampled.....: 10:00
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Actinium-228, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Americium-241, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Americium-241, error +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Americium-241, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Americium-241, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2036	mdg
	Cerium-144, Activity, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Cerium-144, Error, +/-, Solid	0.8					1	pCi/g	10176	09/23/98 2036	mdg
	Cerium-144, MDA, Solid	0.4					1	pCi/g	10176	09/23/98 2036	mdg
	Cerium-144, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 2036	mdg
	Cobalt-60, Activity, Solid	0.6 - J					1	pCi/g	10176	09/23/98 2036	mdg
	Cobalt-60, Error, +/-, Solid	0.3					1	pCi/g	10176	09/23/98 2036	mdg
	Cobalt-60, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Cobalt-60, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Chromium-51, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Chromium-51, Error, +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Chromium-51, MDA, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Chromium-51, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Cesium-134, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Cesium-134, Error, +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Cesium-134, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Cesium-134, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Cesium-137, Activity, Solid	0.4					1	pCi/g	10176	09/23/98 2036	mdg
	Cesium-137, Error, +/-, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Cesium-137, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Cesium-137, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Iron-59, Activity, Solid	1.1 - J					1	pCi/g	10176	09/23/98 2036	mdg
	Iron-59, Error, +/-, Solid	0.3					1	pCi/g	10176	09/23/98 2036	mdg
	Iron-59, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Potassium-40, Activity, Solid	30.0					1	pCi/g	10176	09/23/98 2036	mdg
	Potassium-40, error +/-, Solid	3.8					1	pCi/g	10176	09/23/98 2036	mdg
	Potassium-40, MDA, Solid	0.4					1	pCi/g	10176	09/23/98 2036	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Lead-212, Activity, Solid	1.1					1	pCi/g	10176	09/23/98 2036	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042434-003
Laboratory Sample ID: 982529-5

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:00
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Lead-212, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Lead-214, Activity, Solid	2.4					1	pCi/g	10176	09/23/98 2036	mdg
	Lead-214, error +/-, Solid	0.6					1	pCi/g	10176	09/23/98 2036	mdg
	Lead-214, MDA, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Lead-214, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Radium-226, Activity, Solid	1.4					1	pCi/g	10176	09/23/98 2036	mdg
	Radium-226, Error, +/-, Solid	0.5					1	pCi/g	10176	09/23/98 2036	mdg
	Radium-226, MDA, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Radium-226, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Radium-228, Activity, Solid	1.8 - J					1	pCi/g	10176	09/23/98 2036	mdg
	Radium-228, Error, +/-, Solid	0.4					1	pCi/g	10176	09/23/98 2036	mdg
	Radium-228, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Radium-228, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Ruthenium-103, Activity, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Ruthenium-103, Error, +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Ruthenium-103, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Ruthenium-103, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Ruthenium-106, Activity, Solid	2.0					1	pCi/g	10176	09/23/98 2036	mdg
	Ruthenium-106, Error, +/-, Solid	1.5					1	pCi/g	10176	09/23/98 2036	mdg
	Ruthenium-106, MDA, Solid	1.2					1	pCi/g	10176	09/23/98 2036	mdg
	Ruthenium-106, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Thorium-231, Activity, Solid	0.9					1	pCi/g	10176	09/23/98 2036	mdg
	Thorium-231, error +/-, Solid	0.6					1	pCi/g	10176	09/23/98 2036	mdg
	Thorium-231, MDA, Solid	0.7					1	pCi/g	10176	09/23/98 2036	mdg
	Thorium-231, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 2036	mdg
	Thorium-232, Solid	0.7					1	pCi/g	10176	09/23/98 2036	mdg
	Thorium-232, Error +/-, Solid	9.7					1	pCi/g	10176	09/23/98 2036	mdg
	Thorium-232, MDA, Solid	15.8					1	pCi/g	10176	09/23/98 2036	mdg
	Thorium-232, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2036	mdg
	Uranium-235, Activity, Solid	0.2 - J					1	pCi/g	10176	09/23/98 2036	mdg
	Uranium 235, error +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Uranium-235, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 2036	mdg
	Uranium-238, Activity, Solid	7.4					1	pCi/g	10176	09/23/98 2036	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042434-003
Laboratory Sample ID: 982529-5

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:00
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TEC
	Uranium 238, error +/-, Solid	3.0					1	pCi/g	10176	09/23/98 2036	mdg
	Uranium-238, MDA, Solid	1.6					1	pCi/g	10176	09/23/98 2036	mdg
	Uranium-238, Lc, Solid	0.6					1	pCi/g	10176	09/23/98 2036	mdg
	Zirconium-95, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Zirconium-95, Error, +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Zirconium-95, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Zirconium-95, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 12/03/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Jensen

Customer Sample ID.: 042435-003
Laboratory Sample ID: 982529-6

pile 3-5

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:05
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 901.1	Thorium-230, Lc, Solid	0.110					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, MDA, Solid	0.0500					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Lc, Solid	0.0300					1	pCi/g	10147	09/28/98 1134	plj
	Gamma Scan (HPGe gamma)										
	Actinium-228, Activity, Solid	1.4 -5					1	pCi/g	10176	09/23/98 2036	mdg
	Actinium-228, error +/-, Solid	0.8					1	pCi/g	10176	09/23/98 2036	mdg
	Actinium-228, MDA, Solid	0.4					1	pCi/g	10176	09/23/98 2036	mdg
	Actinium-228, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Americium-241, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Americium-241, error +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Americium-241, MDA, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Americium-241, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Cerium-144, Activity, Solid	0.5					1	pCi/g	10176	09/23/98 2036	mdg
	Cerium-144, Error, +/-, Solid	0.5					1	pCi/g	10176	09/23/98 2036	mdg
	Cerium-144, MDA, Solid	0.3					1	pCi/g	10176	09/23/98 2036	mdg
	Cerium-144, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2036	mdg
	Cobalt-60, Activity, Solid	0.3 -5					1	pCi/g	10176	09/23/98 2036	mdg
	Cobalt-60, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Cobalt-60, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Cobalt-60, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Chromium-51, Activity, Solid	1.5					1	pCi/g	10176	09/23/98 2036	mdg
	Chromium-51, Error, +/-, Solid	0.8					1	pCi/g	10176	09/23/98 2036	mdg
	Chromium-51, MDA, Solid	0.3					1	pCi/g	10176	09/23/98 2036	mdg
	Chromium-51, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Cesium-134, Activity, Solid	0.3					1	pCi/g	10176	09/23/98 2036	mdg
	Cesium-134, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Cesium-134, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Cesium-134, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Cesium-137, Activity, Solid	0.5					1	pCi/g	10176	09/23/98 2036	mdg
	Cesium-137, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Cesium-137, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Cesium-137, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Iron-59, Activity, Solid	0.0 -5					1	pCi/g	10176	09/23/98 2036	mdg
Iron-59, Error, +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg	

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CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 12/03/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Jensen

Customer Sample ID.: 042435-003
Laboratory Sample ID: 982529-6

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:05
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Iron-59, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Potassium-40, Activity, Solid	25.6					1	pCi/g	10176	09/23/98 2036	mdg
	Potassium-40, error +/-, Solid	3.9					1	pCi/g	10176	09/23/98 2036	mdg
	Potassium-40, MDA, Solid	0.5					1	pCi/g	10176	09/23/98 2036	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Lead-212, Activity, Solid	0.9					1	pCi/g	10176	09/23/98 2036	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Lead-212, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Lead-214, Activity, Solid	1.2					1	pCi/g	10176	09/23/98 2036	mdg
	Lead-214, error +/-, Solid	0.5					1	pCi/g	10176	09/23/98 2036	mdg
	Lead-214, MDA, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Lead-214, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2036	mdg
	Radium-226, Activity, Solid	1.4					1	pCi/g	10176	09/23/98 2036	mdg
	Radium-226, Error, +/-, Solid	0.3					1	pCi/g	10176	09/23/98 2036	mdg
	Radium-226, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Radium-226, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Radium-228, Activity, Solid	1.4 -5					1	pCi/g	10176	09/23/98 2036	mdg
	Radium-228, Error, +/-, Solid	0.8					1	pCi/g	10176	09/23/98 2036	mdg
	Radium-228, MDA, Solid	0.4					1	pCi/g	10176	09/23/98 2036	mdg
	Radium-228, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Ruthenium-103, Activity, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Ruthenium-103, Error, +/-, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Ruthenium-103, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Ruthenium-103, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Ruthenium-106, Activity, Solid	1.8					1	pCi/g	10176	09/23/98 2036	mdg
	Ruthenium-106, Error, +/-, Solid	0.7					1	pCi/g	10176	09/23/98 2036	mdg
	Ruthenium-106, MDA, Solid	1.1					1	pCi/g	10176	09/23/98 2036	mdg
	Ruthenium-106, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Thorium-231, Activity, Solid	1.2					1	pCi/g	10176	09/23/98 2036	mdg
	Thorium-231, error +/-, Solid	1.1					1	pCi/g	10176	09/23/98 2036	mdg
	Thorium-231, MDA, Solid	0.8					1	pCi/g	10176	09/23/98 2036	mdg
	Thorium-231, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 2036	mdg
	Thorium-232, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 12/03/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Jensen

Customer Sample ID.: 042435-003
Laboratory Sample ID: 982529-6

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:05
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Thorium-232, Error +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Thorium-232, MDA, Solid	51.3					1	pCi/g	10176	09/23/98 2036	mdg
	Thorium-232, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2036	mdg
	Uranium-235, Activity, Solid	0.2 -5					1	pCi/g	10176	09/23/98 2036	mdg
	Uranium 235, error +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Uranium-235, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2036	mdg
	Uranium-238, Activity, Solid	2.4					1	pCi/g	10176	09/23/98 2036	mdg
	Uranium 238, error +/-, Solid	4.2					1	pCi/g	10176	09/23/98 2036	mdg
	Uranium-238, MDA, Solid	3.8					1	pCi/g	10176	09/23/98 2036	mdg
	Uranium-238, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 2036	mdg
	Zirconium-95, Activity, Solid	0.3					1	pCi/g	10176	09/23/98 2036	mdg
	Zirconium-95, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2036	mdg
	Zirconium-95, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg
	Zirconium-95, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2036	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042436-003
 Laboratory Sample ID: 982529-7

Pile 4-N

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 10:12
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238										
	Uranium-234, Solid	0.870					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 234, error +/-, Solid	0.430					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Activity, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 235, error +/-, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Activity, Solid	2.11					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 238, error +/-, Solid	0.480					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, MDA, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, MDA, Solid	0.0400					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Lc, Solid	0.0300					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, MDA, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Lc, Solid	0.0400					1	pCi/g	10123	09/22/98 1333	plj
CA-GLR 5.0R4	Thorium-228, 230, 232										
	Thorium-228, Solid	1.08					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Solid	1.09		JB			1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Solid	0.650					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Error +/-, Solid	0.310					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Error +/-, Solid	0.450					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Error +/-, Solid	0.310					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, MDA, Solid	0.0200					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Lc, Solid	0.0100					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, MDA, Solid	0.140					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Lc, Solid	0.120					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, MDA, Solid	0.0500					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Lc, Solid	0.0300					1	pCi/g	10147	09/28/98 1134	plj
EPA 901.1	Gamma Scan (HPGe gamma)										
	Actinium-228, Activity, Solid	1.0 - 5					1	pCi/g	10176	09/23/98 2137	mdg
	Actinium-228, error +/-, Solid	0.3					1	pCi/g	10176	09/23/98 2137	mdg
	Actinium-228, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042436-003
Laboratory Sample ID: 982529-7Date Sampled.....: 09/02/98
Date Received.....: 09/09/98Time Sampled.....: 10:12
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Actinium-228, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Americium-241, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Americium-241, error +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Americium-241, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Americium-241, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 2137	mdg
	Cerium-144, Activity, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Cerium-144, Error, +/-, Solid	0.3					1	pCi/g	10176	09/23/98 2137	mdg
	Cerium-144, MDA, Solid	0.3					1	pCi/g	10176	09/23/98 2137	mdg
	Cerium-144, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2137	mdg
	Cobalt-60, Activity, Solid	0.1 - J					1	pCi/g	10176	09/23/98 2137	mdg
	Cobalt-60, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Cobalt-60, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Cobalt-60, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Chromium-51, Activity, Solid	0.7					1	pCi/g	10176	09/23/98 2137	mdg
	Chromium-51, Error, +/-, Solid	0.8					1	pCi/g	10176	09/23/98 2137	mdg
	Chromium-51, MDA, Solid	0.7					1	pCi/g	10176	09/23/98 2137	mdg
	Chromium-51, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2137	mdg
	Cesium-134, Activity, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Cesium-134, Error, +/-, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Cesium-134, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Cesium-134, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Cesium-137, Activity, Solid	0.6					1	pCi/g	10176	09/23/98 2137	mdg
	Cesium-137, Error, +/-, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Cesium-137, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Cesium-137, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Iron-59, Activity, Solid	0.2 - J					1	pCi/g	10176	09/23/98 2137	mdg
	Iron-59, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Iron-59, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Potassium-40, Activity, Solid	26.7					1	pCi/g	10176	09/23/98 2137	mdg
	Potassium-40, error +/-, Solid	3.4					1	pCi/g	10176	09/23/98 2137	mdg
	Potassium-40, MDA, Solid	0.4					1	pCi/g	10176	09/23/98 2137	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Lead-212, Activity, Solid	1.0					1	pCi/g	10176	09/23/98 2137	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042436-003
Laboratory Sample ID: 982529-7Date Sampled.....: 09/02/98
Date Received.....: 09/09/98Time Sampled.....: 10:12
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Lead-212, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2137	mdg
	Lead-214, Activity, Solid	1.6					1	pCi/g	10176	09/23/98 2137	mdg
	Lead-214, error +/-, Solid	0.4					1	pCi/g	10176	09/23/98 2137	mdg
	Lead-214, MDA, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Lead-214, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Radium-226, Activity, Solid	1.7					1	pCi/g	10176	09/23/98 2137	mdg
	Radium-226, Error, +/-, Solid	0.4					1	pCi/g	10176	09/23/98 2137	mdg
	Radium-226, MDA, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Radium-226, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Radium-228, Activity, Solid	1.0 - J					1	pCi/g	10176	09/23/98 2137	mdg
	Radium-228, Error, +/-, Solid	0.3					1	pCi/g	10176	09/23/98 2137	mdg
	Radium-228, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Radium-228, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Ruthenium-103, Activity, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Ruthenium-103, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Ruthenium-103, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Ruthenium-103, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Ruthenium-106, Activity, Solid	4.4					1	pCi/g	10176	09/23/98 2137	mdg
	Ruthenium-106, Error, +/-, Solid	2.8					1	pCi/g	10176	09/23/98 2137	mdg
	Ruthenium-106, MDA, Solid	1.6					1	pCi/g	10176	09/23/98 2137	mdg
	Ruthenium-106, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Thorium-231, Activity, Solid	0.7					1	pCi/g	10176	09/23/98 2137	mdg
	Thorium-231, error +/-, Solid	0.6					1	pCi/g	10176	09/23/98 2137	mdg
	Thorium-231, MDA, Solid	0.7					1	pCi/g	10176	09/23/98 2137	mdg
	Thorium-231, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 2137	mdg
	Thorium-232, Solid	88.9					1	pCi/g	10176	09/23/98 2137	mdg
	Thorium-232, Error +/-, Solid	56.0					1	pCi/g	10176	09/23/98 2137	mdg
	Thorium-232, MDA, Solid	22.8					1	pCi/g	10176	09/23/98 2137	mdg
	Thorium-232, Lc, Solid	0.5					1	pCi/g	10176	09/23/98 2137	mdg
	Uranium-235, Activity, Solid	0.2 - S					1	pCi/g	10176	09/23/98 2137	mdg
	Uranium 235, error +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Uranium-235, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 2137	mdg
	Uranium-238, Activity, Solid	7.9					1	pCi/g	10176	09/23/98 2137	mdg

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042436-003
 Laboratory Sample ID: 982529-7

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 10:12
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	2.4					1	pCi/g	10176	09/23/98 2137	mdg
	Uranium-238, MDA, Solid	1.3					1	pCi/g	10176	09/23/98 2137	mdg
	Uranium-238, Lc, Solid	0.6					1	pCi/g	10176	09/23/98 2137	mdg
	Zirconium-95, Activity, Solid	0.3					1	pCi/g	10176	09/23/98 2137	mdg
	Zirconium-95, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Zirconium-95, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Zirconium-95, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042437-003
 Laboratory Sample ID: 982529-8

Pile 4 - S

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 10:17
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238										
	Uranium-234, Solid	1.31		J			1	pCi/g	10123	09/22/98 1333	plj
	Uranium 234, error +/-, Solid	0.300					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Activity, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 235, error +/-, Solid	0.0700					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Activity, Solid	2.58		J			1	pCi/g	10123	09/22/98 1333	plj
	Uranium 238, error +/-, Solid	0.560					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, MDA, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, MDA, Solid	0.0400					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Lc, Solid	0.0300					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, MDA, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
CA-GLR 5.0R4	Thorium-228, 230, 232										
	Thorium-228, Solid	0.750					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Solid	0.780		JB			1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Solid	1.08					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Error +/-, Solid	0.290					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Error +/-, Solid	0.330					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Error +/-, Solid	0.380					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, MDA, Solid	0.0200					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Lc, Solid	0.0100					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, MDA, Solid	0.110					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Lc, Solid	0.100					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, MDA, Solid	0.0400					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Lc, Solid	0.0300					1	pCi/g	10147	09/28/98 1134	plj
EPA 901.1	Gamma Scan (HPGe gamma)										
	Actinium-228, Activity, Solid	1.7		J			1	pCi/g	10176	09/23/98 2137	mdg
	Actinium-228, error +/-, Solid	0.4					1	pCi/g	10176	09/23/98 2137	mdg
	Actinium-228, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042437-003
Laboratory Sample ID: 982529-8

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:17
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Actinium-228, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Americium-241, Activity, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Americium-241, error +/-, Solid	0.3					1	pCi/g	10176	09/23/98 2137	mdg
	Americium-241, MDA, Solid	0.3					1	pCi/g	10176	09/23/98 2137	mdg
	Americium-241, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2137	mdg
	Cerium-144, Activity, Solid	0.8					1	pCi/g	10176	09/23/98 2137	mdg
	Cerium-144, Error, +/-, Solid	0.6					1	pCi/g	10176	09/23/98 2137	mdg
	Cerium-144, MDA, Solid	0.3					1	pCi/g	10176	09/23/98 2137	mdg
	Cerium-144, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2137	mdg
	Cobalt-60, Activity, Solid	0.0 - J					1	pCi/g	10176	09/23/98 2137	mdg
	Cobalt-60, Error, +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Cobalt-60, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Cobalt-60, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Chromium-51, Activity, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Chromium-51, Error, +/-, Solid	0.3					1	pCi/g	10176	09/23/98 2137	mdg
	Chromium-51, MDA, Solid	0.3					1	pCi/g	10176	09/23/98 2137	mdg
	Chromium-51, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Cesium-134, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Cesium-134, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Cesium-134, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Cesium-134, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Cesium-137, Activity, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Cesium-137, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Cesium-137, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Cesium-137, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Iron-59, Activity, Solid	0.6 - J					1	pCi/g	10176	09/23/98 2137	mdg
	Iron-59, Error, +/-, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Iron-59, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Potassium-40, Activity, Solid	24.3					1	pCi/g	10176	09/23/98 2137	mdg
	Potassium-40, error +/-, Solid	3.6					1	pCi/g	10176	09/23/98 2137	mdg
	Potassium-40, MDA, Solid	0.5					1	pCi/g	10176	09/23/98 2137	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Lead-212, Activity, Solid	0.8					1	pCi/g	10176	09/23/98 2137	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042437-003
Laboratory Sample ID: 982529-8

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:17
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Lead-212, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Lead-214, Activity, Solid	1.3					1	pCi/g	10176	09/23/98 2137	mdg
	Lead-214, error +/-, Solid	0.3					1	pCi/g	10176	09/23/98 2137	mdg
	Lead-214, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Lead-214, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Radium-226, Activity, Solid	1.6					1	pCi/g	10176	09/23/98 2137	mdg
	Radium-226, Error, +/-, Solid	0.3					1	pCi/g	10176	09/23/98 2137	mdg
	Radium-226, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Radium-226, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Radium-228, Activity, Solid	1.7	-5				1	pCi/g	10176	09/23/98 2137	mdg
	Radium-228, Error, +/-, Solid	0.4					1	pCi/g	10176	09/23/98 2137	mdg
	Radium-228, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Radium-228, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Ruthenium-103, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Ruthenium-103, Error, +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Ruthenium-103, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Ruthenium-103, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Ruthenium-106, Activity, Solid	1.5					1	pCi/g	10176	09/23/98 2137	mdg
	Ruthenium-106, Error, +/-, Solid	0.9					1	pCi/g	10176	09/23/98 2137	mdg
	Ruthenium-106, MDA, Solid	1.0					1	pCi/g	10176	09/23/98 2137	mdg
	Ruthenium-106, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Thorium-231, Activity, Solid	0.6					1	pCi/g	10176	09/23/98 2137	mdg
	Thorium-231, error +/-, Solid	1.2					1	pCi/g	10176	09/23/98 2137	mdg
	Thorium-231, MDA, Solid	0.9					1	pCi/g	10176	09/23/98 2137	mdg
	Thorium-231, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 2137	mdg
	Thorium-232, Solid	31.5					1	pCi/g	10176	09/23/98 2137	mdg
	Thorium-232, Error +/-, Solid	56.5					1	pCi/g	10176	09/23/98 2137	mdg
	Thorium-232, MDA, Solid	63.9					1	pCi/g	10176	09/23/98 2137	mdg
	Thorium-232, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2137	mdg
	Uranium-235, Activity, Solid	0.3	-5				1	pCi/g	10176	09/23/98 2137	mdg
	Uranium 235, error +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Uranium-235, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Uranium-238, Activity, Solid	9.3					1	pCi/g	10176	09/23/98 2137	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042437-003
Laboratory Sample ID: 982529-8

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:17
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	5.4					1	pCi/g	10176	09/23/98 2137	mdg
	Uranium-238, MDA, Solid	2.0					1	pCi/g	10176	09/23/98 2137	mdg
	Uranium-238, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2137	mdg
	Zirconium-95, Activity, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Zirconium-95, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2137	mdg
	Zirconium-95, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg
	Zirconium-95, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2137	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042438-003
 Laboratory Sample ID: 982529-9

Pile 5-N

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 10:25
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238										
	Uranium-234, Solid	1.08					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 234, error +/-, Solid	0.440					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Activity, Solid	0.0200					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 235, error +/-, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Activity, Solid	2.47					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 238, error +/-, Solid	0.560					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, MDA, Solid	0.0700					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, MDA, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Lc, Solid	0.0300					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, MDA, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
CA-GLR 5.0R4	Thorium-228, 230, 232										
	Thorium-228, Solid	0.670					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Solid	1.10		JB			1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Solid	0.600					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Error +/-, Solid	0.430					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Error +/-, Solid	0.390					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Error +/-, Solid	0.260					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, MDA, Solid	0.0100					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Lc, Solid	0.0100					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, MDA, Solid	0.110					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Lc, Solid	0.0900					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, MDA, Solid	0.0400					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Lc, Solid	0.0300					1	pCi/g	10147	09/28/98 1134	plj
EPA 901.1	Gamma Scan (HPGe gamma)										
	Actinium-228, Activity, Solid	1.9 - 5					1	pCi/g	10176	09/23/98 2238	mdg
	Actinium-228, error +/-, Solid	0.4					1	pCi/g	10176	09/23/98 2238	mdg
	Actinium-228, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042438-003
Laboratory Sample ID: 982529-9

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:25
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Actinium-228, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Americium-241, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Americium-241, error +/-, Solid	0.2					1	pCi/g	10176	09/23/98 2238	mdg
	Americium-241, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Americium-241, Lc, Solid	0.5					1	pCi/g	10176	09/23/98 2238	mdg
	Cerium-144, Activity, Solid	1.0					1	pCi/g	10176	09/23/98 2238	mdg
	Cerium-144, Error, +/-, Solid	0.7					1	pCi/g	10176	09/23/98 2238	mdg
	Cerium-144, MDA, Solid	0.3					1	pCi/g	10176	09/23/98 2238	mdg
	Cerium-144, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 2238	mdg
	Cobalt-60, Activity, Solid	0.3 - J					1	pCi/g	10176	09/23/98 2238	mdg
	Cobalt-60, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Cobalt-60, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Cobalt-60, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Chromium-51, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Chromium-51, Error, +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Chromium-51, MDA, Solid	0.3					1	pCi/g	10176	09/23/98 2238	mdg
	Chromium-51, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Cesium-134, Activity, Solid	0.2					1	pCi/g	10176	09/23/98 2238	mdg
	Cesium-134, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Cesium-134, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Cesium-134, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2238	mdg
	Cesium-137, Activity, Solid	0.4					1	pCi/g	10176	09/23/98 2238	mdg
	Cesium-137, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Cesium-137, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Cesium-137, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Iron-59, Activity, Solid	0.2 - J					1	pCi/g	10176	09/23/98 2238	mdg
	Iron-59, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Iron-59, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Iron-59, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Potassium-40, Activity, Solid	23.8					1	pCi/g	10176	09/23/98 2238	mdg
	Potassium-40, error +/-, Solid	3.2					1	pCi/g	10176	09/23/98 2238	mdg
	Potassium-40, MDA, Solid	0.4					1	pCi/g	10176	09/23/98 2238	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Lead-212, Activity, Solid	1.0					1	pCi/g	10176	09/23/98 2238	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/23/98 2238	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042438-003
Laboratory Sample ID: 982529-9

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:25
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Lead-212, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2238	mdg
	Lead-214, Activity, Solid	1.4					1	pCi/g	10176	09/23/98 2238	mdg
	Lead-214, error +/-, Solid	0.3					1	pCi/g	10176	09/23/98 2238	mdg
	Lead-214, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Lead-214, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2238	mdg
	Radium-226, Activity, Solid	1.6					1	pCi/g	10176	09/23/98 2238	mdg
	Radium-226, Error, +/-, Solid	0.5					1	pCi/g	10176	09/23/98 2238	mdg
	Radium-226, MDA, Solid	0.2					1	pCi/g	10176	09/23/98 2238	mdg
	Radium-226, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2238	mdg
	Radium-228, Activity, Solid	1.9 -5					1	pCi/g	10176	09/23/98 2238	mdg
	Radium-228, Error, +/-, Solid	0.4					1	pCi/g	10176	09/23/98 2238	mdg
	Radium-228, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Radium-228, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Ruthenium-103, Activity, Solid	0.2					1	pCi/g	10176	09/23/98 2238	mdg
	Ruthenium-103, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Ruthenium-103, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Ruthenium-103, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2238	mdg
	Ruthenium-106, Activity, Solid	0.8					1	pCi/g	10176	09/23/98 2238	mdg
	Ruthenium-106, Error, +/-, Solid	0.8					1	pCi/g	10176	09/23/98 2238	mdg
	Ruthenium-106, MDA, Solid	0.8					1	pCi/g	10176	09/23/98 2238	mdg
	Ruthenium-106, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2238	mdg
	Thorium-231, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Thorium-231, error +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Thorium-231, MDA, Solid	0.7					1	pCi/g	10176	09/23/98 2238	mdg
	Thorium-231, Lc, Solid	0.6					1	pCi/g	10176	09/23/98 2238	mdg
	Thorium-232, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Thorium-232, Error +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Thorium-232, MDA, Solid	20.0					1	pCi/g	10176	09/23/98 2238	mdg
	Thorium-232, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 2238	mdg
	Uranium-235, Activity, Solid	0.2 -5					1	pCi/g	10176	09/23/98 2238	mdg
	Uranium 235, error +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Uranium-235, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 2238	mdg
	Uranium-238, Activity, Solid	7.4					1	pCi/g	10176	09/23/98 2238	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042438-003
Laboratory Sample ID: 982529-9

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:25
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	3.0					1	pCi/g	10176	09/23/98 2238	mdg
	Uranium-238, MDA, Solid	1.5					1	pCi/g	10176	09/23/98 2238	mdg
	Uranium-238, Lc, Solid	0.7					1	pCi/g	10176	09/23/98 2238	mdg
	Zirconium-95, Activity, Solid	0.3					1	pCi/g	10176	09/23/98 2238	mdg
	Zirconium-95, Error, +/-, Solid	0.2					1	pCi/g	10176	09/23/98 2238	mdg
	Zirconium-95, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Zirconium-95, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042439-003
 Laboratory Sample ID: 982529-10

Pile 5-5

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 10:30
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238										
	Uranium-234, Solid	1.38					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 234, error +/-, Solid	0.350					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Activity, Solid	0.0900					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 235, error +/-, Solid	0.100					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Activity, Solid	2.65					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 238, error +/-, Solid	0.600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, MDA, Solid	0.0700					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, Lc, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, MDA, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Lc, Solid	0.0300					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, MDA, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
CA-GLR 5.0R4	Thorium-228, 230, 232										
	Thorium-228, Solid	0.970					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Solid	0.890		JB			1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Solid	0.710					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Error +/-, Solid	0.530					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Error +/-, Solid	0.430					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Error +/-, Solid	0.350					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, MDA, Solid	0.0200					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Lc, Solid	0.0100					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, MDA, Solid	0.150					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Lc, Solid	0.140					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, MDA, Solid	0.0600					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Lc, Solid	0.0400					1	pCi/g	10147	09/28/98 1134	plj
EPA 901.1	Gamma Scan (HPGe gamma)										
	Actinium-228, Activity, Solid	1.6 - 5					1	pCi/g	10176	09/23/98 2238	mdg
	Actinium-228, error +/-, Solid	0.4					1	pCi/g	10176	09/23/98 2238	mdg
	Actinium-228, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042439-003
Laboratory Sample ID: 982529-10Date Sampled.....: 09/02/98
Date Received.....: 09/09/98Time Sampled.....: 10:30
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Actinium-228, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Americium-241, Activity, Solid	0.2					1	pCi/g	10176	09/23/98 2238	mdg
	Americium-241, error +/-, Solid	0.3					1	pCi/g	10176	09/23/98 2238	mdg
	Americium-241, MDA, Solid	0.4					1	pCi/g	10176	09/23/98 2238	mdg
	Americium-241, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2238	mdg
	Cerium-144, Activity, Solid	0.4					1	pCi/g	10176	09/23/98 2238	mdg
	Cerium-144, Error, +/-, Solid	0.6					1	pCi/g	10176	09/23/98 2238	mdg
	Cerium-144, MDA, Solid	0.4					1	pCi/g	10176	09/23/98 2238	mdg
	Cerium-144, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2238	mdg
	Cobalt-60, Activity, Solid	0.0 -J					1	pCi/g	10176	09/23/98 2238	mdg
	Cobalt-60, Error, +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Cobalt-60, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Cobalt-60, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Chromium-51, Activity, Solid	0.8					1	pCi/g	10176	09/23/98 2238	mdg
	Chromium-51, Error, +/-, Solid	0.5					1	pCi/g	10176	09/23/98 2238	mdg
	Chromium-51, MDA, Solid	0.4					1	pCi/g	10176	09/23/98 2238	mdg
	Chromium-51, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2238	mdg
	Cesium-134, Activity, Solid	0.2					1	pCi/g	10176	09/23/98 2238	mdg
	Cesium-134, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Cesium-134, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Cesium-134, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Cesium-137, Activity, Solid	0.4					1	pCi/g	10176	09/23/98 2238	mdg
	Cesium-137, Error, +/-, Solid	0.3					1	pCi/g	10176	09/23/98 2238	mdg
	Cesium-137, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Cesium-137, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2238	mdg
	Iron-59, Activity, Solid	0.0 -J					1	pCi/g	10176	09/23/98 2238	mdg
	Iron-59, Error, +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Iron-59, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Potassium-40, Activity, Solid	23.8					1	pCi/g	10176	09/23/98 2238	mdg
	Potassium-40, error +/-, Solid	3.6					1	pCi/g	10176	09/23/98 2238	mdg
	Potassium-40, MDA, Solid	0.5					1	pCi/g	10176	09/23/98 2238	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Lead-212, Activity, Solid	0.8					1	pCi/g	10176	09/23/98 2238	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/23/98 2238	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042439-003
 Laboratory Sample ID: 982529-10

Date Sampled.....: 09/02/98 Time Sampled.....: 10:30
 Date Received.....: 09/09/98 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Lead-212, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2238	mdg
	Lead-214, Activity, Solid	1.1					1	pCi/g	10176	09/23/98 2238	mdg
	Lead-214, error +/-, Solid	0.3					1	pCi/g	10176	09/23/98 2238	mdg
	Lead-214, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Lead-214, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Radium-226, Activity, Solid	1.3					1	pCi/g	10176	09/23/98 2238	mdg
	Radium-226, Error, +/-, Solid	0.3					1	pCi/g	10176	09/23/98 2238	mdg
	Radium-226, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Radium-226, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Radium-228, Activity, Solid	1.6 -J					1	pCi/g	10176	09/23/98 2238	mdg
	Radium-228, Error, +/-, Solid	0.4					1	pCi/g	10176	09/23/98 2238	mdg
	Radium-228, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Radium-228, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Ruthenium-103, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Ruthenium-103, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Ruthenium-103, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Ruthenium-103, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Ruthenium-106, Activity, Solid	1.8					1	pCi/g	10176	09/23/98 2238	mdg
	Ruthenium-106, Error, +/-, Solid	0.4					1	pCi/g	10176	09/23/98 2238	mdg
	Ruthenium-106, MDA, Solid	1.0					1	pCi/g	10176	09/23/98 2238	mdg
	Ruthenium-106, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Thorium-231, Activity, Solid	1.4					1	pCi/g	10176	09/23/98 2238	mdg
	Thorium-231, error +/-, Solid	1.5					1	pCi/g	10176	09/23/98 2238	mdg
	Thorium-231, MDA, Solid	1.0					1	pCi/g	10176	09/23/98 2238	mdg
	Thorium-231, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 2238	mdg
	Thorium-232, Solid	19.3					1	pCi/g	10176	09/23/98 2238	mdg
	Thorium-232, Error +/-, Solid	56.4					1	pCi/g	10176	09/23/98 2238	mdg
	Thorium-232, MDA, Solid	69.3					1	pCi/g	10176	09/23/98 2238	mdg
	Thorium-232, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2238	mdg
	Uranium-235, Activity, Solid	0.4 -J					1	pCi/g	10176	09/23/98 2238	mdg
	Uranium 235, error +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Uranium-235, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Uranium-235, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2238	mdg
	Uranium-238, Activity, Solid	3.8					1	pCi/g	10176	09/23/98 2238	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042439-003
Laboratory Sample ID: 982529-10

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:30
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	4.3					1	pCi/g	10176	09/23/98 2238	mdg
	Uranium-238, MDA, Solid	3.4					1	pCi/g	10176	09/23/98 2238	mdg
	Uranium-238, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 2238	mdg
	Zirconium-95, Activity, Solid	0.3					1	pCi/g	10176	09/23/98 2238	mdg
	Zirconium-95, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2238	mdg
	Zirconium-95, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg
	Zirconium-95, Lc, Solid	0.0					1	pCi/g	10176	09/23/98 2238	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042440-003
 Laboratory Sample ID: 982529-11

Pile G-N

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 10:40
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238										
	Uranium-234, Solid	1.18					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 234, error +/-, Solid	0.320					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Activity, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 235, error +/-, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Activity, Solid	2.74					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 238, error +/-, Solid	0.570					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, MDA, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, MDA, Solid	0.0400					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Lc, Solid	0.0300					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, MDA, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Lc, Solid	0.0400					1	pCi/g	10123	09/22/98 1333	plj
	CA-GLR 5.0R4	Thorium-228, 230, 232									
Thorium-228, Solid		1.13		J			1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, Solid		1.18		J			1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, Solid		1.08		J			1	pCi/g	10147	09/28/98 1134	plj
Thorium-228, Error +/-, Solid		0.370					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, Error +/-, Solid		0.540					1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, Error +/-, Solid		0.490					1	pCi/g	10147	09/28/98 1134	plj
Thorium-228, MDA, Solid		0.0300					1	pCi/g	10147	09/28/98 1134	plj
Thorium-228, Lc, Solid		0.0100					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, MDA, Solid		0.180					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, Lc, Solid		0.160					1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, MDA, Solid		0.0700					1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, Lc, Solid		0.0500					1	pCi/g	10147	09/28/98 1134	plj
EPA 901.1		Gamma Scan (HPGe gamma)									
	Actinium-228, Activity, Solid	3.6		J			1	pCi/g	10176	09/23/98 2340	mdg
	Actinium-228, error +/-, Solid	1.1					1	pCi/g	10176	09/23/98 2340	mdg
	Actinium-228, MDA, Solid	0.2					1	pCi/g	10176	09/23/98 2340	mdg



LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042440-003
Laboratory Sample ID: 982529-11

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:40
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECI
	Actinium-228, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2340	mdg
	Americium-241, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 2340	mdg
	Americium-241, error +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2340	mdg
	Americium-241, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2340	mdg
	Americium-241, Lc, Solid	0.8					1	pCi/g	10176	09/23/98 2340	mdg
	Cerium-144, Activity, Solid	0.7					1	pCi/g	10176	09/23/98 2340	mdg
	Cerium-144, Error, +/-, Solid	0.8					1	pCi/g	10176	09/23/98 2340	mdg
	Cerium-144, MDA, Solid	0.2					1	pCi/g	10176	09/23/98 2340	mdg
	Cerium-144, Lc, Solid	0.6					1	pCi/g	10176	09/23/98 2340	mdg
	Cobalt-60, Activity, Solid	1.1 - J					1	pCi/g	10176	09/23/98 2340	mdg
	Cobalt-60, Error, +/-, Solid	0.7					1	pCi/g	10176	09/23/98 2340	mdg
	Cobalt-60, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2340	mdg
	Cobalt-60, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 2340	mdg
	Chromium-51, Activity, Solid	1.6					1	pCi/g	10176	09/23/98 2340	mdg
	Chromium-51, Error, +/-, Solid	2.0					1	pCi/g	10176	09/23/98 2340	mdg
	Chromium-51, MDA, Solid	0.4					1	pCi/g	10176	09/23/98 2340	mdg
	Chromium-51, Lc, Solid	0.5					1	pCi/g	10176	09/23/98 2340	mdg
	Cesium-134, Activity, Solid	0.1					1	pCi/g	10176	09/23/98 2340	mdg
	Cesium-134, Error, +/-, Solid	0.1					1	pCi/g	10176	09/23/98 2340	mdg
	Cesium-134, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2340	mdg
	Cesium-134, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 2340	mdg
	Cesium-137, Activity, Solid	0.4					1	pCi/g	10176	09/23/98 2340	mdg
	Cesium-137, Error, +/-, Solid	0.2					1	pCi/g	10176	09/23/98 2340	mdg
	Cesium-137, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2340	mdg
	Cesium-137, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 2340	mdg
	Iron-59, Activity, Solid	0.8 - J					1	pCi/g	10176	09/23/98 2340	mdg
	Iron-59, Error, +/-, Solid	0.6					1	pCi/g	10176	09/23/98 2340	mdg
	Iron-59, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2340	mdg
	Iron-59, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2340	mdg
	Potassium-40, Activity, Solid	75.4					1	pCi/g	10176	09/23/98 2340	mdg
	Potassium-40, error +/-, Solid	6.8					1	pCi/g	10176	09/23/98 2340	mdg
	Potassium-40, MDA, Solid	0.3					1	pCi/g	10176	09/23/98 2340	mdg
	Potassium-40, Lc, Solid	0.1					1	pCi/g	10176	09/23/98 2340	mdg
	Lead-212, Activity, Solid	2.9					1	pCi/g	10176	09/23/98 2340	mdg
	Lead-212, error +/-, Solid	0.3					1	pCi/g	10176	09/23/98 2340	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042440-003
Laboratory Sample ID: 982529-11Date Sampled.....: 09/02/98
Date Received.....: 09/09/98Time Sampled.....: 10:40
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2340	mdg
	Lead-212, Lc, Solid	0.5					1	pCi/g	10176	09/23/98 2340	mdg
	Lead-214, Activity, Solid	3.1					1	pCi/g	10176	09/23/98 2340	mdg
	Lead-214, error +/-, Solid	0.6					1	pCi/g	10176	09/23/98 2340	mdg
	Lead-214, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2340	mdg
	Lead-214, Lc, Solid	0.6					1	pCi/g	10176	09/23/98 2340	mdg
	Radium-226, Activity, Solid	3.2					1	pCi/g	10176	09/23/98 2340	mdg
	Radium-226, Error +/-, Solid	0.8					1	pCi/g	10176	09/23/98 2340	mdg
	Radium-226, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2340	mdg
	Radium-226, Lc, Solid	0.5					1	pCi/g	10176	09/23/98 2340	mdg
	Radium-228, Activity, Solid	3.6 - 5					1	pCi/g	10176	09/23/98 2340	mdg
	Radium-228, Error +/-, Solid	1.1					1	pCi/g	10176	09/23/98 2340	mdg
	Radium-228, MDA, Solid	0.2					1	pCi/g	10176	09/23/98 2340	mdg
	Radium-228, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2340	mdg
	Ruthenium-103, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 2340	mdg
	Ruthenium-103, Error +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2340	mdg
	Ruthenium-103, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2340	mdg
	Ruthenium-103, Lc, Solid	0.4					1	pCi/g	10176	09/23/98 2340	mdg
	Ruthenium-106, Activity, Solid	0.0					1	pCi/g	10176	09/23/98 2340	mdg
	Ruthenium-106, Error +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2340	mdg
	Ruthenium-106, MDA, Solid	0.3					1	pCi/g	10176	09/23/98 2340	mdg
	Ruthenium-106, Lc, Solid	0.2					1	pCi/g	10176	09/23/98 2340	mdg
	Thorium-231, Activity, Solid	2.5					1	pCi/g	10176	09/23/98 2340	mdg
	Thorium-231, error +/-, Solid	1.0					1	pCi/g	10176	09/23/98 2340	mdg
	Thorium-231, MDA, Solid	0.3					1	pCi/g	10176	09/23/98 2340	mdg
	Thorium-231, Lc, Solid	0.7					1	pCi/g	10176	09/23/98 2340	mdg
	Thorium-232, Solid	0.0					1	pCi/g	10176	09/23/98 2340	mdg
	Thorium-232, Error +/-, Solid	0.0					1	pCi/g	10176	09/23/98 2340	mdg
	Thorium-232, MDA, Solid	13.0					1	pCi/g	10176	09/23/98 2340	mdg
	Thorium-232, Lc, Solid	0.8					1	pCi/g	10176	09/23/98 2340	mdg
	Uranium-235, Activity, Solid	0.5 - 5					1	pCi/g	10176	09/23/98 2340	mdg
	Uranium 235, error +/-, Solid	0.2					1	pCi/g	10176	09/23/98 2340	mdg
	Uranium-235, MDA, Solid	0.0					1	pCi/g	10176	09/23/98 2340	mdg
	Uranium-235, Lc, Solid	0.7					1	pCi/g	10176	09/23/98 2340	mdg
	Uranium-238, Activity, Solid	24.2					1	pCi/g	10176	09/23/98 2340	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042440-003
 Laboratory Sample ID: 982529-11

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 10:40
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	6.4					1	pCi/g	10176	09/23/98 2340	mdg
	Uranium-238, MDA, Solid	0.9					1	pCi/g	10176	09/23/98 2340	mdg
	Uranium-238, Lc, Solid	1.2					1	pCi/g	10176	09/23/98 2340	mdg
	Zirconium-95, Activity, Solid	1.3					1	pCi/g	10176	09/23/98 2340	mdg
	Zirconium-95, Error, +/-, Solid	0.8					1	pCi/g	10176	09/23/98 2340	mdg
	Zirconium-95, MDA, Solid	0.1					1	pCi/g	10176	09/23/98 2340	mdg
	Zirconium-95, Lc, Solid	0.3					1	pCi/g	10176	09/23/98 2340	mdg

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CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042441-003
 Laboratory Sample ID: 982529-12

Pile 6-5

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 10:45
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238										
	Uranium-234, Solid	1.13					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 234, error +/-, Solid	0.430					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Activity, Solid	0.0700					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 235, error +/-, Solid	0.0900					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Activity, Solid	2.81					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 238, error +/-, Solid	0.650					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, MDA, Solid	0.0700					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, Lc, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, MDA, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Lc, Solid	0.0400					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, MDA, Solid	0.0700					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Lc, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
CA-GLR 5.0R4	Thorium-228, 230, 232										
	Thorium-228, Solid	0.790					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Solid	0.680		SB			1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Solid	1.00					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Error +/-, Solid	0.460					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Error +/-, Solid	0.290					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Error +/-, Solid	0.360					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, MDA, Solid	0.0200					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Lc, Solid	0.0100					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, MDA, Solid	0.110					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Lc, Solid	0.100					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, MDA, Solid	0.0400					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Lc, Solid	0.0300					1	pCi/g	10147	09/28/98 1134	plj
EPA 901.1	Gamma Scan (HPGe gamma)										
	Actinium-228, Activity, Solid	2.7-5					1	pCi/g	10176	09/24/98 0500	mdg
	Actinium-228, error +/-, Solid	0.5					1	pCi/g	10176	09/24/98 0500	mdg
	Actinium-228, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0500	mdg

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042441-003
Laboratory Sample ID: 982529-12

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:45
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Actinium-228, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0500	mdg
	Americium-241, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 0500	mdg
	Americium-241, error +/-, Solid	0.0					1	pCi/g	10176	09/24/98 0500	mdg
	Americium-241, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0500	mdg
	Americium-241, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0500	mdg
	Cerium-144, Activity, Solid	0.7					1	pCi/g	10176	09/24/98 0500	mdg
	Cerium-144, Error, +/-, Solid	0.6					1	pCi/g	10176	09/24/98 0500	mdg
	Cerium-144, MDA, Solid	0.3					1	pCi/g	10176	09/24/98 0500	mdg
	Cerium-144, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0500	mdg
	Cobalt-60, Activity, Solid	0.1 - J					1	pCi/g	10176	09/24/98 0500	mdg
	Cobalt-60, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0500	mdg
	Cobalt-60, MDA, Solid	0.0					1	pCi/g	10176	09/24/98 0500	mdg
	Cobalt-60, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0500	mdg
	Chromium-51, Activity, Solid	1.0					1	pCi/g	10176	09/24/98 0500	mdg
	Chromium-51, Error, +/-, Solid	1.0					1	pCi/g	10176	09/24/98 0500	mdg
	Chromium-51, MDA, Solid	0.6					1	pCi/g	10176	09/24/98 0500	mdg
	Chromium-51, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0500	mdg
	Cesium-134, Activity, Solid	0.1					1	pCi/g	10176	09/24/98 0500	mdg
	Cesium-134, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0500	mdg
	Cesium-134, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0500	mdg
	Cesium-134, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0500	mdg
	Cesium-137, Activity, Solid	0.4					1	pCi/g	10176	09/24/98 0500	mdg
	Cesium-137, Error, +/-, Solid	0.3					1	pCi/g	10176	09/24/98 0500	mdg
	Cesium-137, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0500	mdg
	Cesium-137, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0500	mdg
	Iron-59, Activity, Solid	0.0 - J					1	pCi/g	10176	09/24/98 0500	mdg
	Iron-59, Error, +/-, Solid	0.0					1	pCi/g	10176	09/24/98 0500	mdg
	Iron-59, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0500	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0500	mdg
	Potassium-40, Activity, Solid	24.4					1	pCi/g	10176	09/24/98 0500	mdg
	Potassium-40, error +/-, Solid	3.4					1	pCi/g	10176	09/24/98 0500	mdg
	Potassium-40, MDA, Solid	0.4					1	pCi/g	10176	09/24/98 0500	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0500	mdg
	Lead-212, Activity, Solid	1.1					1	pCi/g	10176	09/24/98 0500	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0500	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042441-003
Laboratory Sample ID: 982529-12

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:45
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0500	mdg
	Lead-212, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0500	mdg
	Lead-214, Activity, Solid	1.6					1	pCi/g	10176	09/24/98 0500	mdg
	Lead-214, error +/-, Solid	0.4					1	pCi/g	10176	09/24/98 0500	mdg
	Lead-214, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0500	mdg
	Lead-214, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0500	mdg
	Radium-226, Activity, Solid	2.0					1	pCi/g	10176	09/24/98 0500	mdg
	Radium-226, Error, +/-, Solid	0.6					1	pCi/g	10176	09/24/98 0500	mdg
	Radium-226, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0500	mdg
	Radium-226, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0500	mdg
	Radium-228, Activity, Solid	2.7 - J					1	pCi/g	10176	09/24/98 0500	mdg
	Radium-228, Error, +/-, Solid	0.5					1	pCi/g	10176	09/24/98 0500	mdg
	Radium-228, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0500	mdg
	Radium-228, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0500	mdg
	Ruthenium-103, Activity, Solid	0.1					1	pCi/g	10176	09/24/98 0500	mdg
	Ruthenium-103, Error, +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0500	mdg
	Ruthenium-103, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0500	mdg
	Ruthenium-103, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0500	mdg
	Ruthenium-106, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 0500	mdg
	Ruthenium-106, Error, +/-, Solid	0.0					1	pCi/g	10176	09/24/98 0500	mdg
	Ruthenium-106, MDA, Solid	1.1					1	pCi/g	10176	09/24/98 0500	mdg
	Ruthenium-106, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0500	mdg
	Thorium-231, Activity, Solid	0.8					1	pCi/g	10176	09/24/98 0500	mdg
	Thorium-231, error +/-, Solid	0.6					1	pCi/g	10176	09/24/98 0500	mdg
	Thorium-231, MDA, Solid	0.6					1	pCi/g	10176	09/24/98 0500	mdg
	Thorium-231, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 0500	mdg
	Thorium-232, Solid	13.2					1	pCi/g	10176	09/24/98 0500	mdg
	Thorium-232, Error +/-, Solid	22.8					1	pCi/g	10176	09/24/98 0500	mdg
	Thorium-232, MDA, Solid	20.5					1	pCi/g	10176	09/24/98 0500	mdg
	Thorium-232, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0500	mdg
	Uranium-235, Activity, Solid	0.2 - J					1	pCi/g	10176	09/24/98 0500	mdg
	Uranium-235, error +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0500	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0500	mdg
	Uranium-235, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 0500	mdg
	Uranium-238, Activity, Solid	10.7					1	pCi/g	10176	09/24/98 0500	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042441-003
Laboratory Sample ID: 982529-12

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:45
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	6.7					1	pCi/g	10176	09/24/98 0500	mdg
	Uranium-238, MDA, Solid	1.7					1	pCi/g	10176	09/24/98 0500	mdg
	Uranium-238, Lc, Solid	0.6					1	pCi/g	10176	09/24/98 0500	mdg
	Zirconium-95, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 0500	mdg
	Zirconium-95, Error, +/-, Solid	0.0					1	pCi/g	10176	09/24/98 0500	mdg
	Zirconium-95, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0500	mdg
	Zirconium-95, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0500	mdg

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CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042442-003
 Laboratory Sample ID: 982529-13

Pile 7-N

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 10:50
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238						1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, Solid	1.31					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 234, error +/-, Solid	0.560					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Activity, Solid	0.110					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 235, error +/-, Solid	0.0900					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Activity, Solid	3.68					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 238, error +/-, Solid	0.720					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, MDA, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, MDA, Solid	0.0400					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Lc, Solid	0.0300					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, MDA, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
CA-GLR 5.0R4	Thorium-228, 230, 232						1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Solid	1.15					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Solid	0.540		JB			1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Solid	1.11					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Error +/-, Solid	0.540					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Error +/-, Solid	0.280					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Error +/-, Solid	0.410					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, MDA, Solid	0.0200					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Lc, Solid	0.0100					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, MDA, Solid	0.120					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Lc, Solid	0.110					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, MDA, Solid	0.0500					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Lc, Solid	0.0300					1	pCi/g	10147	09/28/98 1134	plj
EPA 901.1	Gamma Scan (HPGe gamma)						1	pCi/g	10176	09/24/98 0602	mdg
	Actinium-228, Activity, Solid	2.1 - J					1	pCi/g	10176	09/24/98 0602	mdg
	Actinium-228, error +/-, Solid	0.9					1	pCi/g	10176	09/24/98 0602	mdg
	Actinium-228, MDA, Solid	0.3					1	pCi/g	10176	09/24/98 0602	mdg

IER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042442-003
 Laboratory Sample ID: 982529-13

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 10:50
 Time Received.....: 09:00

Sample Matrix.....: Soil

METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Actinium-228, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0602	mdg
	Americium-241, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 0602	mdg
	Americium-241, error +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0602	mdg
	Americium-241, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0602	mdg
	Americium-241, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 0602	mdg
	Cerium-144, Activity, Solid	0.7					1	pCi/g	10176	09/24/98 0602	mdg
	Cerium-144, Error, +/-, Solid	0.6					1	pCi/g	10176	09/24/98 0602	mdg
	Cerium-144, MDA, Solid	0.3					1	pCi/g	10176	09/24/98 0602	mdg
	Cerium-144, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0602	mdg
	Cobalt-60, Activity, Solid	0.3 -5					1	pCi/g	10176	09/24/98 0602	mdg
	Cobalt-60, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0602	mdg
	Cobalt-60, MDA, Solid	0.4					1	pCi/g	10176	09/24/98 0602	mdg
	Cobalt-60, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0602	mdg
	Chromium-51, Activity, Solid	1.4					1	pCi/g	10176	09/24/98 0602	mdg
	Chromium-51, Error, +/-, Solid	1.2					1	pCi/g	10176	09/24/98 0602	mdg
	Chromium-51, MDA, Solid	0.6					1	pCi/g	10176	09/24/98 0602	mdg
	Chromium-51, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0602	mdg
	Cesium-134, Activity, Solid	0.1					1	pCi/g	10176	09/24/98 0602	mdg
	Cesium-134, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0602	mdg
	Cesium-134, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0602	mdg
	Cesium-134, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0602	mdg
	Cesium-137, Activity, Solid	0.2					1	pCi/g	10176	09/24/98 0602	mdg
	Cesium-137, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0602	mdg
	Cesium-137, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0602	mdg
	Cesium-137, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0602	mdg
	Iron-59, Activity, Solid	0.5 -5					1	pCi/g	10176	09/24/98 0602	mdg
	Iron-59, Error, +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0602	mdg
	Iron-59, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0602	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0602	mdg
	Potassium-40, Activity, Solid	21.4					1	pCi/g	10176	09/24/98 0602	mdg
	Potassium-40, error +/-, Solid	3.2					1	pCi/g	10176	09/24/98 0602	mdg
	Potassium-40, MDA, Solid	0.4					1	pCi/g	10176	09/24/98 0602	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0602	mdg
	Lead-212, Activity, Solid	1.0					1	pCi/g	10176	09/24/98 0602	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0602	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042442-003
Laboratory Sample ID: 982529-13

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:50
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0602	mdg
	Lead-212, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0602	mdg
	Lead-214, Activity, Solid	1.6					1	pCi/g	10176	09/24/98 0602	mdg
	Lead-214, error +/-, Solid	0.4					1	pCi/g	10176	09/24/98 0602	mdg
	Lead-214, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0602	mdg
	Lead-214, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0602	mdg
	Radium-226, Activity, Solid	1.9					1	pCi/g	10176	09/24/98 0602	mdg
	Radium-226, Error, +/-, Solid	0.5					1	pCi/g	10176	09/24/98 0602	mdg
	Radium-226, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0602	mdg
	Radium-226, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0602	mdg
	Radium-228, Activity, Solid	2.1 - J					1	pCi/g	10176	09/24/98 0602	mdg
	Radium-228, Error, +/-, Solid	0.9					1	pCi/g	10176	09/24/98 0602	mdg
	Radium-228, MDA, Solid	0.3					1	pCi/g	10176	09/24/98 0602	mdg
	Radium-228, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0602	mdg
	Ruthenium-103, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 0602	mdg
	Ruthenium-103, Error, +/-, Solid	0.0					1	pCi/g	10176	09/24/98 0602	mdg
	Ruthenium-103, MDA, Solid	0.0					1	pCi/g	10176	09/24/98 0602	mdg
	Ruthenium-103, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0602	mdg
	Ruthenium-106, Activity, Solid	2.3					1	pCi/g	10176	09/24/98 0602	mdg
	Ruthenium-106, Error, +/-, Solid	1.6					1	pCi/g	10176	09/24/98 0602	mdg
	Ruthenium-106, MDA, Solid	1.3					1	pCi/g	10176	09/24/98 0602	mdg
	Ruthenium-106, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0602	mdg
	Thorium-231, Activity, Solid	5.2					1	pCi/g	10176	09/24/98 0602	mdg
	Thorium-231, error +/-, Solid	2.5					1	pCi/g	10176	09/24/98 0602	mdg
	Thorium-231, MDA, Solid	0.8					1	pCi/g	10176	09/24/98 0602	mdg
	Thorium-231, Lc, Solid	0.6					1	pCi/g	10176	09/24/98 0602	mdg
	Thorium-232, Solid	13.8					1	pCi/g	10176	09/24/98 0602	mdg
	Thorium-232, Error +/-, Solid	21.7					1	pCi/g	10176	09/24/98 0602	mdg
	Thorium-232, MDA, Solid	24.3					1	pCi/g	10176	09/24/98 0602	mdg
	Thorium-232, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 0602	mdg
	Uranium-235, Activity, Solid	0.4 - J					1	pCi/g	10176	09/24/98 0602	mdg
	Uranium-235, error +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0602	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0602	mdg
	Uranium-235, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 0602	mdg
	Uranium-238, Activity, Solid	7.4					1	pCi/g	10176	09/24/98 0602	mdg

Job Number: 982529

LABORATORY TEST RESULTS

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042442-003
 Laboratory Sample ID: 982529-13

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 10:50
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	2.3					1	pCi/g	10176	09/24/98 0602	mdg
	Uranium-238, MDA, Solid	1.4					1	pCi/g	10176	09/24/98 0602	mdg
	Uranium-238, Lc, Solid	0.5					1	pCi/g	10176	09/24/98 0602	mdg
	Zirconium-95, Activity, Solid	0.1					1	pCi/g	10176	09/24/98 0602	mdg
	Zirconium-95, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0602	mdg
	Zirconium-95, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0602	mdg
	Zirconium-95, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0602	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042443-003
Laboratory Sample ID: 982529-14

Pile 7-S

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:55
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238						1				
	Uranium-234, Solid	2.04					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 234, error +/-, Solid	0.240					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Activity, Solid	0.100					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 235, error +/-, Solid	0.110					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Activity, Solid	5.62					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 238, error +/-, Solid	1.02					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, MDA, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, MDA, Solid	0.0400					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Lc, Solid	0.0300					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, MDA, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	CA-GLR 5.0R4	Thorium-228, 230, 232						1			
Thorium-228, Solid		1.44					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, Solid		1.47					1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, Solid		1.37					1	pCi/g	10147	09/28/98 1134	plj
Thorium-228, Error +/-, Solid		0.520					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, Error +/-, Solid		0.720					1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, Error +/-, Solid		0.680					1	pCi/g	10147	09/28/98 1134	plj
Thorium-228, MDA, Solid		0.0400					1	pCi/g	10147	09/28/98 1134	plj
Thorium-228, Lc, Solid		0.0100					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, MDA, Solid		0.300					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, Lc, Solid		0.270					1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, MDA, Solid		0.110					1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, Lc, Solid		0.0700					1	pCi/g	10147	09/28/98 1134	plj
EPA 901.1		Gamma Scan (HPGe gamma)									
	Actinium-228, Activity, Solid	1.8 - J					1	pCi/g	10176	09/24/98 0708	mdg
	Actinium-228, error +/-, Solid	0.9					1	pCi/g	10176	09/24/98 0708	mdg
	Actinium-228, MDA, Solid	0.3					1	pCi/g	10176	09/24/98 0708	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042443-003

Date Sampled.....: 09/02/98

Time Sampled.....: 10:55

Sample Matrix.....: Soil

Laboratory Sample ID: 982529-14

Date Received.....: 09/09/98

Time Received.....: 09:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Actinium-228, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Americium-241, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 0708	mdg
	Americium-241, error +/-, Solid	0.0					1	pCi/g	10176	09/24/98 0708	mdg
	Americium-241, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Americium-241, Lc, Solid	0.5					1	pCi/g	10176	09/24/98 0708	mdg
	Cerium-144, Activity, Solid	0.3					1	pCi/g	10176	09/24/98 0708	mdg
	Cerium-144, Error, +/-, Solid	0.5					1	pCi/g	10176	09/24/98 0708	mdg
	Cerium-144, MDA, Solid	0.4					1	pCi/g	10176	09/24/98 0708	mdg
	Cerium-144, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 0708	mdg
	Cobalt-60, Activity, Solid	0.2 - J					1	pCi/g	10176	09/24/98 0708	mdg
	Cobalt-60, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Cobalt-60, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Cobalt-60, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Chromium-51, Activity, Solid	1.8					1	pCi/g	10176	09/24/98 0708	mdg
	Chromium-51, Error, +/-, Solid	1.1					1	pCi/g	10176	09/24/98 0708	mdg
	Chromium-51, MDA, Solid	0.6					1	pCi/g	10176	09/24/98 0708	mdg
	Chromium-51, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0708	mdg
	Cesium-134, Activity, Solid	0.2					1	pCi/g	10176	09/24/98 0708	mdg
	Cesium-134, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Cesium-134, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Cesium-134, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0708	mdg
	Cesium-137, Activity, Solid	0.4					1	pCi/g	10176	09/24/98 0708	mdg
	Cesium-137, Error, +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0708	mdg
	Cesium-137, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Cesium-137, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Iron-59, Activity, Solid	0.5 - J					1	pCi/g	10176	09/24/98 0708	mdg
	Iron-59, Error, +/-, Solid	0.3					1	pCi/g	10176	09/24/98 0708	mdg
	Iron-59, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Iron-59, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Potassium-40, Activity, Solid	23.7					1	pCi/g	10176	09/24/98 0708	mdg
	Potassium-40, error +/-, Solid	3.4					1	pCi/g	10176	09/24/98 0708	mdg
	Potassium-40, MDA, Solid	0.4					1	pCi/g	10176	09/24/98 0708	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0708	mdg
	Lead-212, Activity, Solid	1.1					1	pCi/g	10176	09/24/98 0708	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0708	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042443-003
 Laboratory Sample ID: 982529-14

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 10:55
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Lead-212, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0708	mdg
	Lead-214, Activity, Solid	1.7					1	pCi/g	10176	09/24/98 0708	mdg
	Lead-214, error +/-, Solid	0.4					1	pCi/g	10176	09/24/98 0708	mdg
	Lead-214, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0708	mdg
	Lead-214, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0708	mdg
	Radium-226, Activity, Solid	1.7					1	pCi/g	10176	09/24/98 0708	mdg
	Radium-226, Error, +/-, Solid	0.4					1	pCi/g	10176	09/24/98 0708	mdg
	Radium-226, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Radium-226, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Radium-228, Activity, Solid	1.8 - 5					1	pCi/g	10176	09/24/98 0708	mdg
	Radium-228, Error, +/-, Solid	0.9					1	pCi/g	10176	09/24/98 0708	mdg
	Radium-228, MDA, Solid	0.3					1	pCi/g	10176	09/24/98 0708	mdg
	Radium-228, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Ruthenium-103, Activity, Solid	0.3					1	pCi/g	10176	09/24/98 0708	mdg
	Ruthenium-103, Error, +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0708	mdg
	Ruthenium-103, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Ruthenium-103, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0708	mdg
	Ruthenium-106, Activity, Solid	0.5					1	pCi/g	10176	09/24/98 0708	mdg
	Ruthenium-106, Error, +/-, Solid	0.4					1	pCi/g	10176	09/24/98 0708	mdg
	Ruthenium-106, MDA, Solid	0.6					1	pCi/g	10176	09/24/98 0708	mdg
	Ruthenium-106, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Thorium-231, Activity, Solid	4.0					1	pCi/g	10176	09/24/98 0708	mdg
	Thorium-231, error +/-, Solid	1.7					1	pCi/g	10176	09/24/98 0708	mdg
	Thorium-231, MDA, Solid	1.1					1	pCi/g	10176	09/24/98 0708	mdg
	Thorium-231, Lc, Solid	0.5					1	pCi/g	10176	09/24/98 0708	mdg
	Thorium-232, Solid	36.5					1	pCi/g	10176	09/24/98 0708	mdg
	Thorium-232, Error +/-, Solid	46.4					1	pCi/g	10176	09/24/98 0708	mdg
	Thorium-232, MDA, Solid	32.9					1	pCi/g	10176	09/24/98 0708	mdg
	Thorium-232, Lc, Solid	0.6					1	pCi/g	10176	09/24/98 0708	mdg
	Uranium-235, Activity, Solid	0.2					1	pCi/g	10176	09/24/98 0708	mdg
	Uranium-235, error +/-, Solid	0.1 - 5					1	pCi/g	10176	09/24/98 0708	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Uranium-235, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 0708	mdg
	Uranium-238, Activity, Solid	12.7					1	pCi/g	10176	09/24/98 0708	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042443-003
Laboratory Sample ID: 982529-14

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 10:55
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	3.3					1	pCi/g	10176	09/24/98 0708	mdg
	Uranium-238, MDA, Solid	1.7					1	pCi/g	10176	09/24/98 0708	mdg
	Uranium-238, Lc, Solid	0.6					1	pCi/g	10176	09/24/98 0708	mdg
	Zirconium-95, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 0708	mdg
	Zirconium-95, Error, +/-, Solid	0.0					1	pCi/g	10176	09/24/98 0708	mdg
	Zirconium-95, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0708	mdg
	Zirconium-95, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0708	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042444-003
 Laboratory Sample ID: 982529-15

Pile B-N

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 11:00
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238										
	Uranium-234, Solid	0.970					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 234, error +/-, Solid	0.610					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Activity, Solid	0.0200					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 235, error +/-, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Activity, Solid	3.57					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 238, error +/-, Solid	0.740					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, MDA, Solid	0.0700					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, Lc, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, MDA, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Lc, Solid	0.0300					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, MDA, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
CA-GLR 5.0R4	Thorium-228, 230, 232										
	Thorium-228, Solid	1.03					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Solid	1.21		JB			1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Solid	1.27					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Error +/-, Solid	0.340					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Error +/-, Solid	0.400					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Error +/-, Solid	0.410					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, MDA, Solid	0.0100					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Lc, Solid	0.0100					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, MDA, Solid	0.100					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Lc, Solid	0.0900					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, MDA, Solid	0.0400					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Lc, Solid	0.0300					1	pCi/g	10147	09/28/98 1134	plj
EPA 901.1	Gamma Scan (HPGe gamma)										
	Actinium-228, Activity, Solid	2.0 -5					1	pCi/g	10176	09/24/98 0812	mdg
	Actinium-228, error +/-, Solid	1.0					1	pCi/g	10176	09/24/98 0812	mdg
	Actinium-228, MDA, Solid	0.4					1	pCi/g	10176	09/24/98 0812	mdg

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042444-003
Laboratory Sample ID: 982529-15

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:00
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Actinium-228, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Americium-241, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Americium-241, error +/-, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Americium-241, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Americium-241, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 0812	mdg
	Cerium-144, Activity, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Cerium-144, Error, +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Cerium-144, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Cerium-144, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Cobalt-60, Activity, Solid	0.0 -5					1	pCi/g	10176	09/24/98 0812	mdg
	Cobalt-60, Error, +/-, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Cobalt-60, MDA, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Cobalt-60, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Chromium-51, Activity, Solid	2.2					1	pCi/g	10176	09/24/98 0812	mdg
	Chromium-51, Error, +/-, Solid	1.6					1	pCi/g	10176	09/24/98 0812	mdg
	Chromium-51, MDA, Solid	0.7					1	pCi/g	10176	09/24/98 0812	mdg
	Chromium-51, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0812	mdg
	Cesium-134, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Cesium-134, Error, +/-, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Cesium-134, MDA, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Cesium-134, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Cesium-137, Activity, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Cesium-137, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Cesium-137, MDA, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Cesium-137, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Iron-59, Activity, Solid	0.9 -5					1	pCi/g	10176	09/24/98 0812	mdg
	Iron-59, Error, +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Iron-59, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Potassium-40, Activity, Solid	26.4					1	pCi/g	10176	09/24/98 0812	mdg
	Potassium-40, error +/-, Solid	3.6					1	pCi/g	10176	09/24/98 0812	mdg
	Potassium-40, MDA, Solid	0.4					1	pCi/g	10176	09/24/98 0812	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Lead-212, Activity, Solid	0.8					1	pCi/g	10176	09/24/98 0812	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042444-003
 Laboratory Sample ID: 982529-15

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 11:00
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Lead-212, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 0812	mdg
	Lead-214, Activity, Solid	1.8					1	pCi/g	10176	09/24/98 0812	mdg
	Lead-214, error +/-, Solid	0.4					1	pCi/g	10176	09/24/98 0812	mdg
	Lead-214, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Lead-214, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0812	mdg
	Radium-226, Activity, Solid	1.7					1	pCi/g	10176	09/24/98 0812	mdg
	Radium-226, Error, +/-, Solid	0.6					1	pCi/g	10176	09/24/98 0812	mdg
	Radium-226, MDA, Solid	0.3					1	pCi/g	10176	09/24/98 0812	mdg
	Radium-226, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0812	mdg
	Radium-228, Activity, Solid	2.0 - J					1	pCi/g	10176	09/24/98 0812	mdg
	Radium-228, Error, +/-, Solid	1.0					1	pCi/g	10176	09/24/98 0812	mdg
	Radium-228, MDA, Solid	0.4					1	pCi/g	10176	09/24/98 0812	mdg
	Radium-228, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Ruthenium-103, Activity, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Ruthenium-103, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Ruthenium-103, MDA, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Ruthenium-103, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Ruthenium-106, Activity, Solid	3.3					1	pCi/g	10176	09/24/98 0812	mdg
	Ruthenium-106, Error, +/-, Solid	2.7					1	pCi/g	10176	09/24/98 0812	mdg
	Ruthenium-106, MDA, Solid	1.6					1	pCi/g	10176	09/24/98 0812	mdg
	Ruthenium-106, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Thorium-231, Activity, Solid	1.5					1	pCi/g	10176	09/24/98 0812	mdg
	Thorium-231, error +/-, Solid	1.0					1	pCi/g	10176	09/24/98 0812	mdg
	Thorium-231, MDA, Solid	0.8					1	pCi/g	10176	09/24/98 0812	mdg
	Thorium-231, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 0812	mdg
	Thorium-232, Solid	39.5					1	pCi/g	10176	09/24/98 0812	mdg
	Thorium-232, Error +/-, Solid	35.9					1	pCi/g	10176	09/24/98 0812	mdg
	Thorium-232, MDA, Solid	22.3					1	pCi/g	10176	09/24/98 0812	mdg
	Thorium-232, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 0812	mdg
	Uranium-235, Activity, Solid	0.1 - J					1	pCi/g	10176	09/24/98 0812	mdg
	Uranium-235, error +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Uranium-235, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 0812	mdg
	Uranium-238, Activity, Solid	7.6					1	pCi/g	10176	09/24/98 0812	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042444-003
Laboratory Sample ID: 982529-15

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:00
Time Received.....: 09:00

Sample Matrix.....: Soil

JEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	1.9					1	pCi/g	10176	09/24/98 0812	mdg
	Uranium-238, MDA, Solid	1.3					1	pCi/g	10176	09/24/98 0812	mdg
	Uranium-238, Lc, Solid	0.5					1	pCi/g	10176	09/24/98 0812	mdg
	Zirconium-95, Activity, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Zirconium-95, Error, +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Zirconium-95, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Zirconium-95, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042445-003
 Laboratory Sample ID: 982529-16

Pile B-S

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 11:05
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238						1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, Solid	1.79					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 234, error +/-, Solid	0.530					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Activity, Solid	0.260					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 235, error +/-, Solid	0.150					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Activity, Solid	4.44					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 238, error +/-, Solid	0.910					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, MDA, Solid	0.0700					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, Lc, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, MDA, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Lc, Solid	0.0400					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, MDA, Solid	0.0700					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	CA-GLR 5.0R4	Thorium-228, 230, 232						1	pCi/g	10147	09/28/98 1134
Thorium-228, Solid		0.950					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, Solid		0.850		IG			1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, Solid		1.00					1	pCi/g	10147	09/28/98 1134	plj
Thorium-228, Error +/-, Solid		0.360					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, Error +/-, Solid		0.310					1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, Error +/-, Solid		0.340					1	pCi/g	10147	09/28/98 1134	plj
Thorium-228, MDA, Solid		0.0100					1	pCi/g	10147	09/28/98 1134	plj
Thorium-228, Lc, Solid		0.0100					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, MDA, Solid		0.100					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, Lc, Solid		0.0900					1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, MDA, Solid		0.0400					1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, Lc, Solid		0.0200					1	pCi/g	10147	09/28/98 1134	plj
EPA 901.1	Gamma Scan (HPGe gamma)						1	pCi/g	10176	09/24/98 0812	mdg
	Actinium-228, Activity, Solid	2.0 - J					1	pCi/g	10176	09/24/98 0812	mdg
	Actinium-228, error +/-, Solid	0.6					1	pCi/g	10176	09/24/98 0812	mdg
	Actinium-228, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042445-003
Laboratory Sample ID: 982529-16

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:05
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Actinium-228, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Americium-241, Activity, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Americium-241, error +/-, Solid	0.4					1	pCi/g	10176	09/24/98 0812	mdg
	Americium-241, MDA, Solid	0.4					1	pCi/g	10176	09/24/98 0812	mdg
	Americium-241, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Cerium-144, Activity, Solid	1.1					1	pCi/g	10176	09/24/98 0812	mdg
	Cerium-144, Error, +/-, Solid	0.6					1	pCi/g	10176	09/24/98 0812	mdg
	Cerium-144, MDA, Solid	0.3					1	pCi/g	10176	09/24/98 0812	mdg
	Cerium-144, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Cobalt-60, Activity, Solid	0.2 - J					1	pCi/g	10176	09/24/98 0812	mdg
	Cobalt-60, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Cobalt-60, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Cobalt-60, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Chromium-51, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Chromium-51, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Chromium-51, MDA, Solid	0.3					1	pCi/g	10176	09/24/98 0812	mdg
	Chromium-51, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Cesium-134, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Cesium-134, Error, +/-, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Cesium-134, MDA, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Cesium-134, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Cesium-137, Activity, Solid	0.3					1	pCi/g	10176	09/24/98 0812	mdg
	Cesium-137, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Cesium-137, MDA, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Cesium-137, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Iron-59, Activity, Solid	0.1 - J					1	pCi/g	10176	09/24/98 0812	mdg
	Iron-59, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Iron-59, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Potassium-40, Activity, Solid	25.6					1	pCi/g	10176	09/24/98 0812	mdg
	Potassium-40, error +/-, Solid	4.3					1	pCi/g	10176	09/24/98 0812	mdg
	Potassium-40, MDA, Solid	0.7					1	pCi/g	10176	09/24/98 0812	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Lead-212, Activity, Solid	1.0					1	pCi/g	10176	09/24/98 0812	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042445-003
Laboratory Sample ID: 982529-16

PILE B-S

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:05
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Lead-212, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0812	mdg
	Lead-214, Activity, Solid	1.5					1	pCi/g	10176	09/24/98 0812	mdg
	Lead-214, error +/-, Solid	0.4					1	pCi/g	10176	09/24/98 0812	mdg
	Lead-214, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Lead-214, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Radium-226, Activity, Solid	1.8					1	pCi/g	10176	09/24/98 0812	mdg
	Radium-226, Error, +/-, Solid	0.4					1	pCi/g	10176	09/24/98 0812	mdg
	Radium-226, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Radium-226, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Radium-228, Activity, Solid	2.0 -J					1	pCi/g	10176	09/24/98 0812	mdg
	Radium-228, Error, +/-, Solid	0.6					1	pCi/g	10176	09/24/98 0812	mdg
	Radium-228, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Radium-228, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Ruthenium-103, Activity, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Ruthenium-103, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Ruthenium-103, MDA, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Ruthenium-103, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Ruthenium-106, Activity, Solid	2.5					1	pCi/g	10176	09/24/98 0812	mdg
	Ruthenium-106, Error, +/-, Solid	0.9					1	pCi/g	10176	09/24/98 0812	mdg
	Ruthenium-106, MDA, Solid	1.4					1	pCi/g	10176	09/24/98 0812	mdg
	Ruthenium-106, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Thorium-231, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Thorium-231, error +/-, Solid	2.8					1	pCi/g	10176	09/24/98 0812	mdg
	Thorium-231, MDA, Solid	1.2					1	pCi/g	10176	09/24/98 0812	mdg
	Thorium-231, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 0812	mdg
	Thorium-232, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Thorium-232, Error +/-, Solid	0.0					1	pCi/g	10176	09/24/98 0812	mdg
	Thorium-232, MDA, Solid	59.7					1	pCi/g	10176	09/24/98 0812	mdg
	Thorium-232, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Uranium-235, Activity, Solid	0.1 -J					1	pCi/g	10176	09/24/98 0812	mdg
	Uranium 235, error +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg
	Uranium-235, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0812	mdg
	Uranium-238, Activity, Solid	5.0					1	pCi/g	10176	09/24/98 0812	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042445-003
Laboratory Sample ID: 982529-16

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:05
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	5.0					1	pCi/g	10176	09/24/98 0812	mdg
	Uranium-238, MDA, Solid	4.4					1	pCi/g	10176	09/24/98 0812	mdg
	Uranium-238, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 0812	mdg
	Zirconium-95, Activity, Solid	0.4					1	pCi/g	10176	09/24/98 0812	mdg
	Zirconium-95, Error, +/-, Solid	0.3					1	pCi/g	10176	09/24/98 0812	mdg
	Zirconium-95, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0812	mdg
	Zirconium-95, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0812	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 12/03/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Jensen

Customer Sample ID.: 042446-003
Laboratory Sample ID: 982529-17*FILE 9-N*Date Sampled.....: 09/02/98
Date Received.....: 09/09/98Time Sampled.....: 11:10
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 901.1	Thorium-230, Lc, Solid	0.160					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, MDA, Solid	0.0700					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Lc, Solid	0.0500					1	pCi/g	10147	09/28/98 1134	plj
	Gamma Scan (HPGe gamma)										
	Actinium-228, Activity, Solid	1.4 -J					1	pCi/g	10176	09/24/98 0915	mdg
	Actinium-228, error +/-, Solid	0.7					1	pCi/g	10176	09/24/98 0915	mdg
	Actinium-228, MDA, Solid	0.3					1	pCi/g	10176	09/24/98 0915	mdg
	Actinium-228, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Americium-241, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Americium-241, error +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Americium-241, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Americium-241, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 0915	mdg
	Cerium-144, Activity, Solid	0.2					1	pCi/g	10176	09/24/98 0915	mdg
	Cerium-144, Error, +/-, Solid	0.5					1	pCi/g	10176	09/24/98 0915	mdg
	Cerium-144, MDA, Solid	0.4					1	pCi/g	10176	09/24/98 0915	mdg
	Cerium-144, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0915	mdg
	Cobalt-60, Activity, Solid	0.5 -J					1	pCi/g	10176	09/24/98 0915	mdg
	Cobalt-60, Error, +/-, Solid	0.3					1	pCi/g	10176	09/24/98 0915	mdg
	Cobalt-60, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Cobalt-60, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Chromium-51, Activity, Solid	1.0					1	pCi/g	10176	09/24/98 0915	mdg
	Chromium-51, Error, +/-, Solid	0.8					1	pCi/g	10176	09/24/98 0915	mdg
	Chromium-51, MDA, Solid	0.6					1	pCi/g	10176	09/24/98 0915	mdg
	Chromium-51, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0915	mdg
	Cesium-134, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Cesium-134, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Cesium-134, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Cesium-134, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Cesium-137, Activity, Solid	0.8					1	pCi/g	10176	09/24/98 0915	mdg
	Cesium-137, Error, +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0915	mdg
	Cesium-137, MDA, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Cesium-137, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Iron-59, Activity, Solid	1.1 -J					1	pCi/g	10176	09/24/98 0915	mdg
	Iron-59, Error, +/-, Solid	0.3					1	pCi/g	10176	09/24/98 0915	mdg

LABORATORY TEST RESULTS

Job Number: 982529

Date: 12/03/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Jensen

Customer Sample ID.: 042446-003
Laboratory Sample ID: 982529-17

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:10
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Iron-59, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Potassium-40, Activity, Solid	29.2					1	pCi/g	10176	09/24/98 0915	mdg
	Potassium-40, error +/-, Solid	4.0					1	pCi/g	10176	09/24/98 0915	mdg
	Potassium-40, MDA, Solid	0.5					1	pCi/g	10176	09/24/98 0915	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Lead-212, Activity, Solid	1.2					1	pCi/g	10176	09/24/98 0915	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0915	mdg
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Lead-212, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0915	mdg
	Lead-214, Activity, Solid	1.6					1	pCi/g	10176	09/24/98 0915	mdg
	Lead-214, error +/-, Solid	0.6					1	pCi/g	10176	09/24/98 0915	mdg
	Lead-214, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0915	mdg
	Lead-214, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0915	mdg
	Radium-226, Activity, Solid	1.8					1	pCi/g	10176	09/24/98 0915	mdg
	Radium-226, Error, +/-, Solid	0.4					1	pCi/g	10176	09/24/98 0915	mdg
	Radium-226, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Radium-226, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Radium-228, Activity, Solid	1.4 -J					1	pCi/g	10176	09/24/98 0915	mdg
	Radium-228, Error, +/-, Solid	0.7					1	pCi/g	10176	09/24/98 0915	mdg
	Radium-228, MDA, Solid	0.3					1	pCi/g	10176	09/24/98 0915	mdg
	Radium-228, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Ruthenium-103, Activity, Solid	0.3					1	pCi/g	10176	09/24/98 0915	mdg
	Ruthenium-103, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Ruthenium-103, MDA, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Ruthenium-103, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Ruthenium-106, Activity, Solid	1.3					1	pCi/g	10176	09/24/98 0915	mdg
	Ruthenium-106, Error, +/-, Solid	0.8					1	pCi/g	10176	09/24/98 0915	mdg
	Ruthenium-106, MDA, Solid	0.9					1	pCi/g	10176	09/24/98 0915	mdg
	Ruthenium-106, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Thorium-231, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Thorium-231, error +/-, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Thorium-231, MDA, Solid	0.7					1	pCi/g	10176	09/24/98 0915	mdg
	Thorium-231, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 0915	mdg
	Thorium-232, Solid	7.7					1	pCi/g	10176	09/24/98 0915	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 12/03/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Jensen

Customer Sample ID.: 042446-003
Laboratory Sample ID: 982529-17Date Sampled.....: 09/02/98
Date Received.....: 09/09/98Time Sampled.....: 11:10
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Thorium-232, Error +/-, Solid	20.8					1	pCi/g	10176	09/24/98 0915	mdg
	Thorium-232, MDA, Solid	23.2					1	pCi/g	10176	09/24/98 0915	mdg
	Thorium-232, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 0915	mdg
	Uranium-235, Activity, Solid	0.3 -5					1	pCi/g	10176	09/24/98 0915	mdg
	Uranium 235, error +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Uranium-235, Lc, Solid	0.5					1	pCi/g	10176	09/24/98 0915	mdg
	Uranium-238, Activity, Solid	9.3					1	pCi/g	10176	09/24/98 0915	mdg
	Uranium 238, error +/-, Solid	2.6					1	pCi/g	10176	09/24/98 0915	mdg
	Uranium-238, MDA, Solid	1.7					1	pCi/g	10176	09/24/98 0915	mdg
	Uranium-238, Lc, Solid	0.6					1	pCi/g	10176	09/24/98 0915	mdg
	Zirconium-95, Activity, Solid	0.6					1	pCi/g	10176	09/24/98 0915	mdg
	Zirconium-95, Error, +/-, Solid	0.4					1	pCi/g	10176	09/24/98 0915	mdg
	Zirconium-95, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0915	mdg
	Zirconium-95, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042447-003
 Laboratory Sample ID: 982529-18

Pile 9 - S

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 11:15
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete				1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238									
	Uranium-234, Solid	1.63				1	pCi/g	10123	09/22/98 1333	plj
	Uranium 234, error +/-, Solid	0.250				1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Activity, Solid	0.130				1	pCi/g	10123	09/22/98 1333	plj
	Uranium 235, error +/-, Solid	0.100				1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Activity, Solid	3.68				1	pCi/g	10123	09/22/98 1333	plj
	Uranium 238, error +/-, Solid	0.710				1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, MDA, Solid	0.0600				1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, Lc, Solid	0.0500				1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, MDA, Solid	0.0400				1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Lc, Solid	0.0300				1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, MDA, Solid	0.0500				1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Lc, Solid	0.0400				1	pCi/g	10123	09/22/98 1333	plj
CA-GLR 5.0R4	Thorium-228, 230, 232									
	Thorium-228, Solid	0.900				1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Solid	0.920	JB			1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Solid	1.14				1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Error +/-, Solid	0.500				1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Error +/-, Solid	0.510				1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Error +/-, Solid	0.550				1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, MDA, Solid	0.0300				1	pCi/g	10147	09/28/98 1134	plj
	Thorium-228, Lc, Solid	0.0100				1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, MDA, Solid	0.230				1	pCi/g	10147	09/28/98 1134	plj
	Thorium-230, Lc, Solid	0.200				1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, MDA, Solid	0.0900				1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Lc, Solid	0.0600				1	pCi/g	10147	09/28/98 1134	plj
EPA 901.1	Gamma Scan (HPGe gamma)									
	Actinium-228, Activity, Solid	1.5 -J				1	pCi/g	10176	09/24/98 0915	mdg
	Actinium-228, error +/-, Solid	0.4				1	pCi/g	10176	09/24/98 0915	mdg
	Actinium-228, MDA, Solid	0.1				1	pCi/g	10176	09/24/98 0915	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042447-003
Laboratory Sample ID: 982529-18

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:15
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Actinium-228, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Americium-241, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Americium-241, error +/-, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Americium-241, MDA, Solid	0.4					1	pCi/g	10176	09/24/98 0915	mdg
	Americium-241, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0915	mdg
	Cerium-144, Activity, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Cerium-144, Error, +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0915	mdg
	Cerium-144, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0915	mdg
	Cerium-144, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Cobalt-60, Activity, Solid	0.4 - J					1	pCi/g	10176	09/24/98 0915	mdg
	Cobalt-60, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Cobalt-60, MDA, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Cobalt-60, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Chromium-51, Activity, Solid	0.2					1	pCi/g	10176	09/24/98 0915	mdg
	Chromium-51, Error, +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0915	mdg
	Chromium-51, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0915	mdg
	Chromium-51, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Cesium-134, Activity, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Cesium-134, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Cesium-134, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0919	mdg
	Cesium-134, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Cesium-137, Activity, Solid	0.4					1	pCi/g	10176	09/24/98 0915	mdg
	Cesium-137, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Cesium-137, MDA, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Cesium-137, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Iron-59, Activity, Solid	0.3 - J					1	pCi/g	10176	09/24/98 0915	mdg
	Iron-59, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Iron-59, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Potassium-40, Activity, Solid	25.6					1	pCi/g	10176	09/24/98 0915	mdg
	Potassium-40, error +/-, Solid	4.0					1	pCi/g	10176	09/24/98 0915	mdg
	Potassium-40, MDA, Solid	0.6					1	pCi/g	10176	09/24/98 0915	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Lead-212, Activity, Solid	0.8					1	pCi/g	10176	09/24/98 0915	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0915	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042447-003
Laboratory Sample ID: 982529-18

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:15
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Lead-212, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0915	mdg
	Lead-214, Activity, Solid	1.2					1	pCi/g	10176	09/24/98 0915	mdg
	Lead-214, error +/-, Solid	0.3					1	pCi/g	10176	09/24/98 0915	mdg
	Lead-214, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Lead-214, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Radium-226, Activity, Solid	1.4					1	pCi/g	10176	09/24/98 0915	mdg
	Radium-226, Error, +/-, Solid	0.4					1	pCi/g	10176	09/24/98 0915	mdg
	Radium-226, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Radium-226, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Radium-228, Activity, Solid	1.5 - J					1	pCi/g	10176	09/24/98 0915	mdg
	Radium-228, Error, +/-, Solid	0.4					1	pCi/g	10176	09/24/98 0915	mdg
	Radium-228, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Radium-228, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Ruthenium-103, Activity, Solid	0.3					1	pCi/g	10176	09/24/98 0915	mdg
	Ruthenium-103, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Ruthenium-103, MDA, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Ruthenium-103, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Ruthenium-106, Activity, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Ruthenium-106, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Ruthenium-106, MDA, Solid	0.4					1	pCi/g	10176	09/24/98 0915	mdg
	Ruthenium-106, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Thorium-231, Activity, Solid	0.8					1	pCi/g	10176	09/24/98 0915	mdg
	Thorium-231, error +/-, Solid	0.9					1	pCi/g	10176	09/24/98 0915	mdg
	Thorium-231, MDA, Solid	1.0					1	pCi/g	10176	09/24/98 0915	mdg
	Thorium-231, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0915	mdg
	Thorium-232, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Thorium-232, Error +/-, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg
	Thorium-232, MDA, Solid	71.2					1	pCi/g	10176	09/24/98 0915	mdg
	Thorium-232, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0915	mdg
	Uranium-235, Activity, Solid	0.2 - J					1	pCi/g	10176	09/24/98 0915	mdg
	Uranium-235, error +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Uranium-235, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0915	mdg
	Uranium-238, Activity, Solid	7.1					1	pCi/g	10176	09/24/98 0915	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042447-003
Laboratory Sample ID: 982529-18

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:15
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	6.3					1	pCi/g	10176	09/24/98 0915	mdg
	Uranium-238, MDA, Solid	3.6					1	pCi/g	10176	09/24/98 0915	mdg
	Uranium-238, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 0915	mdg
	Zirconium-95, Activity, Solid	0.2					1	pCi/g	10176	09/24/98 0915	mdg
	Zirconium-95, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Zirconium-95, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0915	mdg
	Zirconium-95, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0915	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042448-003
 Laboratory Sample ID: 982529-19

Pile 10-N

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 11:25
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238										
	Uranium-234, Solid	0.990					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 234, error +/-, Solid	0.360					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Activity, Solid	0.0400					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 235, error +/-, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Activity, Solid	1.85					1	pCi/g	10123	09/22/98 1333	plj
	Uranium 238, error +/-, Solid	0.470					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, MDA, Solid	0.0700					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-234, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, MDA, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-235, Lc, Solid	0.0300					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, MDA, Solid	0.0600					1	pCi/g	10123	09/22/98 1333	plj
	Uranium-238, Lc, Solid	0.0500					1	pCi/g	10123	09/22/98 1333	plj
	CA-GLR 5.0R4	Thorium-228, 230, 232									
Thorium-228, Solid		0.920					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, Solid		1.21		JB			1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, Solid		1.22					1	pCi/g	10147	09/28/98 1134	plj
Thorium-228, Error +/-, Solid		1.16					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, Error +/-, Solid		0.540					1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, Error +/-, Solid		0.520					1	pCi/g	10147	09/28/98 1134	plj
Thorium-228, MDA, Solid		0.0300					1	pCi/g	10147	09/28/98 1134	plj
Thorium-228, Lc, Solid		0.0100					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, MDA, Solid		0.220					1	pCi/g	10147	09/28/98 1134	plj
Thorium-230, Lc, Solid		0.190					1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, MDA, Solid		0.0800					1	pCi/g	10147	09/28/98 1134	plj
Thorium-232, Lc, Solid		0.0500					1	pCi/g	10147	09/28/98 1134	plj
EPA 901.1		Gamma Scan (HPGe gamma)									
	Actinium-228, Activity, Solid	2.4 - J					1	pCi/g	10176	09/24/98 1023	mdg
	Actinium-228, error +/-, Solid	0.5					1	pCi/g	10176	09/24/98 1023	mdg
	Actinium-228, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042448-003
Laboratory Sample ID: 982529-19Date Sampled.....: 09/02/98
Date Received.....: 09/09/98Time Sampled.....: 11:25
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECN
	Actinium-228, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 1023	mdg
	Americium-241, Activity, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg
	Americium-241, error +/-, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg
	Americium-241, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg
	Americium-241, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 1023	mdg
	Cerium-144, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 1023	mdg
	Cerium-144, Error, +/-, Solid	0.0					1	pCi/g	10176	09/24/98 1023	mdg
	Cerium-144, MDA, Solid	0.3					1	pCi/g	10176	09/24/98 1023	mdg
	Cerium-144, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 1023	mdg
	Cobalt-60, Activity, Solid	0.3		J			1	pCi/g	10176	09/24/98 1023	mdg
	Cobalt-60, Error, +/-, Solid	0.2					1	pCi/g	10176	09/24/98 1023	mdg
	Cobalt-60, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg
	Cobalt-60, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg
	Chromium-51, Activity, Solid	0.4					1	pCi/g	10176	09/24/98 1023	mdg
	Chromium-51, Error, +/-, Solid	0.5					1	pCi/g	10176	09/24/98 1023	mdg
	Chromium-51, MDA, Solid	0.5					1	pCi/g	10176	09/24/98 1023	mdg
	Chromium-51, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 1023	mdg
	Cesium-134, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 1023	mdg
	Cesium-134, Error, +/-, Solid	0.0					1	pCi/g	10176	09/24/98 1023	mdg
	Cesium-134, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg
	Cesium-134, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 1023	mdg
	Cesium-137, Activity, Solid	0.5					1	pCi/g	10176	09/24/98 1023	mdg
	Cesium-137, Error, +/-, Solid	0.4					1	pCi/g	10176	09/24/98 1023	mdg
	Cesium-137, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg
	Cesium-137, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 1023	mdg
	Iron-59, Activity, Solid	0.3		J			1	pCi/g	10176	09/24/98 1023	mdg
	Iron-59, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg
	Iron-59, MDA, Solid	0.0					1	pCi/g	10176	09/24/98 1023	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 1023	mdg
	Potassium-40, Activity, Solid	24.3					1	pCi/g	10176	09/24/98 1023	mdg
	Potassium-40, error +/-, Solid	3.3					1	pCi/g	10176	09/24/98 1023	mdg
	Potassium-40, MDA, Solid	0.4					1	pCi/g	10176	09/24/98 1023	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 1023	mdg
	Lead-212, Activity, Solid	0.9					1	pCi/g	10176	09/24/98 1023	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/24/98 1023	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042448-003
Laboratory Sample ID: 982529-19

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:25
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg
	Lead-212, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 1023	mdg
	Lead-214, Activity, Solid	1.4					1	pCi/g	10176	09/24/98 1023	mdg
	Lead-214, error +/-, Solid	0.5					1	pCi/g	10176	09/24/98 1023	mdg
	Lead-214, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 1023	mdg
	Lead-214, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 1023	mdg
	Radium-226, Activity, Solid	1.6					1	pCi/g	10176	09/24/98 1023	mdg
	Radium-226, Error, +/-, Solid	0.3					1	pCi/g	10176	09/24/98 1023	mdg
	Radium-226, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg
	Radium-226, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 1023	mdg
	Radium-228, Activity, Solid	2.4 - 5					1	pCi/g	10176	09/24/98 1023	mdg
	Radium-228, Error, +/-, Solid	0.5					1	pCi/g	10176	09/24/98 1023	mdg
	Radium-228, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg
	Radium-228, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 1023	mdg
	Ruthenium-103, Activity, Solid	0.2					1	pCi/g	10176	09/24/98 1023	mdg
	Ruthenium-103, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg
	Ruthenium-103, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg
	Ruthenium-103, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 1023	mdg
	Ruthenium-106, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 1023	mdg
	Ruthenium-106, Error, +/-, Solid	0.2					1	pCi/g	10176	09/24/98 1023	mdg
	Ruthenium-106, MDA, Solid	0.4					1	pCi/g	10176	09/24/98 1023	mdg
	Ruthenium-106, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg
	Thorium-231, Activity, Solid	1.3					1	pCi/g	10176	09/24/98 1023	mdg
	Thorium-231, error +/-, Solid	1.0					1	pCi/g	10176	09/24/98 1023	mdg
	Thorium-231, MDA, Solid	0.7					1	pCi/g	10176	09/24/98 1023	mdg
	Thorium-231, Lc, Solid	0.5					1	pCi/g	10176	09/24/98 1023	mdg
	Thorium-232, Solid	0.0					1	pCi/g	10176	09/24/98 1023	mdg
	Thorium-232, Error +/-, Solid	0.0					1	pCi/g	10176	09/24/98 1023	mdg
	Thorium-232, MDA, Solid	1.8					1	pCi/g	10176	09/24/98 1023	mdg
	Thorium-232, Lc, Solid	0.4					1	pCi/g	10176	09/24/98 1023	mdg
	Uranium-235, Activity, Solid	0.1 - 5					1	pCi/g	10176	09/24/98 1023	mdg
	Uranium 235, error +/-, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg
	Uranium-235, Lc, Solid	0.5					1	pCi/g	10176	09/24/98 1023	mdg
	Uranium-238, Activity, Solid	8.9					1	pCi/g	10176	09/24/98 1023	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042448-003
Laboratory Sample ID: 982529-19

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:25
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	3.2					1	pCi/g	10176	09/24/98 1023	mdg
	Uranium-238, MDA, Solid	1.4					1	pCi/g	10176	09/24/98 1023	mdg
	Uranium-238, Lc, Solid	0.6					1	pCi/g	10176	09/24/98 1023	mdg
	Zirconium-95, Activity, Solid	0.3					1	pCi/g	10176	09/24/98 1023	mdg
	Zirconium-95, Error, +/-, Solid	0.2					1	pCi/g	10176	09/24/98 1023	mdg
	Zirconium-95, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg
	Zirconium-95, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 1023	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 12/03/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Jensen

Customer Sample ID...: 042449-003
Laboratory Sample ID: 982529-20

FILE 10-5

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:30
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 901.1	Thorium-230, Lc, Solid	0.170					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, MDA, Solid	0.0700					1	pCi/g	10147	09/28/98 1134	plj
	Thorium-232, Lc, Solid	0.0500					1	pCi/g	10147	09/28/98 1134	plj
	Gamma Scan (HPGe gamma)										
	Actinium-228, Activity, Solid	2.0 -J					1	pCi/g	10176	09/24/98 0124	mdg
	Actinium-228, error +/-, Solid	0.5					1	pCi/g	10176	09/24/98 0124	mdg
	Actinium-228, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0124	mdg
	Actinium-228, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0124	mdg
	Americium-241, Activity, Solid	0.2					1	pCi/g	10176	09/24/98 0124	mdg
	Americium-241, error +/-, Solid	0.3					1	pCi/g	10176	09/24/98 0124	mdg
	Americium-241, MDA, Solid	0.4					1	pCi/g	10176	09/24/98 0124	mdg
	Americium-241, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0124	mdg
	Cerium-144, Activity, Solid	0.1					1	pCi/g	10176	09/24/98 0124	mdg
	Cerium-144, Error, +/-, Solid	0.3					1	pCi/g	10176	09/24/98 0124	mdg
	Cerium-144, MDA, Solid	0.3					1	pCi/g	10176	09/24/98 0124	mdg
	Cerium-144, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0124	mdg
	Cobalt-60, Activity, Solid	0.1 -J					1	pCi/g	10176	09/24/98 0124	mdg
	Cobalt-60, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0124	mdg
	Cobalt-60, MDA, Solid	0.0					1	pCi/g	10176	09/24/98 0124	mdg
	Cobalt-60, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0124	mdg
	Chromium-51, Activity, Solid	0.5					1	pCi/g	10176	09/24/98 0124	mdg
	Chromium-51, Error, +/-, Solid	0.6					1	pCi/g	10176	09/24/98 0124	mdg
	Chromium-51, MDA, Solid	0.6					1	pCi/g	10176	09/24/98 0124	mdg
	Chromium-51, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0124	mdg
	Cesium-134, Activity, Solid	0.0					1	pCi/g	10176	09/24/98 0124	mdg
	Cesium-134, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0124	mdg
	Cesium-134, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0124	mdg
	Cesium-134, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0124	mdg
	Cesium-137, Activity, Solid	0.2					1	pCi/g	10176	09/24/98 0124	mdg
	Cesium-137, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0124	mdg
	Cesium-137, MDA, Solid	0.0					1	pCi/g	10176	09/24/98 0124	mdg
	Cesium-137, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0124	mdg
	Iron-59, Activity, Solid	0.0 -J					1	pCi/g	10176	09/24/98 0124	mdg
Iron-59, Error, +/-, Solid	0.0					1	pCi/g	10176	09/24/98 0124	mdg	

LABORATORY TEST RESULTS

Job Number: 982529

Date: 12/03/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Jensen

Customer Sample ID.: 042449-003
Laboratory Sample ID: 982529-20

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:30
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Iron-59, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0124	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0124	mdg
	Potassium-40, Activity, Solid	27.5					1	pCi/g	10176	09/24/98 0124	mdg
	Potassium-40, error +/-, Solid	4.2					1	pCi/g	10176	09/24/98 0124	mdg
	Potassium-40, MDA, Solid	0.6					1	pCi/g	10176	09/24/98 0124	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0124	mdg
	Lead-212, Activity, Solid	1.1					1	pCi/g	10176	09/24/98 0124	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0124	mdg
	Lead-212, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0124	mdg
	Lead-212, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0124	mdg
	Lead-214, Activity, Solid	1.5					1	pCi/g	10176	09/24/98 0124	mdg
	Lead-214, error +/-, Solid	0.5					1	pCi/g	10176	09/24/98 0124	mdg
	Lead-214, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0124	mdg
	Lead-214, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0124	mdg
	Radium-226, Activity, Solid	1.6					1	pCi/g	10176	09/24/98 0124	mdg
	Radium-226, Error, +/-, Solid	0.4					1	pCi/g	10176	09/24/98 0124	mdg
	Radium-226, MDA, Solid	0.2					1	pCi/g	10176	09/24/98 0124	mdg
	Radium-226, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0124	mdg
	Radium-228, Activity, Solid	2.0 - J					1	pCi/g	10176	09/24/98 0124	mdg
	Radium-228, Error, +/-, Solid	0.5					1	pCi/g	10176	09/24/98 0124	mdg
	Radium-228, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0124	mdg
	Radium-228, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0124	mdg
	Ruthenium-103, Activity, Solid	0.2					1	pCi/g	10176	09/24/98 0124	mdg
	Ruthenium-103, Error, +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0124	mdg
	Ruthenium-103, MDA, Solid	0.0					1	pCi/g	10176	09/24/98 0124	mdg
	Ruthenium-103, Lc, Solid	0.1					1	pCi/g	10176	09/24/98 0124	mdg
	Ruthenium-106, Activity, Solid	2.4					1	pCi/g	10176	09/24/98 0124	mdg
	Ruthenium-106, Error, +/-, Solid	0.8					1	pCi/g	10176	09/24/98 0124	mdg
	Ruthenium-106, MDA, Solid	1.3					1	pCi/g	10176	09/24/98 0124	mdg
	Ruthenium-106, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0124	mdg
	Thorium-231, Activity, Solid	0.9					1	pCi/g	10176	09/24/98 0124	mdg
	Thorium-231, error +/-, Solid	1.0					1	pCi/g	10176	09/24/98 0124	mdg
	Thorium-231, MDA, Solid	1.0					1	pCi/g	10176	09/24/98 0124	mdg
	Thorium-231, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0124	mdg
	Thorium-232, Solid	0.0					1	pCi/g	10176	09/24/98 0124	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 12/03/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Jensen

Customer Sample ID.: 042449-003
Laboratory Sample ID: 982529-20

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:30
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Thorium-232, Error +/-, Solid	0.0					1	pCi/g	10176	09/24/98 0124	mdg
	Thorium-232, MDA, Solid	52.4					1	pCi/g	10176	09/24/98 0124	mdg
	Thorium-232, Lc, Solid	0.2					1	pCi/g	10176	09/24/98 0124	mdg
	Uranium-235, Activity, Solid	0.3 -J					1	pCi/g	10176	09/24/98 0124	mdg
	Uranium 235, error +/-, Solid	0.1					1	pCi/g	10176	09/24/98 0124	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0124	mdg
	Uranium-235, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0124	mdg
	Uranium-238, Activity, Solid	6.0					1	pCi/g	10176	09/24/98 0124	mdg
	Uranium 238, error +/-, Solid	3.6					1	pCi/g	10176	09/24/98 0124	mdg
	Uranium-238, MDA, Solid	2.8					1	pCi/g	10176	09/24/98 0124	mdg
	Uranium-238, Lc, Solid	0.3					1	pCi/g	10176	09/24/98 0124	mdg
	Zirconium-95, Activity, Solid	0.6					1	pCi/g	10176	09/24/98 0124	mdg
	Zirconium-95, Error, +/-, Solid	0.2					1	pCi/g	10176	09/24/98 0124	mdg
	Zirconium-95, MDA, Solid	0.1					1	pCi/g	10176	09/24/98 0124	mdg
	Zirconium-95, Lc, Solid	0.0					1	pCi/g	10176	09/24/98 0124	mdg

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042450-003
Laboratory Sample ID: 982529-21

Pile 11-N

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:40
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238										
	Uranium-234, Solid	2.08 - J		*B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium-234, error +/-, Solid	0.240		B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, Activity, Solid	0.110					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, error +/-, Solid	0.100					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, Activity, Solid	3.85		B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, error +/-, Solid	0.770		B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium-234, MDA, Solid	0.0700					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-234, Lc, Solid	0.0600					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, MDA, Solid	0.0100					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, Lc, Solid	0.0100					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, MDA, Solid	0.0900					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, Lc, Solid	0.0800					1	pCi/g	10066	09/21/98 1734	plj
CA-GLR 5.0R4	Thorium-228, 230, 232										
	Thorium-228, Solid	1.06					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-230, Solid	0.970		J _B			1	pCi/g	10069	09/22/98 1336	plj
	Thorium-232, Solid	0.620		•			1	pCi/g	10069	09/22/98 1336	plj
	Thorium-228, Error +/-, Solid	0.450		B			1	pCi/g	10069	09/22/98 1336	plj
	Thorium-230, Error +/-, Solid	0.450		B			1	pCi/g	10069	09/22/98 1336	plj
	Thorium-232, Error +/-, Solid	0.330					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-228, MDA, Solid	0.0500					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-228, Lc, Solid	0.0300					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-230, MDA, Solid	0.130					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-230, Lc, Solid	0.110					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-232, MDA, Solid	0.0500					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-232, Lc, Solid	0.0200					1	pCi/g	10069	09/22/98 1336	plj
EPA 901.1	Gamma Scan (HPGe gamma)										
	Actinium-228, Activity, Solid	1.3					1	pCi/g	10095	09/24/98 1304	mdg
	Actinium-228, error +/-, Solid	0.3					1	pCi/g	10095	09/24/98 1304	mdg
	Actinium-228, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042450-003
Laboratory Sample ID: 982529-21

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:40
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Actinium-228, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Americium-241, Activity, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Americium-241, error +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Americium-241, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Americium-241, Lc, Solid	0.5					1	pCi/g	10095	09/24/98 1304	mdg
	Cerium-144, Activity, Solid	0.8					1	pCi/g	10095	09/24/98 1304	mdg
	Cerium-144, Error, +/-, Solid	0.7					1	pCi/g	10095	09/24/98 1304	mdg
	Cerium-144, MDA, Solid	0.4					1	pCi/g	10095	09/24/98 1304	mdg
	Cerium-144, Lc, Solid	0.5					1	pCi/g	10095	09/24/98 1304	mdg
	Cobalt-60, Activity, Solid	0.2					1	pCi/g	10095	09/24/98 1304	mdg
	Cobalt-60, Error, +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Cobalt-60, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Cobalt-60, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Chromium-51, Activity, Solid	0.7					1	pCi/g	10095	09/24/98 1304	mdg
	Chromium-51, Error, +/-, Solid	0.8					1	pCi/g	10095	09/24/98 1304	mdg
	Chromium-51, MDA, Solid	0.6					1	pCi/g	10095	09/24/98 1304	mdg
	Chromium-51, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1304	mdg
	Cesium-134, Activity, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Cesium-134, Error, +/-, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Cesium-134, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Cesium-134, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Cesium-137, Activity, Solid	0.4					1	pCi/g	10095	09/24/98 1304	mdg
	Cesium-137, Error, +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Cesium-137, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Cesium-137, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Iron-59, Activity, Solid	0.2					1	pCi/g	10095	09/24/98 1304	mdg
	Iron-59, Error, +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Iron-59, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Potassium-40, Activity, Solid	26.3					1	pCi/g	10095	09/24/98 1304	mdg
	Potassium-40, error +/-, Solid	3.2					1	pCi/g	10095	09/24/98 1304	mdg
	Potassium-40, MDA, Solid	0.3					1	pCi/g	10095	09/24/98 1304	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Lead-212, Activity, Solid	0.9					1	pCi/g	10095	09/24/98 1304	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10095	09/24/98 1304	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042450-003
Laboratory Sample ID: 982529-21

Date Sampled.....: 09/02/98 Time Sampled.....: 11:40
Date Received.....: 09/09/98 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Lead-212, Lc, Solid	0.4					1	pCi/g	10095	09/24/98 1304	mdg
	Lead-214, Activity, Solid	1.4					1	pCi/g	10095	09/24/98 1304	mdg
	Lead-214, error +/-, Solid	0.4					1	pCi/g	10095	09/24/98 1304	mdg
	Lead-214, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Lead-214, Lc, Solid	0.3					1	pCi/g	10095	09/24/98 1304	mdg
	Radium-226, Activity, Solid	1.3					1	pCi/g	10095	09/24/98 1304	mdg
	Radium-226, Error, +/-, Solid	0.5					1	pCi/g	10095	09/24/98 1304	mdg
	Radium-226, MDA, Solid	0.2					1	pCi/g	10095	09/24/98 1304	mdg
	Radium-226, Lc, Solid	0.3					1	pCi/g	10095	09/24/98 1304	mdg
	Radium-228, Activity, Solid	1.3					1	pCi/g	10095	09/24/98 1304	mdg
	Radium-228, Error, +/-, Solid	0.3					1	pCi/g	10095	09/24/98 1304	mdg
	Radium-228, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Radium-228, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Ruthenium-103, Activity, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Ruthenium-103, Error, +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Ruthenium-103, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Ruthenium-103, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1304	mdg
	Ruthenium-106, Activity, Solid	0.3					1	pCi/g	10095	09/24/98 1304	mdg
	Ruthenium-106, Error, +/-, Solid	0.4					1	pCi/g	10095	09/24/98 1304	mdg
	Ruthenium-106, MDA, Solid	0.5					1	pCi/g	10095	09/24/98 1304	mdg
	Ruthenium-106, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Thorium-231, Activity, Solid	0.4					1	pCi/g	10095	09/24/98 1304	mdg
	Thorium-231, error +/-, Solid	1.0					1	pCi/g	10095	09/24/98 1304	mdg
	Thorium-231, MDA, Solid	0.7					1	pCi/g	10095	09/24/98 1304	mdg
	Thorium-231, Lc, Solid	0.5					1	pCi/g	10095	09/24/98 1304	mdg
	Thorium-232, Solid	6.6					1	pCi/g	10095	09/24/98 1304	mdg
	Thorium-232, Error +/-, Solid	19.4					1	pCi/g	10095	09/24/98 1304	mdg
	Thorium-232, MDA, Solid	20.5					1	pCi/g	10095	09/24/98 1304	mdg
	Thorium-232, Lc, Solid	0.5					1	pCi/g	10095	09/24/98 1304	mdg
	Uranium-235, Activity, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Uranium 235, error +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Uranium-235, Lc, Solid	0.5					1	pCi/g	10095	09/24/98 1304	mdg
	Uranium-238, Activity, Solid	8.1					1	pCi/g	10095	09/24/98 1304	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042450-003
 Laboratory Sample ID: 982529-21

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 11:40
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	1.6					1	pCi/g	10095	09/24/98 1304	mdg
	Uranium-238, MDA, Solid	1.0					1	pCi/g	10095	09/24/98 1304	mdg
	Uranium-238, Lc, Solid	0.4					1	pCi/g	10095	09/24/98 1304	mdg
	Zirconium-95, Activity, Solid	0.0 - J					1	pCi/g	10095	09/24/98 1304	mdg
	Zirconium-95, Error, +/-, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Zirconium-95, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Zirconium-95, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg

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CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042451-003
Laboratory Sample ID: 982529-22

Pile 11-5

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:45
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238										
	Uranium-234, Solid	1.34 - J		*B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium 234, error +/-, Solid	1.34		B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, Activity, Solid	0.0500					1	pCi/g	10066	09/21/98 1734	plj
	Uranium 235, error +/-, Solid	0.0600					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, Activity, Solid	2.86		B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium 238, error +/-, Solid	0.580		B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium-234, MDA, Solid	0.0600					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-234, Lc, Solid	0.0500					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, MDA, Solid	0.0100					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, Lc, Solid	0.0100					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, MDA, Solid	0.0800					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, Lc, Solid	0.0700					1	pCi/g	10066	09/21/98 1734	plj
CA-GLR 5.0R4	Thorium-228, 230, 232										
	Thorium-228, Solid	0.760					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-230, Solid	1.30 - JB		B			1	pCi/g	10069	09/22/98 1336	plj
	Thorium-232, Solid	0.870		*			1	pCi/g	10069	09/22/98 1336	plj
	Thorium-228, Error +/-, Solid	2.63		B			1	pCi/g	10069	09/22/98 1336	plj
	Thorium-230, Error +/-, Solid	0.520		B			1	pCi/g	10069	09/22/98 1336	plj
	Thorium-232, Error +/-, Solid	0.390					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-228, MDA, Solid	0.0400					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-228, Lc, Solid	0.0200					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-230, MDA, Solid	0.120					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-230, Lc, Solid	0.100					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-232, MDA, Solid	0.0400					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-232, Lc, Solid	0.0200					1	pCi/g	10069	09/22/98 1336	plj
EPA 901.1	Gamma Scan (HPGe gamma)										
	Actinium-228, Activity, Solid	1.2					1	pCi/g	10095	09/24/98 1304	mdg
	Actinium-228, error +/-, Solid	0.4					1	pCi/g	10095	09/24/98 1304	mdg
	Actinium-228, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042451-003
Laboratory Sample ID: 982529-22Date Sampled.....: 09/02/98
Date Received.....: 09/09/98Time Sampled.....: 11:45
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Actinium-228, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Americium-241, Activity, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Americium-241, error +/-, Solid	0.2					1	pCi/g	10095	09/24/98 1304	mdg
	Americium-241, MDA, Solid	0.3					1	pCi/g	10095	09/24/98 1304	mdg
	Americium-241, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1304	mdg
	Cerium-144, Activity, Solid	0.4					1	pCi/g	10095	09/24/98 1304	mdg
	Cerium-144, Error, +/-, Solid	0.4					1	pCi/g	10095	09/24/98 1304	mdg
	Cerium-144, MDA, Solid	0.4					1	pCi/g	10095	09/24/98 1304	mdg
	Cerium-144, Lc, Solid	0.4					1	pCi/g	10095	09/24/98 1304	mdg
	Cobalt-60, Activity, Solid	0.2					1	pCi/g	10095	09/24/98 1304	mdg
	Cobalt-60, Error, +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Cobalt-60, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Cobalt-60, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Chromium-51, Activity, Solid	0.9					1	pCi/g	10095	09/24/98 1304	mdg
	Chromium-51, Error, +/-, Solid	0.9					1	pCi/g	10095	09/24/98 1304	mdg
	Chromium-51, MDA, Solid	0.7					1	pCi/g	10095	09/24/98 1304	mdg
	Chromium-51, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1304	mdg
	Cesium-134, Activity, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Cesium-134, Error, +/-, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Cesium-134, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Cesium-134, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Cesium-137, Activity, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Cesium-137, Error, +/-, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Cesium-137, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Cesium-137, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Iron-59, Activity, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Iron-59, Error, +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Iron-59, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Potassium-40, Activity, Solid	27.8					1	pCi/g	10095	09/24/98 1304	mdg
	Potassium-40, error +/-, Solid	3.8					1	pCi/g	10095	09/24/98 1304	mdg
	Potassium-40, MDA, Solid	0.5					1	pCi/g	10095	09/24/98 1304	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Lead-212, Activity, Solid	0.8					1	pCi/g	10095	09/24/98 1304	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10095	09/24/98 1304	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/CDC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042451-003
Laboratory Sample ID: 982529-22

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:45
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Lead-212, Lc, Solid	0.3					1	pCi/g	10095	09/24/98 1304	mdg
	Lead-214, Activity, Solid	1.0					1	pCi/g	10095	09/24/98 1304	mdg
	Lead-214, error +/-, Solid	0.2					1	pCi/g	10095	09/24/98 1304	mdg
	Lead-214, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Lead-214, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1304	mdg
	Radium-226, Activity, Solid	1.1					1	pCi/g	10095	09/24/98 1304	mdg
	Radium-226, Error, +/-, Solid	0.5					1	pCi/g	10095	09/24/98 1304	mdg
	Radium-226, MDA, Solid	0.2					1	pCi/g	10095	09/24/98 1304	mdg
	Radium-226, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1304	mdg
	Radium-228, Activity, Solid	1.2					1	pCi/g	10095	09/24/98 1304	mdg
	Radium-228, Error, +/-, Solid	0.4					1	pCi/g	10095	09/24/98 1304	mdg
	Radium-228, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Radium-228, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Ruthenium-103, Activity, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Ruthenium-103, Error, +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Ruthenium-103, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Ruthenium-103, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Ruthenium-106, Activity, Solid	1.1					1	pCi/g	10095	09/24/98 1304	mdg
	Ruthenium-106, Error, +/-, Solid	0.5					1	pCi/g	10095	09/24/98 1304	mdg
	Ruthenium-106, MDA, Solid	0.8					1	pCi/g	10095	09/24/98 1304	mdg
	Ruthenium-106, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Thorium-231, Activity, Solid	1.0					1	pCi/g	10095	09/24/98 1304	mdg
	Thorium-231, error +/-, Solid	1.0					1	pCi/g	10095	09/24/98 1304	mdg
	Thorium-231, MDA, Solid	0.7					1	pCi/g	10095	09/24/98 1304	mdg
	Thorium-231, Lc, Solid	0.3					1	pCi/g	10095	09/24/98 1304	mdg
	Thorium-232, Solid	10.2					1	pCi/g	10095	09/24/98 1304	mdg
	Thorium-232, Error +/-, Solid	43.0					1	pCi/g	10095	09/24/98 1304	mdg
	Thorium-232, MDA, Solid	47.3					1	pCi/g	10095	09/24/98 1304	mdg
	Thorium-232, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1304	mdg
	Uranium-235, Activity, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Uranium-235, error +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Uranium-235, Lc, Solid	0.4					1	pCi/g	10095	09/24/98 1304	mdg
	Uranium-238, Activity, Solid	5.3					1	pCi/g	10095	09/24/98 1304	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042451-003
Laboratory Sample ID: 982529-22

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 11:45
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	4.8					1	pCi/g	10095	09/24/98 1304	mdg
	Uranium-238, MDA, Solid	3.3					1	pCi/g	10095	09/24/98 1304	mdg
	Uranium-238, Lc, Solid	0.4					1	pCi/g	10095	09/24/98 1304	mdg
	Zirconium-95, Activity, Solid	0.2 - J					1	pCi/g	10095	09/24/98 1304	mdg
	Zirconium-95, Error, +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1304	mdg
	Zirconium-95, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg
	Zirconium-95, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1304	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042452-003
 Laboratory Sample ID: 982529-23

Pile 12-N

Date Sampled.....: 09/02/98
 Date Received.....: 09/09/98

Time Sampled.....: 11:55
 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238										
	Uranium-234, Solid	1.50 - 5		*B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium 234, error +/-, Solid	0.380		B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, Activity, Solid	0.120					1	pCi/g	10066	09/21/98 1734	plj
	Uranium 235, error +/-, Solid	0.110					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, Activity, Solid	3.44		B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium 238, error +/-, Solid	0.740		B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium-234, MDA, Solid	0.0800					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-234, Lc, Solid	0.0600					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, MDA, Solid	0.0100					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, Lc, Solid	0.0100					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, MDA, Solid	0.100					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, Lc, Solid	0.0900					1	pCi/g	10066	09/21/98 1734	plj
	CA-GLR 5.0R4	Thorium-228, 230, 232									
Thorium-228, Solid		1.16					1	pCi/g	10069	09/22/98 1336	plj
Thorium-230, Solid		1.04 - 5B		B			1	pCi/g	10069	09/22/98 1336	plj
Thorium-232, Solid		1.01		•			1	pCi/g	10069	09/22/98 1336	plj
Thorium-228, Error +/-, Solid		0.320		B			1	pCi/g	10069	09/22/98 1336	plj
Thorium-230, Error +/-, Solid		0.460		B			1	pCi/g	10069	09/22/98 1336	plj
Thorium-232, Error +/-, Solid		0.420					1	pCi/g	10069	09/22/98 1336	plj
Thorium-228, MDA, Solid		0.0400					1	pCi/g	10069	09/22/98 1336	plj
Thorium-228, Lc, Solid		0.0200					1	pCi/g	10069	09/22/98 1336	plj
Thorium-230, MDA, Solid		0.120					1	pCi/g	10069	09/22/98 1336	plj
Thorium-230, Lc, Solid		0.100					1	pCi/g	10069	09/22/98 1336	plj
Thorium-232, MDA, Solid		0.0400					1	pCi/g	10069	09/22/98 1336	plj
Thorium-232, Lc, Solid		0.0200					1	pCi/g	10069	09/22/98 1336	plj
EPA 901.1		Gamma Scan (HPGe gamma)									
	Actinium-228, Activity, Solid	1.4					1	pCi/g	10095	09/24/98 1516	mdg
	Actinium-228, error +/-, Solid	0.5					1	pCi/g	10095	09/24/98 1516	mdg
	Actinium-228, MDA, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042452-003
Laboratory Sample ID: 982529-23Date Sampled.....: 09/02/98
Date Received.....: 09/09/98Time Sampled.....: 11:55
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Actinium-228, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Americium-241, Activity, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Americium-241, error +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Americium-241, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Americium-241, Lc, Solid	0.4					1	pCi/g	10095	09/24/98 1516	mdg
	Cerium-144, Activity, Solid	0.3					1	pCi/g	10095	09/24/98 1516	mdg
	Cerium-144, Error, +/-, Solid	0.4					1	pCi/g	10095	09/24/98 1516	mdg
	Cerium-144, MDA, Solid	0.4					1	pCi/g	10095	09/24/98 1516	mdg
	Cerium-144, Lc, Solid	0.4					1	pCi/g	10095	09/24/98 1516	mdg
	Cobalt-60, Activity, Solid	0.7					1	pCi/g	10095	09/24/98 1516	mdg
	Cobalt-60, Error, +/-, Solid	0.3					1	pCi/g	10095	09/24/98 1516	mdg
	Cobalt-60, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Cobalt-60, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Chromium-51, Activity, Solid	1.0					1	pCi/g	10095	09/24/98 1516	mdg
	Chromium-51, Error, +/-, Solid	0.8					1	pCi/g	10095	09/24/98 1516	mdg
	Chromium-51, MDA, Solid	0.5					1	pCi/g	10095	09/24/98 1516	mdg
	Chromium-51, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg
	Cesium-134, Activity, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Cesium-134, Error, +/-, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Cesium-134, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Cesium-134, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Cesium-137, Activity, Solid	0.6					1	pCi/g	10095	09/24/98 1516	mdg
	Cesium-137, Error, +/-, Solid	0.3					1	pCi/g	10095	09/24/98 1516	mdg
	Cesium-137, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Cesium-137, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg
	Iron-59, Activity, Solid	0.4					1	pCi/g	10095	09/24/98 1516	mdg
	Iron-59, Error, +/-, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg
	Iron-59, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Potassium-40, Activity, Solid	25.2					1	pCi/g	10095	09/24/98 1516	mdg
	Potassium-40, error +/-, Solid	3.3					1	pCi/g	10095	09/24/98 1516	mdg
	Potassium-40, MDA, Solid	0.4					1	pCi/g	10095	09/24/98 1516	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Lead-212, Activity, Solid	1.1					1	pCi/g	10095	09/24/98 1516	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042452-003
Laboratory Sample ID: 982529-23

Date Sampled.....: 09/02/98 Time Sampled.....: 11:55
Date Received.....: 09/09/98 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Lead-212, Lc, Solid	0.3					1	pCi/g	10095	09/24/98 1516	mdg
	Lead-214, Activity, Solid	1.7					1	pCi/g	10095	09/24/98 1516	mdg
	Lead-214, error +/-, Solid	0.4					1	pCi/g	10095	09/24/98 1516	mdg
	Lead-214, MDA, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg
	Lead-214, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg
	Radium-226, Activity, Solid	1.5					1	pCi/g	10095	09/24/98 1516	mdg
	Radium-226, Error, +/-, Solid	0.4					1	pCi/g	10095	09/24/98 1516	mdg
	Radium-226, MDA, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg
	Radium-226, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg
	Radium-228, Activity, Solid	1.4					1	pCi/g	10095	09/24/98 1516	mdg
	Radium-228, Error, +/-, Solid	0.5					1	pCi/g	10095	09/24/98 1516	mdg
	Radium-228, MDA, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg
	Radium-228, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Ruthenium-103, Activity, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Ruthenium-103, Error, +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Ruthenium-103, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Ruthenium-103, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg
	Ruthenium-106, Activity, Solid	2.9					1	pCi/g	10095	09/24/98 1516	mdg
	Ruthenium-106, Error, +/-, Solid	2.2					1	pCi/g	10095	09/24/98 1516	mdg
	Ruthenium-106, MDA, Solid	0.9					1	pCi/g	10095	09/24/98 1516	mdg
	Ruthenium-106, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg
	Thorium-231, Activity, Solid	0.5					1	pCi/g	10095	09/24/98 1516	mdg
	Thorium-231, error +/-, Solid	1.1					1	pCi/g	10095	09/24/98 1516	mdg
	Thorium-231, MDA, Solid	0.7					1	pCi/g	10095	09/24/98 1516	mdg
	Thorium-231, Lc, Solid	0.5					1	pCi/g	10095	09/24/98 1516	mdg
	Thorium-232, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Thorium-232, Error +/-, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Thorium-232, MDA, Solid	22.2					1	pCi/g	10095	09/24/98 1516	mdg
	Thorium-232, Lc, Solid	0.5					1	pCi/g	10095	09/24/98 1516	mdg
	Uranium-235, Activity, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg
	Uranium-235, error +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Uranium-235, Lc, Solid	0.4					1	pCi/g	10095	09/24/98 1516	mdg
	Uranium-238, Activity, Solid	7.4					1	pCi/g	10095	09/24/98 1516	mdg

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042452-003
Laboratory Sample ID: 982529-23

Date Sampled.....: 09/02/98 Time Sampled.....: 11:55
Date Received.....: 09/09/98 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	2.1					1	pCi/g	10095	09/24/98 1516	mdg
	Uranium-238, MDA, Solid	1.2					1	pCi/g	10095	09/24/98 1516	mdg
	Uranium-238, Lc, Solid	0.5					1	pCi/g	10095	09/24/98 1516	mdg
	Zirconium-95, Activity, Solid	0.7 - J					1	pCi/g	10095	09/24/98 1516	mdg
	Zirconium-95, Error, +/-, Solid	0.3					1	pCi/g	10095	09/24/98 1516	mdg
	Zirconium-95, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Zirconium-95, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042453-003
Laboratory Sample ID: 982529-24

Pile 12-5

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 12:00
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238										
	Uranium-234, Solid	1.34 - J		*B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium 234, error +/-, Solid	0.290		B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, Activity, Solid	0.0200					1	pCi/g	10066	09/21/98 1734	plj
	Uranium 235, error +/-, Solid	0.0500					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, Activity, Solid	3.35		B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium 238, error +/-, Solid	0.640		B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium-234, MDA, Solid	0.0600					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-234, Lc, Solid	0.0500					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, MDA, Solid	0.0100					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, Lc, Solid	0.0100					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, MDA, Solid	0.0800					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, Lc, Solid	0.0700					1	pCi/g	10066	09/21/98 1734	plj
CA-GLR 5.0R4	Thorium-228, 230, 232										
	Thorium-228, Solid	0.790 - J					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-230, Solid	0.810 - JB		B			1	pCi/g	10069	09/22/98 1336	plj
	Thorium-232, Solid	0.950 - J		B			1	pCi/g	10069	09/22/98 1336	plj
	Thorium-228, Error +/-, Solid	0.540		B			1	pCi/g	10069	09/22/98 1336	plj
	Thorium-230, Error +/-, Solid	0.410		B			1	pCi/g	10069	09/22/98 1336	plj
	Thorium-232, Error +/-, Solid	0.420					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-228, MDA, Solid	0.0500					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-228, Lc, Solid	0.0200					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-230, MDA, Solid	0.130					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-230, Lc, Solid	0.100					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-232, MDA, Solid	0.0400					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-232, Lc, Solid	0.0200					1	pCi/g	10069	09/22/98 1336	plj
EPA 901.1	Gamma Scan (HPGe gamma)										
	Actinium-228, Activity, Solid	2.1					1	pCi/g	10095	09/24/98 1516	mdg
	Actinium-228, error +/-, Solid	0.5					1	pCi/g	10095	09/24/98 1516	mdg
	Actinium-228, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montana

Customer Sample ID...: 042453-003
Laboratory Sample ID: 982529-24Date Sampled.....: 09/02/98
Date Received.....: 09/09/98Time Sampled.....: 12:00
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Actinium-228, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Americium-241, Activity, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Americium-241, error +/-, Solid	0.3					1	pCi/g	10095	09/24/98 1516	mdg
	Americium-241, MDA, Solid	0.3					1	pCi/g	10095	09/24/98 1516	mdg
	Americium-241, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg
	Cerium-144, Activity, Solid	0.4					1	pCi/g	10095	09/24/98 1516	mdg
	Cerium-144, Error, +/-, Solid	0.4					1	pCi/g	10095	09/24/98 1516	mdg
	Cerium-144, MDA, Solid	0.3					1	pCi/g	10095	09/24/98 1516	mdg
	Cerium-144, Lc, Solid	0.3					1	pCi/g	10095	09/24/98 1516	mdg
	Cobalt-60, Activity, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg
	Cobalt-60, Error, +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Cobalt-60, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Cobalt-60, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Chromium-51, Activity, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Chromium-51, Error, +/-, Solid	0.4					1	pCi/g	10095	09/24/98 1516	mdg
	Chromium-51, MDA, Solid	0.4					1	pCi/g	10095	09/24/98 1516	mdg
	Chromium-51, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Cesium-134, Activity, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Cesium-134, Error, +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Cesium-134, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Cesium-134, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Cesium-137, Activity, Solid	0.4					1	pCi/g	10095	09/24/98 1516	mdg
	Cesium-137, Error, +/-, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg
	Cesium-137, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Cesium-137, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Iron-59, Activity, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Iron-59, Error, +/-, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Iron-59, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Potassium-40, Activity, Solid	25.0					1	pCi/g	10095	09/24/98 1516	mdg
	Potassium-40, error +/-, Solid	3.8					1	pCi/g	10095	09/24/98 1516	mdg
	Potassium-40, MDA, Solid	0.5					1	pCi/g	10095	09/24/98 1516	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Lead-212, Activity, Solid	0.8					1	pCi/g	10095	09/24/98 1516	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg



CORE LABORATORIES

Job Number: 982529

LABORATORY TEST RESULTS

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042453-003
Laboratory Sample ID: 982529-24

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 12:00
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Lead-212, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg
	Lead-214, Activity, Solid	1.3					1	pCi/g	10095	09/24/98 1516	mdg
	Lead-214, error +/-, Solid	0.4					1	pCi/g	10095	09/24/98 1516	mdg
	Lead-214, MDA, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg
	Lead-214, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg
	Radium-226, Activity, Solid	1.0					1	pCi/g	10095	09/24/98 1516	mdg
	Radium-226, Error, +/-, Solid	0.3					1	pCi/g	10095	09/24/98 1516	mdg
	Radium-226, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Radium-226, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Radium-228, Activity, Solid	2.1					1	pCi/g	10095	09/24/98 1516	mdg
	Radium-228, Error, +/-, Solid	0.5					1	pCi/g	10095	09/24/98 1516	mdg
	Radium-228, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Radium-228, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Ruthenium-103, Activity, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Ruthenium-103, Error, +/-, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Ruthenium-103, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Ruthenium-103, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Ruthenium-106, Activity, Solid	0.8					1	pCi/g	10095	09/24/98 1516	mdg
	Ruthenium-106, Error, +/-, Solid	0.6					1	pCi/g	10095	09/24/98 1516	mdg
	Ruthenium-106, MDA, Solid	0.8					1	pCi/g	10095	09/24/98 1516	mdg
	Ruthenium-106, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Thorium-231, Activity, Solid	1.6					1	pCi/g	10095	09/24/98 1516	mdg
	Thorium-231, error +/-, Solid	1.0					1	pCi/g	10095	09/24/98 1516	mdg
	Thorium-231, MDA, Solid	0.8					1	pCi/g	10095	09/24/98 1516	mdg
	Thorium-231, Lc, Solid	0.3					1	pCi/g	10095	09/24/98 1516	mdg
	Thorium-232, Solid	47.0					1	pCi/g	10095	09/24/98 1516	mdg
	Thorium-232, Error +/-, Solid	45.2					1	pCi/g	10095	09/24/98 1516	mdg
	Thorium-232, MDA, Solid	46.2					1	pCi/g	10095	09/24/98 1516	mdg
	Thorium-232, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1516	mdg
	Uranium-235, Activity, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Uranium 235, error +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Uranium-235, Lc, Solid	0.3					1	pCi/g	10095	09/24/98 1516	mdg
	Uranium-238, Activity, Solid	5.9					1	pCi/g	10095	09/24/98 1516	mdg

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042453-003
Laboratory Sample ID: 982529-24

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 12:00
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	5.3					1	pCi/g	10095	09/24/98 1516	mdg
	Uranium-238, MDA, Solid	3.2					1	pCi/g	10095	09/24/98 1516	mdg
	Uranium-238, Lc, Solid	0.4					1	pCi/g	10095	09/24/98 1516	mdg
	Zirconium-95, Activity, Solid	0.2 -J					1	pCi/g	10095	09/24/98 1516	mdg
	Zirconium-95, Error, +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1516	mdg
	Zirconium-95, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg
	Zirconium-95, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1516	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042454-003
Laboratory Sample ID: 982529-25

Pile B-N

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 12:05
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238										
	Uranium-234, Solid	1.09 - <i>J</i>		*B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium 234, error +/-, Solid	0.560		B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, Activity, Solid	0.0400					1	pCi/g	10066	09/21/98 1734	plj
	Uranium 235, error +/-, Solid	0.0600					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, Activity, Solid	2.05 - <i>JB</i>		B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium 238, error +/-, Solid	0.470		B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium-234, MDA, Solid	0.0600					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-234, Lc, Solid	0.0500					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, MDA, Solid	0.0100					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, Lc, Solid	0.0100					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, MDA, Solid	0.0800					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, Lc, Solid	0.0700					1	pCi/g	10066	09/21/98 1734	plj
CA-GLR 5.0R4	Thorium-228, 230, 232										
	Thorium-228, Solid	1.05					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-230, Solid	0.590 - <i>JB</i>		B			1	pCi/g	10069	09/22/98 1336	plj
	Thorium-232, Solid	0.770		•			1	pCi/g	10069	09/22/98 1336	plj
	Thorium-228, Error +/-, Solid	0.430		B			1	pCi/g	10069	09/22/98 1336	plj
	Thorium-230, Error +/-, Solid	0.250		B			1	pCi/g	10069	09/22/98 1336	plj
	Thorium-232, Error +/-, Solid	0.290					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-228, MDA, Solid	0.0300					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-228, Lc, Solid	0.0200					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-230, MDA, Solid	0.0800					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-230, Lc, Solid	0.0700					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-232, MDA, Solid	0.0300					1	pCi/g	10069	09/22/98 1336	plj
	Thorium-232, Lc, Solid	0.0100					1	pCi/g	10069	09/22/98 1336	plj
EPA 901.1	Gamma Scan (HPGe gamma)										
	Actinium-228, Activity, Solid	1.5					1	pCi/g	10095	09/24/98 1843	mdg
	Actinium-228, error +/-, Solid	0.5					1	pCi/g	10095	09/24/98 1843	mdg
	Actinium-228, MDA, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042454-003
Laboratory Sample ID: 982529-25Date Sampled.....: 09/02/98
Date Received.....: 09/09/98Time Sampled.....: 12:05
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Actinium-228, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Americium-241, Activity, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Americium-241, error +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Americium-241, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Americium-241, Lc, Solid	0.4					1	pCi/g	10095	09/24/98 1843	mdg
	Cerium-144, Activity, Solid	0.5					1	pCi/g	10095	09/24/98 1843	mdg
	Cerium-144, Error, +/-, Solid	0.4					1	pCi/g	10095	09/24/98 1843	mdg
	Cerium-144, MDA, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Cerium-144, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Cobalt-60, Activity, Solid	0.3					1	pCi/g	10095	09/24/98 1843	mdg
	Cobalt-60, Error, +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Cobalt-60, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Cobalt-60, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Chromium-51, Activity, Solid	2.0					1	pCi/g	10095	09/24/98 1843	mdg
	Chromium-51, Error, +/-, Solid	1.4					1	pCi/g	10095	09/24/98 1843	mdg
	Chromium-51, MDA, Solid	0.6					1	pCi/g	10095	09/24/98 1843	mdg
	Chromium-51, Lc, Solid	0.3					1	pCi/g	10095	09/24/98 1843	mdg
	Cesium-134, Activity, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Cesium-134, Error, +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Cesium-134, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Cesium-134, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Cesium-137, Activity, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Cesium-137, Error, +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Cesium-137, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Cesium-137, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Iron-59, Activity, Solid	1.0					1	pCi/g	10095	09/24/98 1843	mdg
	Iron-59, Error, +/-, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Iron-59, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Potassium-40, Activity, Solid	24.4					1	pCi/g	10095	09/24/98 1843	mdg
	Potassium-40, error +/-, Solid	3.2					1	pCi/g	10095	09/24/98 1843	mdg
	Potassium-40, MDA, Solid	0.4					1	pCi/g	10095	09/24/98 1843	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Lead-212, Activity, Solid	1.0					1	pCi/g	10095	09/24/98 1843	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042454-003
Laboratory Sample ID: 982529-25

Date Sampled.....: 09/02/98 Time Sampled.....: 12:05
Date Received.....: 09/09/98 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Lead-212, Lc, Solid	0.3					1	pCi/g	10095	09/24/98 1843	mdg
	Lead-214, Activity, Solid	1.3					1	pCi/g	10095	09/24/98 1843	mdg
	Lead-214, error +/-, Solid	0.4					1	pCi/g	10095	09/24/98 1843	mdg
	Lead-214, MDA, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Lead-214, Lc, Solid	0.3					1	pCi/g	10095	09/24/98 1843	mdg
	Radium-226, Activity, Solid	1.3					1	pCi/g	10095	09/24/98 1843	mdg
	Radium-226, Error, +/-, Solid	0.5					1	pCi/g	10095	09/24/98 1843	mdg
	Radium-226, MDA, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Radium-226, Lc, Solid	0.3					1	pCi/g	10095	09/24/98 1843	mdg
	Radium-228, Activity, Solid	1.5					1	pCi/g	10095	09/24/98 1843	mdg
	Radium-228, Error, +/-, Solid	0.5					1	pCi/g	10095	09/24/98 1843	mdg
	Radium-228, MDA, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Radium-228, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Ruthenium-103, Activity, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Ruthenium-103, Error, +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Ruthenium-103, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Ruthenium-103, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Ruthenium-106, Activity, Solid	2.6					1	pCi/g	10095	09/24/98 1843	mdg
	Ruthenium-106, Error, +/-, Solid	1.7					1	pCi/g	10095	09/24/98 1843	mdg
	Ruthenium-106, MDA, Solid	0.3					1	pCi/g	10095	09/24/98 1843	mdg
	Ruthenium-106, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Thorium-231, Activity, Solid	1.2					1	pCi/g	10095	09/24/98 1843	mdg
	Thorium-231, error +/-, Solid	0.8					1	pCi/g	10095	09/24/98 1843	mdg
	Thorium-231, MDA, Solid	0.5					1	pCi/g	10095	09/24/98 1843	mdg
	Thorium-231, Lc, Solid	0.5					1	pCi/g	10095	09/24/98 1843	mdg
	Thorium-232, Solid	16.6					1	pCi/g	10095	09/24/98 1843	mdg
	Thorium-232, Error +/-, Solid	19.2					1	pCi/g	10095	09/24/98 1843	mdg
	Thorium-232, MDA, Solid	21.6					1	pCi/g	10095	09/24/98 1843	mdg
	Thorium-232, Lc, Solid	0.4					1	pCi/g	10095	09/24/98 1843	mdg
	Uranium-235, Activity, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Uranium-235, error +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Uranium-235, Lc, Solid	0.4					1	pCi/g	10095	09/24/98 1843	mdg
	Uranium-238, Activity, Solid	6.6					1	pCi/g	10095	09/24/98 1843	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042454-003
Laboratory Sample ID: 982529-25

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 12:05
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	1.6					1	pCi/g	10095	09/24/98 1843	mdg
	Uranium-238, MDA, Solid	0.9					1	pCi/g	10095	09/24/98 1843	mdg
	Uranium-238, Lc, Solid	0.4					1	pCi/g	10095	09/24/98 1843	mdg
	Zirconium-95, Activity, Solid	0.7 -J					1	pCi/g	10095	09/24/98 1843	mdg
	Zirconium-95, Error, +/-, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Zirconium-95, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Zirconium-95, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042455-003
 Laboratory Sample ID: 982529-26

Pile 13-S

Date Sampled.....: 09/02/98 Time Sampled.....: 12:10
 Date Received.....: 09/09/98 Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
EPA 600 3.1.2-3	Sample Preparation, Solid	Complete					1		10204	09/01/98 0800	plj
CA-GLR-R405	Uranium-234, 235, 238										
	Uranium-234, Solid	1.93 - J		*B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium 234, error +/-, Solid	3.42		B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, Activity, Solid	0.0300					1	pCi/g	10066	09/21/98 1734	plj
	Uranium 235, error +/-, Solid	0.0900					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, Activity, Solid	4.95		B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium 238, error +/-, Solid	0.930		B			1	pCi/g	10066	09/21/98 1734	plj
	Uranium-234, MDA, Solid	0.0700					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-234, Lc, Solid	0.0600					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, MDA, Solid	0.0100					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-235, Lc, Solid	0.0100					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, MDA, Solid	0.0900					1	pCi/g	10066	09/21/98 1734	plj
	Uranium-238, Lc, Solid	0.0800					1	pCi/g	10066	09/21/98 1734	plj
	CA-GLR 5.0R4	Thorium-228, 230, 232									
Thorium-228, Solid		1.23					1	pCi/g	10069	09/22/98 1336	plj
Thorium-230, Solid		2.43		B			1	pCi/g	10069	09/22/98 1336	plj
Thorium-232, Solid		0.870		*			1	pCi/g	10069	09/22/98 1336	plj
Thorium-228, Error +/-, Solid		0.360		B			1	pCi/g	10069	09/22/98 1336	plj
Thorium-230, Error +/-, Solid		0.660		B			1	pCi/g	10069	09/22/98 1336	plj
Thorium-232, Error +/-, Solid		0.330					1	pCi/g	10069	09/22/98 1336	plj
Thorium-228, MDA, Solid		0.0300					1	pCi/g	10069	09/22/98 1336	plj
Thorium-228, Lc, Solid		0.0200					1	pCi/g	10069	09/22/98 1336	plj
Thorium-230, MDA, Solid		0.0800					1	pCi/g	10069	09/22/98 1336	plj
Thorium-230, Lc, Solid		0.0700					1	pCi/g	10069	09/22/98 1336	plj
Thorium-232, MDA, Solid		0.0300					1	pCi/g	10069	09/22/98 1336	plj
Thorium-232, Lc, Solid		0.0100					1	pCi/g	10069	09/22/98 1336	plj
EPA 901.1		Gamma Scan (HPGe gamma)									
	Actinium-228, Activity, Solid	1.3					1	pCi/g	10095	09/24/98 1843	mdg
	Actinium-228, error +/-, Solid	0.4					1	pCi/g	10095	09/24/98 1843	mdg
	Actinium-228, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg

The analyses, opinions or interpretations contained in this report are based upon observations and material supplied by the client for whose exclusive and confidential use the report has been made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Core.

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042455-003
Laboratory Sample ID: 982529-26

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 12:10
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Actinium-228, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Americium-241, Activity, Solid	0.3					1	pCi/g	10095	09/24/98 1843	mdg
	Americium-241, error +/-, Solid	0.4					1	pCi/g	10095	09/24/98 1843	mdg
	Americium-241, MDA, Solid	0.4					1	pCi/g	10095	09/24/98 1843	mdg
	Americium-241, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Cerium-144, Activity, Solid	0.4					1	pCi/g	10095	09/24/98 1843	mdg
	Cerium-144, Error, +/-, Solid	0.4					1	pCi/g	10095	09/24/98 1843	mdg
	Cerium-144, MDA, Solid	0.4					1	pCi/g	10095	09/24/98 1843	mdg
	Cerium-144, Lc, Solid	0.3					1	pCi/g	10095	09/24/98 1843	mdg
	Cobalt-60, Activity, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Cobalt-60, Error, +/-, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Cobalt-60, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Cobalt-60, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Chromium-51, Activity, Solid	1.5					1	pCi/g	10095	09/24/98 1843	mdg
	Chromium-51, Error, +/-, Solid	1.0					1	pCi/g	10095	09/24/98 1843	mdg
	Chromium-51, MDA, Solid	0.4					1	pCi/g	10095	09/24/98 1843	mdg
	Chromium-51, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Cesium-134, Activity, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Cesium-134, Error, +/-, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Cesium-134, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Cesium-134, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Cesium-137, Activity, Solid	0.3					1	pCi/g	10095	09/24/98 1843	mdg
	Cesium-137, Error, +/-, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Cesium-137, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Cesium-137, Lc, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Iron-59, Activity, Solid	0.3					1	pCi/g	10095	09/24/98 1843	mdg
	Iron-59, Error, +/-, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Iron-59, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Iron-59, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Potassium-40, Activity, Solid	25.1					1	pCi/g	10095	09/24/98 1843	mdg
	Potassium-40, error +/-, Solid	3.8					1	pCi/g	10095	09/24/98 1843	mdg
	Potassium-40, MDA, Solid	0.5					1	pCi/g	10095	09/24/98 1843	mdg
	Potassium-40, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Lead-212, Activity, Solid	1.1					1	pCi/g	10095	09/24/98 1843	mdg
	Lead-212, error +/-, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID...: 042455-003
Laboratory Sample ID: 982529-26

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 12:10
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Lead-212, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Lead-212, Lc, Solid	0.3					1	pCi/g	10095	09/24/98 1843	mdg
	Lead-214, Activity, Solid	1.4					1	pCi/g	10095	09/24/98 1843	mdg
	Lead-214, error +/-, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Lead-214, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Lead-214, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Radium-226, Activity, Solid	1.4					1	pCi/g	10095	09/24/98 1843	mdg
	Radium-226, Error, +/-, Solid	0.5					1	pCi/g	10095	09/24/98 1843	mdg
	Radium-226, MDA, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Radium-226, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Radium-228, Activity, Solid	1.3					1	pCi/g	10095	09/24/98 1843	mdg
	Radium-228, Error, +/-, Solid	0.4					1	pCi/g	10095	09/24/98 1843	mdg
	Radium-228, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Radium-228, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Ruthenium-103, Activity, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Ruthenium-103, Error, +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Ruthenium-103, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Ruthenium-103, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Ruthenium-106, Activity, Solid	1.9					1	pCi/g	10095	09/24/98 1843	mdg
	Ruthenium-106, Error, +/-, Solid	0.7					1	pCi/g	10095	09/24/98 1843	mdg
	Ruthenium-106, MDA, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Ruthenium-106, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Thorium-231, Activity, Solid	2.1					1	pCi/g	10095	09/24/98 1843	mdg
	Thorium-231, error +/-, Solid	1.4					1	pCi/g	10095	09/24/98 1843	mdg
	Thorium-231, MDA, Solid	0.8					1	pCi/g	10095	09/24/98 1843	mdg
	Thorium-231, Lc, Solid	0.3					1	pCi/g	10095	09/24/98 1843	mdg
	Thorium-232, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Thorium-232, Error +/-, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Thorium-232, MDA, Solid	69.3					1	pCi/g	10095	09/24/98 1843	mdg
	Thorium-232, Lc, Solid	0.3					1	pCi/g	10095	09/24/98 1843	mdg
	Uranium-235, Activity, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Uranium-235, error +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Uranium-235, MDA, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Uranium-235, Lc, Solid	0.2					1	pCi/g	10095	09/24/98 1843	mdg
	Uranium-238, Activity, Solid	8.3					1	pCi/g	10095	09/24/98 1843	mdg



CORE LABORATORIES

LABORATORY TEST RESULTS

Job Number: 982529

Date: 10/07/98

CUSTOMER: Sandia National Laboratory

PROJECT: AR/COC-600793

ATTN: Suzi Montano

Customer Sample ID.: 042455-003
Laboratory Sample ID: 982529-26

Date Sampled.....: 09/02/98
Date Received.....: 09/09/98

Time Sampled.....: 12:10
Time Received.....: 09:00

Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	PQL	DILUTION	UNITS	BATCH	DATE ANALYZED	TECH
	Uranium 238, error +/-, Solid	3.8					1	pCi/g	10095	09/24/98 1843	mdg
	Uranium-238, MDA, Solid	2.5					1	pCi/g	10095	09/24/98 1843	mdg
	Uranium-238, Lc, Solid	0.3					1	pCi/g	10095	09/24/98 1843	mdg
	Zirconium-95, Activity, Solid	0.1 -5					1	pCi/g	10095	09/24/98 1843	mdg
	Zirconium-95, Error, +/-, Solid	0.1					1	pCi/g	10095	09/24/98 1843	mdg
	Zirconium-95, MDA, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg
	Zirconium-95, Lc, Solid	0.0					1	pCi/g	10095	09/24/98 1843	mdg

Contract Verification Review (CVR)

Project Leader AASProject Name CCTA-09-RAD VCMCase No. 7215.2201AR/COC No. 600792Analytical Lab CORESDG No. 982391

In the tables below, mark any information that is missing or incorrect and give an explanation.

1.0 Analysis Request and Chain of Custody Record and Log-In Information

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
1.1	All items on COC complete - data entry clerk initialed and dated	X				
1.2	Container type(s) correct for analyses requested	X				
1.3	Sample volume adequate for # and types of analyses requested	X				
1.4	Preservative correct for analyses requested	X				
1.5	Custody records continuous and complete	X				
1.6	Lab sample number(s) provided	X				
1.7	Date samples received	X				
1.8	Condition upon receipt information provided	X				

2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
2.1	Data reviewed, signature	X				
2.2	Method reference number(s) complete and correct	X				
2.3	QC analysis and acceptance limits provided (MB, LCS, LCD)		X	MISSING PAGES 114-115—EXPLOSIVES QC		
2.4	Matrix spike/matrix spike duplicate data provided(if requested)	NA				
2.5	Detection Limits provided; PQL and MDL(or IDL)	X				
2.6	QC batch numbers provided	X				
2.7	Dilution Factors provided	X				
2.8	Data reported using correct sig. fig. (2 for org.; 3 for inorg.)	X				
2.9	Rad analysis uncertainty provided (2 sigma error)	NA				
2.10	Narrative provided	X				
2.11	TAT met	X				
2.12	Hold times met		X	MISSED HOLD TIME FOR VOC SAMPLE#042458-009		X
2.13	Were contractual qualifiers provided	X				
2.14	All requested result data provided	X				

SITE 9 RAD VCM
 Soil Piles & Down Sampling
 - TCLP Metals + Cu, Zn, Hg
 - TCLP SVOCs
 - TCLP VOCs
 (HE
 - VOCs - (imp blank))

3.0 Data Quality Evaluation

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1) Reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg). Units consistent between QC samples and sample data.	X		
3.2) Quantitation limit met for all samples?	X		
3.3) Accuracy a) Laboratory control sample accuracy reported and met for all samples?		X	NITROBENZENE OUTSIDE RECOVERY LIMITS FOR SVOC LCS/CLD 2,4,6-TRICHLOROPHENOL OUTSIDE RECOVERY LIMITS FOR SVOC LCD
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?		X	SEVERAL SURROGATES OUTSIDE RECOVERY LIMITS FOR SAMPLE # 042451-004(982391-43) 4-BROMOFLUOROBENZENE & TOLUENE-D8 OUTSIDE RECOVERY LIMITS FOR VOC LCS SURROGATES OUTSIDE RECOVERY LIMITS FOR ALL EXPLOSIVE SAMPLES EXCEPT SAMPLE #982391-3
c) If requested, matrix spike recovery data reported and met.	NA		
3.4) Precision a) Laboratory control sample precision reported and met for all samples? For rad analysis, sample duplicate precision reported and met.		X	RPD FOR MEK OUTSIDE ACCEPTANCE LIMITS FOR VOC LCS/LCD
b) If requested, matrix spike duplicate RPD data reported and met.	NA		
3.5) Blank data a) Method or reagent blank data reported and met for all samples?		X	1,4-DICHLOROBENZENE DETECTED IN VOC TCLP EXTRACTION BLANK
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	X		
3.6) Contractual qualifiers provided: "J"- estimated quantity; "B"-analyte found in method blank; "U"- analyte undetected (results are below the MDL or L _c (rad)); "H"-analysis done beyond the holding time.	X		
3.7) Narrative included, correct, and complete?	X		

4.0 Data Quality Evaluation Continuation

Summarize the findings in the table below. List only samples/fractions for which deficiencies have been noted.

Sample/ Fraction No.	Analysis	Qualifiers	Comments
ALL	8330		QC PAGES 114 & 115 MISSING
ALL	8260		CONFIRM MDLs FOR BATCH #39482 RUN ON 9-24-98

Were deficiencies noted. Yes No

Based on the review, this data package is complete. Yes No

If no, provide : nonconformance report or correction request number 1388 and date correction request was submitted 11-2-98

Reviewed by: W. Palencia Date: 11-2-98 Closed by: _____ Date: _____

ANALYSIS REQUEST AND CHAIN OF CUSTODY

SF 2001-COC (6-97)

Internal Lab
Batch No.

SAR/WRI No.

(Call 284-5514 for ARCOC and Sample Numbers.)

AR/COC- 600792

Dept. No./Mail Stop: 6134 / 1140 Project/Task Manager: PAULETICH Project Name: CCIA - 01 - RAD VCM Record Center Code: ER/1334 / 09 / 2MT Logbook Ref No.: 0151 Service Order No.: CFD 514	Date Samples Shipped: 9/8/98 Carrier/Waybill No.: 709135 Lab Contact: TIME KELLOGG Lab Destination: CORE DENVER SMO Contact/Phone: DOUG SALMI (505) 844-3110 Send Report to SMO: Wendy PAULETICH	Contract No.: AJ-2480C Case No.: 7215.222100 SMO Authorization: [Signature] Bill to: Sandia National Laboratories Supplier Services Department P.O. Box 5800 MS 0154	Parameter & Method Requested
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Location		Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)					In Sam ID			
Building	Tech Area				Container Type	Volume	Preservative	Sample Collection Method	Sample Type				
N/A													
Sample No. - Fraction		ER Sample ID or Sample Location Detail		Sample Matrix	Type	Volume	Preservative	Sample Collection Method	Sample Type	TCLP RECAL METALS + Hg, Cu, Zn	TCLP SVOCs	HE	TCLP VOCs
042430-004	CCIA-01-VCM-PILE 1-N	N/A	9	0936 9:248	S	G	16	4°C	G	SA	X	X	X
0430-005	↓			↓			4						X
0431-004	PILE 1-S			0940			16				X	X	X
0431-005	↓			↓			4						X
0432-004	PILE 2-N			0945			16				X	X	X
0432-005	↓			↓			4						X
0433-004	PILE 2-S			0952			16				X	X	X
0433-005	↓			↓			4						X
0434-004	PILE 3-N			1000			16				X	X	X
0434-005	↓			↓			4						X

RMMA <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Ref. No. _____	Sample Tracking Date Entered (mm/dd/yy) 9/23/98 Entered by: [Signature]	Special Instructions/QC Requirements EDD <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Raw data package <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Fax results to Joe Pauletich (505) 284-2607 Released by COC # 600795 Please list as separate report.	Abnormal Conditions on Receipt LAB USE
Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by lab	Turnaround Time <input type="checkbox"/> Normal <input checked="" type="checkbox"/> Rush Required Report Date 15 DAY TAT QC initials: [Signature]		
Sample Team Members Name: Joe Pauletich Signature: [Signature] Inil: SP Company/Organization/Phone: GARM/6134/284-2479			

1. Relinquished by [Signature] Org. 6134 Date 9/7/98 Time 0940	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by [Signature] Org. 7577 Date 9/5/98 Time 0940	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by [Signature] Org. 7578 Date 9/8/98 Time 1230	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____

ANALYSIS REQUEST AND CHAIN OF CUSTODY CONTINUATION FORM

AR/COC- 600792

Project Name: CCTA-09-RAD VCM Project/Task Manager: PAULETICH Case No.: 745.220100

Location										Tech Area	ER SITE 9	Beginning Depth in Ft.	ER Site No.	Reference LOV (available at SMO)						Parameter & Method Requested				Sr	
														Building	Room	Date/Time Collected	Sample Matrix	Container		Preservative	Sample Collection Method	Sample Type	TCAP (CCTA Metals + Co, H, Zn)		TCAP SVOCs
Sample No. - Fraction										ER Sample ID or Sample Location Detail															
04	24	35	-	00	4	CCTA-09-VCM- PILE 3-S		N/A	9	1005	4-2-98												S	G	16
						↓						7	7	4							X				
						PILE 4-N				1012				16					X	X	X				
						↓								4								X			
						PILE 4-S				1017				16					X	X	X				
						↓								4								X			
						PILE 5-N				1025				16					X	X	X				
						↓								4								X			
						PILE 5-S				1030				16					X	X	X				
						↓								4								X			
						PILE 6-N				1040				16					X	X	X				
						↓								4								X			
						PILE 6-S				1045				16					X	X	X				
						↓								4								X			
						PILE 7-N				1050				16					X	X	X				
						↓								4								X			
						PILE 7-S				1055				16					X	X	X				
						↓								4								X			

Abnormal Conditions on Receipt

LAB USE

Recipient Initials

WHITE - To Accompany Samples, Laboratory Copy

BLUE - To Accompany Samples, Return to SMO

YELLOW - SMO Suspense Copy

PINK - Field Copy

ANALYSIS AND CHAIN OF CUSTODY CONTINUATION FORM

AR/COC- 600792

Parameter & Method Requested

Project Name: CCTA-09-RAD VCM Project/Task Manager: PAULETICH Case No.: 745.220100

Location		Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)					TELP TELCA Metals + Cu, Hg, Zn TELP SVOCs HE TELP VOCs				L. San II
Building	Room				Sample Matrix	Container		Preservative	Sample Collection Method					
Sample No. - Fraction		ER Sample ID or Sample Location Detail			Type	Volume								
042444-004		CCTA-09-VCM-PILEB-N	N/A	1100 9:29h	S	G	16	4°C	G	SA	X	X	X	
444-005		J		J			4						X	
445-004		PILEB-S		1105			16				X	X	X	
445-005		J		J			4						X	
446-004		PILE9-N		1110			16				X	X	X	
446-005		J		J			4						X	
447-004		PILE9-S		1115			16				X	X	X	
447-005		J		J			4						X	
448-004		PILE10-N		1125			16				X	X	X	
448-005		J		J			4						X	
449-004		PILE10-S		1130			16				X	X	X	
449-005		J		J			4						X	
450-004		PILE11-N		1140			16				X	X	X	
450-005		J		J			4						X	
451-004		PILE11-S		1145			16				X	X	X	
451-005		J		J			4						X	
452-004		PILE12-N		1155			16				X	X	X	
452-005		J		J			4						X	

Abnormal Conditions on Receipt: _____

LAB USE

Recipient Initials: _____

ANALYSIS REQUEST AND CHAIN OF CUSTODY CONTINUATION FORM

SE 2001 COD (12-96)
Supersedes 100-910 (0000)

AR/COC- 600792

Project Name: CCTA-09-RAD VCM Project/Task Manager: Pavietelli Case No.: 715.220100

Location

Tech Area ER 570 9
Building N/A Room

Reference LOV (available at SMO)

Parameter & Method Requested

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container		Preservative	Sample Collection Method	Sample Type	TCLP (CCLP Metals + Co, H, Zn)	TCLP SVOCs	HE	TCLP VOCs	VOCs	L Sal
						Type	Volume									
042453-004	CCTA-09-VCM-PILE12-S	N/A	9	1200 9-2-98	S	G	16	4%	G	SA	X	X	X			
04453-005	↓			↓			4							X		
04454-004	PILE13-N			1205			16				X	X	X			
04454-005	↓			↓			48							X		
04455-004	PILE13-S			1210			16				X	X	X			
04455-005	↓			↓			48							X		
042458-009	CCTA-09-VCM-TB			0901	DIW	G	304028	HCl	HA	TB					X	
04456-004	CCTA-09-VCM-DWMS-1			1510	S	G	16	4%	G	SA	X	X	X			
04456-005	DWMS-1			↓			16							X		
04457-004	DWMS-2			1445			16				X	X	X			
04457-005	↓			↓			48							X		

Abnormal Conditions on Receipt

LAB USE

Resipient Initials

MEMORANDUM

Date: 01/11/00
To: File
From: Marcia Hilchey
Subject: Radiometric Data Review and Validation
Site: CCTA 9
AR/COC: 600793
Case: 7215.2201
Laboratory: CORE
SDG: 982529

See the attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and specified methods (gamma spec. EPA901.1, isotopic thorium CA-GLR 5.0R4, isotopic uranium CA-GLR-R405, and tritium EPA906.0). All components were successfully analyzed.

Note: Several samples submitted for tritium analysis contained insufficient moisture content for proper analysis. Tritium results were reported only for those samples which could be analyzed. The appropriate TL/ATLs were notified by the laboratory.

No qualifications were applied to tritium sample results.

Sample results for isotopic uranium were qualified due to blank contamination, failure to meet tracer recovery acceptance criteria, and failure to meet replicate RER acceptance criteria.

Sample results for isotopic thorium were qualified due to blank contamination and failure to meet tracer recovery acceptance criteria.

Sample results for gamma spec. analytes were qualified due to failure to meet replicate RER acceptance criteria.

Holding Times

The samples were analyzed within the prescribed holding times.

Calibration

Calibration met acceptance criteria for all methods.

Laboratory Control Sample Analyses

The LCS analyses met acceptance criteria for all methods.

Blanks

Th-230 was detected in the isotopic thorium method blank at less than 5 times the result for most samples. Th-230 results for these samples were JB qualified. See attached Sample Findings Summary.

U-238 was detected in the isotopic uranium method blank at less than 5 times the result for sample CCTA-09-VCM-PILE13-N. This sample result was JB qualified.

All other method blanks were free of analytes above the required acceptance limit.

Matrix Spike Analysis

All matrix spike samples met acceptance criteria.

Tracer/Carrier Recovery

Isotopic thorium tracer recovery failed to meet acceptance criteria in samples CCTA-09-VCM-PILE2-S, -PILE6-N, -PILE9-N, -PILE10-S, and -PILE12-S. Previously unqualified (see Blank section above) isotopic thorium results for these samples were J qualified. Previously qualified results received no further qualification. See attached Sample Findings Summary.

Isotopic uranium tracer recovery failed to meet acceptance criteria in sample CCTA-09-VCM-DRUMS-2. Isotopic uranium results for this sample were J qualified.

Replicate Analysis

The replicate samples met acceptance criteria for isotopic thorium and tritium.

The isotopic uranium replicate sample in batch 98717 (samples CCTA-09-VCM-PILE1N through CCTA-09-VCM-PILE20S) failed to meet RER acceptance criteria for U-235. The isotopic uranium replicate sample in batch 98718 (samples CCTA-09-VCM-PILE21N through CCTA-09-VCM-PILE28S and CCTA-09-VCM-DRUMS-1 and CCTA-09-VCM-DRUMS-2) failed to meet RER acceptance criteria for U-234. Previously unqualified U-235 and U-234 results (see Tracer Recover section above) for these samples were J qualified. Previously qualified results received no further qualification. See attached Sample Findings Summary.

The gamma spec. replicate sample in batch 98717 (see above for sample IDs) failed to meet RER acceptance criteria for Ac-228, Co-60, Fe-59, and Ra-228. The gamma spec. replicate sample in batch 98718 (see above for sample IDs) failed to meet RER acceptance criteria for Zr-95. These sample results were J qualified. See attached Sample Findings Summary.

Other QC

No field QC samples were submitted with this AR/COC.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.



Sample Findings Summary

Site: LCTA-9

ER/COC: 600793

Data Classification: Radiometric

Sample/ Fraction No.	Analysis	DV Qualifiers	Comments
	<i>See Attached Table</i>		

Sample No./Fraction No. - This value is located on the Chain of Custody in the ER Sample Id field.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470/1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HE, PCBRISC

Reviewed by: [Signature] Date: 5/24/99

COC: 600793	Th-228	Th-230	Th-232	U-238	U-234	U-235/236	Ac-228	Co-60	Fe-59	Ra-228	Zr-95								
Sample Number																			
CCTA-09-VCM-PILE1-N		JB				J	J	J	J	J									
CCTA-09-VCM-PILE1-S		JB				J	J	J	J	J									
CCTA-09-VCM-PILE2-N		JB				J	J	J	J	J									
CCTA-09-VCM-PILE2-S	J	JB	J			J	J	J	J	J									
CCTA-09-VCM-PILE3-N		JB				J	J	J	J	J									
CCTA-09-VCM-PILE3-S		JB				J	J	J	J	J									
CCTA-09-VCM-PILE4-N		JB				J	J	J	J	J									
CCTA-09-VCM-PILE4-S		JB		J	J	J	J	J	J	J									
CCTA-09-VCM-PILE5-N		JB				J	J	J	J	J									
CCTA-09-VCM-PILE5-S		JB				J	J	J	J	J									
CCTA-09-VCM-PILE6-N	J	JB	J			J	J	J	J	J									
CCTA-09-VCM-PILE6-S		JB				J	J	J	J	J									
CCTA-09-VCM-PILE7-N		JB				J	J	J	J	J									
CCTA-09-VCM-PILE7-S						J	J	J	J	J									
CCTA-09-VCM-PILE8-N		JB				J	J	J	J	J									
CCTA-09-VCM-PILE8-S		JB				J	J	J	J	J									
CCTA-09-VCM-PILE9-N	J	JB	J			J	J	J	J	J									
CCTA-09-VCM-PILE9-S		JB				J	J	J	J	J									
CCTA-09-VCM-PILE10-N		JB				J	J	J	J	J									
CCTA-09-VCM-PILE10-S	J	J	J			J	J	J	J	J									
CCTA-09-VCM-PILE11-N		JB			J						J								
CCTA-09-VCM-PILE11-S		JB			J						J								
CCTA-09-VCM-PILE12-N		JB			J						J								
CCTA-09-VCM-PILE12-S	J	JB	J		J						J								
CCTA-09-VCM-PILE13-N		JB		JB	J						J								
CCTA-09-VCM-PILE13-S					J						J								
CCTA-09-VCM-DRUMS-1		JB			J						J								
CCTA-09-VCM-DRUMS-2		JB		J	J	J					J								

SITE/PROJECT: 9 ARCO# : 600793
 LABORATORY: CORE LABORATORY REPORT #: 982529
 METHODS: H₂, iso U, iso Th, gamma spec.

n/a

QC Element/ Analyte	Method Blks	LCS	MS	Rep RER	Eq. Blks	Field Dup RER	Field Blks	-	Sample ID	Isotope	IS/Trace	Sample	Isotope	IS/Trace			
CRITERIA	U	20%	25%	<1.0	U	<1.0	U	-			50-105			50-105			
H3	✓	✓	-	✓				-	982529-04r	Th-229	49						
U-238	.42	✓	✓	✓				-	-11r	"	43.5						
U-234	✓	✓	✓	1.59 ¹				-	-17r	"	44.8						
U-235/236	✓	-	-	1.1 ²				-	-20c	"	44.2						
Th-232	✓	✓	✓	✓				-	-24	"	48.1						
Th-228	✓	-	-	✓				-	-28	U-232	30.8						
Th-230	.28	-	-	✓				-			RER						
Pu-239/240								-	#985717	Ac-228	1.49						
Gross Alpha								-		Co-60	1.6						
Nonvolatile Beta								-		Fe-59	1.38						
Ra226								-		Ra-228	1.49						
Ra228								-	#985718	Zr-95	1.3						
Gamma Spec								-									
Ni-63								-									
Am-241	-	✓	-					-									
Cs-137	-	✓	-					-									
Co-60	-	✓	-					-									

Parameter	Method	Typical Tracer	Typical Carrier
Iso-U	Alpha spec	U-232	NA
Iso-Pu	Alpha spec	Pu-242	NA
Iso-Th	Alpha spec	Th-229	NA
Am-241	Alpha spec	Am-242	NA
Sr-90	Beta	Y ingrowth	NA
Ni-63	Beta	NA	Ni by ICP
Ra-226	Deamination	NA	NA
Ra-226	Alpha spec	Ba-133 or Ra-225	NA
Ra-228	Gamma spec	Ba-133	NA

Comments:

¹ associated with samples 982529-21, -22, -24, -25, -26, -27, -28
² associated with samples 982529-01 thru -2

Gamma spec LCS contains: Am-241, Cs-137, and Co-60

REVIEWED BY: [Signature]

DATE: 5/24/99

DATA VALIDATION SUMMARY:

SITE/PROJECT: CCTA-9 CASE #: 7215.2201
 ARCO #: 600793
 LABORATORY: Core
 LABORATORY REPORT #: 982529

OF SAMPLES: 28 MATRIX: soil
 LAB SAMPLE IDs: 982529-01 thru -28

ANALYSIS/ QC ELEMENT	VOC	SVOC	PEST/ PCB	HPLC (HE)	ICP/AES	GFAA/ AA	CVAA (Hg)	CN	RAD	OTHER
1. HOLDING TIMES/ PRESERVATION									✓	
2. CALIBRATIONS									✓	
3. METHOD BLANKS									JB	
4. MS/MSD									✓	
5. LABORATORY CONTROL SAMPLES									✓	
6. REPLICATES									J	
7. SURROGATES										
8. INTERNAL STDS										
9. TCL COMPOUND IDENTIFICATION										
10. ICP INTERFERENCE CHECK SAMPLE										
11. ICP SERIAL DILUTION										
12. CARRIER/CHEM TRACER RECOVERIES									J	
13. OTHER QC										

CHECK MARK (✓) - ACCEPTABLE
 J - ESTIMATED
 U - NOT DETECTED

SHADED CELLS - NOT APPLICABLE
 UJ - NOT DETECTED, ESTIMATED
 R - UNUSABLE

REVIEWED BY: [Signature]

DATE: 5/24/99

Contract Verification Review (CVR)

Project Leader AAS

Project Name SITE 9 CCTA RAD VCM

Case No. 7215.2201

AR/COC No. 600793

Analytical Lab CORE

SDG No. 982529

In the tables below, mark any information that is missing or incorrect and give an explanation.

1.0 Analysis Request and Chain of Custody Record and Log-In Information

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
1.1	All items on COC complete - data entry clerk initialed and dated	X				
1.2	Container type(s) correct for analyses requested	X				
1.3	Sample volume adequate for # and types of analyses requested	X				
1.4	Preservative correct for analyses requested	X				
1.5	Custody records continuous and complete	X				
1.6	Lab sample number(s) provided	X				
1.7	Date samples received	X				
1.8	Condition upon receipt information provided	X				

2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
2.1	Data reviewed, signature	X				
2.2	Method reference number(s) complete and correct	X				
2.3	QC analysis and acceptance limits provided (MB, LCS, LCD)	X				
2.4	Matrix spike/matrix spike duplicate data provided(if requested)	NA				
2.5	Detection Limits provided; PQL and MDL(or IDL)	X				
2.6	QC batch numbers provided	X				
2.7	Dilution Factors provided	X				
2.8	Data reported using correct sig. fig. (2 for org.; 3 for inorg.)	X				
2.9	Rad analysis uncertainty provided (2 sigma error)	X				
2.10	Narrative provided	X				
2.11	TAT met	X				
2.12	Hold times met	X				
2.13	Were contractual qualifiers provided	X				
2.14	All requested result data provided		X	TRITIUM NOT REPORTED FOR 20 SAMPLES—SEE NARRATIVE	X	

3.0 Data Quality Evaluation

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1) Reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg). Units consistent between QC samples and sample data.	X		
3.2) Quantitation limit met for all samples?	X		
3.3) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	X		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	NA		
c) If requested, matrix spike recovery data reported and met.	NA		
3.4) Precision a) Laboratory control sample precision reported and met for all samples? For rad analysis, sample duplicate precision reported and met.		X	NO LCD—MS/MSD REPORTED
b) If requested, matrix spike duplicate RPD data reported and met.	NA		
3.5) Blank data a) Method or reagent blank data reported and met for all samples?	X		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	NA		
3.6) Contractual qualifiers provided: "J"- estimated quantity; "B"-analyte found in method blank; "U"- analyte undetected (results are below the MDL or L _c (rad)); "H"-analysis done beyond the holding time.	X		
3.7) Narrative included, correct, and complete?	X		

ANALYSIS REQUEST AND CHAIN OF CUSTODY

SF 2001 COC (5-97)

Internal Lab

Batch No. _____

SAR/WR No. _____

(Call 284-5514 for ARCOC and Sample Numbers.)

AR/COC-

600793

Dept. No./Mail Stop: 6234/1148
 Project/Task Manager: PAULSEN
 Project Name: CCTA-09-RAD VCM
 Record Center Code: ER/1334/09/DAT
 Logbook Ref No: 0151
 Service Order No.: CF0514

Date Samples Shipped: 9-8-98
 Carrier/Waybill No.: 707734
 Lab Contact: TIM KELLOGG
 Lab Destination: COLE CASPER
 SMO Contact/Phone: TRIG SAMI (505) 844-3410
 Send Report to SMO: WENDY PALENCIA

Contract No: AJ-2480C
 Case No: 715,21010
 SMO Authorization: [Signature]
 Bill to: Sandia National Laboratories
 Supplier Services
 Department
 P.O. Box 5803 MS 0154

Parameter & Method Requested

Location		Tech Area	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)					Sample Type	Lat Samp ID
						Building	Room	Sample Matrix	Type	Volume		
N/A		<u>3K 5178 7</u>										
Sample No. - Fraction		ER Sample ID or Sample Location Detail										
042430	-003	<u>CCTA-09-VCM - FILE1-N</u>	<u>N/A</u>	<u>9</u>	<u>0935 9-2-98</u>	<u>S</u>	<u>G</u>	<u>16</u>	<u>NONE</u>	<u>G</u>	<u>SA</u>	<u>1</u>
		<u>FILE1-S</u>			<u>0940</u>							
		<u>FILE2-N</u>			<u>0945</u>							
		<u>FILE2-S</u>			<u>0952</u>							
		<u>FILE3-N</u>			<u>1000</u>							<u>5</u>
		<u>FILE3-S</u>			<u>1005</u>							<u>6</u>
		<u>FILE4-N</u>			<u>1012</u>							<u>7</u>
		<u>FILE4-S</u>			<u>1017</u>							<u>8</u>
		<u>FILE5-N</u>			<u>1025</u>							<u>9</u>
		<u>FILE5-S</u>			<u>1030</u>							<u>10</u>

GAMMA SPEC
 ISO URANIUM
 ISO THORIUM
 TITANIUM

RMMA Yes No Ref. No. _____

Sample Tracking: Date Entered (mm/dd/yy) 9/10/98

Special Instructions/QC Requirements

Abnormal Conditions on Receipt

Sample Disposal Return to Client Disposal by lab

Date Entered (mm/dd/yy) 9/10/98
 Entered by: [Signature]

EDD Yes No
 Raw data package Yes No

LAB USE

Turnaround Time Normal Rush Required Report Date 15 DAY TAT

QC Inits: [Signature]

Release by COC 600795

LAB USE

Sample Team Members	Name	Signature	Init	Company/Organization/Phone
	<u>Joe Paulsen</u>	<u>[Signature]</u>	<u>JP</u>	<u>6004/1034 284-2475</u>

Please list as separate report.

LAB USE

1. Relinquished by <u>[Signature]</u> Org. <u>6134</u> Date <u>9/3/98</u> Time <u>1000</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>7577</u> Date <u>9/3/98</u> Time <u>1000</u>	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>[Signature]</u> Org. <u>7577</u> Date <u>9/8/98</u> Time <u>1230</u>	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____

ANALYSIS REQUEST AND CHAIN OF CUSTODY CONTINUATION FORM

AR/COC- 600793

Project Name: COTA-09-RAD UCM Project/Task Manager: PAULETICA Case No.: 725.220100

Location		Tech Area	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)					Parameter & Method Requested				L1 San II	
						Building	Room	Sample Matrix	Container		Preservative	Sample Collection Method	Sample Type	Gamma SPEC		Iso Uranium
Sample No. - Fraction			ER Sample ID or Sample Location Detail			Type	Volume									
0	042440-003	OR SITE 9	P/A	9	1040 9-296	S	G	16	NONE	G	SA	X	X	X	X	11
0	441-73				1045							X	X	X	X	12
0	442-33				1050							X	X	X	X	13
0	443-33				1055							X	X	X	X	14
0	444-33				1100							X	X	X	X	15
0	445-33				1105							X	X	X	X	16
0	446-33				1110							X	X	X	X	17
0	447-33				1115							X	X	X	X	18
0	448-33				1125							X	X	X	X	19
0	449-33				1130							X	X	X	X	20
0	450-33				1140							X	X	X	X	21
0	451-33				1145							X	X	X	X	22
0	452-33				1155							X	X	X	X	23
0	453-33				1200							X	X	X	X	24
0	454-33				1205							X	X	X	X	25
0	455-33				1210							X	X	X	X	26
0	456-003				1510							X	X	X	X	27
0	457-003				1445							X	X	X	X	28

Abnormal Conditions on Receipt: _____ LAB USE

Recipient Initials: _____

MEMORANDUM

DATE: June 21, 1999
TO: File
FROM: Kenneth Salaz ~~KAS~~
SUBJECT: Inorganic Data Review and Validation
CCTA-09-RAD VCM, ARCO #601666, Case No. 7215.2207

See the attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and specified methods (EPA6010B, EPA7471, EPA6020). Problems were identified with the data package that result in the qualification of data.

1. In the ICB, antimony (Sb) was detected. Results for samples 9903655-01, -07, -11, and -13 were positive, <5X the blank concentration, and will be qualified "J,B3."
2. The MS/MSD percent recoveries (%RECs) of Sb were <30%. Results for samples 9903655-01, -07, -11, and -13 were positive and will be qualified "J,A2." Results for samples -03, -05, -09, -15, -17, -19, -21, -23, -25, -27, -29, -31, -33, -35, -37, and -39 were ND and will be qualified "R,A2" (unusable). Copper (Cu) and zinc (Zn) had MSD %RECs and relative percent differences (RPDs) that exceeded QC limits. All sample results were positive and will be qualified "J,P1."

Data are acceptable, except as noted above in the summary section. QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

All samples were extracted and analyzed within the prescribed holding times.

Calibration

The initial and continuing calibrations met QC acceptance criteria.

Blanks

No target analytes were detected in the method blank, ICB, or CCB above the required acceptance limit except as noted above in the summary section and the following. Na was detected in the ICB, and Ba, Ca, and K were detected in the CCB. However, the absolute values of the blank concentrations were < the DLs. Thus, no data were qualified. Co, Cu, Fe, Mg, and Na were detected in the CCB. Mg, V, and Zn were detected in the method blank. All associated sample results were > 5X the blank concentration; no data were qualified.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

The MS/MSD met QC acceptance criteria except as noted above in the summary section and the following. Ba had an RPD that exceeded QC limits. However, both the MS and MSD passed. Thus, no data were qualified.

Laboratory Control Samples

The LCS/LCSD met QC acceptance criteria.

Replicates

No replicate analysis was performed. The MS/MSD and LCS/LCSD were used to measure laboratory precision.

ICP Interference Check Sample (ICS)

The ICP ICS met QC acceptance criteria.

ICP Serial Dilution

The ICP serial dilution met QC acceptance criteria.

Other QC

No field duplicate, equipment blank (EB), or field blank (FB) were submitted on the ARCOG.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

Site: CCTA-09-RAD VCM

AR/COC: 601666

Data Classification: Inorganics (EPA 6010B
↓
7471
6020)

Sample Fraction No.	Analysis	DV Qualifiers	Comments
	⇒ Note: See attached spreadsheet for data qualifications.		
	Data are acceptable (except as noted on spreadsheet).		
	QC Measures appear to be adequate.		

Sample No./Fraction No. - This value is located on the Chain of Custody in the ER Sample Id field.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470/1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HE, PCBRISC

Reviewed by: [Signature] Date: 6/21/99

Sample Number	7440-50-8 (Cu)	7440-36-0 (Sb)	7440-66-6 (Zn)																	
045146-003 CCTA-09-VCM-PILE1-N	J,P1	J,A2,B3	J,P1																	
045147-003 CCTA-09-VCM-PILE1-S	J,P1	R,A2	J,P1																	
045148-003 CCTA-09-VCM-PILE2-N	J,P1	R,A2	J,P1																	
045149-003 CCTA-09-VCM-PILE2-S	J,P1	J,A2,B3	J,P1																	
045150-003 CCTA-09-VCM-PILE3-N	J,P1	R,A2	J,P1																	
045151-003 CCTA-09-VCM-PILE3-S	J,P1	J,A2,B3	J,P1																	
045152-003 CCTA-09-VCM-PILE4-N	J,P1	J,A2,B3	J,P1																	
045153-003 CCTA-09-VCM-PILE4-S	J,P1	R,A2	J,P1																	
045154-003 CCTA-09-VCM-PILE5-N	J,P1	R,A2	J,P1																	
045155-003 CCTA-09-VCM-PILE5-S	J,P1	R,A2	J,P1																	
045156-003 CCTA-09-VCM-PILE6-N	J,P1	R,A2	J,P1																	
045157-003 CCTA-09-VCM-PILE6-S	J,P1	R,A2	J,P1																	
045158-003 CCTA-09-VCM-PILE7-N	J,P1	R,A2	J,P1																	
045159-003 CCTA-09-VCM-PILE7-S	J,P1	R,A2	J,P1																	
045160-003 CCTA-09-VCM-PILE8-N	J,P1	R,A2	J,P1																	
045161-003 CCTA-09-VCM-PILE8-S	J,P1	R,A2	J,P1																	
045162-003 CCTA-09-VCM-PILE9-N	J,P1	R,A2	J,P1																	
045163-003 CCTA-09-VCM-PILE9-S	J,P1	R,A2	J,P1																	
045164-003 CCTA-09-VCM-PILE10-N	J,P1	R,A2	J,P1																	
045165-003 CCTA-09-VCM-PILE10-S	J,P1	R,A2	J,P1																	
ARCOC #601666																				
Inorganic Analyses																				
(TAL Metals, Total U)																				

[Handwritten signature] 8/21/06

of Samples: 20
 Matrix: Soil

Sample IDs: 9903655-01, -03, -05, -07, -09, -11, -13, -15,
 -17, -19, -21, -23, -25, -27, -29, -31,
 -33, -35, -37, -39

INORGANIC METALS:

SITE/PROJECT: CLTA-09-RPD VCM ARCO# : 601666
 LABORATORY: GEL LABORATORY REPORT #: 9903655
 METHODS: EPA 6010, EPA 7471, EPA 6020

QC Element/ Analyte	ICV	CCV	ICB	CCB	Method Blks	LCS	LCSD	LCSD RPD	MS	MSD	MSD RPD	REP RPD	ICS AB	Serial Dilution	Field Dup RPD	Eq. Blks	Field Blks	CCB	CCB	CCB
7429-90-5 Al	✓	✓	✓	✓	✓	✓	✓	✓	NA	NA	NA	NA	✓	✓	NA	NA	NA	✓	✓	✓
7440-39-3 Ba	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	33.7	✓	✓	✓	✓	✓	✓	✓	0.5	0.2
7440-41-7 Be	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓
7440-43-9 Cd	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓
7440-70-2 Ca	✓	✓	✓	8.7	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7440-47-3 Cr	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓
7440-48-4 Co	✓	✓	✓	0.4	✓	✓	✓	✓	✓	✓	130	39.7	✓	NA	✓	✓	✓	✓	0.5	0.4
7440-50-8 Cu	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	0.8
7439-89-6 Fe	✓	✓	✓	5.9	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓	✓	7.8	9.8
7439-95-4 Mg	✓	✓	✓	7.1	.6613	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7439-96-5 Mn	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7440-02-0 Ni	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7440-09-7 K	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7440-22-4 Ag	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	13.2
7440-23-5 Na	✓	✓	-3.4	-34.7	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	-31.1	-36.6
7440-62-2 V	✓	✓	✓	✓	.05413	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓
7440-66-6 Zn	✓	✓	✓	✓	2.1	✓	✓	✓	✓	✓	577	151	✓	✓	✓	✓	✓	✓	✓	✓
7439-92-1 Pb	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓
7782-49-2 Se	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓
7440-38-2 As	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓
7440-36-0 Sb	✓	✓	3.3	✓	✓	✓	✓	✓	19.2	14.8	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓
7440-28-0 Tl	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓
7439-97-6 Hg	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓
Cyanide CN																				
Uranium (U)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓	✓	✓

mg/kg = ug/g: [(ug/g) x (sample mass (g) / sample vol. (ml)) x (1000ml / liter)] / Dilution Factor = ug/l

NA = Not Applicable

Comments:

- ① Spike % RLC limits do not apply when sample conc. exceeds spike conc. by 4X or more.
- ② No replicate analysis performed. LCS/LCSD and MS/MSD used to measure precision.
- ③ Serial dilution criteria only apply when sample results are > 50X the RL.
- ④ No field dup., Eq. blank, or field blank submitted on the COC.
- ⑤ CCB applies to samples -01, -03, -05, -07, -09, -11, -13, only
- ⑥ " " " " -15, -17, -19, -21, -23, 25, and -27 only.
- ⑦ " " " " -29, -31, and -33 only.
- ⑧ " " " " -35, -37, and -39 only.

* Summary → See back of this page -

REVIEWED BY: [Signature] DATE: 6/21/99

MEMORANDUM

DATE: June 21, 1999

TO: File

FROM: Kenneth Salaz ~~KAS~~

SUBJECT: Organic Data Review and Validation
CCTA-09-RAD VCM, ARCO #601666, Case No. 7215.2207

See the attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and specified methods (EPA8260A, EPA8270B). Problems were identified with the data package that result in the qualification of data.

1. VOC Analysis: The initial calibration response factor (RF) of trichloroethene was < the minimum. Results for samples 9903655-02, -04, -06, -08, -10, -12, -14, -16, -18, -20, -22, -24, -26, -28, -30, -32, -34, -36, -38, and -40 were non-detect (ND) and will be qualified "UJ."

SVOC Analysis: The initial calibration relative standard deviation (RSD) of 2,4-dinitrophenol was >40%. Results for samples 9903655-01, -03, -05, -07, -09, -11, -13, -15, -17, -19, -21, -23, -25, -27, -29, -31, -33, -35, -37, and -39 were ND and will be qualified "UJ."

2. VOC Analysis: In the method blank for sample 9903655-14, methylene chloride was detected. The result was positive, < 10X the blank concentration, < the RL, and will be qualified "5U." Chloroform was detected in all method blanks. The results for samples -02, -12, -14, -16, -18, -20, -36, and -38 were positive, < 5X the blank concentration, < the RL, and will be qualified "1U."

Data are acceptable. QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

VOC/SVOC Analyses: All samples were analyzed within the prescribed holding times.

Calibration

VOC Analysis: The initial and continuing calibrations met QC acceptance criteria except as noted above in the summary section and the following. The CCV percent differences (%Ds) of chloromethane and vinyl acetate were outside of QC limits. All associated sample results were ND; no data were qualified.

SVOC Analysis: The initial and continuing calibrations met QC acceptance criteria except as noted above in the summary section and the following. The initial calibration RSDs of pentachlorophenol and benzoic acid, as well as the CCV %Ds of 4-nitroaniline, 1,3-dichlorobenzene, 1,2-dichlorobenzene, hexachloroethane, 1,2,4-trichlorobenzene, hexachlorocyclopentadiene, 3-nitroaniline, 2-chloronaphthalene, 2,4-dinitrophenol, 3,3'-dichlorobenzidine, and 4-bromophenyl-phenylether, were > 20%. All associated sample results were ND; no data were qualified.

Blanks

VOC Analysis: No target analytes were detected in the method blanks except as noted above in the summary section and xylenes. All associated sample results were ND. Thus, no data were qualified.

SVOC Analysis: No target analytes were detected in the method blanks.

Surrogates

VOC/SVOC Analyses: The surrogate %RECs met QC acceptance criteria.

Internal Standards

VOC/SVOC Analyses: The internal standard retention times and areas met QC acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

VOC/SVOC Analyses: The MS/MSD met QC acceptance criteria.

Laboratory Control Samples

VOC/SVOC Analyses: The LCS/LCSD met QC acceptance criteria.

Other QC

VOC/SVOC Analyses: No field duplicates, trip blanks (TB), field blanks (FB), or equipment blanks (EB) were submitted on the ARCOG.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

SAMPLE FINDINGS SUMMARY

Site: CCTA-09-RAD VCM

AR/COC: 601666

Data Classification: Organics (EPA 8260A ↓ 8270B)

Sample Fraction No.	Analysis	DV Qualifiers	Comments
	⇒ Note: See attached spreadsheet for data qualifications.		
			FILE
	Data are acceptable.		
	QC Measures appear to be adequate.		

Sample No./Fraction No. - This value is located on the Chain of Custody in the ER Sample Id field.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470-1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HE, PCBRISC

Reviewed by: [Signature] Date: 6/21/99

List of Data Qualifiers used in Data Validation and Associated Comment Responses

Qualifier	Comment
A	Laboratory accuracy and/or bias measurements for the associated Laboratory Control Sample (LCS) do not meet acceptance criteria.
A1	Laboratory accuracy and/or bias measurements for the associated Surrogate Spike do not meet acceptance criteria.
A2	Laboratory accuracy and/or bias measurements for the associated Matrix Spike (MS) do not meet acceptance criteria.
B	Analyte present in laboratory method blank
B1	Analyte present in trip blank.
B2	Analyte present in equipment blank.
B3	Analyte present in continuing calibration blank.
J	The associated value is an estimated quantity. (Note: this qualifier may be used in conjunction with other qualifiers (i.e., A,J)
J1	The method requirements for sample preservation/temperature were not met for the sample analysis. The associated value is an estimated quantity.
J2	The holding time was exceeded for the associated sample analysis. The associated value is an estimated quantity.
P	Laboratory precision measurements for the Laboratory Control Sample and duplicate (LCS/LCSD) do not meet acceptance criteria.
P1	Laboratory precision measurements for the Matrix Spike Sample and associated duplicate (MS/MSD) do not meet acceptance criteria.
Q	Quantitation limit reported does not meet Data Quality Objective (DQO) requirements.
R	The data are unusable for their intended purpose (Note: Analyte may or may not be present.)
U	The analyte is a common laboratory contaminant. The associated result is less than ten times the concentration in any blank.
U1	The analyte was also detected in a method or reagent blank. The associated result is less than five times the concentration in any blank.
UJ	The analyte was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

* This is not a definitive list. Other qualifiers are potentially available, see TOP 94-03. Notify Tina Sanchez to revise list.

Sample Number	79-01-6 (trichloroethene)	75-09-2 (methylene chloride)	67-66-3 (chloroform)				
045146-004 CCTA-09-VCM-PILE1-N	UJ		1U				
045147-004 CCTA-09-VCM-PILE1-S	UJ						
045148-004 CCTA-09-VCM-PILE2-N	UJ						
045149-004 CCTA-09-VCM-PILE2-S	UJ						
045150-004 CCTA-09-VCM-PILE3-N	UJ						
045151-004 CCTA-09-VCM-PILE3-S	UJ		1U				
045152-004 CCTA-09-VCM-PILE4-N	UJ	5U	1U				
045153-004 CCTA-09-VCM-PILE4-S	UJ		1U				
045154-004 CCTA-09-VCM-PILE5-N	UJ		1U				
045155-004 CCTA-09-VCM-PILE5-S	UJ		1U				
045156-004 CCTA-09-VCM-PILE6-N	UJ						
045157-004 CCTA-09-VCM-PILE6-S	UJ						
045158-004 CCTA-09-VCM-PILE7-N	UJ						
045159-004 CCTA-09-VCM-PILE7-S	UJ						
045160-004 CCTA-09-VCM-PILE8-N	UJ						
045161-004 CCTA-09-VCM-PILE8-S	UJ						
045162-004 CCTA-09-VCM-PILE9-N	UJ						
045163-004 CCTA-09-VCM-PILE9-S	UJ		1U				
045164-004 CCTA-09-VCM-PILE10-N	UJ		1U				
045165-004 CCTA-09-VCM-PILE10-S	UJ						
ARCOC #601666							
Organic Analyses							
(VOCs)							

Sample Number	51-28-5 (2,4-dinitrophenol)						
045146-003 CCTA-09-VCM-PILE1-N	UJ						
045147-003 CCTA-09-VCM-PILE1-S	UJ						
045148-003 CCTA-09-VCM-PILE2-N	UJ						
045149-003 CCTA-09-VCM-PILE2-S	UJ						
045150-003 CCTA-09-VCM-PILE3-N	UJ						
045151-003 CCTA-09-VCM-PILE3-S	UJ						
045152-003 CCTA-09-VCM-PILE4-N	UJ						
045153-003 CCTA-09-VCM-PILE4-S	UJ						
045154-003 CCTA-09-VCM-PILE5-N	UJ						
045155-003 CCTA-09-VCM-PILE5-S	UJ						
045156-003 CCTA-09-VCM-PILE6-N	UJ						
045157-003 CCTA-09-VCM-PILE6-S	UJ						
045158-003 CCTA-09-VCM-PILE7-N	UJ						
045159-003 CCTA-09-VCM-PILE7-S	UJ						
045160-003 CCTA-09-VCM-PILE8-N	UJ						
045161-003 CCTA-09-VCM-PILE8-S	UJ						
045162-003 CCTA-09-VCM-PILE9-N	UJ						
045163-003 CCTA-09-VCM-PILE9-S	UJ						
045164-003 CCTA-09-VCM-PILE10-N	UJ						
045165-003 CCTA-09-VCM-PILE10-S	UJ						
ARCOC #601666							
Organic Analyses							
(SVOCS)							

Matrix: soil

Sample IDs: 7703655-02, 7703655-03, 7703655-04, 7703655-05, 7703655-06, 7703655-07, 7703655-08, 7703655-09, 7703655-10, 7703655-11, 7703655-12, 7703655-13, 7703655-14, 7703655-15, 7703655-16, 7703655-17, 7703655-18, 7703655-19, 7703655-20, 7703655-21, 7703655-22, 7703655-23, 7703655-24, 7703655-25, 7703655-26, 7703655-27, 7703655-28, 7703655-29, 7703655-30

SITE/PROJECT: CCTA-09-RAD VCM ARCO# : 601666
 LABORATORY: GEL LABORATORY REPORT #: 9903655

MS
 6/11/97
 ①
 ②

IS	GC/MS Name	CAS #	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Trip Blks	TAL	CCV %D	Method Blk	LCS
					>.05	<20% / 0.99	20%												20%		
1	Chloromethane	74-87-3	0.10	NA	✓	✓	✓	✓							NA	NA	NA	✓	22.8	✓	
1	Bromomethane	74-83-9	0.10	✓	✓	✓	✓												✓		
1	vinyl chloride	75-01-4	0.10	NA	✓	✓	✓												✓		
1	Chloroethane	75-00-3	0.01	✓	✓	✓	✓												✓		
1	methylene chloride (10xbk)	75-09-2	0.01	✓	✓	✓	✓												✓	1.5 J	
1	acetone(10xbk)	67-64-1	0.01	✓	✓	✓	✓												✓		
1	carbon disulfide	75-15-0	0.10	NA	✓	✓	✓												✓		
1	1,1-dichloroethene	75-35-4	0.20	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
1	1,1-dichloroethane	75-34-3	0.10	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
1	Chloroform	67-66-3	0.20	✓	✓	✓	✓	0.98											✓	0.75 J	
1	1,2-dichloroethane	107-06-2	0.10	✓	✓	✓	✓												✓		
1	2-butanone(10xbk)	78-93-3	0.01	✓	✓	✓	✓												✓		
2	1,1,1-trichloroethane	71-55-6	0.10	✓	✓	✓	✓												✓		
2	carbon tetrachloride	56-23-5	0.10	✓	✓	✓	✓												✓		
2	Bromodichloromethane	75-27-4	0.20	✓	✓	✓	✓												✓		
2	1,2-dichloropropane	78-87-5	0.01	✓	✓	✓	✓												✓		
2	cis-1,3-dichloropropene	10061-01-5	0.20	✓	✓	✓	✓												✓		
2	Trichloroethene	79-01-6	0.30	✓	2685	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
2	Dibromochloromethane	124-48-1	0.10	✓	✓	✓	✓												✓		
2	1,1,2-trichloroethane	79-00-5	0.10	✓	✓	✓	✓												✓		
2	Benzene	71-43-2	0.50	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
2	trans-1,3-dichloropropene	10061-02-6	0.10	✓	✓	✓	✓												✓		
2	Bromoform	75-25-2	0.10	✓	✓	✓	✓												✓		
3	4-methyl-2-pentanone	108-10-1	0.10	✓	✓	✓	✓												✓		
3	2-hexanone	591-78-6	0.01	✓	✓	✓	✓												✓		
3	Tetrachloroethene	127-18-4	0.20	✓	✓	✓	✓												✓		
3	1,1,2,2-tetrachloroethane	79-34-5	0.30	✓	✓	✓	✓												✓		
3	toluene(10xbk)	108-88-3	0.40	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
3	Chlorobenzene	108-90-7	0.50	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
3	Ethylbenzene	100-41-4	0.10	✓	✓	✓	✓												✓		
3	Styrene	100-42-5	0.30	✓	✓	✓	✓												✓		
3	xylenes(total)	1330-20-7	0.30	✓	✓	✓	✓	0.88 J											✓	1.0 J	
3	1,2-dichloroethane(total)	540-59-0	0.01	NA	✓	✓	✓	✓											✓		
	2-chloroethyl vinyl ether	110-75-8		✓	NA	NA	NA	NA										X	NA	NA	
	Vinyl Acetate	108-05-4		✓	✓	✓	-37.3	✓							✓	✓	✓	27.3	-26.3	✓	

Comments: ① CCV %D applies to samples -02, -04, -06, -08, -10, -12, -14, -16, -18, -20, -22, -24, -26, -28, and -30 only, and method blank / LCS. NA = Not Applicable
 ② LCS/LCSD and CCV(%D)/method blank apply to sample -14 only.
 ③ No field dup., Eq. blank, or trip blank submitted on the COC.

REVIEWED BY: [Signature] DATE: 6/21/97

of Samples: 4

Sample IDs: 9903655-32, -34, -36, -58, -40

Matrix: Soil

VOLATILE ORGANICS: Page 1 of 2

SW-846 - Method 8260

SITE/PROJECT: CCTA-09-RAD VCM ARCO# : 601666

LABORATORY: GEL LABORATORY REPORT #: 9903655

IS	GC/MS Name	CAS #	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	①			②							
									LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Trip Blks	TAL	
					>.05	<20% / 0.99	20%												
1	Chloromethane	74-87-3	0.10	NA	✓	✓	25.5	✓								NA	NA	NA	✓
1	Bromomethane	74-83-9	0.10	✓			✓												
1	vinyl chloride	75-01-4	0.10	NA			✓												
1	Chloroethane	75-00-3	0.01	✓			✓												
1	methylene chloride (10xblk)	75-09-2	0.01	✓			✓												
1	acetone(10xblk)	67-64-1	0.01	✓			✓												
1	carbon disulfide	75-15-0	0.10	NA			✓												
1	1,1-dichloroethene	75-35-4	0.20				✓												
1	1,1-dichloroethane	75-34-3	0.10				✓												
1	Chloroform	67-66-3	0.20				✓												
1	1,2-dichloroethane	107-06-2	0.10				✓												
1	2-butanone(10xblk)	78-93-3	0.01				✓												
2	1,1,1-trichloroethane	71-55-6	0.10				✓												
2	carbon tetrachloride	56-23-5	0.10				✓												
2	Bromodichloromethane	75-27-4	0.20				✓												
2	1,2-dichloropropane	78-87-5	0.01				✓												
2	cis-1,3-dichloropropene	10061-01-5	0.20				✓												
2	Trichloroethene	79-01-6	0.30		0.2685		✓		✓	NA	NA	✓	✓	✓					
2	Dibromochloromethane	124-48-1	0.10		✓		✓												
2	1,1,2-trichloroethane	79-00-5	0.10				✓												
2	Benzene	71-43-2	0.50				✓		✓	NA	NA	✓	✓	✓					
2	trans-1,3-dichloropropene	10061-02-6	0.10				✓												
2	Bromoform	75-25-2	0.10				✓												
3	4-methyl-2-pentanone	108-10-1	0.10				✓												
3	2-hexanone	591-78-6	0.01				✓												
3	Tetrachloroethene	127-18-4	0.20				✓												
3	1,1,2,2-tetrachloroethane	79-34-5	0.30				✓												
3	toluene(10xblk)	108-88-3	0.40				✓		✓	NA	NA	✓	✓	✓					
3	Chlorobenzene	108-90-7	0.50				✓		✓	NA	NA	✓	✓	✓					
3	Ethylbenzene	100-41-4	0.10				✓												
3	Styrene	100-42-5	0.30	✓			✓												
3	xylenes(total)	1330-20-7	0.30	✓			✓	0.887											
	1,2-dichloroethylene(total)	540-59-0	0.01	NA	✓	✓	✓	NA											
	2-chloroethyl vinyl ether	110-75-8		✓	NA	NA	NA	NA											X
	Vinyl Acetate	108-05-4		✓	✓	✓	✓	✓							✓				

Comments: ① No LCSD analyzed for these samples.
 ② No field dup., Eq. blank, or Trip blank submitted on the COC.

NA = Not Applicable

SITE/PROJECT: CCTA-09-RAD WCM ARCO# : 601666
 LABORATORY: GEL LABORATORY REPORT #: 9903655

Surrogate Recovery and Internal Standard Outliers

Sample	SMC 1	SMC 2	SMC 3	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3-area	IS 3-RT			
All Passed												

SMC 1: 4-Bromofluorobenzene
 SMC 2: 1,2-Dichloroethane-d4
 SMC 3: Toluene-d8
 Dibromofluoromethane

IS 1: Bromochloromethane Fluorobenzene
 IS 2: 1,4-Difluorobenzene - d4
 IS 3: Chlorobenzene-d5

Comments:

* Summary

Calibration:
 => trichloroethene had an initial calib. RF < the minimum. All sample results were ND and will be qualified "UJ."
 => chloromethane and vinyl acetate had CCV %0s outside of QC limits. All results were ND; no data were qualified.

Method Blank:

=> methylene chloride was detected in the method blank for Sample - 14. The result was positive, <10x the blank conc., < the RL, and will be qualified "SU."
 => chloroform was detected in all method blanks. Results for samples - 02, -12, -14, -16, -18, -20, -36, and -38 were positive, < the blank conc., < the RL, and will be qualified "IU."
 => xylenes were detected in all the method blanks. All sample results were ND; no data were qualified.

VOLATILE ORGANICS: Page 1 of 2
SW-846 - Method 8260

at 2 mples: 15
Matrix: soil

Sample IDs: 9903655 - 02, -04, -06, -08, -10, -12, -14, -16, -18, -20, -22, -24, -26, -28, -30

SITE/PROJECT: CCTA-09-RAD VCM ARCO# : 601666
LABORATORY: GEL LABORATORY REPORT #: 9903655

MS
6/11/99
①
②

IS	GC/MS	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Trip Blks	TAL	CCV %D	Method Blk	LCS	
	Name	CAS #		>.05	<20% / 0.99	20%															
1	Chloromethane	74-87-3	0.10	NA	✓	✓	✓							NA	NA	NA	✓	20%	22.8	✓	
1	Bromomethane	74-83-9	0.10	✓	✓	✓	✓											✓			
1	vinyl chloride	75-01-4	0.10	NA	✓	✓	✓											✓			
1	Chloroethane	75-00-3	0.01	✓	✓	✓	✓											✓			
1	methylene chloride (10xbk)	75-09-2	0.01	✓	✓	✓	✓											✓	1.5 J		
1	acetone(10xbk)	67-64-1	0.01	✓	✓	✓	✓											✓			
1	carbon disulfide	75-15-0	0.10	NA	✓	✓	✓											✓			
1	1,1-dichloroethene	75-35-4	0.20	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
1	1,1-dichloroethane	75-34-3	0.10	✓	✓	✓	✓											✓			
1	Chloroform	67-66-3	0.20	✓	✓	✓	0.98 J											✓	0.75 J		
1	1,2-dichloroethane	107-06-2	0.10	✓	✓	✓	✓											✓			
1	2-butanone(10xbk)	78-93-3	0.01	✓	✓	✓	✓											✓			
2	1,1,1-trichloroethane	71-55-6	0.10		✓	✓	✓											✓			
2	carbon tetrachloride	56-23-5	0.10		✓	✓	✓											✓			
2	Bromodichloromethane	75-27-4	0.20		✓	✓	✓											✓			
2	1,2-dichloropropane	78-87-5	0.01		✓	✓	✓											✓			
2	cis-1,3-dichloropropene	10061-01-5	0.20		✓	✓	✓											✓			
2	Trichloroethene	79-01-6	0.30		0.685	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
2	Dibromochloromethane	124-48-1	0.10		✓	✓	✓											✓			
2	1,1,2-trichloroethane	79-00-5	0.10		✓	✓	✓											✓			
2	Benzene	71-43-2	0.50		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
2	trans-1,3-dichloropropene	10061-02-6	0.10		✓	✓	✓											✓			
2	Bromoform	75-25-2	0.10		✓	✓	✓											✓			
3	4-methyl-2-pentanone	108-10-1	0.10		✓	✓	✓											✓			
3	2-hexanone	591-78-6	0.01		✓	✓	✓											✓			
3	Tetrachloroethene	127-18-4	0.20		✓	✓	✓											✓			
3	1,1,2,2-tetrachloroethane	79-34-5	0.30		✓	✓	✓											✓			
3	toluene(10xbk)	108-88-3	0.40		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
3	Chlorobenzene	108-90-7	0.50		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
3	Ethylbenzene	100-41-4	0.10		✓	✓	✓											✓			
3	Styrene	100-42-5	0.30		✓	✓	✓											✓			
3	xylenes(total)	1330-20-7	0.30	✓	✓	✓	✓	0.88 J										✓	1.0 J		
3	1,2-dichloroethane(total)	540-59-0	0.01	NA	✓	✓	✓	✓										✓			
	2-chloroethyl vinyl ether	110-75-8		✓	NA	NA	NA	NA										X	NA	NA	
	Vinyl Acetate	108-05-4		✓	✓	-37.3	✓							✓	✓	✓		22.3	-26.3	✓	

Comments: (1) applies to samples -02, -04, -06, -08, -10, -12, -14, -16, -18, -20, -22, -24, -26, -28, and -30 only, and method blank / LCS. NA = Not Applicable
 (2) LCS/LCSD and CCV %D / method blank apply to Sample -14 only.
 (3) No field dup., Eq. blank, or trip blank submitted on the COC.

REVIEWED BY: Ramona Selby DATE: 6/21/99

Matrix: Soil

SITE/PROJECT: CCTA-09-RAD VCM ARCO# : 601666
 LABORATORY: GEL LABORATORY REPORT #: 9903655

IS	GC/MS		Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Trip Blks	TAL		
	Name	CAS #																		
1	Chloromethane	74-87-3	0.10	NA	✓	✓	25.5	✓							NA	NA	NA	✓		
1	Bromomethane	74-83-9	0.10	✓																
1	vinyl chloride	75-01-4	0.10	NA																
1	Chloroethane	75-00-3	0.01	✓																
1	methylene chloride (10xblk)	75-09-2	0.01	✓																
1	acetone(10xblk)	67-64-1	0.01	✓																
1	carbon disulfide	75-15-0	0.10	NA																
1	1,1-dichloroethene	75-35-4	0.20	✓					✓	NA	NA	✓	✓	✓	✓					
1	1,1-dichloroethane	75-34-3	0.10	✓					✓	NA	NA	✓	✓	✓	✓					
1	Chloroform	67-66-3	0.20	✓					✓	NA	NA	✓	✓	✓	✓					
1	1,2-dichloroethane	107-06-2	0.10	✓					✓	NA	NA	✓	✓	✓	✓					
1	2-butanone(10xblk)	78-93-3	0.01	✓					✓	NA	NA	✓	✓	✓	✓					
2	1,1,1-trichloroethane	71-55-6	0.10						✓											
2	carbon tetrachloride	56-23-5	0.10						✓											
2	Bromodichloromethane	75-27-4	0.20						✓											
2	1,2-dichloropropane	78-87-5	0.01						✓											
2	cis-1,3-dichloropropene	10061-01-5	0.20						✓											
2	Trichloroethene	79-01-6	0.30			0.2685			✓	NA	NA	✓	✓	✓	✓					
2	Dibromochloromethane	124-48-1	0.10			✓			✓											
2	1,1,2-trichloroethane	79-00-5	0.10						✓											
2	Benzene	71-43-2	0.50						✓	NA	NA	✓	✓	✓	✓					
2	trans-1,3-dichloropropene	10061-02-6	0.10						✓											
2	Bromoform	75-25-2	0.10						✓											
3	4-methyl-2-pentanone	108-10-1	0.10						✓											
3	2-hexanone	591-78-6	0.01						✓											
3	Tetrachloroethene	127-18-4	0.20						✓											
3	1,1,2,2-tetrachloroethane	79-34-5	0.30						✓											
3	toluene(10xblk)	108-88-3	0.40						✓	NA	NA	✓	✓	✓						
3	Chlorobenzene	108-90-7	0.50						✓	NA	NA	✓	✓	✓						
3	Ethylbenzene	100-41-4	0.10						✓											
3	Styrene	100-42-5	0.30						✓											
3	xylenes(total)	1330-20-7	0.30						✓	0.887										
	1,2-dichloroethylene(total)	540-59-0	0.01	NA					✓											
	2-chloroethyl vinyl ether	110-75-8			NA	NA	NA	NA												
	Vinyl Acetate	108-05-4			✓	✓	✓	✓												

Comments: ① No LCSD analyzed for these samples.
 ② No field dup., Eq. blank, or Trip blank submitted on the COC.

NA = Not Applicable

REVIEWED BY: [Signature] DATE: 6/21/99

SITE/PROJECT: CCTA-09-RAD WCM ARCO# : 601666
 LABORATORY: GEL LABORATORY REPORT #: 9903655

Surrogate Recovery and Internal Standard Outliers

Sample	SMC 1	SMC 2	SMC 3	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3-area	IS 3-RT			
All Passed												

SMC 1: 4-Bromofluorobenzene
 SMC 2: ~~1,2-Dichloroethane-d4~~
 SMC 3: Toluene-d8
 Dibromofluoromethane

IS 1: Bromochloromethane Fluorobenzene
 IS 2: 1,4-Difluorobenzene - d4
 IS 3: Chlorobenzene-d5
 CAS 61114

Comments:

* Summary
Calibration:
 => trichloroethene had an initial calib. RF < the minimum. All sample results were ND and will be qualified "UJ."
 => chloromethane and vinyl acetate had CCV %0, outside of QC limits. All results were ND; no data were qualified.
Method Blank:
 => methylene chloride was detected in the method blank for Sample - 14. The result was positive, < 10x the blank conc., < the RL, and will be qualified "5U."
 => chloroform was detected in all method blanks. Results for samples - 02, -12, -14, -16, -18, -20, -36, and -38 were positive, < 5 the blank conc., < the RL, and will be qualified "1U."
 => xylenes were detected in all the method blanks. All sample results were ND; no data were qualified.

Matrix: soil

Sample IDs: 9903655-01, -03, -05, -07, -09, -11, -13, -15, -17, -19, -21, -23, -25, -27, -29, -31, -33, -35, -37, -39

SITE/PROJECT: CCTA-09-RAD UCM ARCO# : 601666
 LABORATORY: GEL LABORATORY REPORT #: 9903655

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL	①	②	③
																				>.05	<20% / 0.99	20%
1	A	108-95-2	Phenol	0.80	NA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	NA	NA	✓	✓	✓	
1	BN	111-44-4	bis(2-Chloroethyl)ether	0.70		✓	✓	✓												✓	✓	
1	A	95-57-8	2-Chlorophenol	0.80		✓	✓	✓		✓	✓	✓	✓	✓	✓					✓	✓	
1	BN	541-73-1	1,3-Dichlorobenzene	0.60		✓	✓	✓		✓	✓	✓	✓	✓	✓						22.9	22.6
1	BN	106-46-7	1,4-Dichlorobenzene	0.50		✓	✓	✓		✓	✓	✓	✓	✓	✓							
1	BN	95-50-1	1,2-Dichlorobenzene	0.40		✓	✓	✓													21.7	22.6
1	A	95-48-7	2-Methylphenol (o-cresol)	0.70		✓	✓	✓													✓	✓
1	BN	108-60-1	bis(2-chloroisopropyl)ether	0.01		✓	✓	✓	↓											↓	✓	✓
1	A	106-44-5	4-Methylphenol	0.60		NA	NA	NA	NA											X	NA	NA
1	BN	621-64-7	N-Nitroso-di-n-propylamine	0.50		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓
1	BN	67-72-1	Hexachloroethane	0.30		✓	✓	✓													23.0	22.6
2	BN	98-95-3	Nitrobenzene	0.20		✓	✓	✓														
2	BN	78-59-1	Isophorone	0.40		✓	✓	✓													✓	✓
2	A	88-75-5	2-Nitrophenol	0.10		✓	✓	✓													✓	✓
2	A	105-67-9	2,4-Dimethylphenol	0.20		✓	✓	✓													✓	✓
2	BN	111-91-1	bis(2-Chloroethoxy)methane	0.30		✓	✓	✓													✓	✓
2	A	120-83-2	2,4-Dichlorophenol	0.20		✓	✓	✓													✓	✓
2	BN	120-82-1	1,2,4-Trichlorobenzene	0.20		✓	✓	✓		✓	✓	✓	✓	✓	✓						21.6	21.5
2	BN	91-20-3	Naphthalene	0.70		✓	✓	✓													✓	✓
2	BN	106-47-8	4-Chloroaniline	0.01		✓	✓	✓													✓	✓
2	BN	87-68-3	Hexachlorobutadiene	0.01		✓	✓	✓													✓	✓
2	A	59-50-7	4-Chloro-3-methylphenol	0.20		✓	✓	✓		✓	✓	✓	✓	✓	✓						✓	✓
2	BN	91-57-6	2-Methylnaphthalene	0.40		✓	✓	✓													✓	✓
3	BN	77-47-4	Hexachlorocyclopentadiene	0.01		✓	✓	✓													25.3	28.5
3	A	88-06-2	2,4,6-Trichlorophenol	0.20		✓	✓	✓													✓	✓
3	A	95-95-4	2,4,5-Trichlorophenol	0.20		✓	✓	✓	↓							↓	↓	↓	↓		✓	✓

Comments: ① CCV %D applies to samples -03, -05, -07, -09, -11, -13, -15, -17, -19, -21, -23, -25, and -27 only.
 ② CCV %D applies to samples -01, -29, -33, -35, -37, and -39 only.
 ③ CCV %D " " " sample -31 only.
 ④ No field dup, Eq. blank, or field blank submitted on the COC.

NA = Not Applicable

SITE/PROJECT: CCTA-09-RAD UCM ARCO# : 601666
 LABORATORY: GEL LABORATORY REPORT #: 9903655

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL	CCV	CCV	
																				%D	%D	
						>.05	<20% / 0.99	20%													20%	20%
3	BN	91-58-7	2-Chloronaphthalene	0.80	NA	✓	✓	✓	✓							NA	NA	NA	✓	✓	21.9	✓
3	BN	88-74-4	2-Nitroaniline (o-)	0.01		✓	✓	✓													✓	✓
3	BN	131-11-3	Dimethylphthalate	0.01		✓	✓	✓													✓	✓
3	BN	208-96-8	Acenaphthylene	0.90		✓	✓	✓													✓	✓
3	BN	606-20-2	2,6-Dinitrotoluene	0.20		✓	✓	✓													✓	✓
3	BN	99-09-2	3-Nitroaniline (m-)	0.01		✓	✓	✓													28.5	✓
3	BN	83-32-9	Accnaphthene	0.90		✓	✓	✓		✓	✓	✓	✓	✓	✓						✓	✓
3	A	51-28-5	2,4-Dinitrophenol	0.01		✓	45.762	✓													21.5	28.8
3	A	100-02-7	4-Nitrophenol	0.01		✓	✓	✓		✓	✓	✓	✓	✓	✓						✓	✓
3	BN	132-64-9	Dibenzofuran	0.80		✓	✓	✓													✓	✓
3	BN	121-14-2	2,4-Dinitrotoluene	0.20		✓	✓	✓		✓	✓	✓	✓	✓	✓						✓	✓
3	BN	84-66-2	Diethylphthalate	0.01		✓	✓	✓													✓	✓
3	BN	7005-72-3	4-Chlorophenyl-phenylether	0.40		✓	✓	✓													✓	✓
3	BN	86-73-7	Fluorene	0.90		✓	✓	✓													✓	✓
3	BN	100-01-6	4-Nitroaniline (p-)	0.01		✓	✓	29.4													26.4	✓
4	A	534-52-1	4,6-Dinitro-2-methylphenol	0.01		✓	✓	✓													✓	✓
4	BN	86-30-6	N-Nitrosodiphenylamine (1)	0.01		✓	✓	✓													✓	✓
4	BN	101-55-3	4-Bromophenyl-phenylether	0.10		✓	✓	✓													✓	21.5
4	BN	118-74-1	Hexachlorobenzene	0.10		✓	✓	✓													✓	✓
4	A	87-86-5	Pentachlorophenol	0.05		✓	26.901	✓													✓	✓
4	BN	85-01-8	Phenanthrene	0.70		✓	✓	✓													✓	✓
4	BN	120-12-7	Anthracene	0.70		✓	✓	✓													✓	✓
4	BN	86-74-8	Carbazole	0.01		NA	NA	NA	NA												NA	NA
4	BN	84-74-2	Di-n-butylphthalate	0.01		✓	✓	✓	✓												✓	✓
4	BN	206-44-0	Fluoranthene	0.60		✓	✓	✓													✓	✓
5	BN	129-00-0	Pyrene	0.60		✓	✓	✓		✓	✓	✓	✓	✓	✓						✓	✓
5	BN	85-68-7	Butylbenzylphthalate	0.01		✓	✓	✓													✓	✓
5	BN	91-94-1	3,3'-Dichlorobenzidine	0.01		✓	✓	✓													22.5	✓
5	BN	56-55-3	Benzo(a)anthracene	0.80		✓	✓	✓													✓	✓

Comments: (1) CCV %D applies to samples -03, -05, -09, -11, -13, -15, -17, -19, -21, -23, -25, and -27 only.
 (2) CCV %D applies to samples -01, -29, -33, -35, -37, and -39 only.
 (3) " " " " sample -31 only.
 (4) No field dup., Eq. blank, or field blank submitted on the CUC.

NA = Not Applicable

SITE/PROJECT: CCTA-09-RAD UCM ARCO# : 601666
 LABORATORY: GEL LABORATORY REPORT #: 9903655

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	④			⑤ ⑥			
																Field Dup RPD	Eq. Blks	Field Blks	TAL	CCV %D	CCV %D	
						>.05	<20% / 0.99	20%												20%	20%	
5	BN	218-01-9	Chrysene	0.70	NA	✓	✓	✓	✓								NA	NA	NA	✓	✓	✓
5	BN	117-81-7	bis(2-Ethylhexyl)phthalate	0.01	↓	✓	✓	✓	↓								↓	↓	↓	↓	↓	↓
6	BN	117-84-0	Di-n-octylphthalate	0.01	↓	✓	✓	✓	↓								↓	↓	↓	↓	↓	↓
6	BN	205-99-2	Benzo(b)fluoranthene	0.70	↓	✓	✓	✓	↓								↓	↓	↓	↓	↓	↓
6	BN	207-08-9	Benzo(k)fluoranthene	0.70	↓	✓	✓	✓	↓								↓	↓	↓	↓	↓	↓
6	BN	50-32-8	Benzo(a)pyrene	0.70	↓	✓	✓	✓	↓								↓	↓	↓	↓	↓	↓
6	BN	193-39-5	Indeno(1,2,3-cd)pyrene	0.50	↓	✓	✓	✓	↓								↓	↓	↓	↓	↓	↓
6	BN	53-70-3	Dibenz(a,h)anthracene	0.40	↓	✓	✓	✓	↓								↓	↓	↓	↓	↓	↓
6	BN	191-24-2	Benzo(g,h,i)perylene	0.50	↓	✓	✓	✓	↓								↓	↓	↓	↓	↓	↓
	A	65-85-0	Benzoic Acid			✓	21.582	✓												✓	✓	✓
	BN	100-51-6	Benzyl Alcohol			✓	✓	✓												✓	✓	✓
	A	N22	m,p-cresol			✓	✓	✓												✓	✓	✓
	BN	122-66-7	1,2-diphenylhydrazine			✓	✓	✓	↓								↓	↓	↓	↓	↓	↓

Surrogate Recovery Outliers

Sample	SMC 1	SMC 2	SMC 3	SMC 4	SMC 5	SMC 6	SMC 7	SMC 8
All Passed								

Comments:
 ① CCV %D applies to samples -03, -05, -07, -09, -11, -13, -15, -17, -19, -21, -23, -25, and -27 only.
 ② CCV %D applies to samples -01, -29, -33, -35, -37, and -39 only.
 ③ " " " " sample -31 only.
 ④ No field dup., Eq. blank, or field blank submitted on the CCC.

SMC 1: Nitrobenzene-d5 (BN) SMC 2: 2-Fluorobiphenyl (BN) SMC 3: p-Terphenyl-d14 (BN)
 SMC 4: Phenol-d5 (A) SMC 5: 2-Fluorophenol (A) SMC 6: 2,4,6-Tribromophenol (A)
 SMC 7: 2,2-Dichlorophenol-d4 (A) SMC 8: 1,2-Dichlorobenzene-d4 (BN)

Internal Standard Outliers

Sample	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3-area	IS 3-RT	IS 4-area	IS 4-RT	IS 5-area	IS 5-RT	IS 6-area	IS 6-RT
All Passed												

IS 1: 1,4-Dichlorobenzene-d4 (BN) IS 2: Naphthalene-d8 (BN) IS 3: Acenaphthene-d10 (BN)
 IS 4: Phenanthrene-d10 (BN) IS 5: Chrysene-d12 (BN) IS 6: Perylene-d12 (BN)

* Summary → See back of this page.

DATA VALIDATION SUMMARY:

SITE/PROJECT: CCTA-09-RAD^{VCM} CASE #: 7215.2207
 ARCO# : 601666
 LABORATORY: GEL
 LABORATORY REPORT #: 9903655

OF SAMPLES: 40 MATRIX: Soil
 LAB SAMPLE IDs: 9903655-01 thru -40

ANALYSIS/ QC ELEMENT	VOC	SVOC	PEST/ PCB	HPLC (HE)	ICP/AES	GFAA/ AA	CVAA (Hg)	CN	RAD	OTHER	ICP/MS (u)
1. HOLDING TIMES/ PRESERVATION	✓	✓	NA	NA	✓	NA	✓	NA	NA	✓	
2. CALIBRATIONS	UJ	UJ			✓		✓			✓	
3. METHOD BLANKS	5U 1U	✓			J, B3		✓			✓	
4. MS/MSD	✓	✓			J, P1 J, A2; R, A2		✓			✓	
5. LABORATORY CONTROL SAMPLES	✓	✓			✓		✓			✓	
6. REPLICATES					NA		NA			NA	
7. SURROGATES	✓	✓								NA	
8. INTERNAL STDS	✓	✓								↓	
9. TCL COMPOUND IDENTIFICATION	✓	✓								↓	
10. ICP INTERFERENCE CHECK SAMPLE					✓					✓	
11. ICP SERIAL DILUTION					✓					✓	
12. CARRIER/CHEM TRACER RECOVERIES										NA	
13. OTHER QC	NA	NA	↓	↓	NA	↓	NA	↓	↓	↓	

CHECK MARK (✓) - ACCEPTABLE
 J - ESTIMATED
 U - NOT DETECTED

SHADED CELLS - NOT APPLICABLE
 UJ - NOT DETECTED, ESTIMATED
 R - UNUSABLE

NA = Not Applicable

REVIEWED BY: [Signature] DATE: 6/21/99

Contract Verification Review (CVR)

Project Leader BYRD Project Name CCTA – 09 – RAD VCM Case No. 7215.2207

AR/COC No. 601666 Analytical Lab GEL SDG No. 9903655

In the tables below, mark any information that is missing or incorrect and give an explanation.

1.0 Analysis Request and Chain of Custody Record and Log-In Information

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
1.1	All items on COC complete - data entry clerk initialed and dated	X				
1.2	Container type(s) correct for analyses requested	X				
1.3	Sample volume adequate for # and types of analyses requested	X				
1.4	Preservative correct for analyses requested	X				
1.5	Custody records continuous and complete	X				
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	X				
1.7	Date samples received	X				
1.8	Condition upon receipt information provided	X				

2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
2.1	Data reviewed, signature	X				
2.2	Method reference number(s) complete and correct	X				
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X				
2.4	Matrix spike/matrix spike duplicate data provided(if requested)	X				
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and L _c	X				
2.6	QC batch numbers provided	X				
2.7	Dilution factors provided and all dilution levels reported	X				
2.8	Data reported in appropriate units and using correct significant figures	X				
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	NA				
2.10	Narrative provided	X				
2.11	TAT met	X				
2.12	Hold times met	X				
2.13	Contractual qualifiers provided	X				
2.14	All requested result and TIC (if requested) data provided	X				

Contract Verification Review (Continued)

3.0 Data Quality Evaluation

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2 Quantitation limit met for all samples	X		
3.3 Accuracy	X		
a) Laboratory control samples accuracy reported and met for all samples			
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
c) Matrix spike recovery data reported and met		X	ANTIMONY OUTSIDE RECOVERY LIMITS
3.4 Precision	X		
a) Replicate sample precision reported and met for all inorganic and radiochemistry samples			
b) Matrix spike duplicate RPD data reported and met for all organic samples		X	RPD FOR BARIUM, COPPER & ZINC BELOW QC ACCEPTANCE LIMITS
3.5 Blank data		X	CHLOROFORM, METHYLENE CHLORIDE & XYLENES DETECTED IN VOA METHOD BLANK ZINC DETECTED IN METALS BLANK
a) Method or reagent blank data reported and met for all samples			
b) Sampling blank (e.g., field, trip, and equipment) data reported and met	NA		
3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"-analyte found in method blank above the MDL for organic or above the PQL for inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"-analysis done beyond the holding time	X		
3.7 Narrative addresses planchet flaming for gross alpha/beta	NA		
3.8 Narrative included, correct, and complete		X	SEVERAL INCONSISTENCIES BETWEEN METALS NARRATIVE AND QC DATA
3.9 Second column confirmation data provided for methods 8330 (high explosives) and pesticides/PCBs	NA		

Contract Verification Review (Continued)

4.0 Calibration and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.)			
a) 12-hour tune check provided	X		
b) Initial calibration provided	X		
c) Continuing calibration provided	X		
d) Internal standard performance data provided	X		
e) Instrument run logs provided	X		
4.2 GC/HPLC (8330 and 8010)			
a) Initial calibration provided	NA		
b) Continuing calibration provided	NA		
c) Instrument run logs provided	NA		
4.3 Inorganics (metals)			
a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) ICP interference check sample data provided	X		
d) ICP serial dilution provided	X		
e) Instrument run logs provided	X		
4.4 Radiochemistry			
a) Instrument run logs provided	NA		

Contract Verification Review (Concluded)

5.0 Problem Resolution

Summarize the findings in the table below. List only samples/fractions for which deficiencies have been noted.

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions
MS/MSD	6010A	NARRATIVE STATES THAT AI IS OUTSIDE QC LIMITS (Sb IS OUT)
LCS/LCD	6020	NARRATIVE INCORRECTLY STATES URANIUM RECOVERY IS OUTSIDE LIMITS
LCD	6010A	NARRATIVE INCORRECTLY STATES Se IS OUTSIDE QC LIMITS

Were deficiencies unresolved? Yes No

Based on the review, this data package is complete. Yes No

If no, provide: nonconformance report or correction request number 2122 and date correction request was submitted: 5-11-99

Reviewed by: W. Palencia Date: 5-11-99 Closed by: _____ Date: _____

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab
Batch No. 900593

SAR/WR No. _____

(Call 284-5514 for ARCO and Sample Numbers.)

AR/COC- 601666

Dept. No./Mail Stop: 6134 / 114B
 Project/Task Manager: BIRO / PAVLETICH
 Project Name: CCTA-09-RAD VCM
 Record Center Code: ER/1534/09/DAT
 Logbook Ref No.: ER 051
 Service Order No.: CF0670

Date Samples Shipped: 3-17-99 **SMO USE**
 Carrier/Waybill No.: 718476
 Lab Contact: EDIE KENT
 Lab Destination: GEL
 SMO Contact/Phone: SALMI / 505-844-3110
 Send Report to SMO WENDY PALENCIA

Contract No.: AT-2480A
 Case No.: 115.220100
 SMO Authorization: [Signature]
 Bill to: Santa National Laboratories
 Supplier Services
 Department
 P.O. Box 5800 MS 0154

Parameter & Method Requested

Location		Beginning Depth in FL	ER Site No.	Date/Time Collected	Sample Matrix	Reference LOV (available at SMO)			Sample Collection Method	Sample Type	SVOCs	TAL METALS + TOTAL U	VOCs	Lab Samp ID
Building	Tech Area					Container Type	Volume (DE)	Preservative						
Building <u>HA</u> Room _____ ER SITE 9														
Sample No. - Fraction	ER Sample ID or Sample Location Detail													
045146-003	CCTA-09-VCM-PILE 1-N	N/A	9	3-15-99 1120	S	G	16	4°C	G	SA	X	X		
777146-004	J	7	7	J	7	7	4	7	7	7			X	
	PILE 1-S			1125			16				X	X		
	J			J			4						X	
	PILE 2-N			1130			16				X	X		
	J			J			4						X	
	PILE 2-S			1135			16				X	X		
	J			J			4						X	
	PILE 3-N			1140			16				X	X		
	J			J			4						X	

RMMA Yes No Ref. No. _____

Sample Tracking
 Date Entered (mm/dd/yy) 3/22/99 **SMO USE**
 Entered by: Vg

Special Instructions/QC Requirements
 EDD Yes No
 Raw data package Yes No

Abnormal Conditions on Receipt

Turnaround Time Normal Rush Required Report Date 15 DAY TAT QC rolls: [Signature]

PLEASE FAX PRELIMINARY RESULTS TO
 JOE PAVLETICH (505) 284-2617
 released by COC 601668
 Please list as separate report.

LAB USE

Sample Team Members	Name	Signature	Init	Company/Organization/Phone
	JOE PAVLETICH	<u>[Signature]</u>	<u>JP</u>	60001/6134/505 284-2479

1. Relinquished by <u>[Signature]</u> Org. <u>6134</u> Date <u>3-16-99</u> Time <u>1440</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>7577</u> Date <u>3-16-99</u> Time <u>1440</u>	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>[Signature]</u> Org. <u>7577</u> Date <u>3-17-99</u> Time <u>1230</u>	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____

ANALYSIS REQUEST AND CHAIN OF CUSTODY CONTINUATION FORM

AR/COC- 601666

SF 2001-COD (12-96)
Supersedes (10-91) issue

Project Name: CCTA-09-RADVCM Project/Task Manager: BYRD / PAVLETICH Case No.: 7215.220700

Parameter & Method Requested														
SVOCs	TAL METALS + Total U	VOCs												

Location		Tech Area	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)					Sample Type	SVOCs	TAL METALS + Total U	VOCs
Building	Room					Sample No. - Fraction	ER Sample ID or Sample Location Detail	Sample Matrix	Container Type	Volume (oz)				
		<u>ER SRE 9</u>												

Abnormal Conditions on Receipt _____ LAB USE _____
 Recipient Initials _____

ANALYSIS REQUEST AND CHAIN OF CUSTODY CONTINUATION FORM

SF 2001-CO1 (12-96)
Supersedes CO1-93 form

AR/COC- 601666

Project Name: CCTA-09-RA-VCM Project/Task Manager: BYRD / PAULETICH Case No.: 7215, 220700

Parameter & Method Requested

SVOCS	TAL METALS + TOTAL U	VOCs															
-------	----------------------	------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Location				Tech Area	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)					Sample Type	Lab Sample ID													
Building		Room						Sample Matrix	Container		Preservative	Sample Collection Method			Sample Type												
Sample No. - Fraction									ER Sample ID or Sample Location Detail	Type						Volume (oz)											
				ER SITES																							
0	0	4	5	1	6	0	-	0	0	3	CCTA-09-VCM- PILE B-N	N/A	9	3-15-99	1230	S	G	16	4"	G	SA	X	X				
0	7	1	7	1	6	0	-	0	0	4	↓		7		↓			4						X			
					1	6	1	-	0	0	3	PILE B-S						16					X	X			
					1	6	1	-	0	0	4	↓						4						X			
0					1	6	2	-	0	0	3	PILE 9-N						16					X	X			LAB USE
					1	6	2	-	0	0	4	↓						4						X			
0					1	6	3	-	0	0	3	PILE 9-S						16					X	X			
					1	6	3	-	0	0	4	↓						4						X			
					1	6	4	-	0	0	3	PILE 10-N						16					X	X			
					1	6	4	-	0	0	4	↓						4						X			
0					1	6	5	-	0	0	3	PILE 10-S						16					X	X			
0					1	6	5	-	0	0	4	↓						4						X			

Abnormal Conditions on Receipt

LAB USE

Recipient Initials: _____

WHITE - To Accompany Samples, BLUE - To Accompany Samples, YELLOW - SMO Suspense Copy, PINK - Field Copy

Memorandum

Date: 06/10/99

To: File

From: Marcia Hilchey

Subject: Inorganic Data Review and Validation

Site: 09 RadVCM

AR/COC: 601667

Case: 7215.2207

Laboratory: GEL

SDG: 9903662

See attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and with specified methods (ICPAES EPA6010, ICPMS EPA6020, CVAA EPA7470). All components were successfully analyzed.

Qualifications were applied to CVAA sample results due to lack of matrix spike sample analysis.

Qualifications were applied to ICP sample results due to blank contamination, failure to meet LCS acceptance criteria, and failure to meet matrix spike acceptance criteria.

Holding Times

The samples were analyzed within the prescribed holding times.

Calibration

Initial and continuing calibration met QC acceptance criteria for all methods.

Blanks

Method blanks and equipment blanks were free of target analytes above reporting limits in all methods.

The aqueous sample contained several analytes at <5X the value of the continuing calibration blanks. The continuing calibration blanks also had negative values for several analytes. Affected results were JB3 and UJB3 qualified. See inorganic Sample Findings Summary for further qualification information.

Several soil samples contained antimony at <5X the value of the calibration blank. No further qualifications were applied (see Matrix Spike section below).

Matrix Spike Analysis

No soil matrix spike sample was analyzed for this SDG for mercury. All non-detect sample results were UJA2 qualified.

The soil MS recovery was low for antimony. Positive sample results were JA2 qualified. Non-detects were UJA2 qualified.

With the exception of uranium, no aqueous matrix spike samples were analyzed with this SDG. All non-detect aqueous sample results were UJA2 qualified, positive results were JA2 qualified. No further qualifications were applied to aqueous copper and potassium results (see Blank section above).

The aqueous uranium MS sample met acceptance criteria

Laboratory Control/Laboratory Control Duplicate Samples

The LCS/LCSD samples met QC acceptance criteria with the exception of soil uranium. All positive soil uranium results were JA qualified.

ICP Interference check sample (ICS) Analysis

The ICS met all QC acceptance criteria.

Laboratory Replicate Analysis

No replicate samples were analyzed for either metals method. MSD results were used to assess laboratory precision.

The soil MSD RPD was high for barium. Soil barium results were JA qualified. All other soil MSD RPDs met acceptance criteria.

With the exception of uranium, no aqueous MSD samples were analyzed with this SDG. No further qualifications were applied (see Matrix Spike section above).

Other QC

Serial dilution was performed for one sample with this SDG. All acceptance criteria were met.

No field duplicate samples were submitted with this SDG.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.



6/10/99

SAMPLE FINDINGS SUMMARY

Site: 09 rod VCM

AR/COC: 601667 Data Classification: Inorganic

Sample/ Fraction No.	Analysis	DV Qualifiers	Comments
	See Attached Table		

Sample No./Fraction No. - This value is located on the Chain of Custody in the ER Sample Id field.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470/1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HE, PCBRJSC

Reviewed by: [Signature] Date: 6/10/99

COC:601667	Al (7429-90-5)	Ba (7440-39-3)	Be (7440-41-7)	Cd (7440-43-9)	Ca (7440-70-2)	Cr (7440-47-3)	Co (7440-48-4)	Cu (7440-50-8)	Fe (7439-89-6)	Mg (7439-95-4)	Mn (7439-96-5)	Ni (7440-02-0)	K (7440-09-7)	Ag (7440-22-4)	Na (7440-23-5)	V (7440-62-2)	Zn (7440-66-6)	Pb (7439-92-1)	Sb (7440-36-0)	Tl (7440-28-0)	Se (7782-49-2)	As (7440-38-2)	Hg (7439-97-6)	U (7440-61-1)	
Sample Number																									
CCTA-09-VCM-PILE11-N		JA																	JA 2				UJ A2	JA	
CCTA-09-VCM-PILE11-S		JA																	JA 2				UJ A2	JA	
CCTA-09-VCM-PILE12-N		JA																	JA 2				UJ A2	JA	
CCTA-09-VCM-PILE12-S		JA																	UJ A2				UJ A2	JA	
CCTA-09-VCM-PILE13-N		JA																	UJ A2				UJ A2	JA	
CCTA-09-VCM-PILE13-S		JA																	UJ A2				UJ A2	JA	
CCTA-09-VCM-EB	UJ A2	UJ A2	UJ A2	JA2	UJ A2	JA2	UJ A2	UJ B3	UJ A2	UJ JB3	UJ A2	UJ A2	UJ B3	UJ A2	UJ JB3	UJ A2	JA2	JA2	UJ A2	UJ A2	UJ A2	UJ A2	UJ A2	UJ A2	JB

[Handwritten Signature] 6/1/09

INORGANIC METALS:

SITE/PROJECT: 09 100/UCM2 ARCO# 601667 aqueous

LABORATORY: CEL LABORATORY REPORT #: 9903662

METHODS: CVA, TAP AES, ICPMS

QC Element/ Analyte	ICV	CCV	ICB	CCB	Method Blks	LCS	LCS D	LCSD RPD	MS	MSD	MSD RPD	REP RPD	ICS AB	Serial Dilution	Field Dup RPD	Eq. Blks	Field Blks		
7429-90-5 Al	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-		✓						
7440-39-3 Ba				6.3															
7440-41-7 Be				✓															
7440-43-9 Cd																			
7440-70-2 Ca																			
7440-47-3 Cr				4															
7440-48-4 Co																			
7440-50-8 Cu			-1.3	-1.0															
7439-89-6 Fe			✓	✓															
7439-95-4 Mg				7.1															
7439-96-5 Mn				✓															
7440-02-0 Ni				✓															
7440-09-7 K			-14.9	-12.6															
7440-22-4 Ag				✓															
7440-23-5 Na			-16.9	-41.7															
7440-62-2 V			✓	✓															
7440-66-6 Zn			✓	✓															
7440-61-1 Cd			-0.2	-0.2	✓	✓	✓	✓	✓	✓	✓								
7439-92-1 Pb			✓	✓	✓														
7782-49-2 Se																			
7440-38-2 As																			
7440-36-0 Sb																			
7440-28-0 Tl																			
7439-97-6 Hg			✓	✓	✓	✓	✓	✓											
Cyanide CN																			

mg/kg = ug/g : [(ug/g) x (sample mass (g) / sample vol. (ml)) x (1000ml / 1liter)] / Dilution Factor = ug/l

Comments:

REVIEWED BY: [Signature]

DATE: 6/10/99

SITE/PROJECT: 09 radcum ARCO# : 601667 soil
 LABORATORY: CFL LABORATORY REPORT #: 9903662
 METHODS: CLAA, TAPAS, FC, 3MS

QC Element/ Analyte	ICV	CCV	ICB	CCB	Method Blks	LCS	LCS D	LCS D RPD	MS	MSD	MSD RPD	REP RPD	ICS AB	Serial Dilution	Field Dup RPD	Eq. Blks	Field Blks		
7429-90-5 Al	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓					
7430-39-3 Ba			0.5	0.7					✓	149	693								
7440-41-7 Be																			
7440-43-9 Cd																			
7440-70-2 Ca																			
7440-47-3 Cr				0.6															
7440-48-4 Co				0.4															
7440-50-8 Cu																			
7439-89-6 Fe				8.4															
7439-95-4 Mg																			
7439-96-5 Mn																			
7440-02-0 Ni																			
7440-09-7 K																			
7440-22-4 Ag																			
7440-23-5 Na			3.4	55.3															
7440-62-2 V																			
7440-66-6 Zn					.714						33.1								
7440-61-1U						29.0	32.1	✓	✓	✓	✓								
7439-92-1 Pb																			
7782-49-2 Se																			
7440-38-2 As																			
7440-36-0 Sb			3.3						32.5	26.3	210								
7440-28-0 Tl																			
7439-97-6 Hg			✓	✓	✓	✓	✓	✓	✓	✓	✓								
Cyanide CN																			

mg/kg = ug/g : [(ug/g) x (sample mass (g) / sample vol. (ml)) x (1000ml / 1liter)] / Dilution Factor = ug/l
 Comments:

REVIEWED BY: [Signature] DATE: 6/10/99

Memorandum

Date: 06/10/99

To: File

From: Marcia Hilchey

Subject: Organic Data Review and Validation

Site: 09 Rad VCM

AR/COC: 601667

Case: 7215.2207

Laboratory: GEL

SDG: 9903662

See attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and with specified methods (VOC EPA8260, SVOC EPA8270). All compounds were successfully analyzed.

Qualifications were applied to VOC sample data due to failure to meet calibration acceptance criteria.

Qualifications were applied to SVOC sample data due to failure to meet MS/MSD acceptance criteria.

Holding Times

The samples were analyzed within the prescribed holding times.

Calibration

Initial and continuing calibration met acceptance criteria for the SVOC method.

The CCVs associated with all soil samples had high RPD for bromomethane and carbon tetrachloride. Additionally, the CCV associated with samples 9903662-04,-06,-08,-10 ,and 12 had high RPD for 1,2-dichloroethane. See attached organic Sample Findings Summary for qualification information.

Blanks

No target analytes were detected above the reporting limit in the SVOC method blanks.

The VOC soil method blank contained acetone at 6.9 ug/kg. The samples were all non-detect for acetone. No qualifications were applied.

No target analytes were detected in any equipment or trip blankds.

Surrogates

All surrogate recoveries met acceptance criteria for both methods.

Matrix Spike/Matrix Spike Duplicates (MS/MSD)

Matrix spike sample analysis for soil VOC and SVOC met acceptance criteria.

The aqueous SVOC MS/MSD recoveries were low for several analytes. The LCS recoveries for these analytes were acceptable. All aqueous sample results for analytes associated with the failed MS/MSDs were UJ qualified.

No aqueous VOC MS/MSD samples were analyzed from this SDG. No qualifications were applied.

Internal Standards

All internal standard QC acceptance criteria were met for both methods.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

All soil SVOC and VOC LCS/LCSD samples met all acceptance criteria.

The aqueous VOC LCSD sample was analyzed with another SDG. The LCS with this SDG met acceptance criteria. No sample results were qualified.

The soil SVOC LCS recovery was low for 1,2,4-trichlorobenzene. No further qualifications were applied (see Matrix Spike section above).

Other QC

No field duplicate samples were submitted with this SDG. No qualifications were applied.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.



6/10/99

SAMPLE FINDINGS SUMMARY

Site: 09 Parkview

AR/COC: 601667

Data Classification: Organic

Sample/ Fraction No.	Analysis	DV Qualifiers	Comments
	See attached table		

Sample No./Fraction No. - This value is located on the Chain of Custody in the ER Sample Id field.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470/1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HE, PCBRJSC

Reviewed by: [Signature] Date: 6/12/99

E/PROJECT: 09 Rad UCM ARCO# : 601667 soil
 BORATORY: GEL LABORATORY REPORT #: 9903662

GCMS		Min RF	Intercept	Calib RF	Calib RSD / R ¹	CCV RPD	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq Blks	Trip Blks	CCV RPD		
Name	CAS #			>.05	<20% / 0.99	<20%													
Chloromethane	74-87-3	0.10	✓	✓	✓		✓								✓	✓	✓		
Bromomethane	74-83-9	0.10				62.8											66.6		
vinyl chloride	75-01-4	0.10																	
Chloroethane	75-00-3	0.01				36.7													
methylene chloride (10xblk)	75-09-2	0.01																	
acetone(10xblk)	67-64-1	0.01					6.9												
carbon disulfide	75-15-0	0.10																	
1,1-dichloroethene	75-35-4	0.20						✓	✓	✓	✓	✓	✓						
1,1-dichloroethane	75-34-3	0.10																	
Chloroform	67-66-3	0.20																	
1,2-dichloroethane	107-06-2	0.10				37.4											46.0		
2-butanone(10xblk)	78-93-3	0.01																	
1,1,1-trichloroethane	71-55-6	0.10				36.3											36.0		
carbon tetrachloride	56-23-5	0.10				59.3											60.6		
Bromodichloromethane	75-27-4	0.20				20.5													
1,2-dichloropropane	78-87-5	0.01																	
cis-1,3-dichloropropene	10061-01-5	0.20																	
Trichloroethene	79-01-6	0.30						✓	✓	✓	✓	✓	✓						
Dibromochloromethane	124-48-1	0.10																	
1,1,2-trichloroethane	79-00-5	0.10																	
Benzene	71-43-2	0.50						✓	✓	✓	✓	✓	✓						
trans-1,3-dichloropropene	10061-02-6	0.10																	
Bromoform	75-25-2	0.10																	
4-methyl-2-pentanone	108-10-1	0.10																	
2-hexanone	591-78-6	0.01																	
Tetrachloroethene	127-18-4	0.20				35.9											20.8		
1,1,2,2-tetrachloroethane	79-34-5	0.30				27.5											30.9		
toluene(10xblk)	108-88-3	0.40						✓	✓	✓	✓	✓	✓						
Chlorobenzene	108-90-7	0.50						✓	✓	✓	✓	✓	✓						
Ethylbenzene	100-41-4	0.10																	
Styrene	100-42-5	0.30																	
xylenes(total)	1330-20-7	0.30																	
1,2-dichloroethylene(total)	540-59-0	0.01																	
2-chloroethyl vinyl ether	110-75-8																		
vinyl acetate	108-05-4					24.7											29.1		

Comments:

VIEWED BY: [Signature] DATE: 6/10/99

PROJECT: 09 Rad VCM ARCO# : 601667 09.
LABORATORY: GEL LABORATORY REPORT #: 9903662

3/13

n/a

GC/MS	Min RF	Intercept	Calib RF	Calib RSD/R ²	CCV RPD	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Trip Blks
Name	CAS #		>.05	<20% / 0.99	<20%										
chloromethane	74-87-3	0.10	✓	✓	✓	✓									
bromomethane	74-83-9	0.10													
vinyl chloride	75-01-4	0.10													
chloroethane	75-00-3	0.01													
ethylene chloride (10xblk)	75-09-2	0.01													
acetone (10xblk)	67-64-1	0.01													
carbon disulfide	75-15-0	0.10				22.2									
1,1-dichloroethane	75-35-4	0.20				✓	✓	✓							
1,1-dichloroethane	75-34-3	0.10													
chloroform	67-66-3	0.20													
1,2-dichloroethane	107-06-2	0.10													
butanone (10xblk)	78-93-3	0.01													
1,1,1-trichloroethane	71-55-6	0.10													
carbon tetrachloride	56-23-5	0.10				31.1									
bromodichloromethane	75-27-4	0.20													
1,2-dichloropropane	78-87-5	0.01													
trans-1,3-dichloropropene	10061-01-5	0.20													
trichloroethylene	79-01-6	0.30					✓	✓	✓						
dibromochloromethane	124-48-1	0.10													
1,1,2-trichloroethane	79-00-5	0.10													
benzene	71-43-2	0.50					✓	✓	✓						
trans-1,3-dichloropropene	10061-02-6	0.10													
bromoform	75-25-2	0.10													
1-methyl-2-pentanone	108-10-1	0.10													
2-hexanone	591-78-6	0.01													
tetrachloroethene	127-18-4	0.20													
1,1,2,2-tetrachloroethane	79-34-5	0.30													
toluene (10xblk)	108-88-3	0.40					✓	✓	✓						
chlorobenzene	108-90-7	0.50					✓	✓	✓						
ethylbenzene	100-41-4	0.10													
styrene	100-42-5	0.30													
xylenes (total)	1330-20-7	0.30													
1,2-dichloroethylene (total)	540-59-0	0.01													
2-chloroethyl vinyl ether	110-75-8														
vinyl acetate	108-05-9					22.3									

Comments:

VIEWED BY: [Signature] DATE: 6/10/99

SITE/PROJECT: 09 Red VCM ARCO# : 601667 soil
 LABORATORY: GEL LABORATORY REPORT #: 9903662

n/a n/a

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV RPD	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks			
						>.05	<20%/0.99	<20%													
	A	108-95-2	Phenol	0.80	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓			
	BN	111-44-4	bis(2-Chloroethyl)ether	0.70																	
	A	95-57-8	2-Chlorophenol	0.80						✓	✓	✓	✓	✓	✓						
	BN	541-73-1	1,3-Dichlorobenzene	0.60																	
	BN	106-46-7	1,4-Dichlorobenzene	0.50						✓	✓	✓	✓	✓	✓						
	BN	95-50-1	1,2-Dichlorobenzene	0.40																	
	A	95-48-7	2-Methylphenol	0.70																	
	BN	108-60-1	bis(2-chloroisopropyl)ether	0.01																	
	A	106-44-5	4-Methylphenol	0.60																	
	BN	621-64-7	N-Nitroso-di-n-propylamine	0.50						✓	✓	✓	✓	✓	✓						
	BN	67-72-1	Hexachloroethane	0.30																	
2	BN	98-95-3	Nitrobenzene	0.20																	
2	BN	78-59-1	Isophorone	0.40																	
2	A	88-75-5	2-Nitrophenol	0.10																	
2	A	105-67-9	2,4-Dimethylphenol	0.20																	
2	BN	111-91-1	bis(2-Chloroethoxy)methane	0.30																	
2	A	120-83-2	2,4-Dichlorophenol	0.20																	
2	BN	120-82-1	1,2,4-Trichlorobenzene	0.20						✓	✓	✓	✓	✓	✓						
2	BN	91-20-3	Naphthalene	0.70																	
2	BN	106-47-8	4-Chloroaniline	0.01																	
2	BN	87-68-3	Hexachlorobutadiene	0.01																	
2	A	59-50-7	4-Chloro-3-methylphenol	0.20						✓	✓	✓	✓	✓	✓						
2	BN	91-57-6	2-Methylnaphthalene	0.40																	
1	BN	77-47-4	Hexachlorocyclopentadiene	0.01																	
3	A	88-06-2	2,4,6-Trichlorophenol	0.20																	
1	A	95-95-4	2,4,5-Trichlorophenol	0.20	✓	✓	✓	✓	✓												

Comments:

REVIEWED BY: [Signature] DATE: 6/10/99

SITE/PROJECT: 09 Rad VCM ARCO# : 601667 soil
 LABORATORY: GEL LABORATORY REPORT #: 9908662

n/a n/a

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD/R ²	CCV RPD	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks			
						>.05	<20% / 0.99	<20%									✓				
	BN	91-58-7	2-Chloronaphthalene	0.80	✓	✓	✓	✓	✓												
	BN	88-74-4	2-Nitroaniline	0.01																	
	BN	131-11-3	Dimethylphthalate	0.01																	
	BN	208-96-8	Acenaphthylene	0.90																	
	BN	606-20-2	2,6-Dinitrotoluene	0.20																	
	BN	99-09-2	3-Nitroaniline	0.01																	
	BN	83-32-9	Acenaphthene	0.90						✓	✓	✓	✓	✓	✓						
	A	51-28-5	2,4-Dinitrophenol	0.01																	
	A	100-02-7	4-Nitrophenol	0.01				28.2		✓	✓	✓	✓	✓	✓						
	BN	132-64-9	Dibenzofuran	0.80				✓													
	BN	121-14-2	2,4-Dinitrotoluene	0.20						✓	✓	✓	✓	✓	✓						
	BN	84-66-2	Diethylphthalate	0.01																	
	BN	7005-72-3	4-Chlorophenyl-phenylether	0.40																	
	BN	86-73-7	Fluorene	0.90																	
	BN	100-01-6	4-Nitroaniline	0.01																	
	A	534-52-1	4,6-Dinitro-2-methylphenol	0.01																	
	BN	86-30-6	N-Nitrosodiphenylamine (1)	0.01																	
	BN	101-55-3	4-Bromophenyl-phenylether	0.10																	
	BN	118-74-1	Hexachlorobenzene	0.10				20.8													
	A	87-86-5	Pentachlorophenol	0.05				✓		✓	✓	✓	✓	✓	✓						
	BN	85-01-8	Phenanthrene	0.70																	
	BN	120-12-7	Anthracene	0.70																	
	BN	86-74-8	Carbazole	0.01																	
	BN	84-74-2	Di-n-butylphthalate	0.01																	
	BN	206-44-0	Fluoranthene	0.60																	
	BN	129-00-0	Pyrene	0.60						✓	✓	✓	✓	✓	✓						
	BN	85-68-7	Butylbenzylphthalate	0.01																	
	BN	91-94-1	3,3'-Dichlorobenzidine	0.01				31.8	✓												
	BN	56-55-3	Benzo(a)anthracene	0.80	✓	✓	✓	✓	✓												

Comments:

SITE/PROJECT: _____ ARCO# : _____
 LABORATORY: _____ LABORATORY REPORT #: _____

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV RPD	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq Blks	Field Blks			
						>.05	<20% / 0.99	<20%													
	BN	218-01-9	Chrysene	0.70	✓	✓	✓	✓	✓								✓				
	BN	117-81-7	bis(2-Ethylhexyl)phthalate	0.01	↓	↓	↓	↓	↓								↓				
	BN	117-84-0	Di-n-octylphthalate	0.01	↓	↓	↓	↓	↓								↓				
	BN	205-99-2	Benzo(b)fluoranthene	0.70	↓	↓	↓	↓	↓								↓				
	BN	207-08-9	Benzo(k)fluoranthene	0.70	↓	↓	↓	↓	↓								↓				
	BN	50-32-8	Benzo(a)pyrene	0.70	↓	↓	↓	↓	↓								↓				
	BN	193-39-5	Indeno(1,2,3-cd)pyrene	0.50	↓	↓	↓	↓	↓								↓				
	BN	53-70-3	Dibenz(a,h)anthracene	0.40	↓	↓	↓	↓	↓								↓				
	BN	191-24-2	Benzo(g,h,i)perylene	0.50	↓	↓	↓	↓	↓								↓				
		65-85-0	benzoic acid		↓	↓	↓	34.2	↓								↓				
		100-51-6	benzyl alcohol		↓	↓	↓		↓								↓				

Surrogate Recovery Outliers

Sample	SMC 1	SMC 2	SMC 3	SMC 4	SMC 5	SMC 6	SMC 7	SMC 8
			O/C					

Comments:

- SMC 1: Nitrobenzene-d5 (BN)
- SMC 2: 2-Fluorobiphenyl (BN)
- SMC 3: p-Terphenyl-d14 (BN)
- SMC 4: Phenol-d5 (A)
- SMC 5: 2-Fluorophenol (A)
- SMC 6: 2,4,6-Tribromophenol (A)
- SMC 7: 2-2-Chlorophenol-d4 (A)
- SMC 8: 1,2-Dichlorobenzene-d4 (BN)

Internal Standard Outliers

Sample	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3-area	IS 3-RT	IS 4-area	IS 4-RT	IS 5-area	IS 5-RT	IS 6-area	IS 6-RT
			O/C									

- IS 1: 1,4-Dichlorobenzene-d4 (BN)
- IS 2: Naphthalene-d8 (BN)
- IS 3: Acenaphthene-d10 (BN)
- IS 4: Phenanthrene-d10 (BN)
- IS 5: Chrysene-d12 (BN)
- IS 6: Perylene-d12 (BN)

TE/PROJECT: 09 Red UCM ARCO# : 601667 ^{99.}
 LABORATORY: CEL LABORATORY REPORT #: 9903662

n/a n/a-1

BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV RPD	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks
A	108-95-2	Phenol	0.80	✓	✓	>.05 <20% / 0.99	<20%	✓	✓	✓	✓	✓	✓	✓		✓	✓
BN	111-44-4	bis(2-Chloroethyl)ether	0.70						×								
A	95-57-8	2-Chlorophenol	0.80						✓	✓	✓	475	480	✓			
BN	541-73-1	1,3-Dichlorobenzene	0.60														
BN	106-46-7	1,4-Dichlorobenzene	0.50						✓	✓	✓	463	459	✓			
BN	95-50-1	1,2-Dichlorobenzene	0.40														
A	95-48-7	2-Methylphenol	0.70														
BN	108-60-1	bis(2-chloroisopropyl)ether	0.01														
A	106-44-5	4-Methylphenol	0.60														
BN	621-64-7	N-Nitroso-di-n-propylamine	0.50						✓	✓	✓	✓	✓	✓			
BN	67-72-1	Hexachloroethane	0.30														
BN	98-95-3	Nitrobenzene	0.20														
BN	78-59-1	Isophorone	0.40														
A	88-75-5	2-Nitrophenol	0.10														
A	105-67-9	2,4-Dimethylphenol	0.20														
BN	111-91-1	bis(2-Chloroethoxy)methane	0.30														
A	120-83-2	2,4-Dichlorophenol	0.20														
BN	120-82-1	1,2,4-Trichlorobenzene	0.20						75.1	✓	✓	437 544	442	✓			
BN	91-20-3	Naphthalene	0.70														
BN	106-47-8	4-Chloroaniline	0.01														
BN	87-68-3	Hexachlorobutadiene	0.01														
A	59-50-7	4-Chloro-3-methylphenol	0.20						✓	✓	✓	✓	✓	✓			
BN	91-57-6	2-Methylnaphthalene	0.40														
BN	77-47-4	Hexachlorocyclopentadiene	0.01														
A	88-06-2	2,4,6-Trichlorophenol	0.20														
A	95-95-4	2,4,5-Trichlorophenol	0.20	✓	✓	✓	✓	✓									✓

Comments:

REVIEWED BY: [Signature] DATE: 6/10/99

ITE/PROJECT: 09 Radon VM ARCO C #: 601667 99.
 LABORATORY: G-E-L LABORATORY REPORT #: 9903662

BN	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV RPD	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks
					>.05	<20% / 0.99	<20%										
BN	91-58-7	2-Chloronaphthalene	0.80	✓	✓	✓	✓	✓									
BN	88-74-4	2-Nitroaniline	0.01														
BN	131-11-3	Dimethylphthalate	0.01														
BN	208-96-8	Acenaphthylene	0.90														
BN	606-20-2	2,6-Dinitrotoluene	0.20														
BN	99-09-2	3-Nitroaniline	0.01														
BN	83-32-9	Acenaphthene	0.90						✓	✓	✓	489	20.4	✓			
A	51-28-5	2,4-Dinitrophenol	0.01				38.2										
A	100-02-7	4-Nitrophenol	0.01						✓	✓	✓	✓	21.8	21.2			
BN	132-64-9	Dibenzofuran	0.80														
BN	121-14-2	2,4-Dinitrotoluene	0.20						✓	✓	✓	✓	✓	✓			
BN	84-66-2	Diethylphthalate	0.01														
BN	7005-72-3	4-Chlorophenyl-phenylether	0.40														
BN	86-73-7	Fluorene	0.90														
BN	100-01-6	4-Nitroaniline	0.01				34.6										
A	534-52-1	4,6-Dinitro-2-methylphenol	0.01				24.0										
BN	86-30-6	N-Nitrosodiphenylamine (1)	0.01				✓										
BN	101-55-3	4-Bromophenyl-phenylether	0.10														
BN	118-74-1	Hexachlorobenzene	0.10														
A	87-86-5	Pentachlorophenol	0.05						✓	✓	✓	✓	✓	20.1			
BN	85-01-8	Phenanthrene	0.70														
BN	120-12-7	Anthracene	0.70														
BN	86-74-8	Carbazole	0.01														
BN	84-74-2	Di-n-butylphthalate	0.01														
BN	206-44-0	Fluoranthene	0.60														
BN	129-00-0	Pyrene	0.60						✓	✓	✓	✓	✓	✓			
BN	85-68-7	Butylbenzylphthalate	0.01														
BN	91-94-1	3,3'-Dichlorobenzidine	0.01			✓	21.3	✓									
BN	56-55-3	Benzo(a)anthracene	0.80	✓	✓	✓	✓	✓									

Comments:

ITE/PROJECT: _____ ARCO# : _____
 LABORATORY: _____ LABORATORY REPORT #: _____ *aq.*

S	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV RPD	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks
						>.05	<20% / 0.99	<20%										
	BN	218-01-9	Chrysene	0.70	✓	✓	✓	✓	✓									
	BN	117-81-7	bis(2-Ethylhexyl)phthalate	0.01	↓	↓	↓	↓	↓									
	BN	117-84-0	Di-n-octylphthalate	0.01	↓	↓	↓	↓	↓									
	BN	205-99-2	Benzo(b)fluoranthene	0.70														
	BN	207-08-9	Benzo(k)fluoranthene	0.70														
	BN	50-32-8	Benzo(a)pyrene	0.70														
	BN	193-39-5	Indeno(1,2,3-cd)pyrene	0.50														
	BN	53-70-3	Dibenz(a,h)anthracene	0.40														
	BN	191-24-2	Benzo(g,h,i)perylene	0.50														
		65-85-0	benzoic acid					330	↓									
		100-51-6	benzyl alcohol		↓	↓	↓	✓	↓									

Surrogate Recovery Outliers

Sample	SMC 1	SMC 2	SMC 3	SMC 4	SMC 5	SMC 6	SMC 7	SMC 8
		OK						

Comments:

- MC 1: Nitrobenzene-d5 (BN)
- MC 2: 2-Fluorobiphenyl (BN)
- MC 3: p-Terphenyl-d14 (BN)
- MC 4: Phenol-d5 (A)
- MC 5: 2-Fluorophenol (A)
- MC 6: 2,4,6-Tribromophenol (A)
- MC 7: 2,2-Chlorophenol-d4 (A)
- MC 8: 1,2-Dichlorobenzene-d4 (BN)

Internal Standard Outliers

Sample	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3-area	IS 3-RT	IS 4-area	IS 4-RT	IS 5-area	IS 5-RT	IS 6-area	IS 6-RT
		OK										

- IS 1: 1,4-Dichlorobenzene-d4 (BN)
- IS 2: Naphthalene-d8 (BN)
- IS 3: Acenaphthene-d10 (BN)
- IS 4: Phenanthrene-d10 (BN)
- IS 5: Chrysene-d12 (BN)
- IS 6: Perylene-d12 (BN)

DATA VALIDATION SUMMARY:

SITE/PROJECT: 09-radvcin CASE #: 7215.2207
 ARCO #: 601667
 LABORATORY: CEL
 LABORATORY REPORT #: 9903662

OF SAMPLES: 12 MATRIX: soil
 LAB SAMPLE IDS: 9903662-01 thru 12

ANALYSIS/ QC ELEMENT	VOC	SVOC	PEST/ TCB	HPLC (HE)	ICP/AES	GRAAL AA	CVAA (Hg)	EN	RAD	ICP OTHER MS
1. HOLDING TIMES/ PRESERVATION	✓	✓			✓		✓			✓
2. CALIBRATIONS	R/U	✓			✓		✓			✓
3. METHOD BLANKS	✓	✓			J		✓			✓
4. MS/MSD	✓	✓			J/U		J/U			✓
5. LABORATORY CONTROL SAMPLES	✓	✓			✓		✓			J/R
6. REPLICATES					✓		✓			✓
7. SURROGATES	✓	✓								
8. INTERNAL STDS	✓	✓								
9. TCL COMPOUND IDENTIFICATION	✓	✓								
10. ICP INTERFERENCE CHECK SAMPLE					✓					
11. ICP SERIAL DILUTION					✓					
12. CARRIER/CHEM TRACER RECOVERIES										
13. OTHER QC										

CHECK MARK (✓) - ACCEPTABLE
 J - ESTIMATED
 U - NOT DETECTED

SHADED CELLS - NOT APPLICABLE
 UJ - NOT DETECTED, ESTIMATED
 R - UNUSABLE

REVIEWED BY: [Signature]

DATE: 6/10/99

DATA VALIDATION SUMMARY:

SITE/PROJECT: CCTA-09-Reloc CASE #: 7215-2207
 ARCO #: 601667
 LABORATORY: CFL
 LABORATORY REPORT #: 9903662

OF SAMPLES: 24 MATRIX: GRAVEYARD
 LAB SAMPLE IDS: 9903662-13 thru 16

ANALYSIS/ QC ELEMENT	VOC	SVOC	PEST/ PCB	HPLC (HE)	ICP/AES	GFAA/ AA	CVAA (Hg)	CN	RAD	OTHER MS
1. HOLDING TIMES/ PRESERVATION	✓	✓			✓		✓			✓
2. CALIBRATIONS	✓	✓			✓		✓			-
3. METHOD BLANKS	✓	✓			JB3/05		✓			JB
4. MS/MSD	-	UJA2			J/05		J/05			✓
5. LABORATORY CONTROL SAMPLES	✓	✓			✓		✓			✓
6. REPLICATES					-		-			-
7. SURROGATES	✓	✓								
8. INTERNAL STDS	✓	✓								
9. TCL COMPOUND IDENTIFICATION	✓	✓								
10. ICP INTERFERENCE CHECK SAMPLE					✓					✓
11. ICP SERIAL DILUTION					-					-
12. CARRIER/CHEM TRACER RECOVERIES										
13. OTHER QC										

CHECK MARK (✓) - ACCEPTABLE
 J - ESTIMATED
 U - NOT DETECTED

SHADED CELLS - NOT APPLICABLE
 UJ - NOT DETECTED, ESTIMATED
 R - UNUSABLE

REVIEWED BY: [Signature]

DATE: 6/10/99

Contract Verification Review (CVR)

Project Leader BYRD Project Name CCTA – 09 – RAD VCM Case No. 7215.2207
 AR/COC No. 601667 Analytical Lab GEL SDG No. 9903662

In the tables below, mark any information that is missing or incorrect and give an explanation.

1.0 Analysis Request and Chain of Custody Record and Log-In Information

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
1.1	All items on COC complete - data entry clerk initialed and dated	X				
1.2	Container type(s) correct for analyses requested	X				
1.3	Sample volume adequate for # and types of analyses requested	X				
1.4	Preservative correct for analyses requested	X				
1.5	Custody records continuous and complete	X				
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct		X	SAMPLE #045166-003 & 045166-004 INCORRECTLY REPORTED AS 0451666-003 & 0451666-004 ON FORM 1		
1.7	Date samples received	X				
1.8	Condition upon receipt information provided	X				

2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
2.1	Data reviewed, signature	X				
2.2	Method reference number(s) complete and correct	X				
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X				
2.4	Matrix spike/matrix spike duplicate data provided(if requested)	X				
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and L _c	X				
2.6	QC batch numbers provided	X				
2.7	Dilution factors provided and all dilution levels reported	X				
2.8	Data reported in appropriate units and using correct significant figures	X				
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	NA				
2.10	Narrative provided	X				
2.11	TAT met	X				
2.12	Hold times met	X				
2.13	Contractual qualifiers provided	X				
2.14	All requested result and TIC (if requested) data provided	X				

Contract Verification Review (Continued)

3.0 Data Quality Evaluation

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2 Quantitation limit met for all samples	X		
3.3 Accuracy a) Laboratory control samples accuracy reported and met for all samples		X	1,2,4-TCB RECOVERY LOW FOR SVOC LCS (Aq) URANIUM RECOVERY LOW FOR SOIL LCS/LCD
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique		X	2 SURROGATES FOR VOC MATRIX SPIKE OUTSIDE RECOVERY LIMITS
c) Matrix spike recovery data reported and met		X	LOW RECOVERY FOR SEVERAL SVOC MS/MSD ANALYTES (Aq) ANTIMONY RECOVERED LOW FOR MS/MSD
3.4 Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	X		
b) Matrix spike duplicate RPD data reported and met for all organic samples		X	4-NITROPHENOL & PENTACHLOROPHENOL ABOVE RPD LIMITS BARIUM & ZINC ABOVE RPD LIMITS
3.5 Blank data a) Method or reagent blank data reported and met for all samples		X	ZINC DETECTED IN METALS BLANK ACETONE DETECTED IN SOIL METHOD BLANK
b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	SODIUM & ZINC DETECTED IN EQUIPMENT BLANK
3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"-analyte found in method blank above the MDL for organic or above the PQL for inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"-analysis done beyond the holding time	X		
3.7 Narrative addresses planchet flaming for gross alpha/beta	NA		
3.8 Narrative included, correct, and complete		X	QC DATA FOR URANIUM (AQUEOUS) DOES NOT SUPPORT STATEMENTS IN NARRATIVE
3.9 Second column confirmation data provided for methods 8330 (high explosives) and pesticides/PCBs	NA		

Contract Verification Review (Continued)

4.0 Calibration and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.)			
a) 12-hour tune check provided	X		
b) Initial calibration provided	X		
c) Continuing calibration provided	X		
d) Internal standard performance data provided	X		
e) Instrument run logs provided	X		
4.2 GC/HPLC (8330 and 8010)			
a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) Instrument run logs provided	X		
4.3 Inorganics (metals)			
a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) ICP interference check sample data provided	X		
d) ICP serial dilution provided	X		
e) Instrument run logs provided	X		
4.4 Radiochemistry			
a) Instrument run logs provided	NA		

Contract Verification Review (Concluded)

5.0 Problem Resolution

Summarize the findings in the table below. List only samples/fractions for which deficiencies have been noted.

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions
QC	6020	NARRATIVE INCORRECTLY STATES LCS/LCD RECOVERY WAS LOW
9903662-01	8270/6010A	SNL NUMBER INCORRECT ON FORM 1 AND ANALYTICAL NARRATIVE PAGE
9903662-02	8260	SNL NUMBER INCORRECT ON FORM 1

Were deficiencies unresolved? Yes No

Based on the review, this data package is complete. Yes No

If no, provide: nonconformance report or correction request number 2124 and date correction request was submitted: 5-12-99

Reviewed by: W. Palencia Date: 5-12-99 Closed by: _____ Date: _____

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. 900593 SAR/WR No. _____

(Call 284-5514 for ARCOG and Sample Numbers.)

AR/COC-

601667

Depl. No./Mail Stop: 6134 / 1148
 Project/Task Manager: B4100 / PAVLETICH
 Project Name: CLTA-09-RADVCM
 Record Center Code: ER/1334/07/DAT
 Logbook Ref No: ER051
 Service Order No.: CF0670

Date Samples Shipped: 3-17-99 (S) USE
 Carrier/Waybill No.: 718476
 Lab Contact: ERIE KEAT
 Lab Destination: GEL
 SMO Contact/Phone: SALMI / 505-844-3110
 Send Report to SMO WENDY TALENCIA

Contract No.: AT-2480A
 Case No.: 715, 220700
 SMO Authorization: [Signature]
 Bill to: Sandia National Laboratories
 Supplier Services
 Department
 P.O. Box 5800 MS 0154

Parameter & Method Requested

Location Tech Area ER SITE 9

Building _____ Room _____

Sample No. - Fraction										ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container		Preservative	Sample Collection Method	Sample Type	SVOCs	TAL METALS + TETRA U	VOCs	Lab Sample ID
0	1	2	3	4	5	6	7	8	9						Type	Volume (oz)							
0	4	5	1	6	6	-	0	0	3	CLTA-09-VCM-PILE 11-N	N/A	9	3-15-99 1300	S	G	16	4°	G	SA	X	X		
7	7	7	1	6	6	-	0	0	4	J	7	7	J	7	7	4	7	7	7			X	
			1	6	7	-	0	0	3	PILE 11-S			1505			16				X	X		
			1	6	7	-	0	0	4	J			J			4						X	
			1	6	8	-	0	0	3	PILE 12-N			1310			16				X	X		
			1	6	8	-	0	0	4	J			J			4						X	
			1	6	9	-	0	0	3	PILE 12-S			1315			16				X	X		
			1	6	9	-	0	0	4	J			J			4						X	
			1	7	0	-	0	0	3	PILE 13-N			1320			16				X	X		
			1	7	0	-	0	0	4	J			J			4						X	

RMMA Yes No Ref. No. _____

Sample Disposal Return to Client Disposal by lab

Turnaround Time Normal Rush Required Report Date 15 DAY TAT

Sample Tracking Date Entered (mm/dd/yy) 3/22/99 (S) SMO USE

Entered by: VQ

QC initials: [Signature]

Special Instructions/QC Requirements

EDD Yes No

Raw data package Yes No

FOR PRELIMINARY RESULTS TO
 JOE PAVLETICH (505) 284-2617
RELEASED BY 601668
 Please list as separate report.

Abnormal Conditions on Receipt

LAB USE

Sample Team Members	Name	Signature	Init	Company/Organization/Phone
	JOE PAVLETICH	<u>[Signature]</u>	<u>JP</u>	GPOPM/6134/505-284-2429

1. Relinquished by <u>[Signature]</u>	Org. <u>6134</u>	Date <u>3-16-99</u>	Time <u>1430</u>
1. Received by <u>[Signature]</u>	Org. <u>7577</u>	Date <u>3/16/99</u>	Time <u>1430</u>
2. Relinquished by <u>[Signature]</u>	Org. <u>7577</u>	Date <u>3-17-99</u>	Time <u>1230</u>
2. Received by _____	Org. _____	Date _____	Time _____
3. Relinquished by _____	Org. _____	Date _____	Time _____
3. Received by _____	Org. _____	Date _____	Time _____

4. Relinquished by _____	Org. _____	Date _____	Time _____
4. Received by _____	Org. _____	Date _____	Time _____
5. Relinquished by _____	Org. _____	Date _____	Time _____
5. Received by _____	Org. _____	Date _____	Time _____
6. Relinquished by _____	Org. _____	Date _____	Time _____
6. Received by _____	Org. _____	Date _____	Time _____

MEMORANDUM

DATE: January 31, 2000
TO: File
FROM: Kenneth Salaz ~~KS~~
SUBJECT: Radiological Data Review and Validation
103-Central Coyote Site ~~68~~⁹, ARCO #602866,
Project/Task No. 7215.02.02.08

See the attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and specified method: EPA906.0 (Tritium). No problems were identified with the data package that result in the qualification of data.

Data are acceptable. QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

All samples were analyzed within the prescribed holding times.

Calibration

No calibration data were provided. However, the case narrative stated that the instrument was properly calibrated.

Blanks

No target analytes were detected in the method blanks.

Matrix Spike (MS) Analysis

The MS met QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS met QC acceptance criteria.

Replicates

The replicate analysis met QC acceptance criteria.

Tracer Recoveries

No tracer was required for this method.

Negative Bias

All results met negative bias QC acceptance criteria.

Other QC

Two field duplicates were submitted on the ARCOC. All replicate error ratios (RERs) were < 1 . No target analytes were detected in the equipment blank (EB). No field blank (FB) was submitted on the ARCOC.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

Sample Findings Summary

Site: 103 - Central Coyote Site ⁹ 68

AR/COC: 602866

Data Classification: Radiochemical (EPA 906.0)

ER Sample ID	Analysis	DV Qualifiers	Comments
	No	Data were	Qualified.
	QC	measures appear	to be adequate.

ER Sample ID - This value is located on the AR/Chain of Custody.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470/1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HE, PCBRISC

Reviewed by: [Signature]

Date: 1/31/00

Data Validation Summary

Site/Project: 103-Central Coyote Site CS Project/Task #: 7215.02.02.08

of Samples: 5 Matrix: 1 Aqueous / 4 soil

AR/COC #: 602866

Laboratory Sample IDs: 9910709-05^{LAS} 112899 -01, -02, -03, -04, -05

Laboratory: GEL

Laboratory Report #: 9910709

QC Element	Analysis									
	Organics				Inorganics				RAD	Other
	VOC	SVOC	Pesticide/ PCB	HPLC (HE)	ICP/AES	GFAA/ AA	CVAA (Hg)	CN		
1. Holding Times/Preservation	NA	NA	NA	NA	NA	NA	NA	NA	✓	NA
2. Calibrations	↓	↓	↓	↓	↓	↓	↓	↓	✓	↓
3. Method Blanks	↓	↓	↓	↓	↓	↓	↓	↓	✓	↓
4. MS/MSD	↓	↓	↓	↓	↓	↓	↓	↓	✓	↓
5. Laboratory Control Samples	↓	↓	↓	↓	↓	↓	↓	↓	✓	↓
6. Replicates	↓	↓	↓	↓	↓	↓	↓	↓	✓	↓
7. Surrogates	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
8. Internal Standards	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
9. TCL Compound Identification	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
10. ICP Interference Check Sample	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
11. ICP Serial Dilution	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
12. Carrier/Chemical Tracer Recoveries	↓	↓	↓	↓	↓	↓	↓	↓	NA	↓
13. Other QC	↓	↓	↓	↓	↓	↓	↓	↓	✓	↓

- I = Estimated
- U = Not Detected
- UI = Not Detected, Estimated
- R = Unusable

- Check (✓) = Acceptable
- Shaded Cells = Not Applicable (also "NA")
- NP = Not Provided
- Other _____

Reviewed By: [Signature]

Date: 1/31/00

Radiochemistry

Site/Project: 103-Central Coyote Site 68 AR/COC #: 602866 Laboratory Sample IDs: 9910709-01, -02, -03, -04
 Laboratory: GEL Laboratory Report #: 9910709
 Methods: EPA 906.0
 # of Samples: 4 Matrix: soil Batch #: 161362

Analyte	QC Element													
	Method Blanks	LCS	MS	Rep RER	Equip. Blanks	Field Dup. RER	① Field Blanks	② Sample ID	Isotope	IS/Trace	Sample ID	Isotope	IS/Trace	
Criteria	U	20%	25%	<1.0	U	<1.0	U			50-105			50-105	
113	✓	✓	✓	✓	✓	✓	NA	NA	/					
U-238														
U-234														
U-235/236														
Th-232														
Th-228														
Th-230														
Pu-239/240														
Gross Alpha														
Nonvolatile Beta														
Ra-226														
Ra-28														
Ni-63														
Gamma Spec. Am-241														
Gamma Spec. Cs-137														
Gamma Spec. Co-60														

NA = Not Applicable

Parameter	Method	Typical Tracer	Typical Carrier
Iso-U	Alpha spec.	U-232	NA
Iso-Pu	Alpha spec.	Pu-242	NA
Iso-Th	Alpha spec.	Th-229	NA
Am-241	Alpha spec.	Am-242	NA
Sr-90	Beta	Y ingrowth	NA
Ni-63	Beta	NA	Ni by ICP
Ra-226	Deamination	NA	NA
Ra-226	Alpha spec.	Ba-133 or Ra-225	NA
Ra-228	Gamma spec.	Ba-133	NA

Gamma spec. LCS contains: Am-241, Cs-137, and Co-60

Comments:
 ① No FB submitted on the COC.
 ② No tracer required for this method.

* Summary
 => All QC criteria were met. No data were qualified.

Reviewed By: [Signature] Date: 11/31/00

Radiochemistry

Site/Project: 103-Central Cycle Site 68 AR/COC #: 602866

Laboratory Sample IDs: 9910709-05

Laboratory: 602866 GEL Laboratory Report #: 9910709

Methods: EPA 906.0

of Samples: 1 Matrix: Aqueous

Batch #: 161366

Analyte	QC Element												
	Method Blanks	LCS	MS ^①	Rep RER	Equip. Blanks ^②	Field Dup. RER	Field Blanks	③ Sample ID	Isotope	IS/Trace	Sample ID	Isotope	IS/Trace
Criteria	U	20%	25%	<1.0	U	<1.0	U			50-105			50-105
H3	✓	✓	NA	NA	NA	NA	NA	NA	/				
U-238													
U-234													
U-235/236													
Th-232													
Th-228													
Th-230													
Pu-239/240													
Gross Alpha													
Nonvolatile Beta													
Ra-226													
Ra-28													
Ni-63													
Gamma Spec. Am-241													
Gamma Spec. Cs-137													
Gamma Spec. Co-60													

NA = Not Applicable

Parameter	Method	Typical Tracer	Typical Carrier
Iso-U	Alpha spec.	U-232	NA
Iso-Pu	Alpha spec.	Pu-242	NA
Iso-Th	Alpha spec.	Th-229	NA
Am-241	Alpha spec.	Am-242	NA
Sr-90	Beta	Y ingrowth	NA
Ni-63	Beta	NA	Ni by ICP
Ra-226	Deamination	NA	NA
Ra-226	Alpha spec.	Ba-133 or Ra-225	NA
Ra-228	Gamma spec.	Ba-133	NA

Gamma spec. LCS contains: Am-241, Cs-137, and Co-60

Comments:

- ① MS and replicate analyses performed on a sample from another SDC.
- ② Sample is an EB.
- ③ No tracer required for this method.

* Summary

⇒ All QC criteria were met. No data were qualified.

Reviewed By: [Signature] Date: 1/31/09

Contract Verification Review (CVR)

ACTUALLY SITE 9 (Site CB had the #)

Project Leader BYRD Project Name 103-CENTRAL COYOTE **SITE 68** Case No. 7215_02.02.08
 AR/COC No. 602866 Analytical Lab GEL SDG No. 9910709

In the tables below, mark any information that is missing or incorrect and give an explanation.

1.0 Analysis Request and Chain of Custody Record and Log-In Information

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
1.1	All items on COC complete - data entry clerk initialed and dated	X				
1.2	Container type(s) correct for analyses requested	X				
1.3	Sample volume adequate for # and types of analyses requested	X				
1.4	Preservative correct for analyses requested	X				
1.5	Custody records continuous and complete		X	SAMPLE TEAM MEMBER ENTERED INCORRECT "RELINQUISHED BY" DATE	X	X
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	X		↑ No, just a poorly written "9" that looks like an "8" when copied		
1.7	Date samples received	X				
1.8	Condition upon receipt information provided	X				

2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
2.1	Data reviewed, signature	X				
2.2	Method reference number(s) complete and correct	X				
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X				
2.4	Matrix spike/matrix spike duplicate data provided(if requested)	X				
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and L _c	X				
2.6	QC batch numbers provided	X				
2.7	Dilution factors provided and all dilution levels reported	X				
2.8	Data reported in appropriate units and using correct significant figures	X				
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	X				
2.10	Narrative provided	X				
2.11	TAT met	X				
2.12	Hold times met	X				
2.13	Contractual qualifiers provided	X				
2.14	All requested result and TIC (if requested) data provided	X				

Contract Verification Review (Continued)

3.0 Data Quality Evaluation

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2 Quantitation limit met for all samples	X		
3.3 Accuracy a) Laboratory control samples accuracy reported and met for all samples	X		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	NA		
c) Matrix spike recovery data reported and met	X		
3.4 Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	X		
b) Matrix spike duplicate RPD data reported and met for all organic samples	X		
3.5 Blank data a) Method or reagent blank data reported and met for all samples	X		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met	X		
3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"-analyte found in method blank above the MDL for organic or above the PQL for inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"-analysis done beyond the holding time	X		
3.7 Narrative addresses planchet flaming for gross alpha/beta	NA		
3.8 Narrative included, correct, and complete	X		
3.9 Second column confirmation data provided for methods 8330 (high explosives) and pesticides/PCBs	NA		

Contract Verification Review (Continued)

4.0 Calibration and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.)			
a) 12-hour tune check provided	NA		
b) Initial calibration provided	NA		
c) Continuing calibration provided	NA		
d) Internal standard performance data provided	NA		
e) Instrument run logs provided	NA		
4.2 GC/HPLC (8330 and 8010)			
a) Initial calibration provided	NA		
b) Continuing calibration provided	NA		
c) Instrument run logs provided	NA		
4.3 Inorganics (metals)			
a) Initial calibration provided	NA		
b) Continuing calibration provided	NA		
c) ICP interference check sample data provided	NA		
d) ICP serial dilution provided	NA		
e) Instrument run logs provided	NA		
4.4 Radiochemistry			
a) Instrument run logs provided	X		

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab Batch No. 902178 SAR/WR No. _____

(Call 284-5514 for ARCOG and Sample Numbers.) AR/COG- 602866

Dept. No./Mail Stop: 6134 / 1048
 Project/Task Manager: BYRD / PAVLETICH
 Project Name: CGTA-09-RAD VCM
 Record Center Code: EQ/1334/09/DAT
 Logbook Ref No: 0151
 Service Order No.: CFO 006 (715.02.02.08)

Date Samples Shipped: 10-20-99 SMO USE
 Carrier/Waybill No.: 725 838
 Lab Contact: EDIE KENT
 Lab Destination: GEL Charleston
 SMO Contact/Phone: SALMI / (505) 844-3110
 Send Report to SMO SUZI JENSEN

Contract No.: 9J-2480A
 Case No.: 715.02.02.08
 SMO Authorization: [Signature]
 Bill to: Sandia National Laboratories
 Supplier Services
 Department
 P.O. Box 5800 MS 0154

Parameter & Method Requested

Location			Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)					Sample Type	991-0709 Lab Sample ID	
Building	Tech Area					Sample Matrix	Container		Preservative	Sample Collection Method			Sample Type
Sample No. - Fraction			ER Sample ID or Sample Location Detail			Type	Volume						
050319-003	N/A		N/A	9	10-18-99 0935	S	AG	3K 12	4"	G	SA	X	01
777320-003			7	7	7 0957	7	7	7	7	7	DU	X	02
777321-003			7	7	7 1015	7	7	7	7	7	SA	X	03
777322-003			7	7	7 1020	7	7	7	7	7	DU	X	04
777323-103			7	7	7 0915	DIW	7	12	7	7	SA	X	05

RMMA Yes No Ref. No. _____

Sample Tracking SMO USE
 Date Entered (mm/dd/yy) _____
 Entered by: _____

Special Instructions/QC Requirements

Abnormal Conditions on Receipt

Sample Disposal Return to Client Disposal by lab

QC Inits: _____

Raw data package Yes No

LAB USE

Turnaround Time Normal Rush Required Report Date 15 DAY TAT

QC Inits: _____

- 15 DAY TAT

LAB USE

Sample Team Members	Name	Signature	Init	Company/Organization/Phone
	Joe Pavletich	<i>Joe Pavletich</i>	JP	GEL/6134/605-284-2477

RELEASED BY ARCOG 602866
 Please list as separate report.

LAB USE

1. Relinquished by <u>Joe Pavletich</u>	Org. <u>6134</u>	Date <u>10/18/99</u>	Time <u>0930</u>
1. Received by <u>[Signature]</u>	Org. <u>7577</u>	Date <u>10/19/99</u>	Time <u>0930</u>
2. Relinquished by <u>[Signature]</u>	Org. <u>7577</u>	Date <u>10/20/99</u>	Time <u>1145</u>
2. Received by <u>[Signature]</u>	Org. <u>GEL</u>	Date <u>10/21/99</u>	Time <u>10:00</u>
3. Relinquished by _____	Org. _____	Date _____	Time _____
3. Received by _____	Org. _____	Date _____	Time _____

4. Relinquished by _____	Org. _____	Date _____	Time _____
4. Received by _____	Org. _____	Date _____	Time _____
5. Relinquished by _____	Org. _____	Date _____	Time _____
5. Received by _____	Org. _____	Date _____	Time _____
6. Relinquished by _____	Org. _____	Date _____	Time _____
6. Received by _____	Org. _____	Date _____	Time _____

MEMORANDUM

DATE: June 1, 2000
TO: File
FROM: Kevin Lambert *KAL*
SUBJECT: Organic Data Review and Validation
Site 9, ARCO No. 603273, and Project/Task No. 7215.02.02.08

See the attached Data Validation Worksheets for supporting documentation on the data review and validation.

Summary

The samples were prepared and analyzed with accepted procedures and specified method (HE – EPA8330). Problems were identified with the data package that result in the qualification of data.

1. For soil samples, the matrix spike (MS) and matrix spike duplicate (MSD) percent recovery (%R) for HMX were less than (<) the lower acceptance limit (74%). The poor recovery is suspected to result from matrix interference. All detects for HMX (i.e., all samples) will be qualified "J, A2."
2. The confirmation analysis relative percent difference (RPD) was greater than (>) 25% but < 75% for 1,3,5-trinitrobenzene (34%) in sample 25279-005 and for 4-amino-2, 6-dinitrotoluene (30%) in sample 25279-007. In accordance with guidance the highest detect will be reported and qualified "J." The highest detect for sample 25279-005 is on the primary column (137 ug/kg) and for sample 25279-007 it is on the secondary column (140 ug/kg).

Data is acceptable and QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

The samples were extracted and analyzed within the prescribed holding times.

Calibration

The initial and continuing calibration data met QC acceptance criteria.

Blanks

No target analytes were detected in the method blanks.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

The MS/MSD met QC acceptance criteria except as noted above in the summary section.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analyses

For soil samples, the LCS/LCSD met QC acceptance criteria. For the equipment blank (EB), the LCS %R for nitrobenzene was slightly > the upper acceptance limit (110%) and for tetryl was < the lower acceptance limit (35%). The LCSD %R and LCS/LCSD RPD met QC acceptance criteria. Sample results are non-detect; no data were qualified.

Surrogates

The surrogate recoveries met QC acceptance criteria.

Confirmation

The confirmation analysis met QC acceptance criteria except as noted above in the summary section. No confirmation analysis was necessary for the EB.

Other QC

No target analytes were detected in the EB. There are no "required" review criteria for field duplicate analyses comparability. No field blank (FB) was submitted on the ARCOG.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

High Explosives (SW 846 Method 8330)

Site/Project: CCTA-09-RADVCM AR/COC #: 603273

Laboratory Sample IDs: 25281-001 (EB)

Laboratory: GEL Laboratory Report #: 25281

Methods: EPA 8330

of Samples: 1 Matrix: Aqueous

Batch #: 24137

CAS #	NAME	TAL	Intercept	Curve R ²	CCV %D	Method Blanks	LCS	LCSD	LCS RPD 20%	MS	MSD	MS RPD 20%	Field. Dup. RPD	Equip. Blanks	Field Blanks	
2691-41-0	HMX	✓	✓	✓	✓	✓	✓	✓	✓	 Not Run on this SDG Run on another SDG and met criteria except HMX %R was high 			NA	NA	NA	
121-82-4	RDX	✓	✓	✓	✓	✓	✓	✓								
99-35-49	1,3,5-Trinitrobenzene	✓	✓	✓	✓	✓	✓	✓								
99-65-0	1,3-dinitrobenzene	✓	✓	✓	✓	✓	✓	✓								
98-95-3	Nitrobenzene	✓	✓	✓	✓	✓	112	✓								
479-45-8	Tetryl	✓	✓	✓	✓	✓	27	✓								
118-96-7	2,4,6-trinitrotoluene	✓	✓	✓	✓	✓	✓	✓								
35572-78-2	2-amino-4,6-dinitrotoluene	✓	✓	✓	✓	✓	✓	✓								
19406-51-0	4-amino-2,6-dinitrotoluene	✓	✓	✓	✓	✓	✓	✓								
121-14-2	2,4-dinitrotoluene	✓	✓	✓	✓	✓	✓	✓								
606-20-2	2,6-dinitrotoluene	✓	✓	✓	✓	✓	✓	✓								
88-72-2	2-nitrotoluene	✓	✓	✓	✓	✓	✓	✓								
99-99-0	4-nitrotoluene	✓	✓	✓	✓	✓	✓	✓								
99-08-1	3-nitrotoluene	✓	✓	✓	✓	✓	✓	✓								
78-11-5	PEIN															

Sample	SMC %REC	SMC RT	Sample	SMC %REC	SMC RT
MET CRITERIA					

Comments: ① LCS %R were outside control limits for 2 compds. The LCSD %R and LCS/LCSD RPD did not ^{6.1-8.0 KR} meet acceptance criteria, no data are qualified

Confirmation

Sample	CAS #	RPD > 25%	Sample	CAS #	RPD > 25%
Results N/D Confirmation Not Required					

Solids-to-aqueous conversion:

mg/kg = µg/g : [(µg/g) x (sample mass (g) / sample vol. (ml)) x (1000 ml / 1 liter)] / Dilution Factor = µg/l

Reviewed By: Kevin A Lambert Date: 6-2-00

High Explosives (SW 846 Method 8330)

 Site/Project: CCTA-09-RAD-YOMAR/COC #: 603273

 Laboratory Sample IDs: 25279-001 to -009

 Laboratory: CEL Laboratory Report #: 25279

 Methods: EPA 8330

 # of Samples: 9 Matrix: soil

 Batch #: 24389/25262 (Extraction/Reextraction) → Tetryl Only

CAS #	NAME	TAL	Intercept	Curve	CCV	Method	LCS	LCSD	LCS	MS	MSD	MS	Field.	Equip.	Field		
				R ²	%D	Blanks			RPD	RPD	RPD	Dup.	Blanks	Blanks			
				.99	20%	U			20%			20%		U	U		
2691-41-0	HMX	✓	✓	✓	✓	✓	✓	✓	✓	-104	-94	-10	NA	✓	NA		
121-82-4	RDX	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓			
99-35-49	1,3,5-Trinitrobenzene	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓			
99-65-0	1,3-dinitrobenzene	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓			
98-95-3	Nitrobenzene	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓			
479-45-8	Tetryl	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓			
118-96-7	2,4,6-trinitrotoluene	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓			
35572-78-2	2-amino-4,6-dinitrotoluene	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓			
19406-51-0	4-amino-2,6-dinitrotoluene	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓			
121-14-2	2,4-dinitrotoluene	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓			
606-20-2	2,6-dinitrotoluene	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓			
88-72-2	2-nitrotoluene	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓			
99-99-0	4-nitrotoluene	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓			
99-08-1	3-nitrotoluene	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓			
78-11-5	PEIN																

Requiring reanalysis criteria

Sample	SMC %REC	SMC RT	Sample	SMC %REC	SMC RT
MET CRITERIA					

Confirmation

Sample	CAS #	RPD > 25%	Sample	CAS #	RPD > 25%
25279-005	99-35-49	34			
25279-007	19406-51-0	30			

②

Comments: ① MS/MSD %R and RPD are outside acceptance criteria for HMX. All detects will be qualified "J"
 ② RPD is > 25% but < 75% for 1,3,5-TNB in sample 25279-005 and 4-α-2,6-DNT in sample 25279-007. The highest detect will be reported and qualified "J." For 6-1-00 ^{KAL6-1-00} The 2nd column result is the highest for sample 25279-007 (140) and the 1st column is highest for sample 25279-005 (137)

Solids-to-aqueous conversion:

$$\text{mg/kg} = \mu\text{g/g} : [(\mu\text{g/g}) \times (\text{sample mass (g)} / \text{sample vol. (ml)}) \times (1000 \text{ ml} / 1 \text{ liter})] / \text{Dilution Factor} = \mu\text{g/l}$$

 Reviewed By: Kevin A Lambert Date: 6-2-06

Sample Findings Summary

Site: CCTA-09-RAD VCM

AR/COC: 603273

Data Classification: ORGANIC (HE)

ER Sample ID	Analysis	DV Qualifiers	Comments
051900-003 / CCTA-09-VCM-PILE10-N 901- PILE10-S 902- PILE11-N 903- PILE11-S 904- PILE12-N 905- PILE12-N-DU 906- PILE12-S 907- PILE13-N 908- PILE13-S	2691-41-0 (HMX)	J, A2	
051904-003 / CCTA-09-VCM-PILE12-N	99-35-49 (1,3,5-TNB)	137 J	
051906-003 / CCTA-09-VCM-PILE12-S	19406-51-0 (4A26DNT)	140 J	
<i>Data are acceptable</i>			
<i>QC measures appear to be adequate</i>			

ER Sample ID - This value is located on the AR/Chain of Custody.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470/1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HE, PCBRISC

Reviewed by: Kevin A Lambert Date: 6-2-00

Data Validation Summary

Site/Project: CCTA-09-RAD VCM Project/Task #: 7215.02.02.08 # of Samples: 10 Matrix: 9 soil, 1 aqueous
 AR/COC #: 603273 Laboratory Sample IDs: 25279-001 to -009
 Laboratory: GEL 25281-001
 Laboratory Report #: 25279 (soil), 25281 (aqueous)

QC Element	Analysis									
	Organics				Inorganics				RAD	Other
	VOC	SVOC	Pesticide/ PCB	HPLC (HE)	ICP/AES	GFAA/ AA	CVAA (Hg)	GN		
1. Holding Times/Preservation	NA	NA	NA	✓	NA	NA	NA	NA	NA	NA
2. Calibrations				✓						
3. Method Blanks				✓						
4. MS/MSD				J						
5. Laboratory Control Samples				✓						
6. Replicates										
7. Surrogates				✓						
8. Internal Standards										
9. TCL Compound Identification										
10. ICP Interference Check Sample										
11. ICP Serial Dilution										
12. Carrier/Chemical Tracer Recoveries										
13. Other QC	↓	↓	↓	J	↓	↓	↓	↓	↓	↓

J = Estimated
 U = Not Detected
 UJ = Not Detected, Estimated
 R = Unusable

Check (✓) = Acceptable
 Shaded Cells = Not Applicable (also "NA")
 NP = Not Provided
 Other: _____

Reviewed By: Kevin A Lambert Date: 6-2-00

Contract Verification Review (CVR)

Project Leader BYRD Project Name CCTA-09-RAD VCM Case No. 7215_02.02.08
 AR/GOC No. 603273 Analytical Lab GEL SDG No. 25279

In the tables below, mark any information that is missing or incorrect and give an explanation.

1.0 Analysis Request and Chain of Custody Record and Log-In Information

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
1.1	All items on COC complete - data entry clerk initialed and dated	X				
1.2	Container type(s) correct for analyses requested	X				
1.3	Sample volume adequate for # and types of analyses requested	X				
1.4	Preservative correct for analyses requested	X				
1.5	Custody records continuous and complete	X				
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	X				
1.7	Date samples received	X				
1.8	Condition upon receipt information provided	X				

2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
2.1	Data reviewed, signature	X				
2.2	Method reference number(s) complete and correct	X				
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X				
2.4	Matrix spike/matrix spike duplicate data provided (if requested)	X				
2.5	Detection limits provided; PQL and MDL (or IDL), MDA and L _c	X				
2.6	QC batch numbers provided	X				
2.7	Dilution factors provided and all dilution levels reported	X				
2.8	Data reported in appropriate units and using correct significant figures	X				
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	NA				
2.10	Narrative provided	X				
2.11	TAT met	X				
2.12	Hold times met	X				
2.13	Contractual qualifiers provided	X				
2.14	All requested result and TIC (if requested) data provided	X				

06/06/00 09:34 FAX 505 2842617

SOS 2842617 SNL - ENVIRONMENT REST.

Contract Verification Review (Continued)

3.0 Data Quality Evaluation

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2 Quantitation limit met for all samples	X		
3.3 Accuracy a) Laboratory control samples accuracy reported and met for all samples		X	TETRYL OUTSIDE RECOVERY LIMITS FOR LCS NITROBENZENE & TETRYL OUTSIDE RECOVERY LIMITS FOR AQUEOUS LCS/LCD
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
c) Matrix spike recovery data reported and met		X	TETRYL & HMX FAILED RECOVERY LIMITS FOR MS/MSD HMX FAILED RECOVERY LIMITS FOR RE-EXTRACTED MS/MSD
3.4 Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	X		
b) Matrix spike duplicate RPD data reported and met for all organic samples		X	RPD FOR HMX OUTSIDE ACCEPTANCE LIMITS FOR RE-EXTRACTED MS/MSD
3.5 Blank data a) Method or reagent blank data reported and met for all samples	X		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met	X		
3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic or above the PQL for inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time	X		
3.7 Narrative addresses planchet flaming for gross alpha/beta	NA		
3.8 Narrative included, correct, and complete	X		
3.9 Second column confirmation data provided for methods 8330 (high explosives) and pesticides/PCBs	X		

Contract Verification Review (Continued)

4.0 Calibration and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.)			
a) 12-hour tune check provided	NA		
b) Initial calibration provided	NA		
c) Continuing calibration provided	NA		
d) Internal standard performance data provided	NA		
e) Instrument run logs provided	NA		
4.2 GC/HPLC (8330 and 8010)			
a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) Instrument run logs provided	X		
4.3 Inorganics (metals)			
a) Initial calibration provided	NA		
b) Continuing calibration provided	NA		
c) ICP interference check sample data provided	NA		
d) ICP serial dilution provided	NA		
e) Instrument run logs provided	NA		
4.4 Radiochemistry			
a) Instrument run logs provided	NA		

08/06/00 08:35 FAX 505 2842617

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SNL - ENVIRONMENT REST.

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

SAR/WR No. _____

(Call 284-5514 for ARCOG and Sample Numbers.)

AR/COG- 603273

SI 2001-COC (5-97)

Batch No. _____

Dept. No./Mail Stop: 6134/1088
 Project/Task Manager: BYRD / PAVLETICH
 Project Name: CCTA-09-RAD VCM
 Record Center Code: ER/1334/09/DAT
 Logbook Ref No.: ER 0151
 Service Order No.: CFD 004

Date Samples Shipped: _____ SMO USE
 Carrier/Waybill No.: _____
 Lab Contact: EDIE KENT
 Lab Destination: GEL
 SMO Contact/Phone: DOUG SALMI / 844-3110
 Send Report to SMO: SUZIE JENSEN

Contract No.: _____
 Case No.: F215.02.02 CB
 SMO Authorization: _____
 Bill to: Sandia National Laboratories
 Supplier Services
 Department
 P.O. Box 5800 MS 0154

Parameter & Method Requested

HIGH EXPLOSIVES

Location										Tech Area		Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)					Sample Type	Lab Sample ID		
Building _____ Room _____										NA					Sample Matrix	Container		Preservative	Sample Collection Method			Sample Type	
Sample No. - Fraction										ER Sample ID or Sample Location Detail													
0	5	1	9	0	0	-	0	0	3	CCTA-09-VCM-PILE 10-N		NA	9	5-1-00 / 1010	S	G	8oz	4°C	G	SA	X		
										PILE 10-S											X		
										PILE 11-N											X		
										PILE 11-S											X		
										PILE 12-N											X		
										PILE 12-N-DU									DU		X		
										PILE 12-S									SA		X		
										PILE 13-N											X		
										PILE 13-S											X		
										-DDD-EB				0950	DIW	AG	4x12				EB	X	

RMMA Yes No Ref. No. _____

Sample Disposal Return to Client Disposal by lab

Turnaround Time Normal Rush Required Report Date 10 MAY

Sample Team Members: Name JOE PAVLETICH Signature [Signature] Inil [Initials] Company/Organization/Phone 609/634/284-2179

Sample Tracking: Date Entered (mm/dd/yy) _____ Entered by: _____

Special Instructions/QC Requirements EDD Yes No Raw data package Yes No

RELEASED BY ARCOG 603274
 QC SAMPLES ALSO APPLY TO SAMPLES ON ARCOG 603272
 Please list as separate report.

Abnormal Conditions on Receipt
 LAB USE

1. Relinquished by _____	Orig. _____	Date _____	Time _____	4. Relinquished by _____	Orig. _____	Date _____	Time _____
1. Received by _____	Orig. _____	Date _____	Time _____	4. Received by _____	Orig. _____	Date _____	Time _____
2. Relinquished by _____	Orig. _____	Date _____	Time _____	5. Relinquished by _____	Orig. _____	Date _____	Time _____
2. Received by _____	Orig. _____	Date _____	Time _____	5. Received by _____	Orig. _____	Date _____	Time _____
3. Relinquished by _____	Orig. _____	Date _____	Time _____	6. Relinquished by _____	Orig. _____	Date _____	Time _____
3. Received by _____	Orig. _____	Date _____	Time _____	6. Received by _____	Orig. _____	Date _____	Time _____

MEMORANDUM

DATE: June 5, 2000
TO: File
FROM: Kenneth Salaz *KS*
SUBJECT: Organic Data Review and Validation
CCTA-09-RAD VCM, ARCO #603272,
Project/Task No. 7215.02.02.08

See the attached Data Validation Worksheets for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and specified methods: EPA8330 (HEs). Problems were identified with the data package that result in the qualification of data.

1. The LCS/LCSD percent recoveries (%Rs) of tetryl were less than (<) QC limits. All associated sample results were non-detect (ND) and will be qualified "UJ,A."

Data are acceptable. QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times/Preservation

All samples were extracted and analyzed within the prescribed holding times. All samples were properly preserved.

Calibration

The initial and continuing calibrations met QC acceptance criteria.

Blanks

No target analytes were detected in the method blank.

Surrogates

The surrogate %Rs and retention times (RTs) met QC acceptance criteria.

Internal Standards (ISs)

No IS was required for this method.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

The MS/MSD met QC acceptance criteria.

Laboratory Control Samples (LCS/LCSD)

The LCS/LCSD met QC acceptance criteria except as noted above in the summary section.

Other QC

Two field duplicates were submitted on the ARCOC. However, there are no "required" review criteria for field duplicate analyses comparability. The equipment blank (EB) for these samples was submitted on ARCOC #603273 and analyzed in SDG #25281. No target analytes were detected. No field blank (FB) was submitted on the ARCOC.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

HIGH EXPLOSIVES:
SW846 Method 8330

SITE/PROJECT: CTA-09-RAD VCM ARCO# 603272
LABORATORY: GEL LABORATORY REPORT #: 25273

NAME	CAS #	Intercept	Curve R ²	CCV RPD	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks
		✓	.99	20%	U			20%			20%		U	U
IIMX	2691-41-0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	NA
RDX	121-82-4	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
1,3,5-Trinitrobenzene	99-35-4	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
1,3-dinitrobenzene	99-65-0	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Nitrobenzene	98-95-3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Tetryl	479-45-8	↓	↓	↓	↓	46	46	✓	↓	↓	↓	↓	↓	↓
2,4,6-trinitrotoluene	118-96-7	↓	↓	↓	↓	✓	✓	↓	↓	↓	↓	↓	↓	↓
2-amino-4,6-dinitrotoluene	35572-78-2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
4-amino-2,6-dinitrotoluene	1946-51-0	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
2,4-dinitrotoluene	121-14-2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
2,6-dinitrotoluene	606-20-2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
2-nitrotoluene	88-72-2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
4-nitrotoluene	99-99-0	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
3-nitrotoluene	99-08-1	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
PETN	78-11-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	↓	NA	↓

Sample	SMC %REC	SMC RT	Sample	SMC %REC	SMC RT
All Passed					

Comments: *NA = Not Analyzed*
 (1) EB was submitted on COC # 603273 and analyzed in SOG # 25281.

Confirmation

Sample	CAS #	RPD > 25%	Sample	CAS #	RPD > 25%
All Passed					

mg/kg = ug/g : [(ug/g) x (sample mass {g} / sample vol. {ml}) x (1000ml / liter)] / Dilution Factor = ug/l

** Summary*
 LCS/LCSD:
 => The %Rs of Tetryl were < QC limits. All associated sample results were ND and will be qualified "UJ,A."

REVIEWED BY: [Signature] DATE: 6/5/00

Sample Findings Summary

Site: CETA-09-RAD VCM

AR/COC: 603272

Data Classification: Organics (EPA 8330)

ER Sample ID	Analysis	DV Qualifiers	Comments
051880-003 CETA-09-UCM - PILE1 - N	479-45-8 (Tetryl)	UJ, A	
81 - PILE1 - S			
82 - PILE2 - N			
83 - PILE2 - S			
84 - PILE3 - N			
85 - PILE3 - S			
86 - PILE4 - N			
87 - PILE4 - N - DU			
88 - PILE4 - S			
89 - PILE5 - N			
90 - PILE5 - S			
91 - PILE6 - N			
92 - PILE6 - S			
93 - PILE7 - N			
94 - PILE7 - S			
95 - PILE8 - N			
96 - PILE8 - N - DU			
97 - PILE8 - S			
98 - PILE9 - N			
99 - PILE9 - S			
Data are acceptable. QC Measures appear to be adequate.			

ER Sample ID - This value is located on the AR/Chain of Custody.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470/1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HIE, PCBRISC

Reviewed by: [Signature]

Date: 6/5/00

Data Validation Summary

Site/Project: CC TA-09-RAD VCM Project/Task #: 7215.02.02.08 # of Samples: 20 Matrix: Soil
 AR/COC #: 603272 Laboratory Sample IDs: 25273-001 thru -020
 Laboratory: GEL
 Laboratory Report #: 25273

QC Element	Analysis									
	Organics				Inorganics				RAD	Other
	VOC	SVOC	Pesticide/ PCB	HPLC (IE)	ICP/AES	GFAA/ AA	CVAA (Hg)	CN		
1. Holding Times/Preservation	NA	NA	NA	✓	NA	NA	NA	NA	NA	NA
2. Calibrations	↓	↓	↓	✓	↓	↓	↓	↓	↓	↓
3. Method Blanks	↓	↓	↓	✓	↓	↓	↓	↓	↓	↓
4. MS/MSD	↓	↓	↓	✓	↓	↓	↓	↓	↓	↓
5. Laboratory Control Samples	↓	↓	↓	UJ, A	↓	↓	↓	↓	↓	↓
6. Replicates	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
7. Surrogates	↓	↓	↓	✓	↓	↓	↓	↓	↓	↓
8. Internal Standards	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
9. TCL Compound Identification	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
10. ICP Interference Check Sample	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
11. ICP Serial Dilution	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
12. Carrier/Chemical Tracer Recoveries	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
13. Other QC	↓	↓	↓	✓	↓	↓	↓	↓	↓	↓

J = Estimated
 U = Not Detected
 UJ = Not Detected, Estimated
 R = Unusable

Check (✓) = Acceptable
 Shaded Cells = Not Applicable (also "NA")
 NP = Not Provided
 Other: _____

Reviewed By: [Signature] Date: 6/5/09

Contract Verification Review (Continued)

3.0 Data Quality Evaluation

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2 Quantitation limit met for all samples	X		
3.3 Accuracy a) Laboratory control samples accuracy reported and met for all samples		X	TETRYL OUTSIDE RECOVERY LIMITS FOR LCS/LCD
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
c) Matrix spike recovery data reported and met	X		
3.4 Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	X		
b) Matrix spike duplicate RPD data reported and met for all organic samples	X		
3.5 Blank data a) Method or reagent blank data reported and met for all samples	X		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met	NA		
3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic or above the PQL for inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"-analysis done beyond the holding time	X		
3.7 Narrative addresses planchet flaming for gross alpha/beta	NA		
3.8 Narrative included, correct, and complete	X		
3.9 Second column confirmation data provided for methods 8330 (high explosives) and pesticides/PCBs	X		

Contract Verification Review (Continued)

4.0 Calibration and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc)			
a) 12-hour tune check provided	NA		
b) Initial calibration provided	NA		
c) Continuing calibration provided	NA		
d) Internal standard performance data provided	NA		
e) Instrument run logs provided	NA		
4.2 GC/HPLC (8330 and 8010)			
a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) Instrument run logs provided	X		
4.3 Inorganics (metals)			
a) Initial calibration provided	NA		
b) Continuing calibration provided	NA		
c) ICP interference check sample data provided	NA		
d) ICP serial dilution provided	NA		
e) Instrument run logs provided	NA		
4.4 Radiochemistry			
a) Instrument run logs provided	NA		

06-06-00 09:34 FAX 505 2842617

505 2842617
SNL - ENVIRONMENT REST.

004

ANALYSIS REQUEST AND CHAIN OF CUSTODY CONTINUATION FORM

SE 2001-CDD (12.96)
Supersedes CD-20 issue

AR/COC- 603272

Project Name: CCTA-09-RAD VCM Project/Task Manager: BAYRO / PAULETICH Case No.: 7215.02.02.08

Location		Tech Area		Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)					Sample Type	Lab Sample ID	
Building		Room					Sample Matrix	Container		Preservative	Sample Collection Method			Sample Type
Sample No. - Fraction		ER Sample ID or Sample Location Detail						Type	Volume					
051890-003		CCTA-09-VCM		NA	9	5-1-00 / 0935	S	G	8oz	4 ⁰	G	SA	X	011
		PILE 5-S											X	012
		PILE 6-N				0937							X	013
		PILE 6-S				0940							X	014
		PILE 7-N				0942							X	015
		PILE 7-S				0945							X	016
		PILE 8-N				0955						↓	X	017
		PILE 8-N-DU				0955						DU	X	018
		PILE 8-S				0957						SA	X	019
		PILE 9-N				1000							X	020
		PILE 9-S				1003							X	

HIGH EXPLOSIVES

Parameter & Method Requested

Abnormal Conditions on Receipt LAB USE

Recipient Initials: BBD

ANNEX 10-C
Gamma Spectroscopy Results
1999 Confirmatory Sampling

* Analyzed by: *WJ* 7/14/99 Reviewed by: *KJ* 7/14/99 *

Customer : BYRD/D. PERRY (6134/SMO)
 Customer Sample ID : 047230-001
 Lab Sample ID : 90140901

Sample Description : MARINELLI SOLID SAMPLE *CCFA-09-GR-001-0-0.5-S*
 Sample Quantity : 838.000 gram
 Sample Date/Time : 7/12/99 10:15:00 AM
 Acquire Start Date/Time : 7/13/99 5:02:14 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6004 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	7.19E-001
RA-226	1.52E+000	7.52E-001	5.34E-001
PB-214	7.46E-001	1.46E-001	4.02E-002
BI-214	6.88E-001	1.41E-001	3.95E-002
PB-210	Not Detected	-----	3.36E+001
TH-232	8.79E-001	4.42E-001	1.26E-001
RA-228	1.01E+000	3.19E-001	1.25E-001
AC-228	9.79E-001	3.27E-001	7.86E-002
TH-228	9.74E-001	1.38E+000	4.53E-001
RA-224	9.47E-001	2.27E-001	4.58E-002
PB-212	9.35E-001	1.62E-001	3.69E-002
BI-212	1.08E+000	5.64E-001	2.52E-001
TL-208	8.13E-001	1.79E-001	6.21E-002
U-235	2.06E-001	1.70E-001	2.15E-001
TH-231	Not Detected	-----	1.71E+000
PA-231	Not Detected	-----	1.24E+000
TH-227	Not Detected	-----	3.49E-001
RA-223	Not Detected	-----	2.00E-001
RN-219	Not Detected	-----	3.34E-001
PB-211	Not Detected	-----	7.56E-001
TL-207	Not Detected	-----	1.18E+001
AM-241	Not Detected	-----	4.68E-001
PU-239	Not Detected	-----	3.93E+002
NP-237	Not Detected	-----	2.47E-001
PA-233	Not Detected	-----	5.08E-002
TH-229	Not Detected	-----	2.31E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 90140901

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.32E-002
AG-110m	Not Detected	-----	3.12E-002
BA-133	Not Detected	-----	4.29E-002
BE-7	Not Detected	-----	2.22E-001
CD-109	Not Detected	-----	8.37E-001
CD-115	Not Detected	-----	8.84E-002
CE-139	Not Detected	-----	2.59E-002
CE-141	Not Detected	-----	4.69E-002
CE-144	Not Detected	-----	2.15E-001
CO-56	Not Detected	-----	2.89E-002
CO-57	Not Detected	-----	2.85E-002
CO-58	Not Detected	-----	2.89E-002
CO-60	Not Detected	-----	3.27E-002
CR-51	Not Detected	-----	2.07E-001
CS-134	Not Detected	-----	3.68E-002
CS-137	5.04E-002	3.66E-002	2.00E-002
EU-152	Not Detected	-----	8.59E-002
EU-154	Not Detected	-----	1.60E-001
EU-155	Not Detected	-----	1.31E-001
FE-59	Not Detected	-----	6.58E-002
GD-153	Not Detected	-----	9.57E-002
HG-203	Not Detected	-----	2.82E-002
I-131	Not Detected	-----	2.73E-002
IR-192	Not Detected	-----	2.35E-002
K-40	2.27E+001	3.11E+000	2.03E-001
MN-52	Not Detected	-----	2.82E-002
MN-54	Not Detected	-----	1.55E-002
MO-99	Not Detected	-----	2.91E-001
NA-22	Not Detected	-----	3.80E-002
NA-24	Not Detected	-----	1.21E-001
NB-95	Not Detected	-----	1.95E-001
ND-147	Not Detected	-----	1.86E-001
NI-57	Not Detected	-----	4.78E-002
RU-103	Not Detected	-----	2.50E-002
RU-106	Not Detected	-----	2.44E-001
SB-122	Not Detected	-----	4.79E-002
SB-124	Not Detected	-----	2.48E-002
SB-125	Not Detected	-----	7.08E-002
SN-113	Not Detected	-----	3.24E-002
SR-85	Not Detected	-----	3.24E-002
TA-182	Not Detected	-----	1.36E-001
TA-183	Not Detected	-----	4.78E-001
TC-99m	Not Detected	-----	9.61E-001
TL-201	Not Detected	-----	2.25E-001
XE-133	Not Detected	-----	2.00E-001
Y-88	Not Detected	-----	2.34E-002
ZN-65	Not Detected	-----	8.98E-002
ZR-95	Not Detected	-----	5.14E-002

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 7/14/99 7:45:43 AM *

* Analyzed by: ~~SD~~ 7/14/99 Reviewed by: ~~KA~~ 7/14/99 *

Customer : BYRD/D. PERRY (6134/SMO)
 Customer Sample ID : 047236-001
 Lab Sample ID : 90140902

Sample Description : MARINELLI SOLID SAMPLE CCA-09-GR-004-0-0.5-S
 Sample Quantity : 885.000 gram
 Sample Date/Time : 7/12/99 10:20:00 AM
 Acquire Start Date/Time : 7/13/99 6:44:00 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6004 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	6.62E-001
RA-226	Not Detected	-----	4.36E-001
PB-214	4.65E-001	9.92E-002	4.04E-002
BI-214	4.45E-001	6.74E-002	3.75E-002
PB-210	Not Detected	-----	3.05E+001
TH-232	7.50E-001	4.01E-001	1.17E-001
RA-228	7.83E-001	2.53E-001	1.34E-001
AC-228	6.98E-001	1.97E-001	7.62E-002
TH-228	6.28E-001	5.61E-001	3.78E-001
RA-224	7.48E-001	1.83E-001	4.58E-002
PB-212	6.65E-001	1.25E-001	3.65E-002
BI-212	7.65E-001	4.24E-001	2.68E-001
TL-208	6.53E-001	1.47E-001	5.77E-002
U-235	Not Detected	-----	1.95E-001
TH-231	Not Detected	-----	1.53E+000
PA-231	Not Detected	-----	1.17E+000
TH-227	Not Detected	-----	3.07E-001
RA-223	Not Detected	-----	1.76E-001
RN-219	Not Detected	-----	2.96E-001
PB-211	Not Detected	-----	6.64E-001
TL-207	Not Detected	-----	1.15E+001
AM-241	Not Detected	-----	4.13E-001
PU-239	Not Detected	-----	3.61E+002
NP-237	Not Detected	-----	3.19E-001
PA-233	Not Detected	-----	4.82E-002
TH-229	Not Detected	-----	2.24E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 90140902

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.08E-002
AG-110m	Not Detected	-----	3.30E-002
BA-133	Not Detected	-----	3.75E-002
BE-7	Not Detected	-----	2.01E-001
CD-109	1.56E+000	6.96E-001	8.40E-001
CD-115	Not Detected	-----	8.12E-002
CE-139	Not Detected	-----	2.35E-002
CE-141	Not Detected	-----	4.32E-002
CE-144	Not Detected	-----	1.95E-001
CO-56	Not Detected	-----	2.79E-002
CO-57	Not Detected	-----	2.48E-002
CO-58	Not Detected	-----	2.80E-002
CO-60	Not Detected	-----	3.02E-002
CR-51	Not Detected	-----	1.95E-001
CS-134	Not Detected	-----	3.23E-002
CS-137	1.03E-001	3.89E-002	1.86E-002
EU-152	Not Detected	-----	7.51E-002
EU-154	Not Detected	-----	1.46E-001
EU-155	Not Detected	-----	1.22E-001
FE-59	Not Detected	-----	6.34E-002
GD-153	Not Detected	-----	9.04E-002
HG-203	Not Detected	-----	2.57E-002
I-131	Not Detected	-----	2.40E-002
IR-192	Not Detected	-----	2.26E-002
K-40	2.65E+001	3.61E+000	1.74E-001
MN-52	Not Detected	-----	2.72E-002
MN-54	Not Detected	-----	1.42E-002
MO-99	Not Detected	-----	2.72E-001
NA-22	Not Detected	-----	3.70E-002
NA-24	Not Detected	-----	1.20E-001
NB-95	Not Detected	-----	1.75E-001
ND-147	Not Detected	-----	1.72E-001
NI-57	Not Detected	-----	7.10E-002
RU-103	Not Detected	-----	2.31E-002
RU-106	Not Detected	-----	2.26E-001
SB-122	Not Detected	-----	4.46E-002
SB-124	Not Detected	-----	2.45E-002
SB-125	Not Detected	-----	6.44E-002
SN-113	Not Detected	-----	3.06E-002
SR-85	Not Detected	-----	2.93E-002
TA-182	Not Detected	-----	1.26E-001
TA-183	Not Detected	-----	4.24E-001
TC-99m	Not Detected	-----	1.05E+000
TL-201	Not Detected	-----	2.08E-001
XE-133	Not Detected	-----	1.80E-001
Y-88	Not Detected	-----	1.98E-002
ZN-65	Not Detected	-----	8.27E-002
ZR-95	Not Detected	-----	4.63E-002

Not detected *7/14*

 ● Sandia National Laboratories
 * Radiation Protection Sample Diagnostics Program [806 Laboratory]
 ● 7/14/99 8:16:37 AM

*
 ● Analyzed by: *[Signature]* 7/14/99 Reviewed by: *[Signature]* 7/14/99

Customer : BYRD/D. PERRY (6134/SMO)
 Customer Sample ID : 047243-001
 Lab Sample ID : 90140903

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 979.000 gram
 Sample Date/Time : 7/12/99 11:12:00 AM
 Acquire Start Date/Time : 7/13/99 8:25:47 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6004 seconds

CCTA-09-GR-007-0-0.5

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	6.12E-001
RA-226	Not Detected	-----	3.71E-001
PB-214	4.24E-001	9.40E-002	3.80E-002
BI-214	3.93E-001	9.05E-002	3.61E-002
PB-210	Not Detected	-----	2.87E+001
TH-232	7.79E-001	4.03E-001	1.10E-001
RA-228	7.02E-001	2.70E-001	1.08E-001
AC-228	7.52E-001	1.94E-001	7.31E-002
TH-228	6.15E-001	7.20E-001	3.17E-001
RA-224	7.09E-001	1.73E-001	5.12E-002
PB-212	6.92E-001	1.19E-001	3.05E-002
BI-212	7.00E-001	5.03E-001	2.31E-001
TL-208	6.61E-001	2.99E-001	4.76E-002
U-235	Not Detected	-----	1.81E-001
TH-231	Not Detected	-----	1.45E+000
PA-231	Not Detected	-----	1.08E+000
TH-227	Not Detected	-----	2.83E-001
RA-223	Not Detected	-----	1.67E-001
RN-219	Not Detected	-----	2.77E-001
PB-211	Not Detected	-----	6.21E-001
TL-207	Not Detected	-----	1.09E+001
AM-241	Not Detected	-----	3.93E-001
FU-239	Not Detected	-----	3.42E+002
NP-237	Not Detected	-----	2.16E-001
PA-233	Not Detected	-----	4.37E-002
TH-229	Not Detected	-----	2.02E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 90140903

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	2.79E-002
AG-110m	Not Detected	-----	2.77E-002
BA-133	Not Detected	-----	3.49E-002
BE-7	Not Detected	-----	1.95E-001
CD-109	Not Detected	-----	7.32E-001
CD-115	Not Detected	-----	7.70E-002
CE-139	Not Detected	-----	2.21E-002
CE-141	Not Detected	-----	4.10E-002
CE-144	Not Detected	-----	1.83E-001
CO-56	Not Detected	-----	2.67E-002
CO-57	Not Detected	-----	2.46E-002
CO-58	Not Detected	-----	2.47E-002
CO-60	Not Detected	-----	2.97E-002
CR-51	Not Detected	-----	1.76E-001
CS-134	Not Detected	-----	2.88E-002
CS-137	6.27E-002	2.83E-002	1.82E-002
EU-152	Not Detected	-----	7.41E-002
EU-154	Not Detected	-----	1.34E-001
EU-155	Not Detected	-----	1.13E-001
FE-59	Not Detected	-----	6.11E-002
GD-153	Not Detected	-----	8.42E-002
HG-203	Not Detected	-----	2.37E-002
I-131	Not Detected	-----	2.32E-002
IR-192	Not Detected	-----	2.02E-002
K-40	2.54E+001	3.46E+000	1.66E-001
MN-52	Not Detected	-----	2.58E-002
MN-54	Not Detected	-----	2.69E-002
MO-99	Not Detected	-----	2.65E-001
NA-22	Not Detected	-----	3.42E-002
NA-24	Not Detected	-----	1.21E-001
NB-95	Not Detected	-----	1.63E-001
ND-147	Not Detected	-----	1.57E-001
NI-57	Not Detected	-----	6.47E-002
RU-103	Not Detected	-----	2.25E-002
RU-106	Not Detected	-----	2.15E-001
SB-122	Not Detected	-----	4.32E-002
SB-124	Not Detected	-----	2.17E-002
SB-125	Not Detected	-----	6.03E-002
SN-113	Not Detected	-----	2.82E-002
SR-85	Not Detected	-----	2.64E-002
TA-182	Not Detected	-----	1.18E-001
TA-183	Not Detected	-----	4.05E-001
TC-99m	Not Detected	-----	1.07E+000
TL-201	Not Detected	-----	1.98E-001
XE-133	Not Detected	-----	1.72E-001
Y-88	Not Detected	-----	1.74E-002
ZN-65	Not Detected	-----	7.81E-002
ZR-95	Not Detected	-----	4.36E-002

 * Sandia National Laboratories
 * Radiation Protection Sample Diagnostics Program [806 Laboratory]
 * 7/13/99 11:47:48 PM
 *
 * Analyzed by: ~~AS~~ 7/14/99 Reviewed by: ~~KS~~ 7/14/99

Customer : BYRD/D. PERRY (6134/SMO)
 Customer Sample ID : 047248-001
 Lab Sample ID : 90140904

CCTA-09-GR-009-D-D.5-5

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 870.000 gram
 Sample Date/Time : 7/12/99 11:25:00 AM
 Acquire Start Date/Time : 7/13/99 10:07:34 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6004 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	7.02E-001
RA-226	1.34E+000	7.07E-001	5.55E-001
PB-214	4.20E-001	9.11E-002	4.20E-002
BI-214	4.03E-001	1.01E-001	3.99E-002
PB-210	Not Detected	-----	3.05E+001
TH-232	6.74E-001	3.64E-001	1.25E-001
RA-228	7.67E-001	2.52E-001	1.29E-001
AC-228	6.75E-001	1.92E-001	7.39E-002
TH-228	2.57E-001	3.60E-001	3.68E-001
RA-224	7.43E-001	1.83E-001	5.65E-002
PB-212	6.93E-001	1.25E-001	3.14E-002
BI-212	8.83E-001	2.31E-001	2.64E-001
TL-208	6.48E-001	1.34E-001	5.40E-002
U-235	1.99E-001	1.56E-001	1.98E-001
TH-231	Not Detected	-----	1.60E+000
PA-231	Not Detected	-----	1.13E+000
TH-227	Not Detected	-----	3.02E-001
RA-223	Not Detected	-----	1.86E-001
RN-219	Not Detected	-----	3.06E-001
PB-211	Not Detected	-----	6.85E-001
TL-207	Not Detected	-----	1.16E+001
AM-241	Not Detected	-----	4.09E-001
PU-239	Not Detected	-----	3.69E+002
NP-237	Not Detected	-----	2.17E-001
PA-233	Not Detected	-----	4.70E-002
TH-229	Not Detected	-----	2.12E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.04E-002
AG-110m	Not Detected	-----	3.09E-002
BA-133	Not Detected	-----	3.69E-002
BE-7	Not Detected	-----	2.04E-001
CD-109	Not Detected	-----	1.09E+000
CD-115	Not Detected	-----	8.39E-002
CE-139	Not Detected	-----	2.38E-002
CE-141	Not Detected	-----	4.35E-002
CE-144	Not Detected	-----	1.94E-001
CO-56	Not Detected	-----	2.83E-002
CO-57	Not Detected	-----	2.61E-002
CO-58	Not Detected	-----	2.79E-002
CO-60	Not Detected	-----	3.13E-002
CR-51	Not Detected	-----	1.88E-001
CS-134	Not Detected	-----	3.10E-002
CS-137	6.52E-002	6.58E-002	1.82E-002
EU-152	Not Detected	-----	7.87E-002
EU-154	Not Detected	-----	1.47E-001
EU-155	Not Detected	-----	1.22E-001
FE-59	Not Detected	-----	6.38E-002
GD-153	Not Detected	-----	8.83E-002
HG-203	Not Detected	-----	2.55E-002
I-131	Not Detected	-----	2.58E-002
IR-192	Not Detected	-----	2.18E-002
K-40	2.64E+001	3.61E+000	1.96E-001
MN-52	Not Detected	-----	2.93E-002
MN-54	Not Detected	-----	2.87E-002
MO-99	Not Detected	-----	2.78E-001
NA-22	Not Detected	-----	3.75E-002
NA-24	Not Detected	-----	1.37E-001
NB-95	Not Detected	-----	1.75E-001
ND-147	Not Detected	-----	1.79E-001
NI-57	Not Detected	-----	7.37E-002
RU-103	Not Detected	-----	2.15E-002
RU-106	Not Detected	-----	2.29E-001
SB-122	Not Detected	-----	4.66E-002
SB-124	Not Detected	-----	2.39E-002
SB-125	Not Detected	-----	6.62E-002
SN-113	Not Detected	-----	3.01E-002
SR-85	Not Detected	-----	2.91E-002
TA-182	Not Detected	-----	1.26E-001
TA-183	Not Detected	-----	4.28E-001
TC-99m	Not Detected	-----	1.38E+000
TL-201	Not Detected	-----	2.08E-001
XE-133	Not Detected	-----	1.93E-001
Y-88	Not Detected	-----	1.69E-002
ZN-65	Not Detected	-----	8.72E-002
ZR-95	Not Detected	-----	4.68E-002

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 7/14/99 8:12:11 AM *

* Analyzed by: *MS 7/14/99* Reviewed by: *K 7/14/99*

Customer : BYRD/D. PERRY (6134/SMO)
 Customer Sample ID : 047251-001
 Lab Sample ID : 90140905 *CCA-09-GR-030-D-D.5-5*

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 828.000 gram
 Sample Date/Time : 7/12/99 1:30:00 PM
 Acquire Start Date/Time : 7/13/99 11:49:21 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	7.02E-001
RA-226	1.38E+000	7.69E-001	4.92E-001
PB-214	4.48E-001	1.02E-001	4.20E-002
BI-214	4.18E-001	9.76E-002	3.99E-002
PB-210	Not Detected	-----	3.15E+001
TH-232	7.41E-001	3.83E-001	1.24E-001
RA-228	7.47E-001	2.60E-001	1.34E-001
AC-228	7.83E-001	2.27E-001	7.42E-002
TH-228	8.27E-001	6.48E-001	4.60E-001
RA-224	7.77E-001	1.92E-001	5.71E-002
PB-212	7.73E-001	1.60E-001	3.51E-002
BI-212	8.13E-001	4.14E-001	2.55E-001
TL-208	7.26E-001	5.65E-001	5.95E-002
U-235	1.28E-001	1.59E-001	2.02E-001
TH-231	Not Detected	-----	1.64E+000
PA-231	Not Detected	-----	1.20E+000
TH-227	Not Detected	-----	3.26E-001
RA-223	Not Detected	-----	1.90E-001
RN-219	Not Detected	-----	3.19E-001
PB-211	Not Detected	-----	7.11E-001
TL-207	Not Detected	-----	1.20E+001
AM-241	Not Detected	-----	4.32E-001
PU-239	Not Detected	-----	3.77E+002
NP-237	4.96E-001	4.12E-001	2.43E-001
PA-233	Not Detected	-----	4.66E-002
TH-229	Not Detected	-----	2.28E-001

not detected MS 7/14/99

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.18E-002
AG-110m	Not Detected	-----	3.20E-002
BA-133	Not Detected	-----	3.92E-002
BE-7	1.95E-001	2.68E-001	1.43E-001
CD-109	Not Detected	-----	8.25E-001
CD-115	Not Detected	-----	8.76E-002
CE-139	Not Detected	-----	2.42E-002
CE-141	Not Detected	-----	4.44E-002
CE-144	Not Detected	-----	2.03E-001
CO-56	Not Detected	-----	2.73E-002
CO-57	Not Detected	-----	2.74E-002
CO-58	Not Detected	-----	2.71E-002
CO-60	Not Detected	-----	3.35E-002
CR-51	Not Detected	-----	1.99E-001
CS-134	Not Detected	-----	3.25E-002
CS-137	5.59E-002	4.90E-002	2.03E-002
EU-152	Not Detected	-----	8.20E-002
EU-154	Not Detected	-----	1.53E-001
EU-155	Not Detected	-----	7.65E-002
FE-59	Not Detected	-----	6.53E-002
GD-153	Not Detected	-----	9.31E-002
HG-203	Not Detected	-----	2.64E-002
I-131	Not Detected	-----	2.57E-002
IR-192	Not Detected	-----	2.23E-002
K-40	2.53E+001	3.46E+000	1.86E-001
MN-52	Not Detected	-----	3.05E-002
MN-54	Not Detected	-----	2.91E-002
MO-99	Not Detected	-----	2.87E-001
NA-22	Not Detected	-----	3.75E-002
NA-24	Not Detected	-----	1.44E-001
NB-95	Not Detected	-----	1.87E-001
ND-147	Not Detected	-----	1.83E-001
NI-57	Not Detected	-----	3.85E-002
RU-103	Not Detected	-----	2.37E-002
RU-106	Not Detected	-----	2.32E-001
SB-122	Not Detected	-----	4.93E-002
SB-124	Not Detected	-----	2.54E-002
SB-125	Not Detected	-----	6.97E-002
SN-113	Not Detected	-----	3.16E-002
SR-85	Not Detected	-----	3.10E-002
TA-182	Not Detected	-----	1.29E-001
TA-183	Not Detected	-----	4.55E-001
TC-99m	Not Detected	-----	1.38E+000
TL-201	Not Detected	-----	2.24E-001
XE-133	Not Detected	-----	1.93E-001
Y-88	Not Detected	-----	1.83E-002
ZN-65	Not Detected	-----	8.45E-002
ZR-95	Not Detected	-----	4.91E-002

Sandia National Laboratories
 Radiation Protection Sample Diagnostics Program [806 Laboratory]
 7/14/99 8:08:57 AM

Analyzed by: *WJ* 7/14/99 Reviewed by: *K* 7/14/99

Customer : BYRD/D. PERRY (6134/SMO)
 Customer Sample ID : 047255-001
 Lab Sample ID : 90140906 *CCIA-09-GR-032-0-0.5-5*

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 942.000 gram
 Sample Date/Time : 7/12/99 1:50:00 PM
 Acquire Start Date/Time : 7/14/99 1:31:08 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6004 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	1.16E+000	6.56E-001	5.53E-001
RA-226	1.52E+000	6.48E-001	4.58E-001
PB-214	Not Detected	-----	3.74E-002
BI-214	5.12E-001	1.01E-001	3.46E-002
PB-210	Not Detected	-----	3.05E+001
TH-232	8.03E-001	7.28E-001	1.09E-001
RA-228	8.18E-001	2.44E-001	1.06E-001
AC-228	7.83E-001	2.01E-001	6.52E-002
TH-228	8.98E-001	6.41E-001	3.42E-001
RA-224	7.84E-001	1.90E-001	4.09E-002
PB-212	7.79E-001	1.39E-001	3.17E-002
BI-212	7.58E-001	4.89E-001	2.19E-001
TL-208	7.23E-001	1.56E-001	5.29E-002
U-235	Not Detected	-----	1.90E-001
TH-231	Not Detected	-----	1.54E+000
PA-231	Not Detected	-----	1.10E+000
TH-227	Not Detected	-----	3.02E-001
RA-223	Not Detected	-----	1.82E-001
RN-219	Not Detected	-----	2.93E-001
PB-211	Not Detected	-----	6.55E-001
TL-207	Not Detected	-----	9.86E+000
AM-241	Not Detected	-----	4.13E-001
PU-239	Not Detected	-----	3.50E+002
NP-237	4.39E-001	2.25E-001	2.25E-001
PA-233	Not Detected	-----	4.39E-002
TH-229	Not Detected	-----	2.06E-001

Not detected 7/14/99

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	2.86E-002
AG-110m	Not Detected	-----	3.01E-002
BA-133	Not Detected	-----	3.67E-002
BE-7	Not Detected	-----	1.97E-001
CD-109	Not Detected	-----	1.08E+000
CD-115	Not Detected	-----	8.41E-002
CE-139	Not Detected	-----	2.20E-002
CE-141	Not Detected	-----	4.21E-002
CE-144	Not Detected	-----	1.85E-001
CO-56	Not Detected	-----	2.58E-002
CO-57	Not Detected	-----	2.54E-002
CO-58	Not Detected	-----	2.43E-002
CO-60	Not Detected	-----	3.02E-002
CR-51	Not Detected	-----	1.80E-001
CS-134	Not Detected	-----	3.11E-002
CS-137	7.78E-002	3.85E-002	1.94E-002
EU-152	Not Detected	-----	7.66E-002
EU-154	Not Detected	-----	1.38E-001
EU-155	Not Detected	-----	1.16E-001
FE-59	Not Detected	-----	5.38E-002
GD-153	Not Detected	-----	8.64E-002
HG-203	Not Detected	-----	2.48E-002
I-131	Not Detected	-----	2.44E-002
IR-192	Not Detected	-----	2.04E-002
K-40	2.02E+001	2.77E+000	1.73E-001
MN-52	Not Detected	-----	2.52E-002
MN-54	Not Detected	-----	2.64E-002
MO-99	Not Detected	-----	2.51E-001
NA-22	Not Detected	-----	3.38E-002
NA-24	Not Detected	-----	1.37E-001
NB-95	Not Detected	-----	1.75E-001
ND-147	Not Detected	-----	1.72E-001
NI-57	Not Detected	-----	7.54E-002
RU-103	Not Detected	-----	2.21E-002
RU-106	Not Detected	-----	2.19E-001
SB-122	Not Detected	-----	4.50E-002
SB-124	Not Detected	-----	2.21E-002
SB-125	Not Detected	-----	6.34E-002
SN-113	Not Detected	-----	2.88E-002
SR-85	Not Detected	-----	2.78E-002
TA-182	Not Detected	-----	1.18E-001
TA-183	Not Detected	-----	4.32E-001
TC-99m	Not Detected	-----	1.51E+000
TL-201	Not Detected	-----	2.11E-001
XE-133	Not Detected	-----	1.90E-001
Y-88	Not Detected	-----	1.95E-002
ZN-65	Not Detected	-----	7.92E-002
ZR-95	Not Detected	-----	4.26E-002

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 7/14/99 8:05:14 AM *

* Analyzed by: ~~W~~ 7/14/99 Reviewed by: ~~K~~ 7/14/99 *

Customer : BYRD/D. PERRY (6134/SMO)
 Customer Sample ID : 047260-001
 Lab Sample ID : 90140907 CCR-09-GR-034-0-0.5-5

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 940.000 gram
 Sample Date/Time : 7/12/99 2:00:00 PM
 Acquire Start Date/Time : 7/14/99 3:12:54 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6004 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	2.15E+000	1.93E+000	6.08E-001
RA-226	Not Detected	-----	4.76E-001
PB-214	5.40E-001	1.13E-001	3.78E-002
BI-214	4.77E-001	1.10E-001	3.68E-002
PB-210	Not Detected	-----	3.23E+001
TH-232	7.75E-001	4.16E-001	1.05E-001
RA-228	8.37E-001	2.97E-001	1.18E-001
AC-228	7.86E-001	2.16E-001	6.80E-002
TH-228	7.62E-001	5.93E-001	4.20E-001
RA-224	9.06E-001	2.16E-001	4.96E-002
PB-212	7.83E-001	1.38E-001	3.12E-002
BI-212	9.97E-001	5.20E-001	2.44E-001
TL-208	7.07E-001	1.49E-001	5.63E-002
U-235	Not Detected	-----	1.93E-001
TH-231	Not Detected	-----	1.60E+000
PA-231	Not Detected	-----	1.15E+000
TH-227	Not Detected	-----	3.04E-001
RA-223	Not Detected	-----	1.84E-001
RN-219	Not Detected	-----	3.07E-001
PB-211	Not Detected	-----	6.78E-001
TL-207	Not Detected	-----	1.08E+001
AM-241	Not Detected	-----	4.21E-001
PU-239	Not Detected	-----	3.56E+002
NP-237	Not Detected	-----	2.92E-001
PA-233	Not Detected	-----	4.84E-002
TH-229	Not Detected	-----	2.15E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.17E-002
AG-110m	Not Detected	-----	4.53E-002
BA-133	Not Detected	-----	3.81E-002
BE-7	Not Detected	-----	2.14E-001
CD-109	1.93E+000	1.67E+000	2.61E-002
CD-115	Not Detected	-----	8.62E-002
CE-139	Not Detected	-----	2.33E-002
CE-141	Not Detected	-----	4.27E-002
CE-144	Not Detected	-----	1.91E-001
CO-56	Not Detected	-----	2.61E-002
CO-57	Not Detected	-----	2.62E-002
CO-58	Not Detected	-----	2.65E-002
CO-60	Not Detected	-----	3.01E-002
CR-51	Not Detected	-----	1.92E-001
CS-134	Not Detected	-----	3.08E-002
CS-137	3.20E-001	6.49E-002	1.84E-002
EU-152	Not Detected	-----	7.85E-002
EU-154	Not Detected	-----	1.50E-001
EU-155	Not Detected	-----	1.20E-001
FE-59	Not Detected	-----	5.99E-002
GD-153	Not Detected	-----	8.82E-002
HG-203	Not Detected	-----	2.57E-002
I-131	Not Detected	-----	2.52E-002
IR-192	Not Detected	-----	2.26E-002
K-40	2.31E+001	3.16E+000	1.64E-001
MN-52	Not Detected	-----	2.78E-002
MN-54	Not Detected	-----	2.91E-002
MO-99	Not Detected	-----	2.56E-001
NA-22	Not Detected	-----	3.40E-002
NA-24	Not Detected	-----	1.52E-001
NB-95	Not Detected	-----	1.79E-001
ND-147	Not Detected	-----	1.78E-001
NI-57	Not Detected	-----	7.57E-002
RU-103	Not Detected	-----	2.35E-002
RU-106	Not Detected	-----	2.19E-001
SB-122	Not Detected	-----	4.59E-002
SB-124	Not Detected	-----	2.22E-002
SB-125	Not Detected	-----	6.77E-002
SN-113	Not Detected	-----	3.06E-002
SR-85	Not Detected	-----	2.92E-002
TA-182	Not Detected	-----	1.22E-001
TA-183	Not Detected	-----	4.48E-001
TC-99m	Not Detected	-----	1.84E+000
TL-201	Not Detected	-----	2.19E-001
XE-133	Not Detected	-----	1.94E-001
Y-88	Not Detected	-----	1.98E-002
ZN-65	Not Detected	-----	8.04E-002
ZR-95	Not Detected	-----	4.53E-002

not detected *7/14/10*

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 7/14/99 6:34:51 AM *

* Analyzed by: ~~XXX~~ 7/14/99 Reviewed by: ~~XXX~~ 7/14/99 *

Customer : BYRD/D. PERRY (6134/SMO)
 Customer Sample ID : 047262-109
 Lab Sample ID : 90140908

CCIA-09-GR-000-EB

Sample Description : MARINELLI LIQUID SAMPLE
 Sample Quantity : 500.000 mL
 Sample Date/Time : 7/12/99 9:40:00 AM
 Acquire Start Date/Time : 7/14/99 4:54:41 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6001 seconds

Comments:

Nuclide Name	Activity (pCi/mL)	2-sigma Error	MDA (pCi/mL)
U-238	Not Detected	-----	3.20E-001
RA-226	Not Detected	-----	3.97E-001
PB-214	Not Detected	-----	3.44E-002
EI-214	Not Detected	-----	3.76E-002
PB-210	Not Detected	-----	1.22E+001
TH-232	Not Detected	-----	1.11E-001
RA-228	Not Detected	-----	1.09E-001
AC-228	Not Detected	-----	6.43E-002
TH-228	Not Detected	-----	3.89E-001
RA-224	Not Detected	-----	9.42E-002
PB-212	Not Detected	-----	3.00E-002
EI-212	Not Detected	-----	2.21E-001
TL-208	Not Detected	-----	5.07E-002
U-235	Not Detected	-----	1.26E-001
TH-231	Not Detected	-----	9.62E-001
PA-231	Not Detected	-----	7.89E-001
TH-227	Not Detected	-----	1.14E-001
RA-223	Not Detected	-----	9.08E-002
RN-219	Not Detected	-----	2.04E-001
PB-211	Not Detected	-----	4.75E-001
TL-207	Not Detected	-----	7.70E+000
AM-241	Not Detected	-----	1.91E-001
PJ-239	Not Detected	-----	2.12E+002
NP-237	Not Detected	-----	1.42E-001
PA-233	Not Detected	-----	3.41E-002
TH-229	Not Detected	-----	1.17E-001

Nuclide Name	Activity (pCi/mL)	2-sigma Error	MDA (pCi/mL)
AG-108m	Not Detected	-----	1.70E-002
AG-110m	Not Detected	-----	1.52E-002
BA-133	Not Detected	-----	2.05E-002
BE-7	Not Detected	-----	1.52E-001
CD-109	Not Detected	-----	4.80E-001
CD-115	Not Detected	-----	4.83E-002
CE-139	Not Detected	-----	1.53E-002
CE-141	Not Detected	-----	2.68E-002
CE-144	Not Detected	-----	1.22E-001
CO-56	Not Detected	-----	2.24E-002
CO-57	Not Detected	-----	1.63E-002
CO-58	Not Detected	-----	1.75E-002
CO-60	Not Detected	-----	1.87E-002
CR-51	Not Detected	-----	1.42E-001
CS-134	Not Detected	-----	1.67E-002
CS-137	Not Detected	-----	1.69E-002
EU-152	Not Detected	-----	4.89E-002
EU-154	Not Detected	-----	7.96E-002
EU-155	Not Detected	-----	7.42E-002
FE-59	Not Detected	-----	3.16E-002
GD-153	Not Detected	-----	4.84E-002
HG-203	Not Detected	-----	1.65E-002
I-131	Not Detected	-----	1.87E-002
IR-192	Not Detected	-----	1.63E-002
K-40	Not Detected	-----	2.92E-001
MN-52	Not Detected	-----	2.36E-002
MN-54	Not Detected	-----	1.88E-002
MO-99	Not Detected	-----	2.09E-001
NA-22	Not Detected	-----	1.61E-002
NA-24	Not Detected	-----	1.18E-001
NB-95	Not Detected	-----	7.42E-002
ND-147	Not Detected	-----	1.15E-001
NI-57	Not Detected	-----	5.28E-002
RU-103	Not Detected	-----	1.79E-002
RU-106	Not Detected	-----	1.59E-001
SB-122	Not Detected	-----	3.48E-002
SB-124	Not Detected	-----	1.64E-002
SB-125	Not Detected	-----	4.67E-002
SN-113	Not Detected	-----	2.14E-002
SR-85	Not Detected	-----	2.38E-002
TA-182	Not Detected	-----	5.38E-002
TA-183	Not Detected	-----	2.05E-001
TC-99m	Not Detected	-----	2.57E+000
TL-201	Not Detected	-----	1.09E-001
XE-133	Not Detected	-----	1.07E-001
Y-88	Not Detected	-----	1.91E-002
ZN-65	Not Detected	-----	3.68E-002
ZR-95	Not Detected	-----	2.88E-002

 ● Sandia National Laboratories
 * Radiation Protection Sample Diagnostics Program [806 Laboratory]
 * 7/14/99 7:21:34 AM

 * Analyzed by: *KH 7/14/99* Reviewed by: *WJ 7/14/99*

Customer : BYRD/D. PERRY (6134/SMO)
 Customer Sample ID : LAB CONTROL SAMPLE USING CG134
 Lab Sample ID : 90140909

Sample Description : MIXED GAMMA STANDARD CG134
 Sample Quantity : 1.000 Each
 Sample Date/Time : 11/01/90 12:00:00 PM
 Acquire Start Date/Time : 7/14/99 7:11:20 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 600 / 605 seconds

Comments:

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	-----	4.09E+003
RA-226	Not Detected	-----	5.47E+003
PB-214	Not Detected	-----	6.04E+002
BI-214	Not Detected	-----	5.42E+002
PB-210	Not Detected	-----	2.70E+005
TH-232	Not Detected	-----	1.90E+003
RA-228	Not Detected	-----	2.15E+003
AC-228	Not Detected	-----	1.28E+003
TH-228	Not Detected	-----	1.41E+005
RA-224	Not Detected	-----	5.38E+003
PB-212	Not Detected	-----	1.07E+004
BI-212	Not Detected	-----	8.14E+004
TL-208	Not Detected	-----	1.93E+004
U-235	Not Detected	-----	1.55E+003
TH-231	Not Detected	-----	1.16E+004
PA-231	Not Detected	-----	1.28E+004
TH-227	Not Detected	-----	2.36E+003
RA-223	Not Detected	-----	1.00E+026
RN-219	Not Detected	-----	5.34E+003
PB-211	Not Detected	-----	1.20E+004
TL-207	Not Detected	-----	1.87E+005
AM-241	7.78E+004	1.44E+004	2.95E+003
PU-239	Not Detected	-----	2.78E+006
NP-237	Not Detected	-----	2.14E+003
PA-233	Not Detected	-----	5.40E+002
TH-229	Not Detected	-----	1.58E+003

[Summary Report] - Sample ID: : 90140909

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	-----	2.76E+002
AG-110m	Not Detected	-----	1.05E+007
BA-133	Not Detected	-----	6.59E+002
BE-7	Not Detected	-----	2.73E+021
CD-109	Not Detected	-----	7.93E+005
CD-115	Not Detected	-----	1.00E+026
CE-139	Not Detected	-----	1.73E+009
CE-141	Not Detected	-----	1.00E+026
CE-144	Not Detected	-----	3.52E+006
CO-56	Not Detected	-----	7.75E+014
CO-57	Not Detected	-----	6.61E+005
CO-58	Not Detected	-----	8.84E+015
CO-60	7.87E+004	1.07E+004	4.35E+002
CR-51	Not Detected	-----	1.00E+026
CS-134	Not Detected	-----	4.79E+003
CS-137	7.15E+004	9.48E+003	2.47E+002
EU-152	Not Detected	-----	9.42E+002
EU-154	Not Detected	-----	2.43E+003
EU-155	Not Detected	-----	3.17E+003
FE-59	Not Detected	-----	1.00E+026
GD-153	Not Detected	-----	6.04E+006
HG-203	Not Detected	-----	1.00E+026
I-131	Not Detected	-----	1.00E+026
IR-192	Not Detected	-----	2.30E+015
K-40	Not Detected	-----	1.30E+003
MN-52	Not Detected	-----	1.00E+026
MN-54	Not Detected	-----	3.41E+005
MO-99	Not Detected	-----	1.00E+026
NA-22	Not Detected	-----	1.79E+003
NA-24	Not Detected	-----	1.00E+026
NB-95	Not Detected	-----	1.00E+026
ND-147	Not Detected	-----	1.00E+026
NI-57	Not Detected	-----	1.00E+026
RU-103	Not Detected	-----	1.00E+026
RU-106	Not Detected	-----	1.04E+006
SB-122	Not Detected	-----	1.00E+026
SB-124	Not Detected	-----	1.98E+018
SB-125	Not Detected	-----	8.77E+003
SN-113	Not Detected	-----	8.01E+010
SR-85	Not Detected	-----	1.83E+017
TA-182	Not Detected	-----	1.97E+011
TA-183	Not Detected	-----	1.00E+026
TC-99m	Not Detected	-----	1.00E+026
TL-201	Not Detected	-----	1.00E+026
XE-133	Not Detected	-----	1.00E+026
Y-88	Not Detected	-----	1.45E+011
ZN-65	Not Detected	-----	5.97E+006
ZR-95	Not Detected	-----	3.93E+017

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program *
 * Quality Assurance Report *

Report Date : 7/14/99 7:21:36 AM
 QA File : C:\GENIE2K\CAMFILES\LCS2.QAF
 Analyst : KIC
 Sample ID : 90140909
 Sample Quantity : 1.00 Each
 Sample Date : 11/01/90 12:00:00 PM
 Measurement Date : 7/14/99 7:11:20 AM
 Elapsed Live Time : 600 seconds
 Elapsed Real Time : 605 seconds

Parameter	Mean	1S Error	New Value	<	LU	:	SD	:	UD	:	BS
AM-241 Activity	8.169E-002	3.880E-003	7.776E-002	<	:	:	:	:	:	:	:
CS-137 Activity	7.063E-002	1.923E-003	7.152E-002	<	:	:	:	:	:	:	:
CO-60 Activity	7.867E-002	2.123E-003	7.931E-002	<	:	:	:	:	:	:	:

Flags Key: LU = Boundary Test (Ab = Above, Be = Below)
 SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
 UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
 BS = Measurement Bias Test (In = Investigate, Ac = Action)

Reviewed by: *KIC* 7/14/99

★ Analyzed by: *[Signature]* 7/26/99 Reviewed by: *[Signature]* 7/27/99

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047231-001
 Lab Sample ID : 90141101

CCTA-09-GR-001 - 0.5-1.0-S

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 849.000 gram
 Sample Date/Time : 7/12/99 10:17:00 AM Note: Ra-226 and U-235 gamma pe
 Acquire Start Date/Time : 7/14/99 3:26:44 PM interfere. Either isotope
 Detector Name : LAB01 may be over-estimated.
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	5.39E-001
RA-226	1.44E+000	7.83E-001	5.65E-001
PB-214	6.95E-001	1.54E-001	4.67E-002
BI-214	6.73E-001	1.51E-001	4.78E-002
PB-210	Not Detected	-----	8.14E+000
TH-232	8.57E-001	4.61E-001	1.53E-001
RA-228	9.40E-001	3.63E-001	1.69E-001
AC-228	8.83E-001	2.43E-001	9.17E-002
TH-228	1.00E+000	3.27E-001	4.82E-001
RA-224	1.04E+000	4.24E-001	1.07E-001
PB-212	9.30E-001	1.76E-001	3.95E-002
BI-212	1.05E+000	5.89E-001	3.24E-001
TL-208	8.48E-001	1.98E-001	6.95E-002
U-235	Not Detected	-----	1.99E-001
TH-231	Not Detected	-----	7.40E+000
PA-231	Not Detected	-----	1.33E+000
TH-227	Not Detected	-----	3.09E-001
RA-223	Not Detected	-----	1.40E-001
RN-219	Not Detected	-----	3.65E-001
PB-211	Not Detected	-----	8.24E-001
TL-207	Not Detected	-----	1.46E+001
AM-241	Not Detected	-----	2.00E-001
PU-239	Not Detected	-----	3.68E+002
NP-237	Not Detected	-----	2.01E-001
FA-233	Not Detected	-----	6.00E-002
TR-229	Not Detected	-----	1.72E-001

Not Detected
[Signature]
 7/26/99

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	4.07E-002
AG-110m	Not Detected	-----	4.35E-002
BA-133	Not Detected	-----	4.59E-002
BE-7	Not Detected	-----	2.56E-001
CD-109	Not Detected	-----	8.25E-001
CD-115	Not Detected	-----	1.33E-001
CE-139	Not Detected	-----	2.50E-002
CE-141	Not Detected	-----	4.54E-002
CE-144	Not Detected	-----	1.98E-001
CO-56	Not Detected	-----	3.64E-002
CO-57	Not Detected	-----	2.56E-002
CO-58	Not Detected	-----	3.73E-002
CO-60	Not Detected	-----	4.30E-002
CR-51	Not Detected	-----	2.40E-001
CS-134	Not Detected	-----	3.69E-002
CS-137	1.03E-001	2.30E-002	2.43E-002
EU-152	Not Detected	-----	7.67E-002
EU-154	Not Detected	-----	1.98E-001
EU-155	Not Detected	-----	1.19E-001
FE-59	Not Detected	-----	8.31E-002
GD-153	Not Detected	-----	6.88E-002
HG-203	Not Detected	-----	3.11E-002
I-131	Not Detected	-----	3.28E-002
IR-192	Not Detected	-----	2.81E-002
K-40	2.18E+001	3.26E+000	2.70E-001
MN-52	Not Detected	-----	4.67E-002
MN-54	Not Detected	-----	3.73E-002
MO-99	Not Detected	-----	4.11E-001
NA-22	Not Detected	-----	4.95E-002
NA-24	Not Detected	-----	4.74E-001
NB-95	Not Detected	-----	1.68E-001
ND-147	Not Detected	-----	2.36E-001
NI-57	Not Detected	-----	1.55E-001
RU-103	Not Detected	-----	2.90E-002
RU-106	Not Detected	-----	3.06E-001
SB-122	Not Detected	-----	7.21E-002
SB-124	Not Detected	-----	2.94E-002
SB-125	Not Detected	-----	7.86E-002
SN-113	Not Detected	-----	3.66E-002
SR-85	Not Detected	-----	3.67E-002
TA-182	Not Detected	-----	1.69E-001
TA-183	Not Detected	-----	2.30E-001
TC-99m	Not Detected	-----	1.17E+001
TL-201	Not Detected	-----	1.58E-001
XE-133	Not Detected	-----	1.69E-001
Y-88	Not Detected	-----	3.25E-002
ZN-65	Not Detected	-----	1.16E-001
ZR-95	Not Detected	-----	6.06E-002

* Analyzed by: *[Signature]* 7/26/99 Reviewed by: *[Signature]* 7/27/99

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047232-001
 Lab Sample ID : 90141102

CCA-09-GR-002-0-0.5-5

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 853.000 gram
 Sample Date/Time : 7/12/99 10:25:00 AM
 Acquire Start Date/Time : 7/14/99 5:08:46 PM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma pe
 interfere. Either isotope
 may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	5.39E-001
RA-226	1.67E+000	8.18E-001	5.34E-001
PB-214	6.93E-001	1.54E-001	4.68E-002
BI-214	6.47E-001	1.49E-001	4.88E-002
PB-210	Not Detected	-----	8.10E+000
TH-232	8.79E-001	4.68E-001	1.75E-001
RA-228	8.02E-001	1.29E-001	2.24E-001
AC-228	9.03E-001	2.92E-001	9.36E-002
TH-228	9.02E-001	1.71E+000	4.77E-001
RA-224	1.13E+000	3.74E-001	9.19E-002
PB-212	8.83E-001	1.63E-001	4.19E-002
BI-212	8.40E-001	6.73E-001	3.24E-001
TL-208	8.27E-001	2.04E-001	6.94E-002
U-235	Not Detected	-----	2.01E-001
TH-231	Not Detected	-----	7.42E+000
PA-231	Not Detected	-----	1.34E+000
TH-227	Not Detected	-----	3.07E-001
RA-223	Not Detected	-----	1.40E-001
RN-219	Not Detected	-----	3.77E-001
PB-211	Not Detected	-----	8.43E-001
TL-207	Not Detected	-----	1.52E+001
AM-241	Not Detected	-----	2.08E-001
PU-239	Not Detected	-----	3.65E+002
NP-237	Not Detected	-----	2.58E-001
PA-233	Not Detected	-----	5.60E-002
TH-229	Not Detected	-----	1.74E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected		4.16E-002
AG-110m	Not Detected		4.21E-002
BA-133	Not Detected		4.56E-002
BE-7	Not Detected		2.62E-001
CD-109	Not Detected		8.53E-001
CD-115	Not Detected		1.42E-001
CE-139	Not Detected		2.54E-002
CE-141	Not Detected		4.49E-002
CE-144	Not Detected		1.94E-001
CO-56	Not Detected		3.57E-002
CO-57	Not Detected		2.51E-002
CO-58	Not Detected		3.51E-002
CO-60	Not Detected		4.33E-002
CR-51	Not Detected		2.36E-001
CS-134	Not Detected		3.60E-002
CS-137	1.10E-001	1.76E-001	2.42E-002
EU-152	Not Detected		7.45E-002
EU-154	Not Detected		2.00E-001
EU-155	Not Detected		1.18E-001
FE-59	Not Detected		7.96E-002
GD-153	Not Detected		6.86E-002
HG-203	Not Detected		3.10E-002
I-131	Not Detected		3.33E-002
IR-192	Not Detected		2.61E-002
K-40	2.15E+001	3.14E+000	2.64E-001
MN-52	Not Detected		4.38E-002
MN-54	Not Detected		3.87E-002
MO-99	Not Detected		4.27E-001
NA-22	Not Detected		4.78E-002
NA-24	Not Detected		4.65E-001
NB-95	Not Detected		1.68E-001
ND-147	Not Detected		2.32E-001
NI-57	Not Detected		1.43E-001
RU-103	Not Detected		2.91E-002
RU-106	Not Detected		2.89E-001
SB-122	Not Detected		6.86E-002
SB-124	Not Detected		2.93E-002
SB-125	Not Detected		7.90E-002
SN-113	Not Detected		3.66E-002
SR-85	Not Detected		3.76E-002
TA-182	Not Detected		1.69E-001
TA-183	Not Detected		2.42E-001
TC-99m	Not Detected		1.47E+001
TL-201	Not Detected		1.58E-001
XE-133	Not Detected		1.75E-001
Y-88	Not Detected		3.08E-002
ZN-65	Not Detected		1.13E-001
ZR-95	Not Detected		5.79E-002

* Analyzed by: *[Signature]* 7/26/99 Reviewed by: *[Signature]* 7/27/99

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047233-001
 Lab Sample ID : 90141103 CLTA-09-GR-002-D.5-1.0-S

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 829.000 gram
 Sample Date/Time : 7/12/99 10:27:00 AM
 Acquire Start Date/Time : 7/14/99 6:50:48 PM Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	5.45E-001
RA-226	1.61E+000	1.92E+000	5.45E-001
PB-214	7.05E-001	1.60E-001	4.96E-002
BI-214	6.12E-001	1.12E+000	5.25E-002
PB-210	Not Detected	-----	8.49E+000
TH-232	7.97E-001	4.11E-001	1.69E-001
RA-228	Not Detected	-----	1.77E-001
AC-228	8.91E-001	5.09E-001	1.01E-001
TH-228	6.67E-001	2.45E-001	4.92E-001
RA-224	1.20E+000	4.42E-001	8.69E-002
PB-212	9.23E-001	2.19E-001	4.22E-002
BI-212	9.39E-001	8.29E-001	3.75E-001
TL-208	8.49E-001	1.07E+000	7.33E-002
U-235	Not Detected	-----	2.07E-001
TH-231	Not Detected	-----	7.56E+000
PA-231	Not Detected	-----	1.31E+000
TH-227	Not Detected	-----	3.13E-001
RA-223	Not Detected	-----	1.48E-001
RN-219	Not Detected	-----	3.76E-001
PB-211	Not Detected	-----	8.50E-001
TL-207	Not Detected	-----	1.50E+001
AM-241	Not Detected	-----	1.99E-001
PU-239	Not Detected	-----	3.75E+002
NP-237	6.32E-001	1.88E-001	2.15E-001
PA-233	Not Detected	-----	5.80E-002
TH-229	Not Detected	-----	1.71E-001

Not Detected
[Signature] 7/26/99

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	4.26E-002
AG-110m	Not Detected	-----	4.32E-002
BA-133	Not Detected	-----	4.55E-002
BE-7	Not Detected	-----	2.65E-001
CD-109	Not Detected	-----	8.60E-001
CD-115	Not Detected	-----	1.44E-001
CE-139	Not Detected	-----	2.55E-002
CE-141	Not Detected	-----	4.63E-002
CE-144	Not Detected	-----	2.03E-001
CO-56	Not Detected	-----	3.70E-002
CO-57	Not Detected	-----	2.57E-002
CO-58	Not Detected	-----	3.70E-002
CO-60	Not Detected	-----	4.48E-002
CR-51	Not Detected	-----	2.40E-001
CS-134	Not Detected	-----	3.74E-002
CS-137	1.20E-001	4.85E-002	2.62E-002
EU-152	Not Detected	-----	7.69E-002
EU-154	Not Detected	-----	2.01E-001
EU-155	Not Detected	-----	1.18E-001
FE-59	Not Detected	-----	8.33E-002
GD-153	Not Detected	-----	6.98E-002
HG-203	Not Detected	-----	3.21E-002
I-131	Not Detected	-----	3.22E-002
IR-192	Not Detected	-----	2.74E-002
K-40	2.30E+001	3.37E+000	3.07E-001
MN-52	Not Detected	-----	4.94E-002
MN-54	Not Detected	-----	2.01E-002
MO-99	Not Detected	-----	4.48E-001
NA-22	Not Detected	-----	5.10E-002
NA-24	Not Detected	-----	5.33E-001
NB-95	Not Detected	-----	1.77E-001
ND-147	Not Detected	-----	2.37E-001
NI-57	Not Detected	-----	1.61E-001
RU-103	Not Detected	-----	2.93E-002
RU-106	Not Detected	-----	2.93E-001
SB-122	Not Detected	-----	7.31E-002
SB-124	Not Detected	-----	3.07E-002
SB-125	Not Detected	-----	8.02E-002
SN-113	Not Detected	-----	3.91E-002
SR-85	Not Detected	-----	3.84E-002
TA-182	Not Detected	-----	1.73E-001
TA-183	Not Detected	-----	2.34E-001
TC-99m	Not Detected	-----	1.79E+001
TL-201	Not Detected	-----	1.66E-001
XE-133	Not Detected	-----	1.79E-001
Y-88	Not Detected	-----	2.64E-002
ZN-65	Not Detected	-----	1.13E-001
ZR-95	Not Detected	-----	6.23E-002

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

7/14/99 10:13:03 PM

Analyzed by: *[Signature]* 7/26/99

Reviewed by: *[Signature]* 7/27/99

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047234-001
 Lab Sample ID : 90141104

CCTA-09-GR-003-D-D.5-S

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 756.000 gram
 Sample Date/Time : 7/12/99 10:40:00 AM
 Acquire Start Date/Time : 7/14/99 8:32:50 PM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma p
 interfere. Either isotope
 may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	5.26E-001
RA-226	1.41E+000	7.91E-001	5.58E-001
PB-214	6.16E-001	1.34E-001	4.71E-002
BI-214	Not Detected	-----	4.97E-002
PB-210	Not Detected	-----	8.26E+000
TH-232	7.78E-001	4.34E-001	1.56E-001
RA-228	8.43E-001	4.31E-001	1.75E-001
AC-228	7.62E-001	1.37E+000	9.08E-002
TH-228	Not Detected	-----	4.52E-001
RA-224	1.03E+000	4.21E-001	1.07E-001
PB-212	7.91E-001	5.22E-001	4.32E-002
BI-212	9.45E-001	4.94E-001	3.40E-001
TL-208	7.29E-001	1.83E-001	6.54E-002
U-235	9.79E-002	1.76E-001	2.05E-001
TH-231	2.10E+000	4.03E+000	7.41E+000
PA-231	Not Detected	-----	1.30E+000
TH-227	Not Detected	-----	3.05E-001
RA-223	Not Detected	-----	1.40E-001
RN-219	Not Detected	-----	3.69E-001
PB-211	Not Detected	-----	8.40E-001
TL-207	Not Detected	-----	1.46E+001
AM-241	Not Detected	-----	1.96E-001
PU-239	Not Detected	-----	3.69E+002
NP-237	Not Detected	-----	2.15E-001
PA-233	Not Detected	-----	5.83E-002
TH-229	Not Detected	-----	1.69E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	4.15E-002
AG-110m	Not Detected	-----	5.24E-002
BA-133	Not Detected	-----	4.53E-002
BE-7	Not Detected	-----	2.61E-001
CD-109	Not Detected	-----	8.27E-001
CD-115	Not Detected	-----	1.43E-001
CE-139	Not Detected	-----	2.56E-002
CE-141	Not Detected	-----	4.68E-002
CE-144	Not Detected	-----	1.98E-001
CO-56	Not Detected	-----	3.78E-002
CO-57	Not Detected	-----	2.55E-002
CO-58	Not Detected	-----	3.62E-002
CO-60	Not Detected	-----	4.40E-002
CR-51	Not Detected	-----	2.44E-001
CS-134	Not Detected	-----	3.49E-002
CS-137	1.98E-001	5.23E-002	2.59E-002
EU-152	Not Detected	-----	7.71E-002
EU-154	Not Detected	-----	1.97E-001
EU-155	Not Detected	-----	1.18E-001
FE-59	Not Detected	-----	8.27E-002
GD-153	Not Detected	-----	6.62E-002
HG-203	Not Detected	-----	3.21E-002
I-131	Not Detected	-----	3.46E-002
IR-192	Not Detected	-----	2.77E-002
K-40	1.87E+001	2.79E+000	3.16E-001
MN-52	Not Detected	-----	4.62E-002
MN-54	Not Detected	-----	3.94E-002
MO-99	Not Detected	-----	4.39E-001
NA-22	Not Detected	-----	5.04E-002
NA-24	Not Detected	-----	5.36E-001
NB-95	Not Detected	-----	1.75E-001
ND-147	Not Detected	-----	2.44E-001
NI-57	Not Detected	-----	1.71E-001
RU-103	Not Detected	-----	2.92E-002
RU-106	Not Detected	-----	3.01E-001
SB-122	Not Detected	-----	7.46E-002
SB-124	Not Detected	-----	2.93E-002
SB-125	Not Detected	-----	8.12E-002
SN-113	Not Detected	-----	3.75E-002
SR-85	Not Detected	-----	3.83E-002
TA-182	Not Detected	-----	1.74E-001
TA-183	Not Detected	-----	2.32E-001
TC-99m	Not Detected	-----	2.06E+001
TL-201	Not Detected	-----	1.57E-001
XE-133	Not Detected	-----	1.79E-001
Y-88	Not Detected	-----	2.91E-002
ZN-65	Not Detected	-----	1.18E-001
ZR-95	Not Detected	-----	5.91E-002

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

7/14/99 11:55:04 PM

Analyzed by: *[Signature]* 7/21/99

Reviewed by: *[Signature]* 7/27/99

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047235-001
 Lab Sample ID : 90141105 *LCA-09-GR-003-0.5-1.0-5*

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 793.000 gram
 Sample Date/Time : 7/12/99 10:42:00 AM
 Acquire Start Date/Time : 7/14/99 10:14:51 PM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	5.19E-001
RA-226	Not Detected	-----	5.31E-001
PB-214	6.09E-001	1.34E-001	4.73E-002
BI-214	5.40E-001	4.75E-001	4.78E-002
PB-210	Not Detected	-----	7.73E+000
TH-232	6.73E-001	3.79E-001	1.52E-001
RA-228	7.85E-001	3.01E-001	1.77E-001
AC-228	7.14E-001	2.25E-001	9.47E-002
TH-228	8.80E-001	1.22E+000	4.72E-001
RA-224	1.03E+000	3.87E-001	8.34E-002
PB-212	7.69E-001	1.65E-001	4.06E-002
BI-212	8.76E-001	5.73E-001	3.11E-001
TL-208	7.09E-001	1.41E-001	6.75E-002
U-235	Not Detected	-----	1.96E-001
TH-231	Not Detected	-----	6.86E+000
PA-231	Not Detected	-----	1.33E+000
TH-227	Not Detected	-----	2.93E-001
RA-223	Not Detected	-----	1.29E-001
RN-219	Not Detected	-----	3.71E-001
PE-211	Not Detected	-----	8.41E-001
TL-207	Not Detected	-----	1.42E+001
AM-241	Not Detected	-----	1.95E-001
PU-239	Not Detected	-----	3.43E+002
NP-237	4.46E-001	2.12E-001	1.92E-001
PA-233	Not Detected	-----	5.52E-002
TH-229	Not Detected	-----	1.61E-001

Not Detected
[Signature] 7/26/99

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	4.09E-002
AG-110m	Not Detected	-----	4.83E-002
BA-133	Not Detected	-----	4.31E-002
BE-7	Not Detected	-----	2.51E-001
CD-109	Not Detected	-----	7.96E-001
CD-115	Not Detected	-----	1.38E-001
CE-139	Not Detected	-----	2.44E-002
CE-141	Not Detected	-----	4.50E-002
CE-144	Not Detected	-----	1.86E-001
CO-56	Not Detected	-----	3.34E-002
CO-57	Not Detected	-----	2.37E-002
CO-58	Not Detected	-----	3.37E-002
CO-60	Not Detected	-----	4.06E-002
CR-51	Not Detected	-----	2.32E-001
CS-134	Not Detected	-----	3.39E-002
CS-137	Not Detected	-----	2.33E-002
EU-152	Not Detected	-----	7.03E-002
EU-154	Not Detected	-----	1.93E-001
EU-155	Not Detected	-----	1.13E-001
FE-59	Not Detected	-----	8.17E-002
GD-153	Not Detected	-----	6.62E-002
HG-203	Not Detected	-----	2.98E-002
I-131	Not Detected	-----	3.32E-002
IR-192	Not Detected	-----	2.54E-002
K-40	1.83E+001	2.79E+000	2.57E-001
MN-52	Not Detected	-----	5.00E-002
MN-54	Not Detected	-----	3.75E-002
MO-99	Not Detected	-----	4.45E-001
NA-22	Not Detected	-----	4.55E-002
NA-24	Not Detected	-----	5.75E-001
NB-95	Not Detected	-----	1.69E-001
ND-147	Not Detected	-----	2.32E-001
NI-57	Not Detected	-----	1.92E-001
RU-103	Not Detected	-----	2.83E-002
RU-106	Not Detected	-----	2.84E-001
SB-122	Not Detected	-----	7.54E-002
SB-124	Not Detected	-----	2.82E-002
SB-125	Not Detected	-----	7.95E-002
SN-113	Not Detected	-----	3.70E-002
SR-85	Not Detected	-----	3.60E-002
TA-182	Not Detected	-----	1.75E-001
TA-183	Not Detected	-----	2.34E-001
TC-99m	Not Detected	-----	2.43E+001
TL-201	Not Detected	-----	1.56E-001
XE-133	Not Detected	-----	1.72E-001
Y-88	Not Detected	-----	3.19E-002
ZN-65	Not Detected	-----	1.17E-001
ZR-95	Not Detected	-----	5.66E-002

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

7/15/99 1:37:05 AM

Analyzed by: *[Signature]* 7/26/99

Reviewed by: *[Signature]* 7/27/99

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047237-001
 Lab Sample ID : 90141106

CCTA-09-GR-004-0-0.5-0 DU-S

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 892.000 gram
 Sample Date/Time : 7/12/99 10:22:00 AM
 Acquire Start Date/Time : 7/14/99 11:56:52 PM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma interfere. Either isotope may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	4.89E-001
RA-226	8.80E-001	6.57E-001	5.03E-001
PB-214	4.22E-001	3.22E-001	4.29E-002
BI-214	3.99E-001	1.13E-001	4.86E-002
PB-210	Not Detected	-----	7.54E+000
TH-232	7.09E-001	3.85E-001	1.47E-001
RA-228	7.26E-001	3.05E-001	1.95E-001
AC-228	7.80E-001	6.78E-001	9.95E-002
TH-228	8.30E-001	3.07E-001	4.63E-001
RA-224	9.26E-001	3.65E-001	9.77E-002
PB-212	7.46E-001	3.34E-001	3.76E-002
BI-212	6.09E-001	4.45E-001	3.56E-001
TL-208	6.60E-001	1.47E-001	6.44E-002
U-235	Not Detected	-----	1.83E-001
TH-231	Not Detected	-----	6.79E+000
PA-231	Not Detected	-----	1.24E+000
TH-227	Not Detected	-----	2.71E-001
RA-223	Not Detected	-----	1.28E-001
RN-219	Not Detected	-----	3.43E-001
PB-211	Not Detected	-----	7.83E-001
TL-207	Not Detected	-----	1.45E+001
AM-241	Not Detected	-----	1.84E-001
PU-239	Not Detected	-----	3.43E+002
NP-237	Not Detected	-----	2.32E-001
PA-233	Not Detected	-----	5.40E-002
TH-229	Not Detected	-----	1.64E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.82E-002
AG-110m	Not Detected	-----	4.41E-002
BA-133	Not Detected	-----	4.14E-002
BE-7	Not Detected	-----	2.39E-001
CD-109	Not Detected	-----	7.86E-001
CD-115	Not Detected	-----	1.40E-001
CE-139	Not Detected	-----	2.28E-002
CE-141	Not Detected	-----	4.19E-002
CE-144	Not Detected	-----	1.83E-001
CO-56	Not Detected	-----	3.30E-002
CO-57	Not Detected	-----	2.40E-002
CO-58	Not Detected	-----	3.27E-002
CO-60	Not Detected	-----	4.26E-002
CR-51	Not Detected	-----	2.29E-001
CS-134	Not Detected	-----	3.19E-002
CS-137	1.37E-001	4.73E-002	2.32E-002
EU-152	Not Detected	-----	7.20E-002
EU-154	Not Detected	-----	1.80E-001
EU-155	Not Detected	-----	1.11E-001
FE-59	Not Detected	-----	8.59E-002
GD-153	Not Detected	-----	6.30E-002
HG-203	Not Detected	-----	2.75E-002
I-131	Not Detected	-----	3.25E-002
IR-192	Not Detected	-----	2.60E-002
K-40	2.70E+001	3.79E+000	2.79E-001
MN-52	Not Detected	-----	4.37E-002
MN-54	Not Detected	-----	3.73E-002
MO-99	Not Detected	-----	4.50E-001
NA-22	Not Detected	-----	4.79E-002
NA-24	Not Detected	-----	6.45E-001
NB-95	Not Detected	-----	1.61E-001
ND-147	Not Detected	-----	2.35E-001
NI-57	Not Detected	-----	1.70E-001
RU-103	Not Detected	-----	2.78E-002
RU-106	Not Detected	-----	2.82E-001
SB-122	Not Detected	-----	7.17E-002
SB-124	Not Detected	-----	2.79E-002
SE-125	Not Detected	-----	7.44E-002
SN-113	Not Detected	-----	3.39E-002
SR-85	Not Detected	-----	3.52E-002
TA-182	Not Detected	-----	1.59E-001
TA-183	Not Detected	-----	2.23E-001
TC-99m	Not Detected	-----	2.88E+001
TL-201	Not Detected	-----	1.54E-001
XE-133	Not Detected	-----	1.74E-001
Y-88	Not Detected	-----	2.91E-002
ZN-65	Not Detected	-----	1.07E-001
ZR-95	Not Detected	-----	5.90E-002

Sandia National Laboratories
 Radiation Protection Sample Diagnostics Program [806 Laboratory]
 7/15/99 3:19:06 AM

* Analyzed by: *[Signature]* 7/26/99 Reviewed by: *[Signature]* 7/27/99

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047238-001
 Lab Sample ID : 90141107 *CCTA-09-GR-004-0.5-1.0-S*

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 770.000 gram
 Sample Date/Time : 7/12/99 10:24:00 AM
 Acquire Start Date/Time : 7/15/99 1:38:54 AM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma interfere. Either isotope may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	5.45E-001
RA-226	1.01E+000	8.83E-001	5.85E-001
PB-214	4.99E-001	1.22E-001	4.71E-002
BI-214	4.42E-001	1.12E-001	5.15E-002
PB-210	Not Detected	-----	8.38E+000
TH-232	7.79E-001	4.62E-001	1.60E-001
RA-228	7.52E-001	3.38E-001	2.15E-001
AC-228	9.50E-001	2.74E-001	1.05E-001
TH-228	9.40E-001	3.48E-001	5.07E-001
RA-224	1.04E+000	3.76E-001	1.01E-001
PB-212	8.38E-001	1.68E-001	4.31E-002
BI-212	9.12E-001	5.45E-001	3.61E-001
TL-208	Not Detected	-----	7.36E-002
U-235	1.42E-001	1.78E-001	2.08E-001
TH-231	Not Detected	-----	7.47E+000
PA-231	Not Detected	-----	1.37E+000
TH-227	Not Detected	-----	3.21E-001
RA-223	Not Detected	-----	1.44E-001
RN-219	Not Detected	-----	3.79E-001
PB-211	Not Detected	-----	8.36E-001
TL-207	Not Detected	-----	1.56E+001
AM-241	Not Detected	-----	2.05E-001
PU-239	Not Detected	-----	3.85E+002
NP-237	Not Detected	-----	2.51E-001
PA-233	Not Detected	-----	5.93E-002
TH-229	Not Detected	-----	1.76E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	4.46E-002
AG-110m	Not Detected	-----	4.36E-002
BA-133	Not Detected	-----	4.45E-002
BE-7	Not Detected	-----	2.56E-001
CD-109	Not Detected	-----	6.01E-001
CD-115	Not Detected	-----	1.59E-001
CE-139	Not Detected	-----	2.64E-002
CE-141	Not Detected	-----	4.71E-002
CE-144	Not Detected	-----	2.04E-001
CO-56	Not Detected	-----	3.86E-002
CO-57	Not Detected	-----	2.56E-002
CO-58	Not Detected	-----	3.82E-002
CO-60	Not Detected	-----	4.40E-002
CR-51	Not Detected	-----	2.57E-001
CS-134	Not Detected	-----	3.74E-002
CS-137	Not Detected	-----	2.56E-002
EU-152	Not Detected	-----	7.62E-002
EU-154	Not Detected	-----	2.12E-001
EU-155	Not Detected	-----	1.22E-001
FE-59	Not Detected	-----	9.78E-002
GD-153	Not Detected	-----	7.00E-002
HG-203	Not Detected	-----	3.21E-002
I-131	Not Detected	-----	3.66E-002
IR-192	Not Detected	-----	2.82E-002
K-40	2.68E+001	3.94E+000	2.97E-001
MN-52	Not Detected	-----	5.04E-002
MN-54	Not Detected	-----	4.02E-002
MO-99	Not Detected	-----	4.98E-001
NA-22	Not Detected	-----	5.27E-002
NA-24	Not Detected	-----	7.57E-001
NE-95	Not Detected	-----	1.94E-001
ND-147	Not Detected	-----	2.59E-001
NI-57	Not Detected	-----	1.89E-001
RU-103	Not Detected	-----	3.04E-002
RU-106	Not Detected	-----	3.21E-001
SB-122	Not Detected	-----	8.16E-002
SB-124	Not Detected	-----	3.17E-002
SB-125	Not Detected	-----	8.10E-002
SN-113	Not Detected	-----	3.92E-002
SR-85	Not Detected	-----	3.84E-002
TA-182	Not Detected	-----	1.83E-001
TA-183	Not Detected	-----	2.50E-001
TC-99m	Not Detected	-----	3.92E+001
TL-201	Not Detected	-----	1.75E-001
XE-133	Not Detected	-----	1.94E-001
Y-88	Not Detected	-----	3.15E-002
ZN-65	Not Detected	-----	1.23E-001
ZR-95	Not Detected	-----	6.67E-002

* Analyzed by: *[Signature]* 7/26/99 Reviewed by: *[Signature]* *

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047239-001
 Lab Sample ID : 90141108 CETA-D9-GR-005-0-0.5-5

Sample Description : MARINELLI SOLID SAMPLE
 Sample Quantity : 907.000 gram
 Sample Date/Time : 7/12/99 10:38:00 AM
 Acquire Start Date/Time : 7/15/99 3:20:54 AM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma peaks
 interfere. Either isotope
 may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	4.65E-001
RA-226	9.35E-001	5.26E-001	5.16E-001
PB-214	3.91E-001	4.94E-001	4.52E-002
BI-214	3.76E-001	1.09E-001	4.35E-002
PB-210	Not Detected	-----	7.39E+000
TH-232	7.23E-001	4.28E-001	1.40E-001
RA-228	Not Detected	-----	1.66E-001
AC-228	6.59E-001	2.07E-001	9.47E-002
TH-228	4.76E-001	2.43E-001	4.56E-001
RA-224	7.98E-001	3.09E-001	9.04E-002
PB-212	6.91E-001	1.33E-001	3.94E-002
BI-212	6.78E-001	4.59E-001	2.75E-001
TL-208	6.83E-001	1.72E-001	6.37E-002
U-235	9.85E-002	1.56E-001	1.81E-001
TH-231	Not Detected	-----	6.46E+000
PA-231	Not Detected	-----	1.23E+000
TH-227	Not Detected	-----	2.65E-001
RA-223	Not Detected	-----	1.26E-001
RN-219	Not Detected	-----	3.38E-001
PB-211	Not Detected	-----	7.28E-001
TL-207	Not Detected	-----	1.40E+001
AM-241	Not Detected	-----	1.78E-001
PU-239	Not Detected	-----	3.30E+002
NP-237	Not Detected	-----	2.21E-001
PA-233	Not Detected	-----	5.22E-002
TH-229	Not Detected	-----	1.60E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.79E-002
AG-110m	Not Detected	-----	4.17E-002
BA-133	Not Detected	-----	3.98E-002
BE-7	Not Detected	-----	2.25E-001
CD-109	Not Detected	-----	7.33E-001
CD-115	Not Detected	-----	1.42E-001
CE-139	Not Detected	-----	2.33E-002
CE-141	Not Detected	-----	4.11E-002
CE-144	Not Detected	-----	1.81E-001
CO-56	Not Detected	-----	3.46E-002
CO-57	Not Detected	-----	2.27E-002
CO-58	Not Detected	-----	3.26E-002
CO-60	Not Detected	-----	4.24E-002
CR-51	Not Detected	-----	2.19E-001
CS-134	Not Detected	-----	2.94E-002
CS-137	1.13E-001	4.62E-002	2.53E-002
EU-152	Not Detected	-----	6.80E-002
EU-154	Not Detected	-----	1.77E-001
EU-155	Not Detected	-----	1.08E-001
FE-59	Not Detected	-----	8.80E-002
GD-153	Not Detected	-----	6.33E-002
HG-203	Not Detected	-----	2.91E-002
I-131	Not Detected	-----	3.21E-002
IR-192	Not Detected	-----	2.51E-002
K-40	2.78E+001	3.91E+000	2.52E-001
MN-52	Not Detected	-----	4.29E-002
MN-54	Not Detected	-----	3.51E-002
MO-99	Not Detected	-----	4.66E-001
NA-22	Not Detected	-----	4.73E-002
NA-24	Not Detected	-----	7.76E-001
NB-95	Not Detected	-----	1.65E-001
ND-147	Not Detected	-----	2.29E-001
NI-57	Not Detected	-----	1.76E-001
RU-103	Not Detected	-----	2.60E-002
RU-106	Not Detected	-----	2.82E-001
SB-122	Not Detected	-----	7.51E-002
SB-124	Not Detected	-----	2.68E-002
SB-125	Not Detected	-----	7.60E-002
SN-113	Not Detected	-----	3.37E-002
SR-85	Not Detected	-----	3.45E-002
TA-182	Not Detected	-----	1.64E-001
TA-183	Not Detected	-----	2.19E-001
TC-99m	Not Detected	-----	4.03E+001
TL-201	Not Detected	-----	1.56E-001
XE-133	Not Detected	-----	1.73E-001
Y-88	Not Detected	-----	2.46E-002
ZN-65	Not Detected	-----	1.11E-001
ZR-95	Not Detected	-----	5.71E-002

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

7/15/99 9:52:11 AM

Analyzed by: *[Signature]* 7/24/99

Reviewed by: *[Signature]* 7/24/99

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047240-001
 Lab Sample ID : 90141109

CCTA-09-GR-005-0.5-1.0-S

Sample Description : SOIL MARINELLI SAMPLE Note: Ra-226 and U-235 gamma p
 Sample Quantity : 845.000 gram interiere. Either isotope
 Sample Date/Time : 7/12/99 10:41:00 AM may be over-estimated.
 Acquire Start Date/Time : 7/15/99 8:11:56 AM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	4.80E-001
RA-226	Not Detected	-----	5.14E-001
PB-214	4.46E-001	1.29E-001	4.34E-002
BI-214	3.55E-001	5.50E-002	4.81E-002
PB-210	Not Detected	-----	7.92E+000
TH-232	7.34E-001	4.11E-001	1.41E-001
RA-228	7.71E-001	2.30E-001	2.19E-001
AC-228	5.76E-001	1.50E-001	9.80E-002
TH-228	6.64E-001	2.60E-001	4.56E-001
RA-224	7.99E-001	3.21E-001	8.47E-002
PB-212	6.89E-001	2.99E-001	3.98E-002
BI-212	9.40E-001	6.36E-001	3.00E-001
TL-208	Not Detected	-----	7.06E-002
U-235	Not Detected	-----	1.88E-001
TH-231	Not Detected	-----	6.66E+000
PA-231	Not Detected	-----	1.27E+000
TH-227	Not Detected	-----	2.73E-001
RA-223	Not Detected	-----	1.29E-001
RN-219	Not Detected	-----	3.49E-001
PB-211	Not Detected	-----	7.79E-001
TL-207	Not Detected	-----	1.50E+001
AM-241	Not Detected	-----	1.83E-001
PU-239	Not Detected	-----	3.42E+002
NP-237	Not Detected	-----	2.23E-001
PA-233	Not Detected	-----	5.56E-002
TH-229	Not Detected	-----	1.66E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.93E-002
AG-110m	Not Detected	-----	4.31E-002
BA-133	Not Detected	-----	4.10E-002
BE-7	Not Detected	-----	2.49E-001
CD-109	Not Detected	-----	7.49E-001
CD-115	Not Detected	-----	1.55E-001
CE-139	Not Detected	-----	2.38E-002
CE-141	Not Detected	-----	4.29E-002
CE-144	Not Detected	-----	1.85E-001
CO-56	Not Detected	-----	3.64E-002
CO-57	Not Detected	-----	2.40E-002
CO-58	Not Detected	-----	3.65E-002
CO-60	Not Detected	-----	4.40E-002
CR-51	Not Detected	-----	2.38E-001
CS-134	Not Detected	-----	3.30E-002
CS-137	Not Detected	-----	2.46E-002
EU-152	Not Detected	-----	7.14E-002
EU-154	Not Detected	-----	1.89E-001
EU-155	Not Detected	-----	1.10E-001
FE-59	Not Detected	-----	8.70E-002
GD-153	Not Detected	-----	6.61E-002
HG-203	Not Detected	-----	2.99E-002
I-131	Not Detected	-----	3.41E-002
IR-192	Not Detected	-----	2.72E-002
K-40	2.71E+001	3.88E+000	2.49E-001
MN-52	Not Detected	-----	5.00E-002
MN-54	Not Detected	-----	3.77E-002
MO-99	Not Detected	-----	5.14E-001
NA-22	Not Detected	-----	5.20E-002
NA-24	Not Detected	-----	9.21E-001
NB-95	Not Detected	-----	1.71E-001
ND-147	Not Detected	-----	2.30E-001
NI-57	Not Detected	-----	1.90E-001
RU-103	Not Detected	-----	2.79E-002
RU-106	Not Detected	-----	2.87E-001
SB-122	Not Detected	-----	7.82E-002
SB-124	Not Detected	-----	2.97E-002
SB-125	Not Detected	-----	7.48E-002
SN-113	Not Detected	-----	3.48E-002
SR-85	Not Detected	-----	3.48E-002
TA-182	Not Detected	-----	1.73E-001
TA-183	Not Detected	-----	2.32E-001
TC-99m	Not Detected	-----	7.32E+001
TL-201	Not Detected	-----	1.66E-001
XE-133	Not Detected	-----	1.91E-001
Y-88	Not Detected	-----	2.87E-002
ZN-65	Not Detected	-----	1.10E-001
ZR-95	Not Detected	-----	5.88E-002

* Analyzed by: *[Signature]* 7/26/99 Reviewed by: *[Signature]* 7/27/99

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047241-001
 Lab Sample ID : 90141110 CCA-09-GR-006-D-0.5-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 643.000 gram
 Sample Date/Time : 7/12/99 10:55:00 AM
 Acquire Start Date/Time : 7/15/99 9:53:59 AM Note: Ra-226 and U-235 gamma p
 Detector Name : LAB01 interfere. Either isotope
 Elapsed Live/Real Time : 6000 / 6003 seconds may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	6.13E-001
RA-226	1.64E+000	1.25E+000	6.47E-001
PB-214	6.83E-001	1.57E-001	5.71E-002
BI-214	6.10E-001	9.18E-001	5.27E-002
PB-210	Not Detected	-----	9.34E+000
TH-232	9.35E-001	4.75E-001	1.88E-001
RA-228	1.03E+000	4.13E-001	2.19E-001
AC-228	9.65E-001	3.20E-001	9.98E-002
TH-228	1.03E+000	3.89E-001	5.90E-001
RA-224	1.24E+000	8.73E-001	1.36E-001
PB-212	1.00E+000	1.90E-001	4.94E-002
BI-212	1.16E+000	7.55E-001	4.26E-001
TL-208	9.07E-001	2.16E-001	7.63E-002
U-235	1.36E-001	1.98E-001	2.31E-001
TH-231	Not Detected	-----	8.47E+000
PA-231	Not Detected	-----	1.54E+000
TH-227	Not Detected	-----	3.60E-001
RA-223	Not Detected	-----	1.66E-001
RN-219	Not Detected	-----	4.52E-001
PB-211	Not Detected	-----	1.01E+000
TL-207	Not Detected	-----	1.84E+001
AM-241	Not Detected	-----	2.26E-001
PU-239	Not Detected	-----	4.20E+002
NP-237	5.58E-001	2.82E-001	2.28E-001
PA-233	Not Detected	-----	6.69E-002
TH-229	Not Detected	-----	1.96E-001

Not Detected
[Signature]
 7/26/99

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected		4.87E-002
AG-110m	Not Detected		4.78E-002
BA-133	Not Detected		5.25E-002
BE-7	Not Detected		2.89E-001
CD-109	Not Detected		9.63E-001
CD-115	Not Detected		2.06E-001
CE-139	Not Detected		2.93E-002
CE-141	Not Detected		5.31E-002
CE-144	Not Detected		2.28E-001
CO-56	Not Detected		4.42E-002
CO-57	Not Detected		2.82E-002
CO-58	Not Detected		4.32E-002
CO-60	Not Detected		5.29E-002
CR-51	Not Detected		3.00E-001
CS-134	Not Detected		4.05E-002
CS-137	6.35E-002	4.12E-002	2.99E-002
EU-152	Not Detected		8.44E-002
EU-154	Not Detected		2.34E-001
EU-155	Not Detected		1.37E-001
FE-59	Not Detected		1.03E-001
GD-153	Not Detected		8.02E-002
HG-203	Not Detected		3.61E-002
I-131	Not Detected		4.08E-002
IR-192	Not Detected		3.26E-002
K-40	2.52E+001	3.81E+000	3.52E-001
MN-52	Not Detected		6.36E-002
MN-54	Not Detected		4.47E-002
MO-99	Not Detected		6.21E-001
NA-22	Not Detected		5.87E-002
NA-24	Not Detected		1.18E+000
NB-95	Not Detected		2.26E-001
ND-147	Not Detected		2.94E-001
NI-57	Not Detected		2.66E-001
RU-103	Not Detected		3.54E-002
RU-106	Not Detected		3.53E-001
SB-122	Not Detected		9.84E-002
SB-124	Not Detected		3.59E-002
SB-125	Not Detected		9.88E-002
SN-113	Not Detected		4.27E-002
SR-85	Not Detected		4.55E-002
TA-182	Not Detected		2.09E-001
TA-183	Not Detected		2.89E-001
TC-99m	Not Detected		1.06E+002
TL-201	Not Detected		2.09E-001
XE-133	Not Detected		2.46E-001
Y-88	Not Detected		3.48E-002
ZN-65	Not Detected		1.38E-001
ZR-95	Not Detected		7.11E-002

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

7/15/99 1:16:13 PM

Analyzed by: *[Signature]* 7/26/99

Reviewed by: *[Signature]* 7/27/99

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047242-001
 Lab Sample ID : 90141111 *CCTA-09-GR-006-0.5-1.0-5*

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 794.000 gram
 Sample Date/Time : 7/12/99 10:57:00 AM
 Acquire Start Date/Time : 7/15/99 11:36:00 AM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma peaks may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	5.01E-001
RA-226	1.19E+000	7.75E-001	5.32E-001
PB-214	4.83E-001	1.11E-001	4.42E-002
BI-214	4.15E-001	1.15E-001	4.76E-002
PB-210	Not Detected	-----	8.02E+000
TH-232	7.38E-001	4.21E-001	1.59E-001
RA-228	6.67E-001	2.16E-001	1.76E-001
AC-228	7.83E-001	2.40E-001	9.49E-002
TH-228	7.64E-001	2.88E-001	4.67E-001
RA-224	8.62E-001	3.82E-001	9.06E-002
PB-212	7.33E-001	1.44E-001	4.19E-002
BI-212	7.77E-001	3.73E-001	3.26E-001
TL-208	6.86E-001	6.72E-001	6.64E-002
U-235	Not Detected	-----	1.95E-001
TH-231	Not Detected	-----	7.18E+000
PA-231	Not Detected	-----	1.30E+000
TH-227	Not Detected	-----	2.91E-001
RA-223	Not Detected	-----	1.42E-001
RN-219	Not Detected	-----	3.55E-001
PB-211	Not Detected	-----	7.94E-001
TL-207	Not Detected	-----	1.55E+001
AM-241	Not Detected	-----	1.93E-001
PU-239	Not Detected	-----	3.51E+002
NP-237	Not Detected	-----	2.34E-001
PA-233	Not Detected	-----	5.56E-002
TH-229	Not Detected	-----	1.65E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	4.11E-002
AG-110m	Not Detected	-----	3.77E-002
BA-133	Not Detected	-----	4.13E-002
BE-7	Not Detected	-----	2.38E-001
CD-109	Not Detected	-----	7.80E-001
CD-115	Not Detected	-----	1.69E-001
CE-139	Not Detected	-----	2.49E-002
CE-141	Not Detected	-----	4.50E-002
CE-144	Not Detected	-----	1.93E-001
CO-56	Not Detected	-----	3.70E-002
CO-57	Not Detected	-----	2.45E-002
CO-58	Not Detected	-----	3.67E-002
CO-60	Not Detected	-----	4.39E-002
CR-51	Not Detected	-----	2.44E-001
CS-134	Not Detected	-----	3.36E-002
CS-137	3.90E-002	3.57E-002	2.47E-002
EU-152	Not Detected	-----	7.26E-002
EU-154	Not Detected	-----	1.97E-001
EU-155	Not Detected	-----	1.13E-001
FE-59	Not Detected	-----	9.08E-002
GD-153	Not Detected	-----	6.69E-002
HG-203	Not Detected	-----	3.03E-002
I-131	Not Detected	-----	3.59E-002
IR-192	Not Detected	-----	2.69E-002
K-40	2.55E+001	3.73E+000	2.57E-001
MN-52	Not Detected	-----	4.88E-002
MN-54	Not Detected	-----	3.93E-002
MO-99	Not Detected	-----	5.16E-001
NA-22	Not Detected	-----	5.07E-002
NA-24	Not Detected	-----	1.02E+000
NB-95	Not Detected	-----	1.88E-001
ND-147	Not Detected	-----	2.45E-001
NI-57	Not Detected	-----	2.07E-001
RU-103	Not Detected	-----	2.90E-002
RU-106	Not Detected	-----	3.16E-001
SB-122	Not Detected	-----	9.05E-002
SB-124	Not Detected	-----	2.91E-002
SB-125	Not Detected	-----	7.97E-002
SN-113	Not Detected	-----	3.64E-002
SR-85	Not Detected	-----	3.63E-002
TA-182	Not Detected	-----	1.66E-001
TA-183	Not Detected	-----	2.49E-001
TC-99m	Not Detected	-----	1.07E+002
TL-201	Not Detected	-----	1.79E-001
XE-133	Not Detected	-----	2.07E-001
Y-88	Not Detected	-----	3.24E-002
ZN-65	Not Detected	-----	1.16E-001
ZR-95	Not Detected	-----	6.00E-002

* Analyzed by: *[Signature]* 7/26/99 Reviewed by: *[Signature]* 7/26/99 *

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047244-001
 Lab Sample ID : 90141112 *LCTA-09-GR-007-D-0.5-DU*

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 883.000 gram
 Sample Date/Time : 7/12/99 11:14:00 AM
 Acquire Start Date/Time : 7/15/99 1:18:02 PM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma peaks
 interfere. Either isotope
 may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	4.95E-001
RA-226	1.26E+000	7.39E-001	5.25E-001
PB-214	4.29E-001	2.23E-001	4.89E-002
BI-214	3.97E-001	1.15E-001	4.74E-002
PB-210	Not Detected	-----	7.13E+000
TH-232	7.80E-001	4.02E-001	1.51E-001
RA-228	7.77E-001	3.43E-001	1.78E-001
AC-228	6.81E-001	2.28E-001	9.50E-002
TH-228	7.36E-001	3.05E-001	4.86E-001
RA-224	9.56E-001	3.71E-001	9.91E-002
PB-212	7.29E-001	5.38E-001	3.65E-002
BI-212	9.16E-001	6.01E-001	3.51E-001
TL-208	7.09E-001	1.24E-001	6.93E-002
U-235	Not Detected	-----	1.84E-001
TH-231	Not Detected	-----	6.72E+000
PA-231	Not Detected	-----	1.26E+000
TH-227	Not Detected	-----	2.77E-001
RA-223	Not Detected	-----	1.32E-001
RN-219	Not Detected	-----	3.34E-001
PB-211	Not Detected	-----	7.41E-001
TL-207	Not Detected	-----	1.51E+001
AM-241	Not Detected	-----	1.81E-001
PU-239	Not Detected	-----	3.38E+002
NP-237	2.66E-001	2.49E-001	1.91E-001
PA-233	Not Detected	-----	5.23E-002
TH-229	Not Detected	-----	1.61E-001

*NOT
 Detected
 [Signature]
 7/26/99*

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected		3.93E-002
AG-110m	Not Detected		3.67E-002
BA-133	Not Detected		4.21E-002
BE-7	Not Detected		2.43E-001
CD-109	Not Detected		7.57E-001
CD-115	Not Detected		1.66E-001
CE-139	Not Detected		2.32E-002
CE-141	Not Detected		4.25E-002
CE-144	Not Detected		1.88E-001
CO-56	Not Detected		3.39E-002
CO-57	Not Detected		2.38E-002
CO-58	Not Detected		3.40E-002
CO-60	Not Detected		4.16E-002
CR-51	Not Detected		2.32E-001
CS-134	Not Detected		3.21E-002
CS-137	6.95E-002	3.23E-002	2.20E-002
EU-152	Not Detected		7.12E-002
EU-154	Not Detected		1.84E-001
EU-155	Not Detected		1.11E-001
FE-59	Not Detected		8.79E-002
GD-153	Not Detected		6.49E-002
HG-203	Not Detected		2.95E-002
I-131	Not Detected		3.48E-002
IR-192	Not Detected		2.57E-002
K-40	2.60E+001	3.78E+000	2.45E-001
MN-52	Not Detected		4.65E-002
MN-54	Not Detected		3.69E-002
MO-99	Not Detected		5.12E-001
NA-22	Not Detected		5.11E-002
NA-24	Not Detected		1.13E+000
NB-95	Not Detected		1.78E-001
ND-147	Not Detected		2.25E-001
NI-57	Not Detected		2.27E-001
RU-103	Not Detected		2.78E-002
RU-106	Not Detected		2.80E-001
SB-122	Not Detected		8.62E-002
SB-124	Not Detected		2.86E-002
SB-125	Not Detected		6.99E-002
SN-113	Not Detected		3.52E-002
SR-85	Not Detected		3.47E-002
TA-182	Not Detected		1.69E-001
TA-183	Not Detected		2.35E-001
TC-99m	Not Detected		1.23E+002
TL-201	Not Detected		1.76E-001
XE-133	Not Detected		2.01E-001
Y-88	Not Detected		2.91E-002
ZN-65	Not Detected		1.15E-001
ZR-95	Not Detected		5.98E-002

* Analyzed by: *[Signature]* 7/26/99 Reviewed by: *[Signature]* 7/26/99

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047245-001
 Lab Sample ID : 90141113 CTA-09-GR-007-05-1.0-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 924.000 gram
 Sample Date/Time : 7/12/99 11:16:00 AM
 Acquire Start Date/Time : 7/15/99 4:10:15 PM Note: Ra-226 and U-235 gamma peak
 Detector Name : LAB01 interfere. Either isotope
 Elapsed Live/Real Time : 6000 / 6003 seconds may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	4.68E-001
RA-226	9.40E-001	6.42E-001	4.90E-001
PB-214	4.65E-001	1.05E-001	4.21E-002
BI-214	3.73E-001	9.41E-002	3.90E-002
PB-210	Not Detected	-----	7.46E+000
TH-232	7.23E-001	3.85E-001	1.46E-001
RA-228	6.71E-001	2.79E-001	1.71E-001
AC-228	6.61E-001	2.09E-001	9.47E-002
TH-228	6.27E-001	1.20E+000	4.41E-001
RA-224	7.70E-001	3.50E-001	8.41E-002
PB-212	6.96E-001	3.88E-001	3.74E-002
BI-212	9.30E-001	6.01E-001	3.18E-001
TL-208	6.64E-001	1.75E-001	6.19E-002
U-235	1.01E-001	1.56E-001	1.81E-001
TH-231	Not Detected	-----	6.62E+000
PA-231	Not Detected	-----	1.22E+000
TH-227	Not Detected	-----	2.69E-001
RA-223	Not Detected	-----	1.32E-001
RN-219	Not Detected	-----	3.26E-001
PB-211	Not Detected	-----	7.58E-001
TL-207	Not Detected	-----	1.43E+001
AM-241	Not Detected	-----	1.82E-001
PU-239	Not Detected	-----	3.22E+002
NP-237	2.71E-001	1.85E-001	1.76E-001
PA-233	Not Detected	-----	5.17E-002
TH-229	Not Detected	-----	1.58E-001

not detected
[Signature]
 7/26/99

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.71E-002
AG-110m	Not Detected	-----	3.52E-002
BA-133	Not Detected	-----	3.82E-002
BE-7	9.76E-002	1.79E-001	1.41E-001
CD-109	Not Detected	-----	7.29E-001
CD-115	Not Detected	-----	1.64E-001
CE-139	Not Detected	-----	2.28E-002
CE-141	Not Detected	-----	4.17E-002
CE-144	Not Detected	-----	1.74E-001
CO-56	Not Detected	-----	3.54E-002
CO-57	Not Detected	-----	2.26E-002
CO-58	Not Detected	-----	3.32E-002
CO-60	Not Detected	-----	4.22E-002
CR-51	Not Detected	-----	2.23E-001
CS-134	Not Detected	-----	3.09E-002
CS-137	Not Detected	-----	2.41E-002
EU-152	Not Detected	-----	6.74E-002
EU-154	Not Detected	-----	1.76E-001
EU-155	Not Detected	-----	1.07E-001
FE-59	Not Detected	-----	8.42E-002
GD-153	Not Detected	-----	6.47E-002
HG-203	Not Detected	-----	2.79E-002
I-131	Not Detected	-----	3.23E-002
IR-192	Not Detected	-----	2.50E-002
K-40	2.58E+001	3.70E+000	2.40E-001
MN-52	Not Detected	-----	4.54E-002
MN-54	Not Detected	-----	3.67E-002
MO-99	Not Detected	-----	4.97E-001
NA-22	Not Detected	-----	4.92E-002
NA-24	Not Detected	-----	1.28E+000
NE-95	Not Detected	-----	1.85E-001
ND-147	Not Detected	-----	2.24E-001
NI-57	Not Detected	-----	2.15E-001
RU-103	Not Detected	-----	2.72E-002
RU-106	Not Detected	-----	2.74E-001
SB-122	Not Detected	-----	8.40E-002
SB-124	Not Detected	-----	2.61E-002
SB-125	Not Detected	-----	7.28E-002
SN-113	Not Detected	-----	3.21E-002
SR-85	Not Detected	-----	3.35E-002
TA-182	Not Detected	-----	1.66E-001
TA-183	Not Detected	-----	2.40E-001
TC-99m	Not Detected	-----	1.67E+002
TL-201	Not Detected	-----	1.68E-001
XE-133	Not Detected	-----	2.09E-001
Y-88	Not Detected	-----	2.55E-002
ZN-65	Not Detected	-----	1.12E-001
ZR-95	Not Detected	-----	5.82E-002

Not Detected
12/26/99

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 7/15/99 7:32:31 PM *

* Analyzed by: *[Signature]* 7/26/99 Reviewed by *[Signature]* 7/27/99 *

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047246-001
 Lab Sample ID : 90141114 CTA-09-GR-008-0-0.5-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 988.000 gram
 Sample Date/Time : 7/12/99 11:18:00 AM
 Acquire Start Date/Time : 7/15/99 5:52:17 PM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamm
 interfere. Either isotope
 may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	4.76E-001
RA-226	1.40E+000	8.38E-001	4.67E-001
PB-214	4.70E-001	1.03E-001	4.10E-002
BI-214	4.20E-001	4.86E-001	4.41E-002
PB-210	Not Detected	-----	7.10E+000
TH-232	Not Detected	-----	1.28E-001
RA-228	8.28E-001	3.14E-001	1.62E-001
AC-228	7.43E-001	2.23E-001	9.07E-002
TH-228	8.02E-001	3.04E-001	4.21E-001
RA-224	9.19E-001	3.40E-001	7.25E-002
PB-212	7.48E-001	7.20E-001	3.62E-002
BI-212	8.71E-001	5.18E-001	2.91E-001
TL-208	Not Detected	-----	6.24E-002
U-235	Not Detected	-----	1.75E-001
TH-231	Not Detected	-----	6.65E+000
PA-231	Not Detected	-----	1.23E+000
TH-227	Not Detected	-----	2.60E-001
RA-223	Not Detected	-----	1.29E-001
RN-219	Not Detected	-----	3.17E-001
PB-211	Not Detected	-----	7.23E-001
TL-207	Not Detected	-----	1.35E+001
AM-241	Not Detected	-----	1.77E-001
PU-239	Not Detected	-----	3.26E+002
NP-237	Not Detected	-----	2.16E-001
PA-233	Not Detected	-----	5.08E-002
TH-229	Not Detected	-----	1.55E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected		3.47E-002
AG-110m	Not Detected		3.43E-002
BA-133	Not Detected		3.83E-002
BE-7	Not Detected		2.31E-001
CD-109	Not Detected		7.25E-001
CD-115	Not Detected		1.60E-001
CE-139	Not Detected		2.31E-002
CE-141	Not Detected		4.22E-002
CE-144	Not Detected		1.81E-001
CO-56	Not Detected		3.12E-002
CO-57	Not Detected		2.26E-002
CO-58	Not Detected		3.26E-002
CO-60	Not Detected		3.88E-002
CR-51	Not Detected		2.18E-001
CS-134	Not Detected		2.84E-002
CS-137	6.08E-002	3.55E-002	1.97E-002
EU-152	Not Detected		6.79E-002
EU-154	Not Detected		1.66E-001
EU-155	Not Detected		1.06E-001
FE-59	Not Detected		8.15E-002
GD-153	Not Detected		6.21E-002
HG-203	Not Detected		2.75E-002
I-131	Not Detected		3.33E-002
IR-192	Not Detected		2.45E-002
K-40	2.57E+001	3.68E+000	2.18E-001
MN-52	Not Detected		4.36E-002
MN-54	Not Detected		3.58E-002
MO-99	Not Detected		5.04E-001
NA-22	Not Detected		4.81E-002
NA-24	Not Detected		1.33E+000
NB-95	Not Detected		1.77E-001
ND-147	Not Detected		2.11E-001
NI-57	Not Detected		2.15E-001
RU-103	Not Detected		2.60E-002
RU-106	Not Detected		2.60E-001
SB-122	Not Detected		7.96E-002
SB-124	Not Detected		2.61E-002
SB-125	Not Detected		6.95E-002
SN-113	Not Detected		3.27E-002
SR-85	Not Detected		3.30E-002
TA-182	Not Detected		1.56E-001
TA-183	Not Detected		2.37E-001
TC-99m	Not Detected		1.94E+002
TL-201	Not Detected		1.69E-001
XE-133	Not Detected		2.13E-001
Y-88	Not Detected		2.43E-002
ZN-65	Not Detected		1.04E-001
ZR-95	Not Detected		5.38E-002

7/15/99 9:14:33 PM

Analyzed by: *[Signature]* 7/28/99

Reviewed by: *[Signature]* 7/27/99

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047247-001
 Lab Sample ID : 90141115

CCTA-09-GR-008-0.5-1.0-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 959.000 gram
 Sample Date/Time : 7/12/99 11:20:00 AM
 Acquire Start Date/Time : 7/15/99 7:34:19 PM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma interfere. Either isotope may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	4.48E-001
RA-226	1.26E+000	6.78E-001	4.75E-001
PB-214	4.11E-001	1.11E-001	4.32E-002
BI-214	3.67E-001	1.05E-001	4.21E-002
PB-210	Not Detected	-----	6.98E+000
TH-232	5.59E-001	3.30E-001	1.32E-001
RA-228	5.68E-001	2.94E-001	1.73E-001
AC-228	Not Detected	-----	8.92E-002
TH-228	7.04E-001	2.80E-001	4.20E-001
RA-224	9.36E-001	3.15E-001	8.66E-002
PB-212	6.74E-001	1.12E-001	3.38E-002
BI-212	Not Detected	-----	3.03E-001
TL-208	6.17E-001	5.03E-001	6.55E-002
U-235	Not Detected	-----	1.69E-001
TH-231	Not Detected	-----	6.42E+000
PA-231	Not Detected	-----	1.16E+000
TH-227	Not Detected	-----	2.47E-001
RA-223	Not Detected	-----	1.26E-001
RN-219	Not Detected	-----	3.17E-001
PB-211	Not Detected	-----	7.06E-001
TL-207	Not Detected	-----	1.44E+001
AM-241	Not Detected	-----	1.77E-001
PU-239	Not Detected	-----	3.11E+002
NP-237	Not Detected	-----	1.74E-001
PA-233	Not Detected	-----	5.01E-002
TH-229	Not Detected	-----	1.51E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.51E-002
AG-110m	Not Detected	-----	3.52E-002
BA-133	Not Detected	-----	3.87E-002
BE-7	Not Detected	-----	2.24E-001
CD-109	Not Detected	-----	7.15E-001
CD-115	Not Detected	-----	1.59E-001
CE-139	Not Detected	-----	2.21E-002
CE-141	Not Detected	-----	3.99E-002
CE-144	Not Detected	-----	1.75E-001
CO-56	Not Detected	-----	3.41E-002
CO-57	Not Detected	-----	2.17E-002
CO-58	Not Detected	-----	3.05E-002
CO-60	Not Detected	-----	3.99E-002
CR-51	Not Detected	-----	2.21E-001
CS-134	Not Detected	-----	2.78E-002
CS-137	Not Detected	-----	2.01E-002
EU-152	Not Detected	-----	6.53E-002
EU-154	Not Detected	-----	1.68E-001
EU-155	Not Detected	-----	1.03E-001
FE-59	Not Detected	-----	7.77E-002
GD-153	Not Detected	-----	6.13E-002
HG-203	Not Detected	-----	2.67E-002
I-131	Not Detected	-----	3.26E-002
IR-192	Not Detected	-----	2.47E-002
K-40	2.47E+001	3.55E+000	2.47E-001
MN-52	Not Detected	-----	4.34E-002
MN-54	Not Detected	-----	1.36E-002
MO-99	Not Detected	-----	5.15E-001
NA-22	Not Detected	-----	4.48E-002
NA-24	Not Detected	-----	1.43E+000
NB-95	Not Detected	-----	1.71E-001
ND-147	Not Detected	-----	2.16E-001
NI-57	Not Detected	-----	2.08E-001
RU-103	Not Detected	-----	2.66E-002
RU-106	Not Detected	-----	2.59E-001
SB-122	Not Detected	-----	8.88E-002
SB-124	Not Detected	-----	2.52E-002
SB-125	Not Detected	-----	7.33E-002
SN-113	Not Detected	-----	3.11E-002
SR-85	Not Detected	-----	3.19E-002
TA-182	Not Detected	-----	1.59E-001
TA-183	Not Detected	-----	2.38E-001
TC-99m	Not Detected	-----	2.32E+002
TL-201	Not Detected	-----	1.73E-001
XE-133	Not Detected	-----	2.07E-001
Y-88	Not Detected	-----	2.54E-002
ZN-65	Not Detected	-----	1.07E-001
ZR-95	Not Detected	-----	5.59E-002

* Analyzed by: *[Signature]* 7/26/99 Reviewed by: *[Signature]* 7/27/99 *

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047249-001
 Lab Sample ID : 90141116 CETA-09-GR-009-0.5-1.0-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 946.000 gram
 Sample Date/Time : 7/12/99 11:27:00 AM
 Acquire Start Date/Time : 7/15/99 9:16:19 PM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments: Note: Ra-226 and U-235 gamma
 ***** interference from other isotopes
 may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	4.44E-001
RA-226	1.39E+000	8.97E-001	4.59E-001
PB-214	4.38E-001	1.05E-001	4.25E-002
BI-214	Not Detected	-----	9.03E-002
PB-210	Not Detected	-----	7.08E+000
TH-232	6.35E-001	4.92E-001	1.40E-001
RA-228	7.62E-001	2.99E-001	1.62E-001
AC-228	6.17E-001	2.07E-001	9.50E-002
TH-228	7.25E-001	2.87E-001	4.30E-001
RA-224	7.15E-001	2.29E-001	9.59E-002
PB-212	6.75E-001	1.26E-001	3.53E-002
BI-212	5.72E-001	4.19E-001	2.81E-001
TL-208	5.91E-001	1.50E-001	6.25E-002
U-235	Not Detected	-----	1.71E-001
TH-231	Not Detected	-----	6.36E+000
PA-231	Not Detected	-----	1.16E+000
TH-227	Not Detected	-----	2.58E-001
RA-223	Not Detected	-----	1.30E-001
RN-219	Not Detected	-----	3.15E-001
PB-211	Not Detected	-----	7.17E-001
TL-207	Not Detected	-----	1.38E+001
AM-241	Not Detected	-----	1.70E-001
PU-239	Not Detected	-----	3.12E+002
NP-237	Not Detected	-----	2.11E-001
PA-233	Not Detected	-----	5.06E-002
TH-229	Not Detected	-----	1.55E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.47E-002
AG-110m	Not Detected	-----	3.52E-002
BA-133	Not Detected	-----	3.84E-002
BE-7	Not Detected	-----	2.22E-001
CD-109	Not Detected	-----	7.12E-001
CD-115	Not Detected	-----	1.66E-001
CE-139	Not Detected	-----	2.26E-002
CE-141	Not Detected	-----	4.03E-002
CE-144	Not Detected	-----	1.73E-001
CO-56	Not Detected	-----	3.36E-002
CO-57	Not Detected	-----	2.20E-002
CO-58	Not Detected	-----	3.24E-002
CO-60	Not Detected	-----	4.18E-002
CR-51	Not Detected	-----	2.25E-001
CS-134	Not Detected	-----	2.79E-002
CS-137	7.30E-002	3.92E-002	1.83E-002
EU-152	Not Detected	-----	6.61E-002
EU-154	Not Detected	-----	1.64E-001
EU-155	Not Detected	-----	1.01E-001
FE-59	Not Detected	-----	7.91E-002
GD-153	Not Detected	-----	6.04E-002
HG-203	Not Detected	-----	2.78E-002
I-131	Not Detected	-----	3.33E-002
IR-192	Not Detected	-----	2.45E-002
K-40	2.44E+001	3.55E+000	2.74E-001
MN-52	Not Detected	-----	4.76E-002
MN-54	Not Detected	-----	3.40E-002
MO-99	Not Detected	-----	5.08E-001
NA-22	Not Detected	-----	4.69E-002
NA-24	Not Detected	-----	1.61E+000
NB-95	4.73E-002	2.69E-002	9.36E-002
ND-147	Not Detected	-----	2.14E-001
NI-57	Not Detected	-----	2.53E-001
RU-103	Not Detected	-----	2.47E-002
RU-106	Not Detected	-----	2.77E-001
SB-122	Not Detected	-----	8.89E-002
SB-124	Not Detected	-----	2.62E-002
SB-125	Not Detected	-----	6.85E-002
SN-113	Not Detected	-----	3.17E-002
SR-85	Not Detected	-----	3.26E-002
TA-182	Not Detected	-----	1.55E-001
TA-183	Not Detected	-----	2.31E-001
TC-99m	Not Detected	-----	2.81E+002
TL-201	Not Detected	-----	1.79E-001
XE-133	Not Detected	-----	2.13E-001
Y-88	Not Detected	-----	2.54E-002
ZN-65	Not Detected	-----	1.07E-001
ZR-95	Not Detected	-----	5.40E-002

NOT
Detected
7/26/88

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

7/16/99 12:38:34 AM

Analyzed by: *[Signature]* 7/26/99

Reviewed by: *[Signature]* 7/27/99

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047250-001
 Lab Sample ID : 90141117

LCTA-09-GR-029-3.0-3.5-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 904.000 gram
 Sample Date/Time : 7/12/99 1:25:00 PM
 Acquire Start Date/Time : 7/15/99 10:58:21 PM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma interfere. Either isotope may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	3.77E-001	4.26E-001	4.20E-001
RA-226	1.37E+000	8.95E-001	5.23E-001
PB-214	6.31E-001	1.26E-001	4.36E-002
BI-214	5.72E-001	1.27E-001	4.71E-002
PB-210	Not Detected	-----	7.57E+000
TH-232	7.92E-001	4.25E-001	1.58E-001
RA-228	8.40E-001	3.21E-001	1.57E-001
AC-228	8.72E-001	2.35E-001	8.73E-002
TH-228	8.20E-001	2.73E-001	4.31E-001
RA-224	9.10E-001	3.46E-001	1.06E-001
PB-212	8.37E-001	1.59E-001	3.91E-002
BI-212	1.17E+000	6.73E-001	3.33E-001
TL-208	7.24E-001	1.60E-001	6.27E-002
U-235	8.88E-002	1.65E-001	1.92E-001
TH-231	Not Detected	-----	6.79E+000
PA-231	Not Detected	-----	1.21E+000
TH-227	Not Detected	-----	2.86E-001
RA-223	Not Detected	-----	1.37E-001
RN-219	Not Detected	-----	3.48E-001
PB-211	Not Detected	-----	7.72E-001
TL-207	Not Detected	-----	1.39E+001
AM-241	Not Detected	-----	1.79E-001
PU-239	Not Detected	-----	3.42E+002
NP-237	Not Detected	-----	2.34E-001
PA-233	Not Detected	-----	5.30E-002
TH-229	Not Detected	-----	1.62E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.79E-002
AG-110m	Not Detected	-----	3.38E-002
BA-133	Not Detected	-----	4.33E-002
BE-7	Not Detected	-----	2.42E-001
CD-109	Not Detected	-----	7.80E-001
CD-115	Not Detected	-----	1.84E-001
CE-139	Not Detected	-----	2.45E-002
CE-141	Not Detected	-----	4.47E-002
CE-144	Not Detected	-----	1.82E-001
CO-56	Not Detected	-----	3.48E-002
CO-57	Not Detected	-----	2.35E-002
CO-58	Not Detected	-----	3.39E-002
CO-60	Not Detected	-----	3.99E-002
CR-51	Not Detected	-----	2.31E-001
CS-134	Not Detected	-----	3.13E-002
CS-137	3.22E-002	2.53E-002	1.88E-002
EU-152	Not Detected	-----	7.01E-002
EU-154	Not Detected	-----	1.83E-001
EU-155	Not Detected	-----	1.08E-001
FE-59	Not Detected	-----	8.25E-002
GD-153	Not Detected	-----	6.43E-002
HG-203	Not Detected	-----	2.89E-002
I-131	Not Detected	-----	3.60E-002
IR-192	Not Detected	-----	2.63E-002
K-40	2.06E+001	3.00E+000	2.68E-001
MN-52	Not Detected	-----	4.97E-002
MN-54	Not Detected	-----	3.58E-002
MO-99	Not Detected	-----	5.64E-001
NA-22	Not Detected	-----	4.54E-002
NA-24	Not Detected	-----	1.60E+000
NB-95	Not Detected	-----	1.95E-001
ND-147	Not Detected	-----	2.25E-001
NI-57	Not Detected	-----	2.66E-001
RU-103	Not Detected	-----	2.73E-002
RU-106	Not Detected	-----	2.77E-001
SB-122	Not Detected	-----	8.91E-002
SB-124	Not Detected	-----	2.72E-002
SB-125	Not Detected	-----	7.47E-002
SN-113	Not Detected	-----	3.35E-002
SR-85	Not Detected	-----	3.39E-002
TA-182	Not Detected	-----	1.52E-001
TA-183	Not Detected	-----	2.42E-001
TC-99m	Not Detected	-----	2.99E+002
TL-201	Not Detected	-----	1.83E-001
XE-133	Not Detected	-----	2.26E-001
Y-88	Not Detected	-----	3.21E-002
ZN-65	Not Detected	-----	1.07E-001
ZR-95	Not Detected	-----	5.90E-002

* Analyzed by: *[Signature]* 7/26/99 Reviewed by: *[Signature]* 7/27/99 *

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047252-001
 Lab Sample ID : 90141118 CCA-09-GR-030-D.S-1.0-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 901.000 gram
 Sample Date/Time : 7/12/99 1:32:00 PM
 Acquire Start Date/Time : 7/16/99 12:40:23 AM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma
 interiere. Either isotope
 may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	4.59E-001	3.62E-001	4.32E-001
RA-226	1.13E+000	9.57E-001	4.95E-001
PB-214	3.87E-001	9.49E-002	4.29E-002
BI-214	3.94E-001	1.21E-001	4.17E-002
PB-210	Not Detected	-----	7.11E+000
TH-232	5.80E-001	3.49E-001	1.46E-001
RA-228	7.52E-001	3.10E-001	1.72E-001
AC-228	7.13E-001	2.86E-001	9.97E-002
TH-228	Not Detected	-----	4.78E-001
RA-224	8.87E-001	5.35E-001	9.48E-002
PB-212	7.03E-001	1.43E-001	3.54E-002
BI-212	6.53E-001	1.83E-001	3.39E-001
TL-208	6.15E-001	1.55E-001	6.20E-002
U-235	Not Detected	-----	1.79E-001
TH-231	Not Detected	-----	6.67E+000
PA-231	Not Detected	-----	1.16E+000
TH-227	Not Detected	-----	2.69E-001
RA-223	Not Detected	-----	1.33E-001
RN-219	Not Detected	-----	3.16E-001
PB-211	Not Detected	-----	7.17E-001
TL-207	Not Detected	-----	1.48E+001
AM-241	Not Detected	-----	1.76E-001
PU-239	Not Detected	-----	3.25E+002
NP-237	4.00E-001	2.55E-001	1.87E-001
PA-233	Not Detected	-----	5.14E-002
TH-229	Not Detected	-----	1.54E-001

Not Detected

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.73E-002
AG-110m	Not Detected	-----	3.34E-002
BA-133	Not Detected	-----	3.88E-002
BE-7	Not Detected	-----	2.17E-001
CD-109	Not Detected	-----	7.20E-001
CD-115	Not Detected	-----	1.72E-001
CE-139	Not Detected	-----	2.29E-002
CE-141	Not Detected	-----	4.20E-002
CE-144	Not Detected	-----	1.74E-001
CO-56	Not Detected	-----	3.36E-002
CO-57	Not Detected	-----	2.28E-002
CO-58	Not Detected	-----	3.31E-002
CO-60	Not Detected	-----	4.06E-002
CR-51	Not Detected	-----	2.28E-001
CS-134	Not Detected	-----	2.98E-002
CS-137	2.75E-002	1.79E-002	2.21E-002
EU-152	Not Detected	-----	6.78E-002
EU-154	Not Detected	-----	1.77E-001
EU-155	Not Detected	-----	1.04E-001
FE-59	Not Detected	-----	8.61E-002
GD-153	Not Detected	-----	6.07E-002
HG-203	Not Detected	-----	2.80E-002
I-131	Not Detected	-----	3.31E-002
IR-192	Not Detected	-----	2.58E-002
K-40	2.54E+001	3.68E+000	2.56E-001
MN-52	Not Detected	-----	4.83E-002
MN-54	Not Detected	-----	3.56E-002
MO-99	Not Detected	-----	5.42E-001
NA-22	Not Detected	-----	4.95E-002
NA-24	Not Detected	-----	1.65E+000
NB-95	Not Detected	-----	1.88E-001
ND-147	Not Detected	-----	2.25E-001
NI-57	Not Detected	-----	2.20E-001
RU-103	Not Detected	-----	2.58E-002
RU-106	Not Detected	-----	2.69E-001
SB-122	Not Detected	-----	8.94E-002
SB-124	Not Detected	-----	2.79E-002
SB-125	Not Detected	-----	7.07E-002
SN-113	Not Detected	-----	3.26E-002
SR-85	Not Detected	-----	3.38E-002
TA-182	Not Detected	-----	1.55E-001
TA-183	Not Detected	-----	2.40E-001
TC-99m	Not Detected	-----	3.37E+002
TL-201	Not Detected	-----	1.76E-001
XE-133	Not Detected	-----	2.27E-001
Y-88	Not Detected	-----	2.71E-002
ZN-65	Not Detected	-----	1.08E-001
ZR-95	Not Detected	-----	5.84E-002

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

7/16/99 4:02:38 AM

Analyzed by: *[Signature]* 7/26/99

Reviewed by: *[Signature]* 7/27/99

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047253-001
 Lab Sample ID : 90141119 CCA-09-GR-031-0-0.5-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 965.000 gram
 Sample Date/Time : 7/12/99 1:40:00 PM
 Acquire Start Date/Time : 7/16/99 2:22:24 AM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma interfere. Either isotope may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	4.89E-001
RA-226	1.34E+000	6.78E-001	4.69E-001
PB-214	4.44E-001	1.06E-001	4.48E-001
BI-214	3.98E-001	3.44E-001	4.42E-002
PB-210	Not Detected	-----	7.22E+000
TH-232	Not Detected	-----	1.38E-001
RA-228	7.06E-001	2.54E-001	1.57E-001
AC-228	Not Detected	-----	8.75E-002
TH-228	5.23E-001	2.46E-001	4.34E-001
RA-224	8.50E-001	3.24E-001	7.49E-002
PB-212	7.24E-001	3.31E-001	3.69E-002
BI-212	6.57E-001	5.76E-001	2.79E-001
TL-208	6.95E-001	4.52E-001	6.00E-002
U-235	Not Detected	-----	1.74E-001
TH-231	Not Detected	-----	6.35E+000
PA-231	Not Detected	-----	1.16E+000
TH-227	Not Detected	-----	2.63E-001
RA-223	Not Detected	-----	1.29E-001
RN-219	Not Detected	-----	3.06E-001
PB-211	Not Detected	-----	6.97E-001
TL-207	Not Detected	-----	1.33E+001
AM-241	Not Detected	-----	1.74E-001
PU-239	Not Detected	-----	3.20E+002
NP-237	4.88E-001	2.34E-001	1.88E-001
PA-233	Not Detected	-----	4.84E-002
TH-229	Not Detected	-----	1.53E-001

Not detected
[Signature]
 7/26/99

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.50E-002
AG-110m	Not Detected	-----	3.09E-002
BA-133	Not Detected	-----	3.80E-002
BE-7	Not Detected	-----	2.26E-001
CD-109	Not Detected	-----	7.21E-001
CD-115	Not Detected	-----	1.77E-001
CE-139	Not Detected	-----	2.24E-002
CE-141	Not Detected	-----	4.14E-002
CE-144	Not Detected	-----	1.77E-001
CO-56	Not Detected	-----	3.27E-002
CO-57	Not Detected	-----	2.18E-002
CO-58	Not Detected	-----	3.31E-002
CO-60	Not Detected	-----	3.95E-002
CR-51	Not Detected	-----	2.15E-001
CS-134	Not Detected	-----	2.96E-002
CS-137	3.49E-002	3.58E-002	2.32E-002
EU-152	Not Detected	-----	6.51E-002
EU-154	Not Detected	-----	1.67E-001
EU-155	Not Detected	-----	1.03E-001
FE-59	Not Detected	-----	8.14E-002
GD-153	Not Detected	-----	6.05E-002
HG-203	Not Detected	-----	2.67E-002
I-131	Not Detected	-----	3.15E-002
IR-192	Not Detected	-----	2.36E-002
K-40	2.42E+001	3.50E+000	2.54E-001
MN-52	Not Detected	-----	4.41E-002
MN-54	Not Detected	-----	3.31E-002
MO-99	Not Detected	-----	5.70E-001
NA-22	Not Detected	-----	4.86E-002
NA-24	Not Detected	-----	1.69E+000
NB-95	Not Detected	-----	1.88E-001
ND-147	Not Detected	-----	2.29E-001
NI-57	Not Detected	-----	2.46E-001
RU-103	Not Detected	-----	2.52E-002
RU-106	Not Detected	-----	2.62E-001
SB-122	Not Detected	-----	8.54E-002
SB-124	Not Detected	-----	2.66E-002
SB-125	Not Detected	-----	6.84E-002
SN-113	Not Detected	-----	3.24E-002
SR-85	Not Detected	-----	3.23E-002
TA-182	Not Detected	-----	1.48E-001
TA-183	Not Detected	-----	2.40E-001
TC-99m	Not Detected	-----	3.89E+002
TL-201	Not Detected	-----	1.80E-001
XE-133	Not Detected	-----	2.20E-001
Y-88	Not Detected	-----	2.49E-002
ZN-65	Not Detected	-----	1.03E-001
ZR-95	Not Detected	-----	5.67E-002

7/16/99 5:44:39 AM

Analyzed by: *[Signature]* 7/26/99

Reviewed by: *[Signature]* 8/2/99

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047254-001
 Lab Sample ID : 90141120

CCTA-09-GR-031-0.5-1.0-5

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 779.000 gram
 Sample Date/Time : 7/12/99 1:42:00 PM
 Acquire Start Date/Time : 7/16/99 4:04:26 AM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	5.37E-001
RA-226	Not Detected	-----	5.67E-001
PB-214	4.45E-001	1.21E-001	4.74E-002
BI-214	Not Detected	-----	1.07E-001
PB-210	Not Detected	-----	7.87E+000
TH-232	7.08E-001	3.99E-001	1.63E-001
RA-228	Not Detected	-----	1.87E-001
AC-228	7.14E-001	2.18E-001	1.02E-001
TH-228	6.84E-001	2.81E-001	4.82E-001
RA-224	9.01E-001	3.92E-001	1.17E-001
PB-212	8.09E-001	1.54E-001	4.08E-002
BI-212	9.29E-001	9.85E-001	3.38E-001
TL-208	6.95E-001	1.11E+000	6.60E-002
U-235	Not Detected	-----	1.94E-001
TH-231	Not Detected	-----	7.19E+000
PA-231	Not Detected	-----	1.34E+000
TH-227	Not Detected	-----	2.97E-001
RA-223	Not Detected	-----	1.48E-001
RN-219	Not Detected	-----	3.79E-001
PB-211	Not Detected	-----	8.15E-001
TL-207	Not Detected	-----	1.63E+001
AM-241	Not Detected	-----	1.97E-001
PU-239	Not Detected	-----	3.55E+002
NP-237	Not Detected	-----	2.43E-001
PA-233	Not Detected	-----	5.84E-002
TH-229	Not Detected	-----	1.72E-001

[Summary Report] - Sample ID: : 90141120

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	4.07E-002
AG-110m	Not Detected	-----	3.39E-002
BA-133	Not Detected	-----	4.39E-002
BE-7	Not Detected	-----	2.54E-001
CD-109	Not Detected	-----	8.10E-001
CD-115	Not Detected	-----	2.04E-001
CE-139	Not Detected	-----	2.44E-002
CE-141	Not Detected	-----	4.57E-002
CE-144	Not Detected	-----	1.92E-001
CO-56	Not Detected	-----	3.82E-002
CO-57	Not Detected	-----	2.43E-002
CO-58	Not Detected	-----	3.85E-002
CO-60	Not Detected	-----	4.43E-002
CR-51	Not Detected	-----	2.43E-001
CS-134	Not Detected	-----	3.46E-002
CS-137	Not Detected	-----	3.80E-002
EU-152	Not Detected	-----	7.31E-002
EU-154	Not Detected	-----	1.99E-001
EU-155	Not Detected	-----	1.18E-001
FE-59	Not Detected	-----	9.34E-002
GD-153	Not Detected	-----	6.97E-002
HG-203	Not Detected	-----	3.14E-002
I-131	Not Detected	-----	3.69E-002
IR-192	Not Detected	-----	2.78E-002
K-40	2.60E+001	3.81E+000	2.96E-001
MN-52	Not Detected	-----	5.38E-002
MN-54	Not Detected	-----	4.09E-002
MO-99	Not Detected	-----	6.05E-001
NA-22	Not Detected	-----	5.02E-002
NA-24	Not Detected	-----	2.15E+000
NB-95	Not Detected	-----	2.13E-001
ND-147	Not Detected	-----	2.42E-001
NI-57	Not Detected	-----	2.94E-001
RU-103	Not Detected	-----	2.90E-002
RU-106	Not Detected	-----	2.98E-001
SB-122	Not Detected	-----	9.76E-002
SB-124	Not Detected	-----	3.18E-002
SB-125	Not Detected	-----	8.00E-002
SN-113	Not Detected	-----	3.60E-002
SR-85	Not Detected	-----	3.65E-002
TA-182	Not Detected	-----	1.74E-001
TA-183	Not Detected	-----	2.75E-001
TC-99m	Not Detected	-----	5.43E+002
TL-201	Not Detected	-----	2.12E-001
XE-133	Not Detected	-----	2.58E-001
Y-88	Not Detected	-----	2.83E-002
ZN-65	Not Detected	-----	1.15E-001
ZR-95	Not Detected	-----	6.51E-002

Sandia National Laboratories
 Radiation Protection Sample Diagnostics Program [806 Laboratory]
 7/16/99 9:52:27 AM

* Analyzed by: *[Signature]* 7/26/99

Reviewed by: *[Signature]* 7/27/99

Customer : BYRD/D. SALMI
 Customer Sample ID : 047256-001
 Lab Sample ID : 90141121 *CCFA-09-GR-032-0-0.5-DU*

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 890.000 gram
 Sample Date/Time : 7/12/99 1:52:00 PM
 Acquire Start Date/Time : 7/16/99 8:12:12 AM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma
 interfere. Either isotope
 may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	5.47E-001
RA-226	1.30E+000	7.49E-001	5.48E-001
PB-214	5.75E-001	1.20E-001	4.34E-002
BI-214	5.08E-001	1.23E-001	4.71E-002
PB-210	Not Detected	-----	7.66E+000
TH-232	8.53E-001	4.63E-001	1.56E-001
RA-228	8.70E-001	3.53E-001	1.66E-001
AC-228	7.65E-001	2.33E-001	9.15E-002
TH-228	7.60E-001	2.69E-001	4.57E-001
RA-224	9.37E-001	6.53E-001	1.03E-001
PB-212	8.34E-001	1.54E-001	4.02E-002
BI-212	7.85E-001	5.00E-001	3.33E-001
TL-208	6.84E-001	5.88E-001	6.47E-002
U-235	Not Detected	-----	1.90E-001
TH-231	Not Detected	-----	7.13E+000
PA-231	Not Detected	-----	1.21E+000
TH-227	Not Detected	-----	2.89E-001
RA-223	Not Detected	-----	1.47E-001
RN-219	Not Detected	-----	3.56E-001
PB-211	Not Detected	-----	7.80E-001
TL-207	Not Detected	-----	1.49E+001
AM-241	Not Detected	-----	1.89E-001
PU-239	Not Detected	-----	3.48E+002
NP-237	Not Detected	-----	2.35E-001
PA-233	Not Detected	-----	5.57E-002
TH-229	Not Detected	-----	1.65E-001

[Summary Report] - Sample ID: : 90141121

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.86E-002
AG-110m	Not Detected	-----	3.87E-002
BA-133	Not Detected	-----	4.22E-002
BE-7	Not Detected	-----	2.48E-001
CD-109	Not Detected	-----	7.83E-001
CD-115	Not Detected	-----	2.11E-001
CE-139	Not Detected	-----	2.40E-002
CE-141	Not Detected	-----	4.43E-002
CE-144	Not Detected	-----	1.90E-001
CO-56	Not Detected	-----	3.49E-002
CO-57	Not Detected	-----	2.37E-002
CO-58	Not Detected	-----	3.38E-002
CO-60	Not Detected	-----	4.13E-002
CR-51	Not Detected	-----	2.38E-001
CS-134	Not Detected	-----	3.31E-002
CS-137	8.25E-002	4.11E-002	2.58E-002
EU-152	Not Detected	-----	7.16E-002
EU-154	Not Detected	-----	1.87E-001
EU-155	Not Detected	-----	1.13E-001
FE-59	Not Detected	-----	8.25E-002
GD-153	Not Detected	-----	6.72E-002
HG-203	Not Detected	-----	2.97E-002
I-131	Not Detected	-----	3.60E-002
IR-192	Not Detected	-----	2.67E-002
K-40	2.35E+001	3.40E+000	2.78E-001
MN-52	Not Detected	-----	5.23E-002
MN-54	Not Detected	-----	3.76E-002
MO-99	Not Detected	-----	6.29E-001
NA-22	Not Detected	-----	4.69E-002
NA-24	Not Detected	-----	2.19E+000
NB-95	Not Detected	-----	2.13E-001
ND-147	Not Detected	-----	2.42E-001
NI-57	Not Detected	-----	2.82E-001
RU-103	Not Detected	-----	2.80E-002
RU-106	Not Detected	-----	2.96E-001
SB-122	Not Detected	-----	1.04E-001
SB-124	Not Detected	-----	2.95E-002
SB-125	Not Detected	-----	7.79E-002
SN-113	Not Detected	-----	3.48E-002
SR-85	Not Detected	-----	3.51E-002
TA-182	Not Detected	-----	1.64E-001
TA-183	Not Detected	-----	2.70E-001
TC-99m	Not Detected	-----	8.33E+002
TL-201	Not Detected	-----	2.10E-001
XE-133	Not Detected	-----	2.57E-001
Y-88	Not Detected	-----	2.34E-002
ZN-65	Not Detected	-----	1.10E-001
ZR-95	Not Detected	-----	5.64E-002

* Analyzed by: *[Signature]* 7/26/99 Reviewed by: *[Signature]* 7/27/99 *

Customer : BYRD/D. SALMI
 Customer Sample ID : 047257-001
 Lab Sample ID : 90141122 CCA-09-GR-032-0.5-1.0-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 894.000 gram
 Sample Date/Time : 7/12/99 1:54:00 PM
 Acquire Start Date/Time : 7/16/99 9:54:15 AM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma p
 interfere. Either isotope
 may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	8.77E-001	6.11E-001	4.56E-001
RA-226	1.51E+000	7.68E-001	5.18E-001
PB-214	5.46E-001	1.20E-001	4.34E-002
BI-214	Not Detected	-----	4.20E-002
PB-210	Not Detected	-----	7.85E+000
TH-232	7.10E-001	4.16E-001	1.40E-001
RA-228	8.46E-001	3.37E-001	1.75E-001
AC-228	7.62E-001	1.44E+000	9.14E-002
TH-228	6.85E-001	2.82E-001	4.93E-001
RA-224	1.07E+000	5.86E-001	9.29E-002
PB-212	7.62E-001	9.24E-001	3.93E-002
BI-212	9.53E-001	5.22E-001	2.99E-001
TL-208	8.02E-001	1.83E-001	5.85E-002
U-235	8.91E-002	1.66E-001	1.92E-001
TH-231	Not Detected	-----	7.11E+000
PA-231	Not Detected	-----	1.22E+000
TH-227	Not Detected	-----	2.78E-001
RA-223	Not Detected	-----	1.47E-001
RN-219	Not Detected	-----	3.60E-001
PB-211	Not Detected	-----	7.96E-001
TL-207	Not Detected	-----	1.45E+001
AM-241	Not Detected	-----	1.89E-001
PU-239	Not Detected	-----	3.49E+002
NP-237	5.43E-001	2.23E-001	1.95E-001
PA-233	Not Detected	-----	5.59E-002
TH-229	Not Detected	-----	1.61E-001

Not Detected
7/26/99

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.80E-002
AG-110m	Not Detected	-----	3.88E-002
BA-133	Not Detected	-----	4.30E-002
BE-7	Not Detected	-----	2.41E-001
CD-109	Not Detected	-----	7.96E-001
CD-115	Not Detected	-----	2.10E-001
CE-139	Not Detected	-----	2.38E-002
CE-141	Not Detected	-----	4.49E-002
CE-144	Not Detected	-----	1.82E-001
CO-56	Not Detected	-----	3.39E-002
CO-57	Not Detected	-----	2.42E-002
CO-58	Not Detected	-----	3.45E-002
CO-60	Not Detected	-----	4.17E-002
CR-51	Not Detected	-----	2.40E-001
CS-134	Not Detected	-----	3.17E-002
CS-137	Not Detected	-----	2.44E-002
EU-152	Not Detected	-----	7.13E-002
EU-154	Not Detected	-----	1.81E-001
EU-155	Not Detected	-----	1.11E-001
FE-59	Not Detected	-----	8.27E-002
GD-153	Not Detected	-----	6.60E-002
HG-203	Not Detected	-----	2.92E-002
I-131	Not Detected	-----	3.67E-002
IR-192	Not Detected	-----	2.66E-002
K-40	2.31E+001	3.34E+000	2.48E-001
MN-52	Not Detected	-----	5.01E-002
MN-54	Not Detected	-----	3.77E-002
MO-99	Not Detected	-----	6.20E-001
NA-22	Not Detected	-----	4.64E-002
NA-24	Not Detected	-----	2.46E+000
NB-95	Not Detected	-----	2.10E-001
ND-147	Not Detected	-----	2.45E-001
NI-57	Not Detected	-----	2.89E-001
RU-103	Not Detected	-----	2.83E-002
RU-106	Not Detected	-----	2.86E-001
SB-122	Not Detected	-----	1.05E-001
SB-124	Not Detected	-----	2.89E-002
SB-125	Not Detected	-----	7.19E-002
SN-113	Not Detected	-----	3.39E-002
SR-85	Not Detected	-----	3.51E-002
TA-182	Not Detected	-----	1.59E-001
TA-183	Not Detected	-----	2.72E-001
TC-99m	Not Detected	-----	9.83E+002
TL-201	Not Detected	-----	2.10E-001
XE-133	Not Detected	-----	2.74E-001
Y-88	Not Detected	-----	3.12E-002
ZN-65	Not Detected	-----	1.07E-001
ZR-95	Not Detected	-----	5.83E-002

* Analyzed by: *[Signature]* 7/26/99 Reviewed by: *

Customer : BYRD/D. SALMI
 Customer Sample ID : 047258-001
 Lab Sample ID : 90141123 *LCTA-09-GR-033-0-0.5-5*

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 679.000 gram
 Sample Date/Time : 7/12/99 1:55:00 PM
 Acquire Start Date/Time : 7/16/99 11:36:18 AM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma
 interfere. Either isotope
 may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	1.48E+000	5.68E-001	5.65E-001
RA-226	2.22E+000	1.61E+000	6.11E-001
PB-214	Not Detected	-----	5.34E-002
BI-214	7.17E-001	1.34E+000	5.60E-002
PB-210	Not Detected	-----	9.37E+000
TH-232	9.23E-001	5.20E-001	1.64E-001
RA-228	9.00E-001	3.85E-001	1.95E-001
AC-228	8.17E-001	2.70E-001	1.14E-001
TH-228	Not Detected	-----	5.30E-001
RA-224	9.80E-001	4.17E-001	1.21E-001
PB-212	9.55E-001	1.86E-001	4.67E-002
BI-212	Not Detected	-----	3.86E-001
TL-208	8.63E-001	2.24E-001	7.32E-002
U-235	Not Detected	-----	2.24E-001
TH-231	Not Detected	-----	8.51E+000
PA-231	Not Detected	-----	1.53E+000
TH-227	Not Detected	-----	3.55E-001
RA-223	Not Detected	-----	1.83E-001
RN-219	Not Detected	-----	4.21E-001
PB-211	Not Detected	-----	9.35E-001
TL-207	Not Detected	-----	1.68E+001
AM-241	Not Detected	-----	2.29E-001
PJ-239	Not Detected	-----	4.08E+002
NP-237	Not Detected	-----	2.88E-001
PA-233	Not Detected	-----	6.35E-002
TH-229	Not Detected	-----	1.98E-001

[Summary Report] - Sample ID: : 90141123

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	4.53E-002
AG-110m	Not Detected	-----	5.48E-002
BA-133	Not Detected	-----	5.16E-002
BE-7	2.27E-001	2.76E-001	1.91E-001
CD-109	Not Detected	-----	9.50E-001
CD-115	Not Detected	-----	2.65E-001
CE-139	Not Detected	-----	2.92E-002
CE-141	Not Detected	-----	5.28E-002
CE-144	Not Detected	-----	2.22E-001
CO-56	Not Detected	-----	4.01E-002
CO-57	Not Detected	-----	2.81E-002
CO-58	Not Detected	-----	4.01E-002
CO-60	Not Detected	-----	4.77E-002
CR-51	Not Detected	-----	2.88E-001
CS-134	Not Detected	-----	3.99E-002
CS-137	1.55E-001	4.96E-002	3.06E-002
EU-152	Not Detected	-----	8.32E-002
EU-154	Not Detected	-----	2.17E-001
EU-155	Not Detected	-----	1.29E-001
FE-59	Not Detected	-----	9.48E-002
GD-153	Not Detected	-----	7.89E-002
HG-203	Not Detected	-----	3.58E-002
I-131	Not Detected	-----	4.30E-002
IR-192	Not Detected	-----	3.11E-002
K-40	2.19E+001	3.38E+000	3.16E-001
MN-52	Not Detected	-----	6.19E-002
MN-54	Not Detected	-----	4.25E-002
MO-99	Not Detected	-----	7.43E-001
NA-22	Not Detected	-----	5.58E-002
NA-24	Not Detected	-----	3.67E+000
NB-95	Not Detected	-----	2.66E-001
ND-147	Not Detected	-----	3.04E-001
NI-57	Not Detected	-----	4.03E-001
RU-103	Not Detected	-----	3.21E-002
RU-106	Not Detected	-----	3.45E-001
SB-122	Not Detected	-----	1.20E-001
SB-124	Not Detected	-----	3.31E-002
SB-125	Not Detected	-----	9.28E-002
SN-113	Not Detected	-----	4.29E-002
SR-85	Not Detected	-----	4.16E-002
TA-182	Not Detected	-----	1.91E-001
TA-183	Not Detected	-----	3.33E-001
TC-99m	Not Detected	-----	1.41E+003
TL-201	Not Detected	-----	2.59E-001
XE-133	Not Detected	-----	3.29E-001
Y-88	Not Detected	-----	3.76E-002
ZN-65	Not Detected	-----	1.34E-001
ZR-95	Not Detected	-----	7.19E-002

NOT DETECTED K₂O + H₂O

* Analyzed by: *[Signature]* 7/16/99 Reviewed by: *[Signature]* 7/16/99 *

Customer : BYRD/D. SALMI
 Customer Sample ID : 047259-001
 Lab Sample ID : 90141124 CCA-09-GR-033-0.5-1.0-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 730.000 gram
 Sample Date/Time : 7/12/99 1:57:00 PM
 Acquire Start Date/Time : 7/16/99 1:18:19 PM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma p
 interfere. Either isotope
 may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	2.02E+000	5.62E-001	5.11E-001
RA-226	Not Detected	-----	5.90E-001
PB-214	6.67E-001	1.34E-001	4.77E-002
BI-214	5.97E-001	1.49E-001	4.92E-002
PB-210	Not Detected	-----	8.81E+000
TH-232	8.27E-001	5.04E-001	1.53E-001
RA-228	1.01E+000	3.44E-001	1.73E-001
AC-228	8.35E-001	2.51E-001	9.64E-002
TH-228	8.46E-001	3.15E-001	5.45E-001
RA-224	1.04E+000	5.74E-001	1.20E-001
PB-212	9.04E-001	1.94E-001	4.56E-002
BI-212	Not Detected	-----	3.94E-001
TL-208	8.02E-001	5.23E-001	7.35E-002
U-235	1.18E-001	7.90E-002	1.54E-001
TH-231	Not Detected	-----	7.75E+000
PA-231	Not Detected	-----	1.45E+000
TH-227	Not Detected	-----	3.35E-001
RA-223	Not Detected	-----	1.61E-001
RN-219	Not Detected	-----	3.88E-001
PB-211	Not Detected	-----	8.89E-001
TL-207	Not Detected	-----	1.59E+001
AM-241	Not Detected	-----	2.13E-001
PU-239	Not Detected	-----	3.86E+002
NP-237	Not Detected	-----	2.71E-001
PA-233	Not Detected	-----	6.01E-002
TH-229	Not Detected	-----	1.92E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	4.20E-002
AG-110m	Not Detected	-----	4.98E-002
BA-133	Not Detected	-----	5.01E-002
BE-7	2.22E-001	2.72E-001	1.97E-001
CD-109	Not Detected	-----	9.15E-001
CD-115	Not Detected	-----	2.52E-001
CE-139	Not Detected	-----	2.66E-002
CE-141	Not Detected	-----	5.09E-002
CE-144	Not Detected	-----	2.15E-001
CO-56	Not Detected	-----	4.10E-002
CO-57	Not Detected	-----	2.63E-002
CO-58	Not Detected	-----	3.76E-002
CO-60	Not Detected	-----	4.17E-002
CR-51	Not Detected	-----	2.77E-001
CS-134	Not Detected	-----	3.60E-002
CS-137	1.57E-001	5.63E-002	2.69E-002
EU-152	Not Detected	-----	7.95E-002
EU-154	Not Detected	-----	1.99E-001
EU-155	Not Detected	-----	1.23E-001
FE-59	Not Detected	-----	9.32E-002
GD-153	Not Detected	-----	7.63E-002
HG-203	Not Detected	-----	3.37E-002
I-131	Not Detected	-----	4.21E-002
IR-192	Not Detected	-----	3.04E-002
K-40	2.02E+001	3.10E+000	2.43E-001
MN-52	Not Detected	-----	5.42E-002
MN-54	Not Detected	-----	4.26E-002
MO-99	Not Detected	-----	7.43E-001
NA-22	Not Detected	-----	5.43E-002
NA-24	Not Detected	-----	3.33E+000
NE-95	Not Detected	-----	2.53E-001
ND-147	Not Detected	-----	2.86E-001
NI-57	Not Detected	-----	3.70E-001
RU-103	Not Detected	-----	3.19E-002
RU-106	Not Detected	-----	2.95E-001
SB-122	Not Detected	-----	1.17E-001
SB-124	Not Detected	-----	3.15E-002
SB-125	Not Detected	-----	8.75E-002
SN-113	Not Detected	-----	4.14E-002
SR-85	Not Detected	-----	4.13E-002
TA-182	Not Detected	-----	1.79E-001
TA-183	Not Detected	-----	3.12E-001
TC-99m	Not Detected	-----	1.60E+003
TL-201	Not Detected	-----	2.42E-001
XE-133	Not Detected	-----	3.04E-001
Y-88	Not Detected	-----	3.40E-002
ZN-65	Not Detected	-----	1.23E-001
ZR-95	Not Detected	-----	6.68E-002

* Analyzed by: *[Signature]* 7/27/99 Reviewed by: *[Signature]* 7/27/99 *

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : 047261-001
 Lab Sample ID : 90141125 *LTA-04-GR-034-0.5-1.0-5* Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 1004.000 gram
 Sample Date/Time : 7/12/99 2:02:00 PM
 Acquire Start Date/Time : 7/19/99 8:16:33 AM
 Detector Name : LAB01
 Elapsed Live/Real Time : 6000 / 6004 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	4.62E-001
RA-226	1.17E+000	6.73E-001	4.77E-001
PB-214	4.39E-001	9.80E-002	4.11E-002
BI-214	4.48E-001	1.08E-001	4.02E-002
PB-210	Not Detected	-----	6.88E+000
TH-232	6.99E-001	3.60E-001	1.39E-001
RA-228	7.63E-001	2.72E-001	1.48E-001
AC-228	7.64E-001	2.27E-001	9.16E-002
TH-228	Not Detected	-----	4.14E-001
RA-224	1.02E+000	3.68E-001	8.66E-002
PB-212	7.82E-001	6.86E-001	3.66E-002
BI-212	7.48E-001	4.75E-001	2.81E-001
TL-208	7.17E-001	1.63E-001	6.22E-002
U-235	8.82E-002	1.57E-001	1.81E-001
TH-231	Not Detected	-----	6.52E+000
PA-231	Not Detected	-----	1.15E+000
TH-227	Not Detected	-----	2.62E-001
RA-223	Not Detected	-----	1.58E-001
RN-219	Not Detected	-----	3.09E-001
PB-211	Not Detected	-----	6.99E-001
TL-207	Not Detected	-----	1.30E+001
AM-241	Not Detected	-----	1.71E-001
PU-239	Not Detected	-----	3.27E+002
NP-237	2.56E-001	2.64E-001	1.80E-001
PA-233	Not Detected	-----	4.96E-002
TH-229	Not Detected	-----	1.52E-001

Not Detected
[Signature]
 7/27/99

[Summary Report] - Sample ID: : 90141125

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.53E-002
AG-110m	Not Detected	-----	3.44E-002
BA-133	Not Detected	-----	3.78E-002
BE-7	Not Detected	-----	2.44E-001
CD-109	Not Detected	-----	7.40E-001
CD-115	Not Detected	-----	4.83E-001
CE-139	Not Detected	-----	2.27E-002
CE-141	Not Detected	-----	4.47E-002
CE-144	Not Detected	-----	1.74E-001
CO-56	Not Detected	-----	3.24E-002
CO-57	Not Detected	-----	2.23E-002
CO-58	Not Detected	-----	3.31E-002
CO-60	Not Detected	-----	3.98E-002
CR-51	Not Detected	-----	2.36E-001
CS-134	Not Detected	-----	2.86E-002
CS-137	4.51E-002	3.40E-002	2.32E-002
EU-152	Not Detected	-----	6.65E-002
EU-154	Not Detected	-----	1.69E-001
EU-155	Not Detected	-----	1.06E-001
FE-59	Not Detected	-----	8.30E-002
GD-153	Not Detected	-----	6.29E-002
HG-203	Not Detected	-----	2.93E-002
I-131	Not Detected	-----	4.52E-002
IR-192	Not Detected	-----	2.47E-002
K-40	2.54E+001	3.68E+000	2.47E-001
MN-52	Not Detected	-----	6.57E-002
MN-54	Not Detected	-----	3.50E-002
MO-99	Not Detected	-----	1.17E+000
NA-22	Not Detected	-----	4.60E-002
NA-24	Not Detected	-----	5.87E+001
NB-95	Not Detected	-----	3.48E-001
ND-147	Not Detected	-----	2.79E-001
NI-57	Not Detected	-----	1.05E+000
RU-103	Not Detected	-----	2.74E-002
RU-106	Not Detected	-----	2.59E-001
SB-122	Not Detected	-----	1.99E-001
SB-124	Not Detected	-----	2.68E-002
SB-125	Not Detected	-----	7.06E-002
SN-113	Not Detected	-----	3.13E-002
SR-85	Not Detected	-----	3.27E-002
TA-182	Not Detected	-----	1.48E-001
TA-183	Not Detected	-----	3.65E-001
TC-99m	Not Detected	-----	3.12E+006
TL-201	Not Detected	-----	3.83E-001
XE-133	Not Detected	-----	6.35E-001
Y-88	Not Detected	-----	2.59E-002
ZN-65	Not Detected	-----	9.90E-002
ZR-95	Not Detected	-----	5.47E-002

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 7/19/99 12:30:22 PM *

* Analyzed by: *[Signature]* 7/21/99 Reviewed by: *[Signature]* *

Customer : BYRD/D. SALMI (6134/SMO)
 Customer Sample ID : LAB CONTROL SAMPLE USING CG134
 Lab Sample ID : 90141126

Sample Description : MIXED GAMMA STANDARD CG134
 Sample Quantity : 1.000 Each
 Sample Date/Time : 11/01/90 12:00:00 PM
 Acquire Start Date/Time : 7/19/99 12:20:09 PM
 Detector Name : LAB01
 Elapsed Live/Real Time : 600 / 605 seconds

Comments:

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	-----	2.79E+003
RA-226	Not Detected	-----	5.13E+003
PB-214	Not Detected	-----	6.76E+002
BI-214	Not Detected	-----	6.39E+002
PB-210	Not Detected	-----	7.04E+004
TH-232	Not Detected	-----	2.24E+003
RA-228	Not Detected	-----	2.85E+003
AC-228	Not Detected	-----	1.70E+003
TH-228	Not Detected	-----	1.50E+005
RA-224	Not Detected	-----	1.02E+004
PB-212	Not Detected	-----	1.06E+004
BI-212	Not Detected	-----	1.03E+005
TL-208	Not Detected	-----	2.19E+004
U-235	Not Detected	-----	1.39E+003
TH-231	Not Detected	-----	4.15E+004
PA-231	Not Detected	-----	1.38E+004
TH-227	Not Detected	-----	2.31E+003
RA-223	Not Detected	-----	1.00E+026
RN-219	Not Detected	-----	6.17E+003
PB-211	Not Detected	-----	1.40E+004
TL-207	Not Detected	-----	2.54E+005
AM-241	8.11E+004	1.40E+004	1.39E+003
PU-239	Not Detected	-----	2.38E+006
NP-237	Not Detected	-----	1.32E+003
PA-233	Not Detected	-----	6.27E+002
TH-229	Not Detected	-----	1.10E+003

[Summary Report] - Sample ID: : 90141126

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	-----	3.43E+002
AG-110m	Not Detected	-----	1.24E+007
BA-133	Not Detected	-----	7.66E+002
BE-7	Not Detected	-----	3.28E+021
CD-109	Not Detected	-----	5.18E+005
CD-115	Not Detected	-----	1.00E+026
CE-139	Not Detected	-----	1.68E+009
CE-141	Not Detected	-----	1.00E+026
CE-144	Not Detected	-----	3.09E+006
CO-56	Not Detected	-----	1.07E+015
CO-57	Not Detected	-----	5.87E+005
CO-58	Not Detected	-----	1.22E+016
CO-60	7.74E+004	1.09E+004	6.10E+002
CR-51	Not Detected	-----	1.00E+026
CS-134	Not Detected	-----	5.71E+003
CS-137	6.95E+004	9.35E+003	3.22E+002
EU-152	Not Detected	-----	8.28E+002
EU-154	Not Detected	-----	3.05E+003
EU-155	Not Detected	-----	2.67E+003
FE-59	Not Detected	-----	1.00E+026
GD-153	Not Detected	-----	4.11E+006
HG-203	Not Detected	-----	1.00E+026
I-131	Not Detected	-----	1.00E+026
IR-192	Not Detected	-----	2.79E+015
K-40	Not Detected	-----	1.56E+003
MN-52	Not Detected	-----	1.00E+026
MN-54	Not Detected	-----	4.58E+005
MO-99	Not Detected	-----	1.00E+026
NA-22	Not Detected	-----	2.11E+003
NA-24	Not Detected	-----	1.00E+026
NE-95	Not Detected	-----	1.00E+026
ND-147	Not Detected	-----	1.00E+026
NI-57	Not Detected	-----	1.00E+026
RU-103	Not Detected	-----	1.00E+026
RU-106	Not Detected	-----	1.19E+006
SB-122	Not Detected	-----	1.00E+026
SB-124	Not Detected	-----	2.48E+018
SB-125	Not Detected	-----	1.01E+004
SN-113	Not Detected	-----	9.50E+010
SR-85	Not Detected	-----	2.27E+017
TA-182	Not Detected	-----	2.64E+011
TA-183	Not Detected	-----	1.00E+026
TC-99m	Not Detected	-----	1.00E+026
TL-201	Not Detected	-----	1.00E+026
XE-133	Not Detected	-----	1.00E+026
Y-88	Not Detected	-----	2.03E+011
ZN-65	Not Detected	-----	8.15E+006
ZR-95	Not Detected	-----	5.39E+017


 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program *
 * Quality Assurance Report *

Report Date : 7/19/99 12:30:24 PM
 QA File : C:\GENIE2K\CAMFILES\LCS1.QAF
 Analyst : KIC
 Sample ID : 90141126
 Sample Quantity : 1.00 Each
 Sample Date : 11/01/90 12:00:00 PM
 Measurement Date : 7/19/99 12:20:09 PM
 Elapsed Live Time : 600 seconds
 Elapsed Real Time : 605 seconds

Parameter	Mean	1S Error	New Value	< LU	: SD	: UD	:
AM-241 ACTIVITY	8.499E-002	2.854E-003	8.111E-002	<	:	:	:
CS-137 Activity	6.833E-002	1.218E-003	6.951E-002	<	:	:	:
CO-60 Activity	7.611E-002	2.681E-003	7.783E-002	<	:	:	:

Flags Key: LU = Boundary Test (Ab = Above, Be = Below)
 SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Actio
 UD = User Driven N-Sigma Test (In = Investigate, Ac = Actio
 BS = Measurement Bias Test (In = Investigate, Ac = Actio

Reviewed by: _____


 7/27/99

* Analyzed by: *KR 7/15/99* Reviewed by: *AM 7/15/99* *

Customer : BYRD/SALMI (6134/SMO)
 Customer Sample ID : 047266-001
 Lab Sample ID : 90141701

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 796.000 gram
 Sample Date/Time : 7/13/99 10:04:00 AM
 Acquire Start Date/Time : 7/14/99 2:57:16 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	2.38E+000	3.81E+000	6.14E-001
RA-226	Not Detected	-----	5.36E-001
PB-214	6.02E-001	1.26E-001	4.08E-002
BI-214	5.26E-001	1.02E-001	4.13E-002
PB-210	Not Detected	-----	3.34E+001
TH-232	9.87E-001	4.87E-001	1.30E-001
RA-228	8.72E-001	2.81E-001	1.25E-001
AC-228	8.58E-001	2.31E-001	7.47E-002
TH-228	Not Detected	-----	3.93E-001
RA-224	8.19E-001	2.01E-001	5.11E-002
PB-212	8.46E-001	1.48E-001	3.54E-002
BI-212	8.32E-001	4.84E-001	2.69E-001
TL-208	7.42E-001	9.89E-001	6.35E-002
U-235	1.37E-001	6.55E-002	1.41E-001
TH-231	Not Detected	-----	1.69E+000
PA-231	Not Detected	-----	1.22E+000
TH-227	Not Detected	-----	3.44E-001
RA-223	Not Detected	-----	1.92E-001
PN-219	Not Detected	-----	3.20E-001
PB-211	Not Detected	-----	7.22E-001
TL-207	Not Detected	-----	1.18E+001
AM-241	Not Detected	-----	4.72E-001
PU-239	Not Detected	-----	3.84E+002
NP-237	Not Detected	-----	2.60E-001
PA-233	Not Detected	-----	5.12E-002
TH-229	Not Detected	-----	2.33E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.37E-002
AG-110m	Not Detected	-----	3.11E-002
BA-133	Not Detected	-----	4.17E-002
BE-7	1.36E-001	2.08E-001	1.25E-001
CD-109	Not Detected	-----	8.81E-001
CD-115	Not Detected	-----	8.92E-002
CE-139	Not Detected	-----	2.58E-002
CE-141	Not Detected	-----	4.66E-002
CE-144	Not Detected	-----	2.09E-001
CO-56	Not Detected	-----	3.07E-002
CO-57	Not Detected	-----	2.78E-002
CO-58	Not Detected	-----	2.94E-002
CO-60	Not Detected	-----	3.31E-002
CR-51	Not Detected	-----	2.10E-001
CS-134	Not Detected	-----	3.54E-002
CS-137	5.06E-002	3.56E-002	2.14E-002
EU-152	Not Detected	-----	8.30E-002
EU-154	Not Detected	-----	1.63E-001
EU-155	Not Detected	-----	1.29E-001
FE-59	Not Detected	-----	6.44E-002
GD-153	Not Detected	-----	9.46E-002
HG-203	Not Detected	-----	2.79E-002
I-131	Not Detected	-----	2.57E-002
IR-192	Not Detected	-----	2.37E-002
K-40	2.28E+001	3.14E+000	1.96E-001
MN-52	Not Detected	-----	2.86E-002
MN-54	Not Detected	-----	3.02E-002
MO-99	Not Detected	-----	2.79E-001
NA-22	Not Detected	-----	3.70E-002
NA-24	Not Detected	-----	1.12E-001
NB-95	Not Detected	-----	1.90E-001
ND-147	Not Detected	-----	1.83E-001
NI-57	Not Detected	-----	4.10E-002
RU-103	Not Detected	-----	2.52E-002
RU-106	Not Detected	-----	2.21E-001
SB-122	Not Detected	-----	4.68E-002
SB-124	Not Detected	-----	2.59E-002
SB-125	Not Detected	-----	6.90E-002
SN-113	Not Detected	-----	3.20E-002
SR-85	Not Detected	-----	3.16E-002
TA-182	Not Detected	-----	1.37E-001
TA-183	Not Detected	-----	4.75E-001
TC-99m	Not Detected	-----	7.65E-001
TL-201	Not Detected	-----	2.15E-001
XE-133	Not Detected	-----	1.93E-001
Y-88	Not Detected	-----	2.45E-002
ZN-65	Not Detected	-----	9.30E-002
ZR-95	Not Detected	-----	4.80E-002

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 7/14/99 6:19:20 PM *

* Analyzed by: *Ka 7/15/99* Reviewed by: *W 7/15/99*

Customer : BYRD/SALMI (6134/SMO)
 Customer Sample ID : 047269-001
 Lab Sample ID : 90141702

 Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 894.000 gram
 Sample Date/Time : 7/13/99 10:10:00 AM
 Acquire Start Date/Time : 7/14/99 4:39:05 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6004 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	7.45E-001
RA-226	1.96E+000	7.88E-001	5.05E-001
PB-214	4.83E-001	1.07E-001	3.89E-002
BI-214	4.39E-001	1.02E-001	3.79E-002
PB-210	Not Detected	-----	3.05E+001
TH-232	7.53E-001	3.75E-001	1.14E-001
RA-228	8.16E-001	2.98E-001	1.32E-001
AC-228	7.44E-001	1.98E-001	7.59E-002
TH-228	5.71E-001	4.44E-001	3.78E-001
RA-224	8.14E-001	1.97E-001	4.28E-002
PB-212	7.54E-001	1.37E-001	3.22E-002
BI-212	8.63E-001	5.81E-001	2.55E-001
TL-208	6.57E-001	1.54E-001	5.75E-002
U-235	Not Detected	-----	1.98E-001
TH-231	Not Detected	-----	1.56E+000
PA-231	Not Detected	-----	1.11E+000
TH-227	Not Detected	-----	3.07E-001
PA-223	Not Detected	-----	1.83E-001
RN-219	Not Detected	-----	3.07E-001
PB-211	Not Detected	-----	6.74E-001
TL-207	Not Detected	-----	1.13E+001
AM-241	Not Detected	-----	4.36E-001
PU-239	Not Detected	-----	3.72E+002
NP-237	6.97E-001	2.66E-001	2.87E-001
PA-233	Not Detected	-----	4.81E-002
TH-229	Not Detected	-----	2.19E-001

NOT DETECTED *Ka 7/15*

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.09E-002
AG-110m	Not Detected	-----	2.77E-002
BA-133	Not Detected	-----	3.78E-002
BE-7	Not Detected	-----	2.05E-001
CD-109	Not Detected	-----	9.74E-001
CD-115	Not Detected	-----	7.65E-002
CE-139	Not Detected	-----	2.35E-002
CE-141	Not Detected	-----	4.44E-002
CE-144	Not Detected	-----	1.96E-001
CO-56	Not Detected	-----	2.77E-002
CO-57	Not Detected	-----	2.61E-002
CO-58	Not Detected	-----	2.61E-002
CO-60	Not Detected	-----	3.07E-002
CR-51	Not Detected	-----	1.92E-001
CS-134	Not Detected	-----	3.18E-002
CS-137	3.73E-002	4.89E-002	1.92E-002
EU-152	Not Detected	-----	7.83E-002
EU-154	Not Detected	-----	1.49E-001
EU-155	Not Detected	-----	1.23E-001
FE-59	Not Detected	-----	6.30E-002
GD-153	Not Detected	-----	9.16E-002
HG-203	Not Detected	-----	2.54E-002
I-131	Not Detected	-----	2.39E-002
IR-192	Not Detected	-----	2.21E-002
K-40	2.46E+001	3.36E+000	1.88E-001
MN-52	Not Detected	-----	2.84E-002
MN-54	Not Detected	-----	1.43E-002
MO-99	Not Detected	-----	2.56E-001
NA-22	Not Detected	-----	3.63E-002
NA-24	Not Detected	-----	1.16E-001
NB-95	3.76E-002	2.58E-002	6.16E-002
ND-147	Not Detected	-----	1.72E-001
NI-57	Not Detected	-----	7.20E-002
RU-103	Not Detected	-----	2.27E-002
RU-106	Not Detected	-----	2.36E-001
SB-122	Not Detected	-----	4.38E-002
SB-124	Not Detected	-----	2.36E-002
SB-125	Not Detected	-----	6.48E-002
SN-113	Not Detected	-----	2.97E-002
SR-85	Not Detected	-----	2.94E-002
TA-182	Not Detected	-----	1.25E-001
TA-183	Not Detected	-----	4.44E-001
TC-99m	Not Detected	-----	8.54E-001
TL-201	Not Detected	-----	2.09E-001
XE-133	Not Detected	-----	1.80E-001
Y-88	Not Detected	-----	1.96E-002
ZN-65	Not Detected	-----	8.22E-002
ZR-95	Not Detected	-----	4.63E-002

NOT DETECTED K-40 7/15/99

* Analyzed by: *KR 7/15/99* Reviewed by: *[Signature] 7/15/99*

Customer : BYRD/SALMI (6134/SMO)
 Customer Sample ID : 047273-001
 Lab Sample ID : 90141703

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 828.000 gram
 Sample Date/Time : 7/13/99 10:30:00 AM
 Acquire Start Date/Time : 7/14/99 6:20:54 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	7.35E-001
RA-226	1.69E+000	8.54E-001	4.51E-001
PB-214	5.97E-001	1.26E-001	4.22E-002
BI-214	5.55E-001	3.21E-001	3.98E-002
PB-210	Not Detected	-----	3.33E+001
TH-232	Not Detected	-----	1.22E-001
RA-228	1.04E+000	3.18E-001	1.15E-001
AC-228	8.95E-001	6.86E-001	7.60E-002
TH-228	7.03E-001	6.28E-001	4.26E-001
RA-224	9.62E-001	2.31E-001	5.16E-002
PB-212	8.86E-001	1.59E-001	3.34E-002
BI-212	Not Detected	-----	2.53E-001
TL-208	7.94E-001	1.49E-001	5.91E-002
U-235	2.12E-001	1.70E-001	2.15E-001
TH-231	Not Detected	-----	1.64E+000
PA-231	Not Detected	-----	1.22E+000
TH-227	Not Detected	-----	3.42E-001
RA-223	Not Detected	-----	1.92E-001
RN-219	Not Detected	-----	3.16E-001
PB-211	Not Detected	-----	7.11E-001
TL-207	Not Detected	-----	1.19E+001
AM-241	Not Detected	-----	4.56E-001
FU-239	Not Detected	-----	3.78E+002
NP-237	Not Detected	-----	2.41E-001
PA-233	Not Detected	-----	5.13E-002
TH-229	Not Detected	-----	2.30E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 90141703

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.38E-002
AG-110m	Not Detected	-----	2.74E-002
BA-133	Not Detected	-----	4.14E-002
BE-7	Not Detected	-----	1.24E-001
CD-109	Not Detected	-----	8.20E-001
CD-115	Not Detected	-----	8.56E-002
CE-139	Not Detected	-----	2.48E-002
CE-141	Not Detected	-----	4.76E-002
CE-144	Not Detected	-----	2.06E-001
CO-56	Not Detected	-----	2.85E-002
CO-57	Not Detected	-----	2.67E-002
CO-58	Not Detected	-----	2.83E-002
CO-60	Not Detected	-----	3.19E-002
CR-51	Not Detected	-----	1.94E-001
CS-134	Not Detected	-----	3.56E-002
CS-137	2.22E-002	3.41E-003	1.95E-002
EU-152	Not Detected	-----	8.09E-002
EU-154	Not Detected	-----	1.62E-001
EU-155	Not Detected	-----	1.28E-001
FE-59	Not Detected	-----	6.19E-002
GD-153	Not Detected	-----	9.47E-002
HG-203	Not Detected	-----	2.77E-002
I-131	Not Detected	-----	2.50E-002
IR-192	Not Detected	-----	2.27E-002
K-40	2.19E+001	3.01E+000	1.86E-001
MN-52	Not Detected	-----	2.91E-002
MN-54	Not Detected	-----	2.97E-002
MO-99	Not Detected	-----	2.67E-001
NA-22	Not Detected	-----	3.48E-002
NA-24	Not Detected	-----	1.27E-001
NB-95	Not Detected	-----	1.94E-001
ND-147	Not Detected	-----	1.77E-001
NI-57	Not Detected	-----	4.41E-002
RU-103	Not Detected	-----	2.32E-002
RU-106	Not Detected	-----	2.45E-001
SB-122	Not Detected	-----	4.64E-002
SB-124	Not Detected	-----	2.53E-002
SB-125	Not Detected	-----	6.97E-002
SN-113	Not Detected	-----	3.16E-002
SR-85	Not Detected	-----	3.15E-002
TA-182	Not Detected	-----	1.29E-001
TA-183	Not Detected	-----	4.71E-001
TC-99m	Not Detected	-----	1.05E+000
TL-201	Not Detected	-----	2.26E-001
XE-133	Not Detected	-----	1.98E-001
Y-88	Not Detected	-----	2.08E-002
ZN-65	Not Detected	-----	8.64E-002
ZR-95	Not Detected	-----	4.69E-002

* Analyzed by: *JK 7/15/99* Reviewed by: *WJ 7/15/99*

Customer : BYRD/SALMI (6134/SMO)
 Customer Sample ID : 047277-001
 Lab Sample ID : 90141704

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 823.000 gram
 Sample Date/Time : 7/13/99 10:50:00 AM
 Acquire Start Date/Time : 7/14/99 8:02:41 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	2.51E+000	3.26E+000	6.19E-001
RA-226	2.04E+000	8.00E-001	4.93E-001
PB-214	6.68E-001	1.28E-001	4.06E-002
BI-214	5.39E-001	1.06E-001	3.81E-002
PB-210	Not Detected	-----	3.37E+001
TH-232	9.25E-001	4.76E-001	1.21E-001
RA-228	9.05E-001	2.81E-001	1.24E-001
AC-228	8.68E-001	2.13E-001	7.06E-002
TH-228	Not Detected	-----	3.67E-001
RA-224	7.61E-001	1.88E-001	5.37E-002
PB-212	8.33E-001	1.45E-001	3.41E-002
BI-212	8.42E-001	4.56E-001	2.53E-001
TL-208	7.55E-001	9.37E-001	6.47E-002
U-235	1.31E-001	1.62E-001	2.06E-001
TH-231	Not Detected	-----	1.68E+000
PA-231	Not Detected	-----	1.19E+000
TH-227	Not Detected	-----	3.32E-001
RA-223	Not Detected	-----	2.01E-001
RN-219	Not Detected	-----	3.17E-001
PB-211	Not Detected	-----	7.15E-001
TL-207	Not Detected	-----	1.13E+001
AM-241	Not Detected	-----	4.59E-001
PU-239	Not Detected	-----	3.73E+002
NP-237	Not Detected	-----	2.58E-001
PA-233	Not Detected	-----	4.88E-002
TH-229	Not Detected	-----	2.28E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected		3.15E-002
AG-110m	Not Detected		2.71E-002
BA-133	Not Detected		4.12E-002
BE-7	Not Detected		2.09E-001
CD-109	Not Detected		1.19E+000
CD-115	Not Detected		9.11E-002
CE-139	Not Detected		2.53E-002
CE-141	Not Detected		4.55E-002
CE-144	Not Detected		2.07E-001
CO-56	Not Detected		2.94E-002
CO-57	Not Detected		2.71E-002
CO-58	Not Detected		2.70E-002
CO-60	Not Detected		3.19E-002
CR-51	Not Detected		1.90E-001
CS-134	Not Detected		3.48E-002
CS-137	2.32E-002	3.19E-002	1.79E-002
EU-152	Not Detected		8.17E-002
EU-154	Not Detected		1.50E-001
EU-155	Not Detected		1.27E-001
FE-59	Not Detected		5.88E-002
GD-153	Not Detected		9.53E-002
HG-203	Not Detected		2.70E-002
I-131	Not Detected		2.56E-002
IR-192	Not Detected		2.21E-002
K-40	1.82E+001	2.51E+000	1.87E-001
MN-52	Not Detected		2.97E-002
MN-54	Not Detected		1.66E-002
MO-99	Not Detected		2.77E-001
NA-22	Not Detected		3.29E-002
NA-24	Not Detected		1.20E-001
NB-95	Not Detected		1.90E-001
ND-147	Not Detected		1.68E-001
NI-57	Not Detected		7.92E-002
RU-103	Not Detected		2.28E-002
RU-106	Not Detected		2.38E-001
SB-122	Not Detected		4.71E-002
SB-124	Not Detected		2.51E-002
SB-125	Not Detected		6.68E-002
SN-113	Not Detected		3.11E-002
SR-85	Not Detected		3.16E-002
TA-182	Not Detected		1.27E-001
TA-183	Not Detected		4.73E-001
TC-99m	Not Detected		1.23E+000
Tl-201	Not Detected		2.27E-001
XE-133	Not Detected		2.01E-001
Y-88	Not Detected		1.86E-002
ZN-65	Not Detected		8.66E-002
ZR-95	Not Detected		4.65E-002

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

7/14/99 11:24:41 PM

Analyzed by: *K 7/15/99*

Reviewed by: *JS 7/15/99*

Customer : BYRD/SALMI (6134/SMO)
 Customer Sample ID : 047286-001
 Lab Sample ID : 90141705

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 889.000 gram
 Sample Date/Time : 7/13/99 1:15:00 PM
 Acquire Start Date/Time : 7/14/99 9:44:27 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6004 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	4.28E+000	3.42E+000	6.21E-001
RA-226	3.20E+000	3.18E+000	5.25E-001
PB-214	Not Detected	-----	3.99E-002
BI-214	5.66E-001	1.13E-001	3.70E-002
PB-210	Not Detected	-----	3.28E+001
TH-232	Not Detected	-----	1.20E-001
RA-228	8.72E-001	2.75E-001	1.23E-001
AC-228	8.96E-001	2.17E-001	7.14E-002
TH-228	9.30E-001	5.78E-001	4.19E-001
RA-224	9.32E-001	2.23E-001	4.57E-002
PB-212	8.30E-001	3.84E-001	3.38E-002
BI-212	Not Detected	-----	2.46E-001
TL-208	7.83E-001	1.79E-001	5.91E-002
U-235	1.06E-001	1.68E-001	2.13E-001
TH-231	Not Detected	-----	1.71E+000
PA-231	Not Detected	-----	1.19E+000
TH-227	Not Detected	-----	3.25E-001
RA-223	Not Detected	-----	2.00E-001
RN-219	Not Detected	-----	3.09E-001
PB-211	Not Detected	-----	7.02E-001
TL-207	Not Detected	-----	1.06E+001
AM-241	Not Detected	-----	4.66E-001
PU-239	Not Detected	-----	3.86E+002
NP-237	Not Detected	-----	2.69E-001
PA-233	Not Detected	-----	4.76E-002
TH-229	Not Detected	-----	2.34E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.11E-002
AG-110m	Not Detected	-----	3.24E-002
BA-133	Not Detected	-----	3.98E-002
BE-7	Not Detected	-----	2.06E-001
CD-109	Not Detected	-----	9.13E-001
CD-115	Not Detected	-----	8.56E-002
CE-139	Not Detected	-----	2.54E-002
CE-141	Not Detected	-----	4.74E-002
CE-144	Not Detected	-----	2.05E-001
CO-56	Not Detected	-----	2.69E-002
CO-57	Not Detected	-----	2.73E-002
CO-58	Not Detected	-----	2.64E-002
CO-60	Not Detected	-----	3.08E-002
CR-51	Not Detected	-----	1.97E-001
CS-134	Not Detected	-----	3.40E-002
CS-137	8.23E-002	1.51E-001	1.85E-002
EU-152	Not Detected	-----	8.17E-002
EU-154	Not Detected	-----	1.47E-001
EU-155	Not Detected	-----	1.28E-001
FE-59	Not Detected	-----	6.06E-002
GD-153	Not Detected	-----	9.67E-002
HG-203	Not Detected	-----	2.65E-002
I-131	Not Detected	-----	2.61E-002
IR-192	Not Detected	-----	2.21E-002
K-40	2.13E+001	2.92E+000	1.71E-001
MN-52	Not Detected	-----	2.96E-002
MN-54	Not Detected	-----	2.84E-002
MO-99	Not Detected	-----	2.76E-001
NA-22	Not Detected	-----	3.54E-002
NA-24	Not Detected	-----	1.16E-001
NB-95	Not Detected	-----	1.86E-001
ND-147	Not Detected	-----	1.80E-001
NI-57	Not Detected	-----	7.33E-002
RU-103	Not Detected	-----	2.36E-002
RU-106	Not Detected	-----	2.32E-001
SB-122	Not Detected	-----	4.58E-002
SB-124	Not Detected	-----	2.47E-002
SB-125	Not Detected	-----	6.83E-002
SN-113	Not Detected	-----	3.13E-002
SR-85	Not Detected	-----	3.02E-002
TA-182	Not Detected	-----	1.25E-001
TA-183	Not Detected	-----	4.81E-001
TC-99m	Not Detected	-----	1.14E+000
TL-201	Not Detected	-----	2.26E-001
XE-133	Not Detected	-----	2.02E-001
Y-88	Not Detected	-----	1.95E-002
ZN-65	Not Detected	-----	8.47E-002
ZR-95	Not Detected	-----	4.74E-002

•
 * Analyzed by: K 7/15/99 Reviewed by: W 7/15/99 *

Customer : BYRD/SALMI (6134/SMO)
 Customer Sample ID : 047291-001
 Lab Sample ID : 90141706

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 846.000 gram
 Sample Date/Time : 7/13/99 1:30:00 PM
 Acquire Start Date/Time : 7/14/99 11:26:14 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6004 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	3.60E+000	1.99E+000	6.15E-001
RA-226	Not Detected	-----	4.65E-001
PB-214	6.37E-001	1.28E-001	4.08E-002
BI-214	6.39E-001	1.33E-001	3.86E-002
PB-210	Not Detected	-----	3.40E+001
TH-232	9.02E-001	6.01E-001	1.34E-001
RA-228	8.90E-001	2.98E-001	1.31E-001
AC-228	9.67E-001	1.72E-001	7.76E-002
TH-228	8.55E-001	5.96E-001	4.47E-001
PA-224	9.61E-001	2.30E-001	5.30E-002
PB-212	Not Detected	-----	3.57E-002
BI-212	8.93E-001	4.47E-001	2.55E-001
TL-208	8.01E-001	1.72E-001	5.97E-002
U-235	Not Detected	-----	2.17E-001
TH-231	Not Detected	-----	1.70E+000
PA-231	Not Detected	-----	1.26E+000
TH-227	Not Detected	-----	3.45E-001
RA-223	Not Detected	-----	2.03E-001
RN-219	Not Detected	-----	3.16E-001
PB-211	Not Detected	-----	7.11E-001
TL-207	Not Detected	-----	1.16E+001
AM-241	Not Detected	-----	4.64E-001
PB-239	Not Detected	-----	4.03E+002
NP-237	Not Detected	-----	3.09E-001
PA-233	Not Detected	-----	5.04E-002
TH-229	Not Detected	-----	2.40E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.31E-002
AG-110m	Not Detected	-----	3.38E-002
BA-133	Not Detected	-----	4.26E-002
BE-7	Not Detected	-----	2.14E-001
CD-109	2.63E+000	1.47E+000	1.05E+000
CD-115	Not Detected	-----	9.18E-002
CE-139	Not Detected	-----	2.57E-002
CE-141	Not Detected	-----	4.81E-002
CE-144	Not Detected	-----	2.16E-001
CO-56	Not Detected	-----	2.84E-002
CO-57	Not Detected	-----	2.80E-002
CO-58	Not Detected	-----	2.79E-002
CO-60	Not Detected	-----	3.16E-002
CR-51	Not Detected	-----	2.07E-001
CS-134	Not Detected	-----	3.64E-002
CS-137	7.83E-002	2.40E-002	1.94E-002
EU-152	Not Detected	-----	8.50E-002
EU-154	Not Detected	-----	1.58E-001
EU-155	Not Detected	-----	1.33E-001
FE-59	Not Detected	-----	6.09E-002
GD-153	Not Detected	-----	9.74E-002
HG-203	Not Detected	-----	2.86E-002
I-131	Not Detected	-----	2.63E-002
IR-192	Not Detected	-----	2.37E-002
K-40	2.02E+001	2.77E+000	1.91E-001
MN-52	Not Detected	-----	2.88E-002
MN-54	Not Detected	-----	3.10E-002
MO-99	Not Detected	-----	2.84E-001
NA-22	Not Detected	-----	3.52E-002
NA-24	Not Detected	-----	1.36E-001
NB-95	Not Detected	-----	1.98E-001
ND-147	Not Detected	-----	1.84E-001
NI-57	Not Detected	-----	8.02E-002
RU-103	Not Detected	-----	2.44E-002
RU-106	Not Detected	-----	2.40E-001
SB-122	Not Detected	-----	4.88E-002
SB-124	Not Detected	-----	2.53E-002
SB-125	Not Detected	-----	7.13E-002
SN-113	Not Detected	-----	3.24E-002
SR-85	Not Detected	-----	3.16E-002
TA-182	Not Detected	-----	1.29E-001
TA-183	Not Detected	-----	4.83E-001
TC-99m	Not Detected	-----	1.40E+000
TL-201	Not Detected	-----	2.35E-001
XE-133	Not Detected	-----	2.10E-001
Y-88	Not Detected	-----	2.17E-002
ZN-65	Not Detected	-----	8.53E-002
ZR-95	Not Detected	-----	4.77E-002

NOT DETECTED FOR 7/10/99

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

7/15/99 2:48:14 AM

Analyzed by: *[Signature]* 7/15/99

Reviewed by: *[Signature]* 7/15/99

Customer : BYRD/SALMI (6134/SMO)
 Customer Sample ID : 047298-001
 Lab Sample ID : 90141707

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 903.000 gram
 Sample Date/Time : 7/13/99 1:50:00 PM
 Acquire Start Date/Time : 7/15/99 1:08:00 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6004 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	5.98E-001
RA-226	Not Detected	-----	4.61E-001
PB-214	5.55E-001	1.15E-001	3.86E-002
BI-214	5.02E-001	1.07E-001	3.61E-002
PB-210	Not Detected	-----	3.04E+001
TH-232	7.94E-001	3.88E-001	1.26E-001
RA-228	Not Detected	-----	1.34E-001
AC-228	8.11E-001	1.86E-001	7.30E-002
TH-228	9.36E-001	2.51E-001	4.24E-001
RA-224	8.22E-001	1.99E-001	5.19E-002
PB-212	7.88E-001	8.96E-001	3.30E-002
BI-212	9.50E-001	5.05E-001	2.29E-001
TL-208	7.11E-001	1.27E-001	5.73E-002
U-235	8.46E-002	1.56E-001	1.98E-001
TH-231	Not Detected	-----	1.59E+000
PA-231	Not Detected	-----	1.16E+000
TH-227	Not Detected	-----	3.12E-001
RA-223	Not Detected	-----	1.86E-001
PN-219	Not Detected	-----	2.96E-001
PB-211	Not Detected	-----	6.71E-001
TL-207	Not Detected	-----	1.06E+001
AM-241	Not Detected	-----	4.38E-001
PU-239	Not Detected	-----	3.70E+002
NP-237	Not Detected	-----	3.35E-001
PA-233	Not Detected	-----	4.81E-002
TH-229	Not Detected	-----	2.20E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected		2.99E-002
AG-110m	Not Detected		2.89E-002
BA-133	Not Detected		3.88E-002
BE-7	Not Detected		2.08E-001
CD-109	Not Detected		8.79E-001
CD-115	Not Detected		8.62E-002
CE-139	Not Detected		2.37E-002
CE-141	Not Detected		4.36E-002
CE-144	Not Detected		2.02E-001
CO-56	Not Detected		2.83E-002
CO-57	Not Detected		2.57E-002
CO-58	Not Detected		2.65E-002
CO-60	Not Detected		3.01E-002
CR-51	Not Detected		1.86E-001
CS-134	Not Detected		3.26E-002
CS-137	4.46E-002	3.83E-002	1.85E-002
EU-152	Not Detected		7.69E-002
EU-154	Not Detected		1.45E-001
EU-155	Not Detected		1.24E-001
FE-59	Not Detected		5.70E-002
GD-153	Not Detected		9.25E-002
HG-203	Not Detected		2.62E-002
I-131	Not Detected		2.57E-002
IR-192	Not Detected		2.20E-002
K-40	2.18E+001	2.99E+000	1.91E-001
MN-52	Not Detected		2.83E-002
MN-54	Not Detected		2.76E-002
MO-99	Not Detected		2.82E-001
NA-22	Not Detected		3.55E-002
NA-24	Not Detected		1.31E-001
NB-95	Not Detected		1.82E-001
ND-147	Not Detected		1.74E-001
NI-57	Not Detected		7.79E-002
RU-103	Not Detected		2.30E-002
RU-106	Not Detected		2.29E-001
SB-122	Not Detected		4.68E-002
SB-124	Not Detected		2.35E-002
SB-125	Not Detected		6.38E-002
SN-113	Not Detected		3.09E-002
SR-85	Not Detected		2.89E-002
TA-182	Not Detected		1.21E-001
TA-183	Not Detected		4.62E-001
TC-99m	Not Detected		1.50E+000
TL-201	Not Detected		2.19E-001
XE-133	Not Detected		1.94E-001
Y-88	Not Detected		1.72E-002
ZN-65	Not Detected		8.10E-002
ZR-95	Not Detected		4.81E-002

Sandia National Laboratories
 Radiation Protection Sample Diagnostics Program [806 Laboratory]
 7/15/99 9:41:28 AM

Analyzed by: *K. J. Johnson* Reviewed by: *W. J. 7/15/99*

Customer : BYRD/SALMI (6134/SMO)
 Customer Sample ID : 047300-109
 Lab Sample ID : 90141708

Sample Description : WATER MARINELLI SAMPLE
 Sample Quantity : 500.000 mL
 Sample Date/Time : 7/13/99 9:25:00 AM
 Acquire Start Date/Time : 7/15/99 2:49:47 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6001 seconds

Comments:

Nuclide Name	Activity (pCi/mL)	2-sigma Error	MDA (pCi/mL)
U-238	Not Detected	-----	3.84E-001
RA-226	Not Detected	-----	4.53E-001
PB-214	Not Detected	-----	3.79E-002
BI-214	Not Detected	-----	4.37E-002
PB-210	Not Detected	-----	2.21E+001
TH-232	Not Detected	-----	1.29E-001
RA-228	Not Detected	-----	1.04E-001
AC-228	Not Detected	-----	6.82E-002
TH-228	Not Detected	-----	4.23E-001
RA-224	Not Detected	-----	1.09E-001
PB-212	Not Detected	-----	3.64E-002
BI-212	Not Detected	-----	2.87E-001
TL-208	Not Detected	-----	6.03E-002
U-235	Not Detected	-----	1.42E-001
TH-231	Not Detected	-----	1.02E+000
PA-231	Not Detected	-----	9.16E-001
TH-227	Not Detected	-----	1.39E-001
RA-223	Not Detected	-----	1.14E-001
RN-219	Not Detected	-----	2.24E-001
PB-211	Not Detected	-----	4.97E-001
TL-207	Not Detected	-----	8.11E+000
AM-241	Not Detected	-----	3.03E-001
PU-239	Not Detected	-----	2.47E+002
NP-237	Not Detected	-----	1.93E-001
PA-233	Not Detected	-----	3.62E-002
TH-229	Not Detected	-----	1.35E-001

Nuclide Name	Activity (pCi/mL)	2-sigma Error	MDA (pCi/mL)
AG-108m	Not Detected	-----	1.92E-002
AG-110m	Not Detected	-----	1.87E-002
BA-133	Not Detected	-----	2.31E-002
BE-7	Not Detected	-----	1.62E-001
CD-109	Not Detected	-----	6.42E-001
CD-115	Not Detected	-----	5.47E-002
CE-139	Not Detected	-----	1.79E-002
CE-141	Not Detected	-----	3.24E-002
CE-144	Not Detected	-----	1.48E-001
CO-56	Not Detected	-----	2.34E-002
CO-57	Not Detected	-----	1.95E-002
CO-58	Not Detected	-----	1.63E-002
CO-60	Not Detected	-----	1.75E-002
CR-51	Not Detected	-----	1.66E-001
CS-134	Not Detected	-----	1.82E-002
CS-137	Not Detected	-----	1.90E-002
EU-152	Not Detected	-----	5.73E-002
EU-154	Not Detected	-----	8.97E-002
EU-155	Not Detected	-----	8.03E-002
FE-59	Not Detected	-----	3.78E-002
GD-153	Not Detected	-----	6.46E-002
HG-203	Not Detected	-----	2.03E-002
I-131	Not Detected	-----	2.03E-002
IR-192	Not Detected	-----	1.89E-002
K-40	Not Detected	-----	3.00E-001
MN-52	Not Detected	-----	2.56E-002
MN-54	Not Detected	-----	2.18E-002
MO-99	Not Detected	-----	1.97E-001
NA-22	Not Detected	-----	1.80E-002
NA-24	Not Detected	-----	1.42E-001
NB-95	Not Detected	-----	8.90E-002
ND-147	Not Detected	-----	1.51E-001
NI-57	Not Detected	-----	5.12E-002
RU-103	Not Detected	-----	1.72E-002
RU-106	Not Detected	-----	1.66E-001
SB-122	Not Detected	-----	3.82E-002
SB-124	Not Detected	-----	1.86E-002
SB-125	Not Detected	-----	5.07E-002
SN-113	Not Detected	-----	2.28E-002
SR-85	Not Detected	-----	2.65E-002
TA-182	Not Detected	-----	5.57E-002
TA-183	Not Detected	-----	3.27E-001
TC-99m	Not Detected	-----	2.25E+000
TL-201	Not Detected	-----	1.48E-001
XE-133	Not Detected	-----	1.24E-001
Y-88	Not Detected	-----	2.04E-002
ZN-65	Not Detected	-----	4.17E-002
ZR-95	Not Detected	-----	3.22E-002

* Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 7/15/99 7:16:42 AM *

* Analyzed by: *KA 9/15/99* Reviewed by: *MS 7/15/99*

Customer : BYRD/SALMI (6134/SMO)
 Customer Sample ID : LAB CONTROL SAMPLE USING CG134
 Lab Sample ID : 90141709

Sample Description : MIXED GAMMA STANDARD CG134
 Sample Quantity : 1.000 Each
 Sample Date/Time : 11/01/90 12:00:00 PM
 Acquire Start Date/Time : 7/15/99 7:06:28 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 600 / 605 seconds

Comments:

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	-----	4.00E+003
RA-226	Not Detected	-----	5.42E+003
PB-214	Not Detected	-----	5.94E+002
BI-214	Not Detected	-----	5.45E+002
PB-210	Not Detected	-----	2.69E+005
TH-232	Not Detected	-----	1.90E+003
RA-228	Not Detected	-----	2.15E+003
AC-228	Not Detected	-----	1.27E+003
TH-228	Not Detected	-----	1.42E+005
RA-224	Not Detected	-----	3.30E+003
PB-212	Not Detected	-----	1.07E+004
BI-212	Not Detected	-----	8.31E+004
TL-208	Not Detected	-----	1.83E+004
U-235	Not Detected	-----	1.52E+003
TH-231	Not Detected	-----	1.17E+004
PA-231	Not Detected	-----	1.27E+004
TH-227	Not Detected	-----	2.34E+003
RA-223	Not Detected	-----	1.00E+026
RN-219	Not Detected	-----	5.48E+003
PB-211	Not Detected	-----	1.23E+004
TL-207	Not Detected	-----	1.91E+005
AM-241	7.88E+004	1.43E+004	2.83E+003
PU-239	Not Detected	-----	2.74E+006
NP-237	Not Detected	-----	2.06E+003
PA-233	Not Detected	-----	5.47E+002
TH-229	Not Detected	-----	1.60E+003

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	-----	2.74E+002
AG-110m	Not Detected	-----	1.04E+007
BA-133	Not Detected	-----	6.57E+002
BE-7	Not Detected	-----	2.64E+021
CD-109	Not Detected	-----	7.99E+005
CD-115	Not Detected	-----	1.00E+026
CE-139	Not Detected	-----	1.75E+009
CE-141	Not Detected	-----	1.00E+026
CE-144	Not Detected	-----	3.59E+006
CO-56	Not Detected	-----	7.69E+014
CO-57	Not Detected	-----	6.66E+005
CO-58	Not Detected	-----	8.95E+015
CO-60	7.85E+004	1.06E+004	4.12E+002
CR-51	Not Detected	-----	1.00E+026
CS-134	Not Detected	-----	4.87E+003
CS-137	7.04E+004	9.40E+003	2.35E+002
EU-152	Not Detected	-----	9.50E+002
EU-154	Not Detected	-----	2.43E+003
EU-155	Not Detected	-----	3.18E+003
FE-59	Not Detected	-----	1.00E+026
GD-153	Not Detected	-----	6.16E+006
HG-203	Not Detected	-----	1.00E+026
I-131	Not Detected	-----	1.00E+026
IR-192	Not Detected	-----	2.32E+015
K-40	Not Detected	-----	1.24E+003
MN-52	Not Detected	-----	1.00E+026
MN-54	Not Detected	-----	3.62E+005
MO-99	Not Detected	-----	1.00E+026
NA-22	Not Detected	-----	1.72E+003
NA-24	Not Detected	-----	1.00E+026
NE-95	Not Detected	-----	1.00E+026
ND-147	Not Detected	-----	1.00E+026
NI-57	Not Detected	-----	1.00E+026
RU-103	Not Detected	-----	1.00E+026
RU-105	Not Detected	-----	1.01E+006
SB-122	Not Detected	-----	1.00E+026
SB-124	Not Detected	-----	2.02E+018
SB-125	Not Detected	-----	8.79E+003
SN-113	Not Detected	-----	8.01E+010
SR-85	Not Detected	-----	1.85E+017
TA-182	Not Detected	-----	1.96E+011
TA-183	Not Detected	-----	1.00E+026
TC-99m	Not Detected	-----	1.00E+026
TL-201	Not Detected	-----	1.00E+026
XE-133	Not Detected	-----	1.00E+026
Y-88	Not Detected	-----	1.10E+011
ZN-65	Not Detected	-----	5.74E+006
ZR-95	Not Detected	-----	3.83E+017

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program *
 * Quality Assurance Report *

Report Date : 7/15/99 7:16:44 AM
 QA File : C:\GENIE2K\CAMFILES\LCS2.QAF
 Analyst : KIC
 Sample ID : 90141709
 Sample Quantity : 1.00 Each
 Sample Date : 11/01/90 12:00:00 PM
 Measurement Date : 7/15/99 7:06:28 AM
 Elapsed Live Time : 600 seconds
 Elapsed Real Time : 605 seconds

Parameter	Mean	1S Error	New Value	<	LU	:	SD	:	UD	:	ES
AM-241 Activity	8.167E-002	3.880E-003	7.885E-002	<	:	:	:	:	:	:	>
CS-137 Activity	7.064E-002	1.922E-003	7.037E-002	<	:	:	:	:	:	:	>
CO-60 Activity	7.867E-002	2.120E-003	7.914E-002	<	:	:	:	:	:	:	>

Flags Key: LU = Boundary Test (Ab = Above, Be = Below)
 SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
 UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
 ES = Measurement Bias Test (In = Investigate, Ac = Action)

Reviewed by: *[Signature]* 7/15/99

* Analyzed by: *[Signature]* 7/14/99 Reviewed by: *S.T. Orak* 7/21/99

Customer : BYRD/SALMI
 Customer Sample ID : 047264-001
 Lab Sample ID : 90141601 *LLTA-09-GR-035-0-0.5*

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 685.000 gram
 Sample Date/Time : 7/13/99 10:00:00 AM
 Acquire Start Date/Time : 7/15/99 9:55:13 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	8.21E-001
RA-226	Not Detected	-----	5.77E-001
PB-214	7.49E-001	1.43E-001	4.74E-002
BI-214	6.76E-001	1.46E-001	4.74E-002
PB-210	Not Detected	-----	3.77E+001
TH-232	Not Detected	-----	1.47E-001
RA-228	1.50E+000	2.04E-001	1.89E-001
AC-228	9.62E-001	2.41E-001	9.06E-002
TH-228	9.05E-001	6.20E-001	4.67E-001
RA-224	1.09E+000	2.64E-001	7.00E-002
PB-212	9.76E-001	2.37E-001	3.90E-002
EI-212	9.14E-001	6.47E-001	3.28E-001
TL-208	8.96E-001	7.23E-001	6.77E-002
U-235	Not Detected	-----	2.32E-001
TH-231	Not Detected	-----	1.86E+000
PA-231	Not Detected	-----	1.36E+000
TH-227	Not Detected	-----	3.90E-001
RA-223	Not Detected	-----	2.25E-001
RN-219	Not Detected	-----	3.87E-001
PB-211	Not Detected	-----	8.40E-001
TL-207	Not Detected	-----	1.32E+001
AM-241	Not Detected	-----	5.18E-001
PU-239	Not Detected	-----	4.41E+002
NP-237	Not Detected	-----	2.85E-001
PA-233	Not Detected	-----	5.52E-002
TH-229	Not Detected	-----	2.57E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.86E-002
AG-110m	Not Detected	-----	2.93E-002
BA-133	Not Detected	-----	4.87E-002
BE-7	Not Detected	-----	2.55E-001
CD-109	Not Detected	-----	9.69E-001
CD-115	Not Detected	-----	1.23E-001
CE-139	Not Detected	-----	2.86E-002
CE-141	Not Detected	-----	5.25E-002
CE-144	Not Detected	-----	2.36E-001
CO-56	Not Detected	-----	3.39E-002
CO-57	Not Detected	-----	3.11E-002
CO-58	Not Detected	-----	2.84E-002
CO-60	Not Detected	-----	3.54E-002
CR-51	Not Detected	-----	2.40E-001
CS-134	Not Detected	-----	4.23E-002
CS-137	Not Detected	-----	3.18E-002
EU-152	Not Detected	-----	9.31E-002
EU-154	Not Detected	-----	1.82E-001
EU-155	Not Detected	-----	1.44E-001
FE-59	Not Detected	-----	7.12E-002
GD-153	Not Detected	-----	1.05E-001
HG-203	Not Detected	-----	3.22E-002
I-131	Not Detected	-----	3.13E-002
IR-192	Not Detected	-----	2.73E-002
K-40	2.17E+001	3.01E+000	2.44E-001
MN-52	Not Detected	-----	3.66E-002
MN-54	Not Detected	-----	1.76E-002
MO-99	Not Detected	-----	3.82E-001
NA-22	Not Detected	-----	3.99E-002
NA-24	Not Detected	-----	2.76E-001
NB-95	Not Detected	-----	2.49E-001
ND-147	Not Detected	-----	2.20E-001
NI-57	Not Detected	-----	1.20E-001
RU-103	Not Detected	-----	2.81E-002
RU-106	Not Detected	-----	2.67E-001
SB-122	Not Detected	-----	6.54E-002
SB-124	Not Detected	-----	2.96E-002
SB-125	Not Detected	-----	7.99E-002
SN-113	Not Detected	-----	3.79E-002
SR-85	Not Detected	-----	3.73E-002
TA-182	Not Detected	-----	1.49E-001
TA-183	Not Detected	-----	5.77E-001
TC-99m	Not Detected	-----	7.60E+000
TL-201	Not Detected	-----	2.87E-001
XE-133	Not Detected	-----	2.70E-001
Y-88	Not Detected	-----	2.79E-002
ZN-65	Not Detected	-----	9.89E-002
ZR-95	Not Detected	-----	5.35E-002

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

7/15/99 1:17:14 PM

Analyzed by: *[Signature]* 7/19/99

Reviewed by: S.T. Shanks 7/21/99

Customer : BYRD/SALMI
 Customer Sample ID : 047265-001
 Lab Sample ID : 90141602

CCRA-09-GR-035-0.5-1.0-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 791.000 gram
 Sample Date/Time : 7/13/99 10:02:00 AM
 Acquire Start Date/Time : 7/15/99 11:37:00 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	7.38E-001
RA-226	1.78E+000	8.11E-001	5.64E-001
PB-214	6.63E-001	1.38E-001	4.28E-002
BI-214	6.21E-001	9.61E-002	4.11E-002
PB-210	Not Detected	-----	3.43E+001
TH-232	8.23E-001	4.76E-001	1.29E-001
RA-228	9.22E-001	2.72E-001	1.35E-001
AC-228	9.25E-001	2.17E-001	8.00E-002
TH-228	9.30E-001	7.16E-001	4.40E-001
RA-224	9.62E-001	2.32E-001	4.20E-002
PB-212	9.29E-001	1.64E-001	3.36E-002
BI-212	1.17E+000	5.77E-001	2.75E-001
TL-208	8.49E-001	9.07E-001	6.33E-002
U-235	1.53E-001	1.71E-001	2.17E-001
TH-231	Not Detected	-----	1.70E+000
PA-231	Not Detected	-----	1.29E+000
TH-227	Not Detected	-----	3.54E-001
RA-223	Not Detected	-----	2.11E-001
RN-219	Not Detected	-----	3.24E-001
PB-211	Not Detected	-----	7.32E-001
TL-207	Not Detected	-----	1.21E+001
AM-241	Not Detected	-----	4.74E-001
PO-239	Not Detected	-----	3.96E+002
NR-237	4.00E-001	2.72E-001	2.94E-001
FR-233	Not Detected	-----	5.09E-002
TR-229	Not Detected	-----	2.32E-001

Not Detected
[Signature]
 7/19/99

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.53E-002
AG-110m	Not Detected	-----	2.73E-002
BA-133	Not Detected	-----	4.39E-002
BE-7	Not Detected	-----	2.28E-001
CD-109	Not Detected	-----	1.00E+000
CD-115	Not Detected	-----	1.15E-001
CE-139	Not Detected	-----	2.62E-002
CE-141	Not Detected	-----	4.86E-002
CE-144	Not Detected	-----	2.15E-001
CO-56	Not Detected	-----	3.00E-002
CO-57	Not Detected	-----	2.80E-002
CO-58	Not Detected	-----	2.82E-002
CO-60	Not Detected	-----	3.35E-002
CR-51	Not Detected	-----	2.03E-001
CS-134	Not Detected	-----	3.74E-002
CS-137	Not Detected	-----	2.99E-002
EU-152	Not Detected	-----	8.39E-002
EU-154	Not Detected	-----	1.72E-001
EU-155	Not Detected	-----	1.32E-001
FE-59	Not Detected	-----	6.50E-002
GD-153	Not Detected	-----	9.59E-002
HG-203	Not Detected	-----	2.89E-002
I-131	Not Detected	-----	2.87E-002
IR-192	Not Detected	-----	2.43E-002
K-40	2.08E+001	2.86E+000	1.92E-001
MN-52	Not Detected	-----	3.35E-002
MN-54	Not Detected	-----	3.20E-002
MO-99	Not Detected	-----	3.38E-001
NA-22	Not Detected	-----	3.70E-002
NA-24	Not Detected	-----	2.77E-001
NB-95	Not Detected	-----	2.30E-001
ND-147	Not Detected	-----	1.97E-001
NI-57	Not Detected	-----	1.23E-001
RU-103	Not Detected	-----	2.59E-002
RU-106	Not Detected	-----	2.39E-001
SB-122	Not Detected	-----	5.82E-002
SB-124	Not Detected	-----	2.52E-002
SB-125	Not Detected	-----	7.00E-002
SN-113	Not Detected	-----	3.24E-002
SR-85	Not Detected	-----	3.21E-002
TA-182	Not Detected	-----	1.27E-001
TA-183	Not Detected	-----	5.35E-001
TC-99m	Not Detected	-----	8.40E+000
TL-201	Not Detected	-----	2.67E-001
XE-133	Not Detected	-----	2.53E-001
Y-88	Not Detected	-----	2.33E-002
ZN-65	Not Detected	-----	8.45E-002
ZR-95	Not Detected	-----	4.99E-002

* Analyzed by: *[Signature]* 7/19/99 Reviewed by: S.T. Shank 7/21/99 *

Customer : BYRD/SALMI
 Customer Sample ID : 047267-001
 Lab Sample ID : 90141603 CTA-09-GRL-036-0.5-1.0-S

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 927.000 gram
 Sample Date/Time : 7/13/99 10:06:00 AM Note: Ra-226 and U-235 gamma peaks
 Acquire Start Date/Time : 7/15/99 1:18:47 PM interfere. Either isotope
 Detector Name : LAB02 may be over-estimated.
 Elapsed Live/Real Time : 6000 / 6004 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	6.65E-001
RA-226	1.24E+000	4.27E-001	4.42E-001
PB-214	Not Detected	-----	4.14E-002
BI-214	4.60E-001	6.91E-002	3.49E-002
PB-210	Not Detected	-----	3.03E+001
TH-232	7.96E-001	4.22E-001	1.27E-001
RA-228	8.60E-001	2.57E-001	1.09E-001
AC-228	8.33E-001	2.29E-001	6.57E-002
TH-228	8.31E-001	5.57E-001	3.88E-001
RA-224	8.91E-001	2.13E-001	4.66E-002
PB-212	8.14E-001	9.25E-001	3.33E-002
BI-212	8.13E-001	5.80E-001	2.64E-001
TL-208	7.20E-001	1.60E-001	5.83E-002
U-235	1.60E-001	1.50E-001	1.91E-001
TH-231	Not Detected	-----	1.52E+000
PA-231	Not Detected	-----	1.14E+000
TH-227	Not Detected	-----	3.11E-001
RA-223	Not Detected	-----	1.90E-001
RN-219	Not Detected	-----	2.87E-001
PB-211	Not Detected	-----	6.57E-001
TL-207	Not Detected	-----	1.05E+001
AM-241	Not Detected	-----	4.18E-001
PU-239	Not Detected	-----	3.55E+002
NP-237	Not Detected	-----	2.28E-001
PA-233	Not Detected	-----	4.48E-002
TH-229	Not Detected	-----	2.16E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.06E-002
AG-110m	Not Detected	-----	2.50E-002
BA-133	Not Detected	-----	3.68E-002
BE-7	Not Detected	-----	1.99E-001
CD-109	Not Detected	-----	1.07E+000
CD-115	Not Detected	-----	1.04E-001
CE-139	Not Detected	-----	2.30E-002
CE-141	Not Detected	-----	4.27E-002
CE-144	Not Detected	-----	1.93E-001
CO-56	Not Detected	-----	2.54E-002
CO-57	Not Detected	-----	2.56E-002
CO-58	Not Detected	-----	2.63E-002
CO-60	Not Detected	-----	2.99E-002
CR-51	Not Detected	-----	1.90E-001
CS-134	Not Detected	-----	3.19E-002
CS-137	1.91E-002	2.29E-002	1.86E-002
EU-152	Not Detected	-----	7.62E-002
EU-154	Not Detected	-----	1.48E-001
EU-155	Not Detected	-----	1.16E-001
FE-59	Not Detected	-----	6.04E-002
GD-153	Not Detected	-----	8.88E-002
HG-203	Not Detected	-----	2.55E-002
I-131	Not Detected	-----	2.65E-002
IR-192	Not Detected	-----	2.11E-002
K-40	2.19E+001	3.00E+000	1.74E-001
MN-52	Not Detected	-----	2.95E-002
MN-54	Not Detected	-----	1.40E-002
MO-99	Not Detected	-----	3.15E-001
NA-22	Not Detected	-----	3.43E-002
NA-24	Not Detected	-----	2.83E-001
NB-95	Not Detected	-----	2.05E-001
ND-147	Not Detected	-----	1.68E-001
NI-57	Not Detected	-----	9.87E-002
RU-103	Not Detected	-----	2.30E-002
RU-106	Not Detected	-----	2.26E-001
SB-122	Not Detected	-----	5.24E-002
SE-124	Not Detected	-----	2.31E-002
SE-125	Not Detected	-----	6.42E-002
SN-113	Not Detected	-----	2.88E-002
SR-85	Not Detected	-----	2.98E-002
TA-182	Not Detected	-----	1.21E-001
TA-183	Not Detected	-----	4.80E-001
TC-99m	Not Detected	-----	8.94E+000
TL-201	Not Detected	-----	2.42E-001
XE-133	Not Detected	-----	2.36E-001
Y-88	Not Detected	-----	1.81E-002
ZN-65	Not Detected	-----	8.33E-002
ZR-95	Not Detected	-----	4.50E-002

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

7/15/99 4:40:49 PM

Analyzed by: *[Signature]* 7/19/99

Reviewed by: S.T. Shanks 7/21/99

Customer : BYRD/SALMI
 Customer Sample ID : 047268-001
 Lab Sample ID : 90141604

CLTA-D9-GR-036-0.5-1.0-DU

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 792.000 gram
 Sample Date/Time : 7/13/99 10:08:00 AM
 Acquire Start Date/Time : 7/15/99 3:00:34 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	1.69E+000	2.01E+000	6.01E-001
RA-226	Not Detected	-----	5.38E-001
PB-214	5.79E-001	1.26E-001	4.30E-002
BI-214	5.08E-001	1.14E-001	4.16E-002
PB-210	Not Detected	-----	3.33E+001
TH-232	8.76E-001	4.46E-001	1.28E-001
RA-228	8.02E-001	2.99E-001	1.36E-001
AC-228	8.31E-001	2.25E-001	8.16E-002
TH-228	Not Detected	-----	4.37E-001
RA-224	8.53E-001	2.09E-001	5.36E-002
PB-212	8.56E-001	1.53E-001	3.47E-002
BI-212	9.31E-001	4.57E-001	2.97E-001
TL-208	7.75E-001	1.70E-001	6.05E-002
U-235	Not Detected	-----	2.09E-001
TH-231	Not Detected	-----	1.67E+000
PA-231	Not Detected	-----	1.27E+000
TH-227	Not Detected	-----	3.44E-001
RA-223	Not Detected	-----	2.08E-001
RN-219	Not Detected	-----	3.19E-001
PB-211	Not Detected	-----	7.02E-001
TL-207	Not Detected	-----	1.28E+001
AM-241	Not Detected	-----	4.78E-001
PU-239	Not Detected	-----	3.91E+002
NP-237	Not Detected	-----	2.56E-001
PA-233	Not Detected	-----	4.86E-002
TH-229	Not Detected	-----	2.33E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.29E-002
AG-110m	Not Detected	-----	2.93E-002
BA-133	Not Detected	-----	4.10E-002
BE-7	Not Detected	-----	2.25E-001
CD-109	Not Detected	-----	8.71E-001
CD-115	Not Detected	-----	1.19E-001
CE-139	Not Detected	-----	2.54E-002
CE-141	Not Detected	-----	4.71E-002
CE-144	Not Detected	-----	2.08E-001
CO-56	Not Detected	-----	2.92E-002
CO-57	Not Detected	-----	2.75E-002
CO-58	Not Detected	-----	2.88E-002
CO-60	Not Detected	-----	3.12E-002
CR-51	Not Detected	-----	2.10E-001
CS-134	Not Detected	-----	3.37E-002
CS-137	2.62E-002	2.38E-002	1.98E-002
EU-152	Not Detected	-----	8.34E-002
EU-154	Not Detected	-----	1.58E-001
EU-155	Not Detected	-----	1.31E-001
FE-59	Not Detected	-----	6.73E-002
GD-153	Not Detected	-----	9.73E-002
HG-203	Not Detected	-----	2.78E-002
I-131	Not Detected	-----	2.82E-002
IR-192	Not Detected	-----	2.37E-002
K-40	2.31E+001	3.18E+000	2.08E-001
MN-52	Not Detected	-----	3.42E-002
MN-54	2.62E-002	2.38E-002	1.77E-002
MO-99	Not Detected	-----	3.52E-001
NA-22	Not Detected	-----	3.70E-002
NA-24	Not Detected	-----	3.44E-001
NE-95	Not Detected	-----	2.31E-001
ND-147	Not Detected	-----	2.01E-001
NI-57	Not Detected	-----	6.74E-002
RU-103	Not Detected	-----	2.45E-002
RU-106	Not Detected	-----	2.39E-001
SE-122	Not Detected	-----	6.20E-002
SE-124	Not Detected	-----	2.51E-002
SE-125	Not Detected	-----	7.13E-002
SN-113	Not Detected	-----	3.29E-002
SR-85	Not Detected	-----	3.25E-002
TA-182	Not Detected	-----	1.36E-001
TA-183	Not Detected	-----	5.55E-001
TC-99m	Not Detected	-----	1.23E+001
TL-201	Not Detected	-----	2.80E-001
XE-133	Not Detected	-----	2.67E-001
Y-88	Not Detected	-----	2.18E-002
ZN-65	Not Detected	-----	9.15E-002
ZR-95	Not Detected	-----	4.75E-002

Not Detected
2/19/94

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

7/15/99 6:45:22 PM

 * Analyzed by: *[Signature]* 7/14/99 Reviewed by: S.T. Shank 7/14/99 *

Customer : BYRD/SALMI
 Customer Sample ID : 047270-001
 Lab Sample ID : 90141605 CCA-09-GR-037-0.5-1.0-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 933.000 gram
 Sample Date/Time : 7/13/99 10:12:00 AM Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.
 Acquire Start Date/Time : 7/15/99 5:05:08 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6004 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	6.92E-001
RA-226	Not Detected	-----	4.49E-001
PB-214	4.56E-001	9.97E-002	3.67E-002
BI-214	4.03E-001	2.27E-001	3.55E-002
PB-210	Not Detected	-----	2.97E+001
TH-232	6.27E-001	3.48E-001	1.17E-001
RA-228	7.36E-001	2.77E-001	1.11E-001
AC-228	7.07E-001	1.95E-001	7.39E-002
TH-228	5.25E-001	4.75E-001	3.64E-001
RA-224	8.17E-001	1.97E-001	4.59E-002
PB-212	7.23E-001	1.26E-001	3.30E-002
BI-212	6.87E-001	4.95E-001	2.15E-001
TL-208	6.32E-001	1.46E-001	5.64E-002
U-235	1.25E-001	2.08E-001	1.37E-001
TH-231	Not Detected	-----	1.52E+000
PA-231	Not Detected	-----	1.10E+000
TH-227	Not Detected	-----	2.95E-001
RA-223	Not Detected	-----	1.85E-001
RN-219	Not Detected	-----	2.83E-001
PB-211	Not Detected	-----	6.38E-001
TL-207	Not Detected	-----	1.11E+001
AM-241	Not Detected	-----	4.19E-001
PU-239	Not Detected	-----	3.49E+002
NP-237	3.15E-001	1.17E-001	2.47E-001
PA-233	Not Detected	-----	4.46E-002
TH-229	Not Detected	-----	2.12E-001

Not Detected
[Signature]
 7/14/99

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected		2.89E-002
AG-110m	Not Detected		2.61E-002
BA-133	Not Detected		3.60E-002
BE-7	Not Detected		1.98E-001
CD-109	Not Detected		8.39E-001
CD-115	Not Detected		1.06E-001
CE-139	Not Detected		2.29E-002
CE-141	Not Detected		4.25E-002
CE-144	Not Detected		1.89E-001
CO-56	Not Detected		2.71E-002
CO-57	Not Detected		2.47E-002
CO-58	Not Detected		2.45E-002
CO-60	Not Detected		2.97E-002
CR-51	Not Detected		1.92E-001
CS-134	Not Detected		2.95E-002
CS-137	1.97E-002	2.76E-002	1.85E-002
EU-152	Not Detected		7.41E-002
EU-154	Not Detected		1.37E-001
EU-155	Not Detected		1.16E-001
FE-59	Not Detected		6.27E-002
GD-153	Not Detected		8.61E-002
HG-203	Not Detected		2.48E-002
I-131	Not Detected		2.60E-002
IR-192	Not Detected		2.17E-002
K-40	2.41E+001	3.29E+000	1.71E-001
MN-52	Not Detected		3.23E-002
MN-54	Not Detected		2.65E-002
MO-99	Not Detected		3.34E-001
NA-22	Not Detected		3.46E-002
NA-24	Not Detected		3.08E-001
NB-95	Not Detected		2.01E-001
ND-147	Not Detected		1.63E-001
NI-57	Not Detected		1.03E-001
RU-103	Not Detected		2.32E-002
RU-106	Not Detected		2.11E-001
SB-122	Not Detected		5.58E-002
SB-124	Not Detected		2.24E-002
SB-125	Not Detected		6.05E-002
SN-113	Not Detected		2.95E-002
SR-85	Not Detected		2.80E-002
TA-182	Not Detected		1.22E-001
TA-183	Not Detected		4.88E-001
TC-99m	Not Detected		1.36E+001
TL-201	Not Detected		2.52E-001
XE-133	Not Detected		2.40E-001
Y-88	Not Detected		1.98E-002
ZN-65	Not Detected		7.96E-002
ZR-95	Not Detected		4.47E-002

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

7/15/99 8:27:09 PM

Analyzed by: *[Signature]* 7/20/99

Reviewed by: S.T. Shanks 7/21/99

Customer : BYRD/SALMI
 Customer Sample ID : 047271-001
 Lab Sample ID : 90141606

CCTA-09-62-038-0-0.5-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 778.000 gram
 Sample Date/Time : 7/13/99 10:15:00 AM
 Acquire Start Date/Time : 7/15/99 6:46:55 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	8.66E-001
RA-226	2.06E+000	2.53E+000	4.78E-001
PB-214	5.25E-001	3.21E-001	4.28E-002
BI-214	4.38E-001	1.10E-001	4.36E-002
PB-210	Not Detected	-----	3.51E+001
TH-232	8.83E-001	4.57E-001	1.40E-001
RA-228	8.82E-001	1.81E-001	1.33E-001
AC-228	8.37E-001	2.21E-001	8.18E-002
TH-228	7.99E-001	5.96E-001	4.20E-001
RA-224	8.11E-001	2.00E-001	5.22E-002
PB-212	Not Detected	-----	3.69E-002
BI-212	8.40E-001	4.42E-001	3.08E-001
TL-208	7.94E-001	1.69E-001	6.31E-002
U-235	Not Detected	-----	2.14E-001
TH-231	Not Detected	-----	1.76E+000
PA-231	Not Detected	-----	1.28E+000
TH-227	Not Detected	-----	3.50E-001
RA-223	Not Detected	-----	2.19E-001
RN-219	Not Detected	-----	3.31E-001
PB-211	Not Detected	-----	7.44E-001
TL-207	Not Detected	-----	1.29E+001
AM-241	Not Detected	-----	4.91E-001
FU-239	Not Detected	-----	4.07E+002
NP-237	Not Detected	-----	3.82E-001
PA-233	Not Detected	-----	5.21E-002
TH-229	Not Detected	-----	2.46E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.57E-002
AG-110m	Not Detected	-----	3.17E-002
BA-133	Not Detected	-----	4.11E-002
BE-7	2.48E-001	2.45E-001	1.48E-001
CD-109	Not Detected	-----	1.02E+000
CD-115	Not Detected	-----	1.26E-001
CE-139	Not Detected	-----	2.69E-002
CE-141	Not Detected	-----	4.89E-002
CE-144	Not Detected	-----	2.18E-001
CO-56	Not Detected	-----	3.19E-002
CO-57	Not Detected	-----	2.93E-002
CO-58	Not Detected	-----	2.98E-002
CO-60	Not Detected	-----	3.59E-002
CR-51	Not Detected	-----	2.26E-001
CS-134	Not Detected	-----	3.40E-002
CS-137	4.84E-002	2.19E-002	2.15E-002
EU-152	Not Detected	-----	8.71E-002
EU-154	Not Detected	-----	1.71E-001
EU-155	Not Detected	-----	1.33E-001
FE-59	Not Detected	-----	6.96E-002
GD-153	Not Detected	-----	9.96E-002
HG-203	Not Detected	-----	2.93E-002
I-131	Not Detected	-----	2.90E-002
IR-192	Not Detected	-----	2.51E-002
K-40	2.63E+001	3.60E+000	2.06E-001
MN-52	Not Detected	-----	3.62E-002
MN-54	Not Detected	-----	3.13E-002
MO-99	Not Detected	-----	3.77E-001
NA-22	Not Detected	-----	4.25E-002
NA-24	Not Detected	-----	4.19E-001
NB-95	Not Detected	-----	2.41E-001
ND-147	Not Detected	-----	2.09E-001
NI-57	Not Detected	-----	1.34E-001
RU-103	Not Detected	-----	2.61E-002
RU-106	Not Detected	-----	2.49E-001
SB-122	Not Detected	-----	6.67E-002
SB-124	Not Detected	-----	2.54E-002
SB-125	Not Detected	-----	7.40E-002
SN-113	Not Detected	-----	3.44E-002
SR-85	Not Detected	-----	3.38E-002
TA-182	Not Detected	-----	1.36E-001
TA-183	Not Detected	-----	5.77E-001
TC-99m	Not Detected	-----	1.90E+001
TL-201	Not Detected	-----	2.98E-001
XE-133	Not Detected	-----	2.89E-001
Y-88	Not Detected	-----	2.18E-002
ZN-65	Not Detected	-----	8.99E-002
ZR-95	Not Detected	-----	5.25E-002

7/15/99 10:08:56 PM

Analyzed by: [Signature] 7/20/99 Reviewed by: S.T. Shanley 7/21/99

Customer : BYRD/SALMI
Customer Sample ID : 047272-001
Lab Sample ID : 90141607

CCTA-09-GR-038-0.5-1.0-5

Sample Description : SOIL MARINELLI SAMPLE
Sample Quantity : 984.000 gram
Sample Date/Time : 7/13/99 10:17:00 AM
Acquire Start Date/Time : 7/15/99 8:28:42 PM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6004 seconds

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Comments:

Table with 4 columns: Nuclide Name, Activity (pCi/gram), 2-sigma Error, and MDA (pCi/gram). Lists various isotopes like U-238, Ra-226, Th-232, U-235, etc.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	2.78E-002
AG-110m	Not Detected	-----	2.40E-002
BA-133	Not Detected	-----	3.47E-002
BE-7	Not Detected	-----	1.90E-001
CD-109	1.63E+000	8.72E-001	7.84E-001
CD-115	Not Detected	-----	1.07E-001
CE-139	Not Detected	-----	2.18E-001
CE-141	Not Detected	-----	4.19E-002
CE-144	Not Detected	-----	1.84E-001
CO-56	Not Detected	-----	2.53E-002
CO-57	Not Detected	-----	2.45E-002
CO-58	Not Detected	-----	2.47E-002
CO-60	Not Detected	-----	2.91E-002
CR-51	Not Detected	-----	1.78E-001
CS-134	Not Detected	-----	2.94E-002
CS-137	Not Detected	-----	1.48E-002
EU-152	Not Detected	-----	7.35E-002
EU-154	Not Detected	-----	1.31E-001
EU-155	Not Detected	-----	1.14E-001
FE-59	Not Detected	-----	5.82E-002
GD-153	Not Detected	-----	8.46E-002
HG-203	Not Detected	-----	2.43E-002
I-131	Not Detected	-----	2.49E-002
IR-192	Not Detected	-----	2.11E-002
K-40	2.34E+001	3.20E+000	1.76E-001
MN-52	Not Detected	-----	2.96E-002
MN-54	Not Detected	-----	2.58E-002
MO-99	Not Detected	-----	3.12E-001
NA-22	Not Detected	-----	3.32E-002
NA-24	Not Detected	-----	3.62E-001
NE-95	Not Detected	-----	1.99E-001
ND-147	Not Detected	-----	1.72E-001
NI-57	Not Detected	-----	7.25E-002
RU-103	Not Detected	-----	2.18E-002
RU-106	Not Detected	-----	2.08E-001
SB-122	Not Detected	-----	5.49E-002
SB-124	Not Detected	-----	2.25E-002
SB-125	Not Detected	-----	6.03E-002
SN-113	Not Detected	-----	2.78E-002
SR-85	Not Detected	-----	2.73E-002
TA-182	Not Detected	-----	1.13E-001
TA-183	Not Detected	-----	4.71E-001
TC-99m	Not Detected	-----	1.95E+001
TL-201	Not Detected	-----	2.50E-001
XE-133	Not Detected	-----	2.44E-001
Y-88	Not Detected	-----	1.74E-002
ZN-65	Not Detected	-----	7.55E-002
ZR-95	Not Detected	-----	4.38E-002

Not Detected
4/20/04

• Analyzed by: *[Signature]* 7/20/99 Reviewed by: S.T. Shank 7/21/99 *

Customer : BYRD/SALMI
 Customer Sample ID : 047274-001
 Lab Sample ID : 90141608 CTA-09-GR-039-0.5-1.0-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 827.000 gram
 Sample Date/Time : 7/13/99 10:32:00 AM
 Acquire Start Date/Time : 7/15/99 10:10:28 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	7.33E-001
RA-226	Not Detected	-----	5.16E-001
PB-214	5.80E-001	1.13E-001	4.07E-002
BI-214	5.49E-001	1.15E-001	4.03E-002
PB-210	Not Detected	-----	3.24E+001
TH-232	9.58E-001	4.89E-001	1.09E-001
RA-228	9.00E-001	3.16E-001	1.28E-001
AC-228	8.82E-001	2.20E-001	7.74E-002
TH-228	7.08E-001	5.78E-001	3.93E-001
RA-224	8.77E-001	2.13E-001	5.89E-002
PE-212	Not Detected	-----	3.63E-002
EI-212	1.02E+000	4.39E-001	2.59E-001
TL-208	7.95E-001	1.79E-001	6.04E-002
U-235	Not Detected	-----	2.01E-001
TH-231	Not Detected	-----	1.66E+000
PA-231	Not Detected	-----	1.24E+000
TH-227	Not Detected	-----	3.36E-001
RA-223	Not Detected	-----	2.08E-001
RN-219	Not Detected	-----	3.13E-001
PB-211	Not Detected	-----	7.21E-001
TL-207	Not Detected	-----	1.15E+001
AM-241	Not Detected	-----	4.61E-001
FC-239	Not Detected	-----	3.73E+002
NP-237	Not Detected	-----	2.54E-001
PA-233	Not Detected	-----	4.96E-002
TH-229	Not Detected	-----	2.25E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.22E-002
AG-110m	Not Detected	-----	2.55E-002
BA-133	Not Detected	-----	4.28E-002
BE-7	Not Detected	-----	2.13E-001
CD-109	Not Detected	-----	8.65E-001
CD-115	Not Detected	-----	1.26E-001
CE-139	Not Detected	-----	2.50E-002
CE-141	Not Detected	-----	4.64E-002
CE-144	Not Detected	-----	2.11E-001
CO-56	Not Detected	-----	2.92E-002
CO-57	Not Detected	-----	2.71E-002
CO-58	Not Detected	-----	2.71E-002
CO-60	Not Detected	-----	2.86E-002
CR-51	Not Detected	-----	2.15E-001
CS-134	Not Detected	-----	3.50E-002
CS-137	Not Detected	-----	2.77E-002
EU-152	Not Detected	-----	8.10E-002
EU-154	Not Detected	-----	1.56E-001
EU-155	Not Detected	-----	1.24E-001
FE-59	Not Detected	-----	6.01E-002
GD-153	Not Detected	-----	9.30E-002
GG-203	Not Detected	-----	2.82E-002
HI-131	Not Detected	-----	2.84E-002
IR-192	Not Detected	-----	2.40E-002
K-40	2.10E+001	2.89E+000	1.93E-001
MN-52	Not Detected	-----	3.66E-002
MN-54	2.17E-002	6.41E-002	1.73E-002
MO-99	Not Detected	-----	3.60E-001
NA-22	Not Detected	-----	3.64E-002
NA-24	Not Detected	-----	4.61E-001
NB-95	Not Detected	-----	2.36E-001
ND-147	Not Detected	-----	1.98E-001
NI-57	Not Detected	-----	1.36E-001
RU-103	Not Detected	-----	2.39E-002
RU-106	Not Detected	-----	2.40E-001
SB-122	Not Detected	-----	6.28E-002
SB-124	Not Detected	-----	2.60E-002
SB-125	Not Detected	-----	6.85E-002
SN-113	Not Detected	-----	3.19E-002
SR-85	Not Detected	-----	3.19E-002
TA-182	Not Detected	-----	1.28E-001
TA-183	Not Detected	-----	5.56E-001
TC-99m	Not Detected	-----	2.57E+001
TL-201	Not Detected	-----	2.81E-001
XE-133	Not Detected	-----	2.81E-001
Y-88	Not Detected	-----	2.05E-002
ZN-65	Not Detected	-----	8.42E-002
ZR-95	Not Detected	-----	4.78E-002

Not Detected
2/20/99

* Analyzed by: *[Signature]* 7/20/99 Reviewed by: S.T. Shanks 7/21/99 *

Customer : BYRD/SALMI
 Customer Sample ID : 047275-001
 Lab Sample ID : 90141609 LCA-09-GR-040-D-0.5-S

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 949.000 gram
 Sample Date/Time : 7/13/99 10:34:00 AM
 Acquire Start Date/Time : 7/15/99 11:52:15 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6004 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	7.05E-001
RA-226	1.93E+000	8.81E-001	4.74E-001
PE-214	6.16E-001	2.99E-001	3.78E-002
BI-214	5.74E-001	1.18E-001	3.50E-002
PE-210	Not Detected	-----	3.06E+001
TH-232	8.52E-001	7.29E-001	1.09E-001
RA-228	9.41E-001	2.77E-001	1.09E-001
AC-228	8.90E-001	2.04E-001	6.85E-002
TH-228	7.38E-001	2.55E-001	3.98E-001
RA-224	8.79E-001	2.10E-001	3.77E-002
PE-212	8.55E-001	9.56E-001	3.10E-002
BI-212	9.92E-001	4.75E-001	2.57E-001
TL-208	7.81E-001	1.64E-001	5.32E-002
U-235	1.11E-001	1.54E-001	1.95E-001
TH-231	Not Detected	-----	1.52E+000
PA-231	Not Detected	-----	1.08E+000
TH-227	Not Detected	-----	3.12E-001
RA-223	Not Detected	-----	1.95E-001
RN-219	Not Detected	-----	2.89E-001
PE-211	Not Detected	-----	6.71E-001
TL-207	Not Detected	-----	1.04E+001
AM-241	Not Detected	-----	4.25E-001
FU-239	Not Detected	-----	3.64E+002
NP-237	Not Detected	-----	3.38E-001
PA-233	Not Detected	-----	4.59E-002
TH-229	Not Detected	-----	2.14E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.03E-002
AG-110m	Not Detected	-----	2.47E-002
BA-133	Not Detected	-----	3.80E-002
BE-7	2.14E-001	2.11E-001	1.30E-001
CD-109	Not Detected	-----	8.31E-001
CD-115	Not Detected	-----	1.19E-001
CE-139	Not Detected	-----	2.34E-002
CE-141	Not Detected	-----	4.43E-002
CE-144	Not Detected	-----	1.91E-001
CO-56	Not Detected	-----	2.59E-002
CO-57	Not Detected	-----	2.54E-002
CO-58	Not Detected	-----	2.49E-002
CO-60	Not Detected	-----	2.76E-002
CR-51	Not Detected	-----	1.91E-001
CS-134	Not Detected	-----	3.26E-002
CS-137	2.75E-002	2.57E-002	1.86E-002
EU-152	Not Detected	-----	7.63E-002
EU-154	Not Detected	-----	1.47E-001
EU-155	Not Detected	-----	1.17E-001
FE-59	Not Detected	-----	5.88E-002
GD-153	Not Detected	-----	8.91E-002
HG-203	Not Detected	-----	2.50E-002
I-131	Not Detected	-----	2.68E-002
IR-192	Not Detected	-----	2.17E-002
K-40	1.92E+001	2.63E+000	1.60E-001
MN-52	Not Detected	-----	3.25E-002
MN-54	Not Detected	-----	1.50E-002
MO-99	Not Detected	-----	3.49E-001
NA-22	Not Detected	-----	3.23E-002
NA-24	Not Detected	-----	4.54E-001
NB-95	Not Detected	-----	2.23E-001
ND-147	Not Detected	-----	1.80E-001
NI-57	Not Detected	-----	7.75E-002
RU-103	Not Detected	-----	2.25E-002
RU-106	Not Detected	-----	2.23E-001
SB-122	Not Detected	-----	5.66E-002
SB-124	Not Detected	-----	2.26E-002
SB-125	Not Detected	-----	6.22E-002
SN-113	Not Detected	-----	2.93E-002
SR-85	Not Detected	-----	2.98E-002
TA-182	Not Detected	-----	1.18E-001
TA-183	Not Detected	-----	5.20E-001
TC-99m	Not Detected	-----	2.93E+001
TL-201	Not Detected	-----	2.71E-001
XE-133	Not Detected	-----	2.66E-001
Y-88	Not Detected	-----	2.02E-002
ZN-65	Not Detected	-----	7.82E-002
ZR-95	Not Detected	-----	4.35E-002

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

7/16/99 3:14:16 AM

Analyzed by: *[Signature]* 7/20/99

Reviewed by: S.T. Shankis 7/21/99

Customer : BYRD/SALMI
 Customer Sample ID : 047276-001
 Lab Sample ID : 90141610

CCTA-09-GR-040-D.5-1.0-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 926.000 gram
 Sample Date/Time : 7/13/99 10:36:00 AM
 Acquire Start Date/Time : 7/16/99 1:34:02 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6004 seconds

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	2.64E+000	2.67E+000	5.56E-001
RA-226	1.90E+000	2.24E+000	4.91E-001
PB-214	5.93E-001	1.14E-001	3.91E-002
BI-214	5.24E-001	1.04E-001	3.29E-002
PB-210	Not Detected	-----	3.10E+001
TH-232	7.45E-001	5.59E-001	1.07E-001
RA-228	8.25E-001	2.38E-001	1.15E-001
AC-228	7.47E-001	1.84E-001	6.78E-002
TH-228	6.25E-001	6.12E-001	3.54E-001
RA-224	8.48E-001	2.04E-001	5.00E-002
PB-212	8.30E-001	4.59E-001	3.40E-002
BI-212	8.25E-001	4.18E-001	2.55E-001
TL-208	7.27E-001	1.59E-001	5.78E-002
U-235	Not Detected	-----	1.21E-001
TH-231	Not Detected	-----	1.57E+000
PA-231	Not Detected	-----	1.16E+000
TH-227	Not Detected	-----	3.14E-001
RA-223	Not Detected	-----	2.02E-001
RN-219	Not Detected	-----	3.01E-001
PB-211	Not Detected	-----	6.73E-001
TL-207	Not Detected	-----	1.05E+001
AM-241	Not Detected	-----	4.24E-001
FU-239	Not Detected	-----	3.57E+002
NP-237	Not Detected	-----	3.33E-001
PA-233	Not Detected	-----	4.56E-002
TH-229	Not Detected	-----	2.16E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	2.93E-002
AG-110m	Not Detected	-----	2.85E-002
BA-133	Not Detected	-----	3.89E-002
EE-7	Not Detected	-----	1.13E-001
CD-109	Not Detected	-----	8.07E-001
CD-115	Not Detected	-----	1.22E-001
CE-139	Not Detected	-----	2.31E-002
CE-141	Not Detected	-----	4.41E-002
CE-144	Not Detected	-----	1.95E-001
CO-56	Not Detected	-----	2.68E-002
CO-57	Not Detected	-----	2.59E-002
CO-58	Not Detected	-----	2.55E-002
CO-60	Not Detected	-----	2.81E-002
CR-51	Not Detected	-----	1.89E-001
CS-134	Not Detected	-----	3.14E-002
CS-137	6.33E-002	9.85E-002	1.61E-002
EU-152	Not Detected	-----	7.74E-002
EU-154	Not Detected	-----	1.43E-001
EU-155	Not Detected	-----	1.19E-001
FE-59	Not Detected	-----	5.84E-002
GD-153	Not Detected	-----	8.91E-002
HG-203	Not Detected	-----	2.66E-002
I-131	Not Detected	-----	2.69E-002
IR-192	Not Detected	-----	2.16E-002
K-40	1.91E+001	2.62E+000	1.82E-001
MN-52	Not Detected	-----	3.15E-002
MN-54	Not Detected	-----	2.78E-002
MO-99	Not Detected	-----	3.42E-001
NA-22	Not Detected	-----	3.15E-002
NA-24	Not Detected	-----	4.68E-001
NB-95	Not Detected	-----	2.26E-001
ND-147	Not Detected	-----	1.74E-001
NI-57	Not Detected	-----	8.19E-002
RU-103	Not Detected	-----	2.29E-002
RU-106	Not Detected	-----	2.17E-001
SB-122	Not Detected	-----	5.87E-002
SB-124	Not Detected	-----	2.30E-002
SB-125	Not Detected	-----	6.50E-002
SN-113	Not Detected	-----	2.95E-002
SR-85	Not Detected	-----	2.90E-002
TA-182	Not Detected	-----	1.23E-001
TA-183	Not Detected	-----	5.18E-001
TC-99m	Not Detected	-----	3.61E+001
TL-201	Not Detected	-----	2.76E-001
XE-133	Not Detected	-----	2.86E-001
Y-88	Not Detected	-----	2.00E-002
ZN-65	Not Detected	-----	8.23E-002
ZR-95	Not Detected	-----	4.43E-002

 * Analyzed by: *[Signature]* 7/20/99 Reviewed by: S.T. Phank 7/21/99 *

Customer : BYRD/SALMI
 Customer Sample ID : 047278-001
 Lab Sample ID : 90141611 *LCTA-09-GR - 041-0-0.5-DU*

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 901.000 gram
 Sample Date/Time : 7/13/99 10:52:00 AM
 Acquire Start Date/Time : 7/16/99 3:15:49 AM Note: Ra-226 and U-235 gamma peaks
 Detector Name : LAB02 interfere. Either isotope
 Elapsed Live/Real Time : 6000 / 6004 seconds may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	2.55E+000	1.14E+000	5.51E-001
RA-226	2.06E+000	7.52E-001	4.67E-001
PB-214	5.86E-001	1.18E-001	3.67E-002
EI-214	5.42E-001	1.22E-001	3.85E-002
PB-210	Not Detected	-----	3.11E+001
TH-232	8.74E-001	4.40E-001	1.29E-001
RA-228	7.80E-001	2.48E-001	1.08E-001
AC-228	7.81E-001	2.18E-001	7.22E-002
TH-228	7.34E-001	6.24E-001	4.01E-001
RA-224	8.72E-001	2.10E-001	5.41E-002
PE-212	7.95E-001	4.75E-001	3.33E-002
EI-212	8.44E-001	4.20E-001	2.43E-001
TL-208	7.45E-001	1.58E-001	5.23E-002
U-235	Not Detected	-----	1.99E-001
TH-231	Not Detected	-----	1.55E+000
PA-231	Not Detected	-----	1.13E+000
TH-227	Not Detected	-----	3.14E-001
RA-223	Not Detected	-----	1.99E-001
RN-219	Not Detected	-----	2.85E-001
PE-211	Not Detected	-----	6.61E-001
TL-207	Not Detected	-----	1.06E+001
AM-241	Not Detected	-----	4.30E-001
PU-239	Not Detected	-----	3.67E+002
NP-237	Not Detected	-----	2.61E-001
PA-233	Not Detected	-----	4.55E-002
TH-229	Not Detected	-----	2.21E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	2.99E-002
AG-110m	Not Detected	-----	2.65E-002
BA-133	Not Detected	-----	3.79E-002
BE-7	Not Detected	-----	1.34E-001
CD-109	2.04E+000	3.62E-001	8.88E-001
CD-115	Not Detected	-----	1.25E-001
CE-139	Not Detected	-----	2.39E-002
CE-141	Not Detected	-----	4.55E-002
CE-144	Not Detected	-----	1.99E-001
CO-56	Not Detected	-----	2.65E-002
CO-57	Not Detected	-----	2.64E-002
CO-58	Not Detected	-----	2.50E-002
CO-60	Not Detected	-----	2.91E-002
CR-51	Not Detected	-----	1.97E-001
CS-134	Not Detected	-----	3.31E-002
CS-137	2.43E-002	4.07E-002	1.62E-002
EU-152	Not Detected	-----	7.87E-002
EU-154	Not Detected	-----	1.44E-001
EU-155	Not Detected	-----	1.18E-001
FE-59	Not Detected	-----	5.64E-002
GD-153	Not Detected	-----	9.33E-002
HG-203	Not Detected	-----	2.70E-002
I-131	Not Detected	-----	2.76E-002
IR-192	Not Detected	-----	2.21E-002
K-40	1.84E+001	2.54E+000	1.89E-001
MN-52	Not Detected	-----	3.19E-002
MN-54	Not Detected	-----	1.68E-002
MO-99	Not Detected	-----	3.72E-001
NA-22	Not Detected	-----	3.29E-002
NA-24	Not Detected	-----	4.75E-001
NE-95	Not Detected	-----	2.30E-001
ND-147	Not Detected	-----	1.76E-001
NI-57	Not Detected	-----	6.98E-002
RU-103	Not Detected	-----	2.35E-002
RU-106	Not Detected	-----	2.27E-001
SE-122	Not Detected	-----	6.17E-002
SE-124	Not Detected	-----	2.28E-002
SE-125	Not Detected	-----	6.47E-002
SN-113	Not Detected	-----	2.87E-002
SR-85	Not Detected	-----	2.95E-002
TA-182	Not Detected	-----	1.19E-001
TA-183	Not Detected	-----	5.29E-001
TC-99m	Not Detected	-----	4.26E+001
TL-201	Not Detected	-----	2.90E-001
XE-133	Not Detected	-----	2.82E-001
Y-88	Not Detected	-----	2.02E-002
ZN-65	Not Detected	-----	8.01E-002
ZR-95	Not Detected	-----	4.36E-002

Not Detected
2/20/99

7/16/99 6:37:50 AM

Analyzed by: *[Signature]* 7/20/99

Reviewed by: S.T. Shanks 7/21/99

Customer : BYRD/SALMI
Customer Sample ID : 047279-001
Lab Sample ID : 90141612

CCTA-09-GR-041-0.5-1.0-5

Sample Description : SOIL MARINELLI SAMPLE
Sample Quantity : 711.000 gram
Sample Date/Time : 7/13/99 10:54:00 AM
Acquire Start Date/Time : 7/16/99 4:57:36 AM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma peaks interfere. Either isotopes may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	4.00E+000	3.62E+000	6.73E-001
RA-226	2.17E+000	1.67E+000	5.15E-001
PB-214	5.33E-001	1.10E-001	4.08E-002
BI-214	5.09E-001	3.66E-001	4.09E-002
PB-210	Not Detected	-----	3.59E+001
TH-232	8.40E-001	4.52E-001	1.34E-001
RA-228	8.50E-001	1.76E-001	1.31E-001
AC-228	8.14E-001	2.20E-001	6.96E-002
TH-228	5.98E-001	7.27E-001	4.79E-001
RA-224	8.42E-001	2.10E-001	6.35E-002
PB-212	7.67E-001	1.38E-001	3.73E-002
BI-212	9.32E-001	5.96E-001	3.10E-001
TL-208	6.28E-001	1.75E-001	7.13E-002
U-235	Not Detected	-----	1.28E-001
TH-231	Not Detected	-----	1.75E+000
PA-231	Not Detected	-----	1.27E+000
TH-227	Not Detected	-----	3.42E-001
RA-223	Not Detected	-----	2.24E-001
RN-219	Not Detected	-----	3.28E-001
PB-211	Not Detected	-----	7.48E-001
TL-207	Not Detected	-----	1.23E+001
AM-241	Not Detected	-----	4.91E-001
PU-239	Not Detected	-----	4.08E+002
NP-237	Not Detected	-----	2.98E-001
PA-233	Not Detected	-----	5.00E-002
TH-229	Not Detected	-----	2.47E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.46E-002
AG-110m	Not Detected	-----	2.75E-002
BA-133	Not Detected	-----	4.24E-002
BE-7	Not Detected	-----	2.30E-001
CD-109	Not Detected	-----	1.27E+000
CD-115	Not Detected	-----	1.44E-001
CE-139	Not Detected	-----	2.59E-002
CE-141	Not Detected	-----	5.13E-002
CE-144	Not Detected	-----	2.21E-001
CO-56	Not Detected	-----	3.15E-002
CO-57	Not Detected	-----	2.86E-002
CO-58	Not Detected	-----	2.92E-002
CO-60	Not Detected	-----	3.39E-002
CR-51	Not Detected	-----	2.17E-001
CS-134	Not Detected	-----	3.55E-002
CS-137	Not Detected	-----	2.99E-002
EU-152	Not Detected	-----	8.49E-002
EU-154	Not Detected	-----	1.67E-001
EU-155	Not Detected	-----	1.34E-001
FE-59	Not Detected	-----	6.65E-002
FE-153	Not Detected	-----	1.05E-001
FE-203	Not Detected	-----	2.91E-002
FE-131	Not Detected	-----	2.94E-002
IR-192	Not Detected	-----	2.46E-002
K-40	1.95E+001	2.69E+000	2.17E-001
MN-52	Not Detected	-----	3.95E-002
MN-54	Not Detected	-----	3.19E-002
MO-99	Not Detected	-----	4.30E-001
NA-22	Not Detected	-----	3.72E-002
NA-24	Not Detected	-----	6.38E-001
NB-95	Not Detected	-----	2.53E-001
ND-147	Not Detected	-----	2.06E-001
NI-57	Not Detected	-----	6.33E-002
RU-103	Not Detected	-----	2.62E-002
RU-106	Not Detected	-----	2.48E-001
SB-122	Not Detected	-----	7.21E-002
SB-124	Not Detected	-----	2.63E-002
SB-125	Not Detected	-----	7.14E-002
SN-113	Not Detected	-----	3.22E-002
SR-85	Not Detected	-----	3.21E-002
TA-182	Not Detected	-----	1.32E-001
TA-183	Not Detected	-----	6.09E-001
TC-99m	Not Detected	-----	5.79E+001
TL-201	Not Detected	-----	3.23E-001
XE-133	Not Detected	-----	3.38E-001
Y-88	Not Detected	-----	2.29E-002
ZN-65	Not Detected	-----	8.89E-002
ZR-95	Not Detected	-----	4.96E-002

7/16/99 9:09:47 AM

Analyzed by: *[Signature]* 7/20/99 Reviewed by: *S.T. Shank* 7/21/99

Customer : BYRD/SALMI
 Customer Sample ID : 047280-001
 Lab Sample ID : 90141613 CCA-09-GR -042 -0-0.5-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 832.000 gram
 Sample Date/Time : 7/13/99 11:00:00 AM
 Acquire Start Date/Time : 7/16/99 7:29:32 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	4.50E+000	4.25E+000	6.27E-001
RA-226	Not Detected	-----	4.86E-001
PB-214	6.11E-001	7.62E-001	3.95E-002
BI-214	5.80E-001	1.24E-001	3.78E-002
PB-210	Not Detected	-----	3.42E+001
TH-232	7.87E-001	4.04E-001	1.25E-001
RA-228	9.36E-001	2.86E-001	1.25E-001
AC-228	8.62E-001	1.75E-001	7.26E-002
TH-228	6.37E-001	5.82E-001	3.55E-001
RA-224	8.34E-001	2.04E-001	6.00E-002
PB-212	8.56E-001	1.37E-001	3.24E-002
BI-212	8.12E-001	2.85E-001	2.41E-001
TL-208	8.01E-001	8.40E-001	5.87E-002
U-235	3.01E-001	2.75E-001	1.77E-001
TH-231	Not Detected	-----	1.70E+000
PA-231	Not Detected	-----	1.19E+000
TH-227	Not Detected	-----	3.34E-001
RA-223	Not Detected	-----	2.21E-001
RN-219	Not Detected	-----	3.10E-001
PB-211	Not Detected	-----	6.90E-001
TL-207	Not Detected	-----	1.13E+001
AM-241	Not Detected	-----	4.74E-001
PU-239	Not Detected	-----	3.97E+002
NP-237	Not Detected	-----	2.86E-001
PA-233	Not Detected	-----	4.72E-002
TH-229	Not Detected	-----	2.40E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected		3.17E-002
AG-110m	Not Detected		2.88E-002
BA-133	Not Detected		4.04E-002
BE-7	Not Detected		2.21E-001
CD-109	Not Detected		9.73E-001
CD-115	Not Detected		1.39E-001
CE-139	Not Detected		2.53E-002
CE-141	Not Detected		5.05E-002
CE-144	Not Detected		2.12E-001
CO-56	Not Detected		2.90E-002
CO-57	Not Detected		2.76E-002
CO-58	Not Detected		2.69E-002
CO-60	Not Detected		2.94E-002
CR-51	Not Detected		2.15E-001
CS-134	Not Detected		3.47E-002
CS-137	2.65E-002	4.13E-002	1.77E-002
EU-152	Not Detected		8.29E-002
EU-154	Not Detected		1.54E-001
EU-155	Not Detected		1.31E-001
FE-59	Not Detected		5.93E-002
GD-153	Not Detected		1.02E-001
HG-203	Not Detected		2.75E-002
I-131	Not Detected		2.91E-002
IR-192	Not Detected		2.31E-002
K-40	1.91E+001	2.63E+000	1.83E-001
MN-52	Not Detected		3.53E-002
MN-54	Not Detected		1.64E-002
MO-99	Not Detected		4.03E-001
NA-22	Not Detected		3.44E-002
NA-24	Not Detected		6.57E-001
NE-95	Not Detected		2.53E-001
ND-147	Not Detected		1.91E-001
NI-57	Not Detected		1.57E-001
RU-103	Not Detected		2.41E-002
RU-106	Not Detected		2.33E-001
SB-122	Not Detected		6.97E-002
SB-124	Not Detected		2.40E-002
SB-125	Not Detected		6.95E-002
SN-113	Not Detected		3.24E-002
SR-85	Not Detected		3.15E-002
TA-182	Not Detected		1.25E-001
TA-183	Not Detected		6.02E-001
TC-99m	Not Detected		7.55E+001
TL-201	Not Detected		3.49E-001
XE-133	Not Detected		3.38E-001
Y-88	Not Detected		2.29E-002
ZN-65	Not Detected		8.28E-002
ZR-95	Not Detected		4.76E-002

* Analyzed by: *[Signature]* 7/20/99 Reviewed by: S.T. Shanks 7/21/99 *

Customer : BYRD/SALMI
 Customer Sample ID : 047281-001
 Lab Sample ID : 90141614 CCA-09-GR-042-0.5-1.0-S

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 951.000 gram
 Sample Date/Time : 7/13/99 11:02:00 AM
 Acquire Start Date/Time : 7/16/99 9:11:21 AM Note: Ra-226 and U-235 gamma peak
 Detector Name : LAB02 interfere. Either isotope
 Elapsed Live/Real Time : 6000 / 6003 seconds may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	6.59E-001
RA-226	Not Detected	-----	3.82E-001
PB-214	5.62E-001	1.27E-001	3.55E-002
BI-214	5.15E-001	1.11E-001	3.38E-002
PB-210	Not Detected	-----	2.99E+001
TH-232	7.11E-001	3.74E-001	9.94E-002
RA-228	8.55E-001	2.45E-001	1.09E-001
AC-228	7.09E-001	1.36E-001	6.44E-002
TH-228	Not Detected	-----	3.96E-001
RA-224	8.51E-001	2.04E-001	4.24E-002
PB-212	7.53E-001	6.93E-001	3.22E-002
BI-212	8.76E-001	4.89E-001	2.33E-001
TL-208	7.09E-001	1.59E-001	5.43E-002
U-235	9.12E-002	1.46E-001	1.85E-001
TH-231	Not Detected	-----	1.45E+000
PA-231	Not Detected	-----	1.06E+000
TH-227	Not Detected	-----	2.98E-001
RA-223	Not Detected	-----	1.89E-001
RN-219	Not Detected	-----	2.77E-001
PB-211	Not Detected	-----	6.23E-001
TL-207	Not Detected	-----	1.04E+001
AM-241	Not Detected	-----	4.03E-001
PU-239	Not Detected	-----	3.41E+002
NP-237	6.66E-001	2.67E-001	2.81E-001
PA-233	Not Detected	-----	4.47E-002
TH-229	Not Detected	-----	2.08E-001

Not Detected
[Signature]
 7/20/99

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	2.78E-002
AG-110m	Not Detected	-----	2.30E-002
BA-133	Not Detected	-----	3.60E-002
BE-7	Not Detected	-----	1.89E-001
CD-109	Not Detected	-----	9.56E-001
CD-115	Not Detected	-----	1.24E-001
CE-139	Not Detected	-----	2.22E-002
CE-141	Not Detected	-----	4.22E-002
CE-144	Not Detected	-----	1.85E-001
CO-56	Not Detected	-----	2.41E-002
CO-57	Not Detected	-----	2.50E-002
CO-58	Not Detected	-----	2.43E-002
CO-60	Not Detected	-----	2.63E-002
CR-51	Not Detected	-----	1.86E-001
CS-134	Not Detected	-----	3.03E-002
CS-137	Not Detected	-----	2.43E-002
EU-152	Not Detected	-----	7.50E-002
EU-154	Not Detected	-----	1.35E-001
EU-155	Not Detected	-----	1.16E-001
FE-59	Not Detected	-----	5.25E-002
GD-153	Not Detected	-----	8.54E-002
HG-203	Not Detected	-----	2.44E-002
I-131	Not Detected	-----	2.64E-002
IR-192	Not Detected	-----	2.10E-002
K-40	1.73E+001	2.38E+000	1.60E-001
MN-52	Not Detected	-----	3.14E-002
MN-54	Not Detected	-----	1.52E-002
MO-99	Not Detected	-----	3.47E-001
NA-22	Not Detected	-----	3.17E-002
NA-24	Not Detected	-----	6.60E-001
NB-95	Not Detected	-----	2.29E-001
ND-147	Not Detected	-----	1.77E-001
NI-57	Not Detected	-----	1.46E-001
RU-103	Not Detected	-----	2.08E-002
RU-106	Not Detected	-----	2.19E-001
SB-122	Not Detected	-----	6.31E-002
SB-124	Not Detected	-----	2.23E-002
SB-125	Not Detected	-----	6.35E-002
SN-113	Not Detected	-----	2.77E-002
SR-85	Not Detected	-----	2.82E-002
TA-182	Not Detected	-----	1.16E-001
TA-183	Not Detected	-----	5.03E-001
TC-99m	Not Detected	-----	7.88E+001
TL-201	Not Detected	-----	2.80E-001
XE-133	Not Detected	-----	2.80E-001
Y-88	Not Detected	-----	1.85E-002
ZN-65	Not Detected	-----	7.60E-002
ZR-95	Not Detected	-----	4.25E-002

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

7/16/99 12:33:21 PM

Analyzed by: *[Signature]* 7/20/99

Reviewed by: S.T. Shanks 7/21/99

Customer : BYRD/SALMI
 Customer Sample ID : 047282-001
 Lab Sample ID : 90141615

CCTA-09-GR-043-0-0.5-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 876.000 gram
 Sample Date/Time : 7/13/99 11:10:00 AM
 Acquire Start Date/Time : 7/16/99 10:53:05 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6004 seconds

Note: Ra-226 and U-235 gamma peak interfere. Either isotope may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	3.30E+000	3.16E+000	6.57E-001
RA-226	2.80E+000	9.62E-001	4.55E-001
PB-214	6.13E-001	1.11E-001	4.18E-002
EI-214	5.70E-001	1.23E-001	3.89E-002
PB-210	Not Detected	-----	3.38E+001
TH-232	9.05E-001	7.17E-001	1.32E-001
RA-228	8.72E-001	3.05E-001	1.17E-001
AC-228	9.09E-001	2.19E-001	7.24E-002
TH-228	7.07E-001	6.66E-001	4.16E-001
RA-224	9.19E-001	2.21E-001	5.56E-002
PB-212	8.67E-001	1.49E-001	3.43E-002
EI-212	9.81E-001	5.08E-001	2.58E-001
TL-208	8.05E-001	1.72E-001	6.10E-002
U-235	1.15E-001	1.72E-001	2.17E-001
TH-231	Not Detected	-----	1.76E+000
PA-231	Not Detected	-----	1.21E+000
TH-227	Not Detected	-----	3.31E-001
RA-223	Not Detected	-----	2.32E-001
RN-219	Not Detected	-----	3.00E-001
PB-211	Not Detected	-----	6.87E-001
TL-207	Not Detected	-----	1.08E+001
AM-241	Not Detected	-----	4.77E-001
FU-239	Not Detected	-----	3.96E+002
NP-237	Not Detected	-----	2.96E-001
PA-233	Not Detected	-----	4.93E-002
TH-229	Not Detected	-----	2.48E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.16E-002
AG-110m	Not Detected	-----	2.79E-002
BA-133	Not Detected	-----	4.08E-002
BE-7	8.80E-002	1.33E-001	1.35E-001
CD-109	Not Detected	-----	1.01E+000
CD-115	Not Detected	-----	1.48E-001
CE-139	Not Detected	-----	2.60E-002
CE-141	Not Detected	-----	4.99E-002
CE-144	Not Detected	-----	2.13E-001
CO-56	Not Detected	-----	2.78E-002
CO-57	Not Detected	-----	2.83E-002
CO-58	Not Detected	-----	2.65E-002
CO-60	Not Detected	-----	2.88E-002
CR-51	Not Detected	-----	2.12E-001
CS-134	Not Detected	-----	3.43E-002
CS-137	3.75E-002	2.81E-002	1.83E-002
EU-152	Not Detected	-----	8.43E-002
EU-154	Not Detected	-----	1.53E-001
EU-155	Not Detected	-----	1.29E-001
FE-59	Not Detected	-----	6.04E-002
GD-153	Not Detected	-----	1.07E-001
HG-203	Not Detected	-----	2.84E-002
I-131	Not Detected	-----	3.05E-002
IR-192	Not Detected	-----	2.39E-002
K-40	1.98E+001	2.72E+000	1.90E-001
MN-52	Not Detected	-----	3.24E-002
MN-54	Not Detected	-----	3.12E-002
MO-99	Not Detected	-----	4.36E-001
NA-22	Not Detected	-----	3.59E-002
NA-24	Not Detected	-----	7.39E-001
NE-95	1.78E-002	3.75E-002	9.31E-002
ND-147	Not Detected	-----	2.01E-001
NI-57	Not Detected	-----	1.70E-001
RU-103	Not Detected	-----	2.36E-002
RU-106	Not Detected	-----	2.32E-001
SB-122	Not Detected	-----	7.00E-002
SB-124	Not Detected	-----	2.45E-002
SB-125	Not Detected	-----	6.87E-002
SN-113	Not Detected	-----	3.16E-002
SR-85	Not Detected	-----	3.05E-002
TA-182	Not Detected	-----	1.29E-001
TA-183	Not Detected	-----	6.12E-001
TC-99m	Not Detected	-----	1.09E+002
TL-201	Not Detected	-----	3.39E-001
TE-133	Not Detected	-----	3.60E-001
Tl-88	Not Detected	-----	1.96E-002
TN-65	Not Detected	-----	8.45E-002
ZR-95	Not Detected	-----	4.61E-002

Not Detected
ll
7/20/94

* Analyzed by: *[Signature]* 7/20/99 Reviewed by: S.T. Shank 7/21/99 *

Customer : BYRD/SALMI
 Customer Sample ID : 047283-001
 Lab Sample ID : 90141616 CCA-09-GR-043-0.5-1.0-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 871.000 gram
 Sample Date/Time : 7/13/99 11:12:00 AM
 Acquire Start Date/Time : 7/16/99 12:34:54 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	6.71E-001
RA-226	Not Detected	-----	5.16E-001
PB-214	5.83E-001	1.15E-001	3.69E-002
BI-214	5.18E-001	1.12E-001	3.89E-002
PB-210	Not Detected	-----	3.08E+001
TH-232	7.59E-001	1.10E+000	1.15E-001
RA-228	7.98E-001	2.54E-001	1.12E-001
AC-228	7.73E-001	2.92E-001	7.24E-002
TH-228	8.57E-001	6.46E-001	3.91E-001
RA-224	8.05E-001	1.96E-001	4.41E-002
PB-212	7.96E-001	1.41E-001	3.24E-002
BI-212	7.86E-001	1.47E-001	2.55E-001
TL-208	7.22E-001	1.62E-001	5.68E-002
U-235	Not Detected	-----	1.86E-001
TH-231	Not Detected	-----	1.58E+000
PA-231	Not Detected	-----	1.11E+000
TH-227	Not Detected	-----	3.15E-001
RA-223	Not Detected	-----	1.97E-001
RN-219	Not Detected	-----	2.96E-001
PB-211	Not Detected	-----	6.60E-001
TL-207	Not Detected	-----	1.00E+001
AM-241	Not Detected	-----	4.34E-001
PU-239	Not Detected	-----	3.61E+002
NP-237	Not Detected	-----	2.35E-001
FA-233	Not Detected	-----	4.70E-002
TH-229	Not Detected	-----	2.13E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	2.87E-002
AG-110m	Not Detected	-----	2.45E-002
BA-133	Not Detected	-----	3.74E-002
BE-7	Not Detected	-----	1.89E-001
CD-109	Not Detected	-----	1.09E+000
CD-115	Not Detected	-----	1.38E-001
CE-139	Not Detected	-----	2.33E-002
CE-141	Not Detected	-----	4.41E-002
CE-144	Not Detected	-----	1.91E-001
CO-56	Not Detected	-----	2.72E-002
CO-57	Not Detected	-----	2.63E-002
CO-58	Not Detected	-----	2.62E-002
CO-60	Not Detected	-----	2.92E-002
CR-51	Not Detected	-----	2.00E-001
CS-134	Not Detected	-----	3.30E-002
CS-137	Not Detected	-----	2.62E-002
EU-152	Not Detected	-----	7.87E-002
EU-154	Not Detected	-----	1.38E-001
EU-155	Not Detected	-----	1.22E-001
FE-59	Not Detected	-----	6.04E-002
GD-153	Not Detected	-----	8.82E-002
HG-203	Not Detected	-----	2.61E-002
I-131	Not Detected	-----	2.85E-002
IR-192	Not Detected	-----	2.21E-002
K-40	1.83E+001	2.53E+000	1.62E-001
MN-52	Not Detected	-----	3.25E-002
MN-54	Not Detected	-----	2.75E-002
MO-99	Not Detected	-----	3.84E-001
NA-22	Not Detected	-----	3.26E-002
NA-24	Not Detected	-----	8.05E-001
NE-95	Not Detected	-----	2.47E-001
ND-147	Not Detected	-----	1.78E-001
NI-57	Not Detected	-----	1.55E-001
RU-103	Not Detected	-----	2.29E-002
RU-106	Not Detected	-----	2.28E-001
SB-122	Not Detected	-----	6.67E-002
SB-124	Not Detected	-----	2.39E-002
SB-125	Not Detected	-----	6.18E-002
SN-113	Not Detected	-----	2.92E-002
SR-85	Not Detected	-----	3.01E-002
TA-182	Not Detected	-----	1.24E-001
TA-183	Not Detected	-----	5.65E-001
TC-99m	Not Detected	-----	1.15E+002
TL-201	Not Detected	-----	3.03E-001
XE-133	Not Detected	-----	3.18E-001
Y-88	Not Detected	-----	2.04E-002
ZN-65	Not Detected	-----	8.32E-002
ZR-95	Not Detected	-----	4.42E-002

7/16/99 4:57:22 PM

Analyzed by: *[Signature]* 7/21/99

Reviewed by: S.T. Shanks 7/21/99

Customer : BYRD/SALMI
 Customer Sample ID : 047284-001
 Lab Sample ID : 90141617

LCTA-09-GR-044-0-0.5-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 889.000 gram
 Sample Date/Time : 7/13/99 1:10:00 PM
 Acquire Start Date/Time : 7/16/99 3:17:07 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6004 seconds

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	7.82E-001
RA-226	2.12E+000	9.52E-001	4.61E-001
PB-214	5.79E-001	1.15E-001	3.91E-002
BI-214	5.60E-001	1.19E-001	3.80E-002
PB-210	Not Detected	-----	3.13E+001
TH-232	7.92E-001	4.12E-001	1.32E-001
RA-228	8.60E-001	2.61E-001	1.16E-001
AC-228	8.40E-001	1.58E-001	7.33E-002
TH-228	9.12E-001	6.27E-001	4.04E-001
RA-224	8.51E-001	2.06E-001	4.87E-002
PB-212	8.12E-001	2.32E-001	3.33E-002
BI-212	9.80E-001	4.64E-001	2.66E-001
TL-208	7.61E-001	5.21E-001	5.66E-002
U-235	1.82E-001	1.59E-001	2.02E-001
TH-231	Not Detected	-----	1.61E+000
PA-231	Not Detected	-----	1.13E+000
TH-227	Not Detected	-----	3.20E-001
RA-223	Not Detected	-----	2.06E-001
RN-219	Not Detected	-----	3.06E-001
PB-211	Not Detected	-----	6.95E-001
TL-207	Not Detected	-----	1.10E+001
AM-241	Not Detected	-----	4.58E-001
PU-239	Not Detected	-----	3.70E+002
NP-237	5.40E-001	5.56E-001	2.24E-001
PA-233	Not Detected	-----	4.66E-002
TH-229	Not Detected	-----	2.27E-001

Not Detected
[Signature] 7/21/99

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.07E-002
AG-110m	Not Detected	-----	3.12E-002
BA-133	Not Detected	-----	3.97E-002
BE-7	Not Detected	-----	2.19E-001
BD-109	Not Detected	-----	7.61E-001
BD-115	Not Detected	-----	1.46E-001
BE-139	Not Detected	-----	2.47E-002
BE-141	Not Detected	-----	4.63E-002
BE-144	Not Detected	-----	2.01E-001
CO-56	Not Detected	-----	2.78E-002
CO-57	Not Detected	-----	2.71E-002
CO-58	Not Detected	-----	2.72E-002
CO-60	Not Detected	-----	2.91E-002
CR-51	Not Detected	-----	2.04E-001
CS-134	Not Detected	-----	3.38E-002
CS-137	6.72E-002	4.14E-002	1.82E-002
EU-152	Not Detected	-----	8.14E-002
EU-154	Not Detected	-----	1.49E-001
EU-155	Not Detected	-----	1.21E-001
FE-59	Not Detected	-----	6.47E-002
FD-153	Not Detected	-----	9.65E-002
HG-203	Not Detected	-----	2.70E-002
I-131	Not Detected	-----	2.81E-002
IR-192	Not Detected	-----	2.27E-002
K-40	2.07E+001	2.84E+000	1.75E-001
MN-52	Not Detected	-----	3.38E-002
MN-54	Not Detected	-----	2.84E-002
MO-99	Not Detected	-----	4.06E-001
NA-22	Not Detected	-----	3.58E-002
NA-24	Not Detected	-----	8.42E-001
NE-95	Not Detected	-----	2.55E-001
ND-147	Not Detected	-----	1.94E-001
NI-57	Not Detected	-----	9.60E-002
RU-103	Not Detected	-----	2.41E-002
RU-106	Not Detected	-----	2.29E-001
SE-122	Not Detected	-----	7.11E-002
SE-124	Not Detected	-----	2.46E-002
SE-125	Not Detected	-----	6.50E-002
SN-113	Not Detected	-----	3.15E-002
SR-85	Not Detected	-----	3.07E-002
TA-182	Not Detected	-----	1.24E-001
TA-183	Not Detected	-----	5.98E-001
TC-99m	Not Detected	-----	1.32E+002
TL-201	Not Detected	-----	3.28E-001
XE-133	Not Detected	-----	3.33E-001
Y-88	Not Detected	-----	1.94E-002
ZN-65	Not Detected	-----	7.97E-002
ZR-95	Not Detected	-----	4.59E-002

7/16/99 6:39:10 PM

Analyzed by: *[Signature]*

7/21/99

Reviewed by: S.T. Shanks

7/21/99

Customer : BYRD/SALMI
Customer Sample ID : 047285-001
Lab Sample ID : 90141618

CCTA-09-GR-044-0.5-1.0-S

Sample Description : SOIL MARINELLI SAMPLE
Sample Quantity : 877.000 gram
Sample Date/Time : 7/13/99 1:12:00 PM
Acquire Start Date/Time : 7/16/99 4:58:55 PM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6004 seconds

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	2.73E+000	1.04E+000	5.60E-001
RA-226	1.74E+000	5.64E-001	5.04E-001
PB-214	5.92E-001	1.23E-001	4.17E-002
BI-214	5.28E-001	1.14E-001	3.53E-002
PB-210	Not Detected	-----	3.28E+001
TH-232	8.10E-001	4.59E-001	1.25E-001
RA-228	8.18E-001	3.10E-001	1.23E-001
AC-228	8.10E-001	2.05E-001	7.45E-002
TH-228	3.73E-001	5.42E-001	4.25E-001
RA-224	8.25E-001	2.00E-001	5.06E-002
PB-212	7.97E-001	1.41E-001	3.25E-002
BI-212	8.88E-001	2.37E-001	2.58E-001
TL-208	7.27E-001	1.57E-001	5.78E-002
U-235	Not Detected	-----	2.03E-001
TH-231	Not Detected	-----	1.61E+000
PA-231	Not Detected	-----	1.15E+000
TH-227	Not Detected	-----	3.18E-001
RA-223	Not Detected	-----	2.13E-001
RN-219	Not Detected	-----	3.10E-001
PB-211	Not Detected	-----	6.91E-001
TL-207	Not Detected	-----	1.10E+001
AM-241	Not Detected	-----	4.43E-001
PU-239	Not Detected	-----	3.70E+002
NP-237	6.87E-001	2.19E-001	2.78E-001
PA-233	Not Detected	-----	4.80E-002
TH-229	Not Detected	-----	2.33E-001

Set
7/21/99

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.11E-002
AG-110m	Not Detected	-----	3.00E-002
BA-133	Not Detected	-----	4.00E-002
BE-7	Not Detected	-----	2.07E-001
CD-109	Not Detected	-----	9.45E-001
CD-115	Not Detected	-----	1.49E-001
CE-139	Not Detected	-----	2.46E-002
CE-141	Not Detected	-----	4.72E-002
CE-144	Not Detected	-----	2.00E-001
CO-56	Not Detected	-----	2.76E-002
CO-57	Not Detected	-----	2.65E-002
CO-58	Not Detected	-----	2.66E-002
CO-60	Not Detected	-----	2.96E-002
CR-51	Not Detected	-----	2.07E-001
CS-134	Not Detected	-----	3.33E-002
CS-137	5.73E-002	3.81E-002	1.97E-002
EU-152	Not Detected	-----	7.89E-002
EU-154	Not Detected	-----	1.50E-001
EU-155	Not Detected	-----	1.23E-001
FE-59	Not Detected	-----	6.21E-002
GD-153	Not Detected	-----	9.44E-002
HG-203	Not Detected	-----	2.75E-002
I-131	Not Detected	-----	2.92E-002
IR-192	Not Detected	-----	2.29E-002
K-40	2.15E+001	2.95E+000	1.94E-001
MN-52	Not Detected	-----	3.67E-002
MN-54	Not Detected	-----	1.56E-002
MO-99	Not Detected	-----	4.21E-001
NA-22	Not Detected	-----	3.50E-002
NA-24	Not Detected	-----	8.75E-001
NE-95	Not Detected	-----	2.55E-001
ND-147	Not Detected	-----	2.05E-001
NI-57	Not Detected	-----	8.95E-002
RU-103	Not Detected	-----	2.51E-002
RU-106	Not Detected	-----	2.22E-001
SB-122	Not Detected	-----	7.00E-002
SB-124	Not Detected	-----	2.49E-002
SB-125	Not Detected	-----	6.44E-002
SN-113	Not Detected	-----	2.95E-002
SR-85	Not Detected	-----	3.06E-002
TA-182	Not Detected	-----	1.32E-001
TA-183	Not Detected	-----	5.90E-001
TC-99m	Not Detected	-----	1.63E+002
TL-201	Not Detected	-----	3.35E-001
XE-133	Not Detected	-----	3.44E-001
Y-88	Not Detected	-----	2.18E-002
ZN-65	Not Detected	-----	8.55E-002
ZR-95	Not Detected	-----	4.56E-002

7/16/99 8:20:59 PM

Analyzed by: *[Signature]* 7/21/99

Reviewed by: S.T. Shanks 7/21/99

Customer : BYRD/SALMI
 Customer Sample ID : 047287-001
 Lab Sample ID : 90141619 LCA-09-GR-045-0-0.5-DU

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 936.000 gram
 Sample Date/Time : 7/13/99 1:17:00 PM
 Acquire Start Date/Time : 7/16/99 6:40:43 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6004 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	3.50E+000	1.87E+000	5.81E-001
RA-226	Not Detected	-----	4.82E-001
PB-214	5.63E-001	2.36E-001	3.80E-002
BI-214	5.39E-001	1.17E-001	3.69E-002
PB-210	Not Detected	-----	3.10E+001
TH-232	7.61E-001	1.20E+000	1.15E-001
RA-228	8.34E-001	3.04E-001	1.14E-001
AC-228	7.59E-001	2.16E-001	6.90E-002
TH-228	Not Detected	-----	3.42E-001
RA-224	8.99E-001	2.15E-001	4.62E-002
PB-212	7.94E-001	6.04E-001	3.33E-002
BI-212	8.56E-001	4.98E-001	2.60E-001
TL-208	7.27E-001	1.55E-001	5.77E-002
U-235	Not Detected	-----	1.98E-001
TH-231	Not Detected	-----	1.60E+000
PA-231	Not Detected	-----	1.13E+000
TH-227	Not Detected	-----	3.07E-001
RA-223	Not Detected	-----	2.09E-001
RN-219	Not Detected	-----	2.96E-001
PB-211	Not Detected	-----	6.59E-001
TL-207	Not Detected	-----	1.08E+001
AM-241	Not Detected	-----	4.45E-001
PU-239	Not Detected	-----	3.64E+002
NP-237	Not Detected	-----	3.39E-001
PA-233	Not Detected	-----	4.53E-002
TH-229	Not Detected	-----	2.19E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	2.99E-002
AG-110m	Not Detected	-----	3.06E-002
BA-133	Not Detected	-----	3.88E-002
BE-7	1.35E-001	1.96E-001	1.33E-001
CD-109	Not Detected	-----	1.14E+000
CD-115	Not Detected	-----	1.45E-001
CE-139	Not Detected	-----	2.39E-002
CE-141	Not Detected	-----	4.61E-002
CE-144	Not Detected	-----	1.97E-001
CO-56	Not Detected	-----	2.58E-002
CO-57	Not Detected	-----	2.71E-002
CO-58	Not Detected	-----	2.57E-002
CO-60	Not Detected	-----	2.91E-002
CR-51	Not Detected	-----	1.95E-001
CS-134	Not Detected	-----	3.21E-002
CS-137	8.34E-002	3.49E-002	1.93E-002
EU-152	Not Detected	-----	8.05E-002
EU-154	Not Detected	-----	1.43E-001
EU-155	Not Detected	-----	1.21E-001
FE-59	Not Detected	-----	5.40E-002
GD-153	Not Detected	-----	9.16E-002
HG-203	Not Detected	-----	2.67E-002
I-131	Not Detected	-----	2.83E-002
IR-192	Not Detected	-----	2.21E-002
K-40	2.24E+001	3.07E+000	1.59E-001
MN-52	Not Detected	-----	3.51E-002
MN-54	Not Detected	-----	2.76E-002
MO-99	Not Detected	-----	4.07E-001
NA-22	Not Detected	-----	3.36E-002
NA-24	Not Detected	-----	8.80E-001
NB-95	Not Detected	-----	2.50E-001
ND-147	Not Detected	-----	1.88E-001
NI-57	Not Detected	-----	8.89E-002
RU-103	Not Detected	-----	2.39E-002
RU-106	Not Detected	-----	2.24E-001
SB-122	Not Detected	-----	7.16E-002
SB-124	Not Detected	-----	2.40E-002
SB-125	Not Detected	-----	6.15E-002
SN-113	Not Detected	-----	3.01E-002
SR-85	Not Detected	-----	2.97E-002
TA-182	Not Detected	-----	1.25E-001
TA-183	Not Detected	-----	5.84E-001
TC-99m	Not Detected	-----	1.87E+002
TL-201	Not Detected	-----	3.31E-001
XE-133	Not Detected	-----	3.46E-001
Y-88	Not Detected	-----	1.93E-002
ZN-65	Not Detected	-----	8.39E-002
ZR-95	Not Detected	-----	4.37E-002

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

7/16/99 10:02:47 PM

Analyzed by: *[Signature]* 7/21/99

Reviewed by: S.T. Shank 7/21/99

Customer : BYRD/SALMI
 Customer Sample ID : 047288-001
 Lab Sample ID : 90141620

LCTA-09-GR -045-0.5-1.0-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 797.000 gram
 Sample Date/Time : 7/13/99 1:19:00 PM Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.
 Acquire Start Date/Time : 7/16/99 8:22:32 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	3.04E+000	3.29E+000	6.49E-001
RA-226	2.44E+000	8.54E-001	5.25E-001
PB-214	6.22E-001	1.34E-001	4.32E-002
BI-214	5.38E-001	1.11E-001	3.88E-002
PB-210	Not Detected	-----	3.42E+001
TH-232	Not Detected	-----	1.39E-001
RA-228	8.38E-001	2.66E-001	1.26E-001
AC-228	8.62E-001	2.23E-001	7.31E-002
TH-228	7.58E-001	6.20E-001	4.06E-001
RA-224	8.64E-001	2.11E-001	4.85E-002
PB-212	8.36E-001	4.01E-001	3.80E-002
BI-212	7.09E-001	5.46E-001	2.70E-001
TL-208	7.93E-001	1.67E-001	5.99E-002
U-235	Not Detected	-----	1.22E-001
TH-231	Not Detected	-----	1.71E+000
PA-231	Not Detected	-----	1.21E+000
TH-227	Not Detected	-----	3.46E-001
RA-223	Not Detected	-----	2.31E-001
RN-219	Not Detected	-----	3.18E-001
PB-211	Not Detected	-----	7.19E-001
TL-207	Not Detected	-----	1.13E+001
AM-241	Not Detected	-----	4.69E-001
PU-239	Not Detected	-----	3.89E+002
NP-237	Not Detected	-----	2.86E-001
PA-233	Not Detected	-----	4.98E-002
TH-229	Not Detected	-----	2.39E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.27E-002
AG-110m	Not Detected	-----	3.12E-002
BA-133	Not Detected	-----	4.35E-002
BE-7	Not Detected	-----	2.17E-001
CD-109	Not Detected	-----	1.28E+000
CD-115	Not Detected	-----	1.63E-001
CE-139	Not Detected	-----	2.59E-002
CE-141	Not Detected	-----	4.93E-002
CE-144	Not Detected	-----	2.15E-001
CO-56	Not Detected	-----	3.01E-002
CO-57	Not Detected	-----	2.77E-002
CO-58	Not Detected	-----	2.89E-002
CO-60	Not Detected	-----	3.05E-002
CR-51	Not Detected	-----	2.17E-001
CS-134	Not Detected	-----	3.48E-002
CS-137	5.46E-002	3.71E-002	1.72E-002
EU-152	Not Detected	-----	8.21E-002
EU-154	Not Detected	-----	1.57E-001
EU-155	Not Detected	-----	1.30E-001
FE-59	Not Detected	-----	6.43E-002
GD-153	Not Detected	-----	9.92E-002
HG-203	Not Detected	-----	2.87E-002
I-131	Not Detected	-----	3.14E-002
IR-192	Not Detected	-----	2.47E-002
K-40	2.02E+001	2.78E+000	2.11E-001
MN-52	Not Detected	-----	3.39E-002
MN-54	Not Detected	-----	2.91E-002
MO-99	Not Detected	-----	4.60E-001
NA-22	Not Detected	-----	3.79E-002
NA-24	Not Detected	-----	1.12E+000
NB-95	Not Detected	-----	2.86E-001
ND-147	Not Detected	-----	2.05E-001
NI-57	Not Detected	-----	1.88E-001
RU-103	Not Detected	-----	2.50E-002
RU-106	Not Detected	-----	2.47E-001
SB-122	Not Detected	-----	7.78E-002
SB-124	Not Detected	-----	2.48E-002
SB-125	Not Detected	-----	6.92E-002
SN-113	Not Detected	-----	3.25E-002
SR-85	Not Detected	-----	3.28E-002
TA-182	Not Detected	-----	1.30E-001
TA-183	Not Detected	-----	6.26E-001
TC-99m	Not Detected	-----	2.47E+002
TI-201	Not Detected	-----	3.63E-001
XE-133	Not Detected	-----	3.77E-001
Y-88	Not Detected	-----	2.07E-002
ZN-65	Not Detected	-----	8.51E-002
ZR-95	Not Detected	-----	4.93E-002

* Analyzed by: *[Signature]* 7/21/99 Reviewed by: S.T. Shanks 7/21/99 *

Customer : BYRD/SALMI
 Customer Sample ID : 047289-001
 Lab Sample ID : 90141621 CCTA-09-GR-046-D-0.5-S

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 868.000 gram
 Sample Date/Time : 7/13/99 1:25:00 PM
 Acquire Start Date/Time : 7/16/99 10:04:20 PM Note: Ra-226 and U-235 gamma peaks
 Detector Name : LAB02 interfere. Either isotope
 Elapsed Live/Real Time : 6000 / 6004 seconds may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	4.56E+000	3.57E+000	6.30E-001
RA-226	Not Detected	-----	4.99E-001
PB-214	6.37E-001	8.83E-002	4.33E-002
BI-214	6.01E-001	2.40E-001	3.93E-002
PB-210	Not Detected	-----	3.48E+001
TH-232	9.25E-001	4.65E-001	1.36E-001
RA-228	9.70E-001	3.13E-001	1.13E-001
AC-228	9.57E-001	2.30E-001	7.90E-002
TH-228	8.58E-001	6.89E-001	4.20E-001
RA-224	9.45E-001	2.26E-001	5.13E-002
PB-212	9.21E-001	1.58E-001	3.56E-002
BI-212	1.03E+000	5.62E-001	2.70E-001
TL-208	7.93E-001	1.76E-001	5.63E-002
U-235	9.83E-002	1.74E-001	2.20E-001
TH-231	Not Detected	-----	1.75E+000
PA-231	Not Detected	-----	1.26E+000
TH-227	Not Detected	-----	3.43E-001
RA-223	Not Detected	-----	2.30E-001
RN-219	Not Detected	-----	3.23E-001
PB-211	Not Detected	-----	7.37E-001
TL-207	Not Detected	-----	1.17E+001
AM-241	Not Detected	-----	4.87E-001
PU-239	Not Detected	-----	4.02E+002
NP-237	Not Detected	-----	2.93E-001
PA-233	Not Detected	-----	5.05E-002
TH-229	Not Detected	-----	2.46E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.26E-002
AG-110m	Not Detected	-----	2.97E-002
BA-133	Not Detected	-----	4.23E-002
BE-7	2.05E-001	1.91E-001	1.32E-001
CD-109	Not Detected	-----	9.97E-001
CD-115	Not Detected	-----	1.72E-001
CE-139	Not Detected	-----	2.58E-002
CE-141	Not Detected	-----	5.12E-002
CE-144	Not Detected	-----	2.18E-001
CO-56	Not Detected	-----	2.86E-002
CO-57	Not Detected	-----	2.93E-002
CO-58	Not Detected	-----	2.90E-002
CO-60	Not Detected	-----	3.04E-002
CR-51	Not Detected	-----	2.10E-001
CS-134	Not Detected	-----	3.53E-002
CS-137	5.29E-002	3.63E-002	1.73E-002
EU-152	Not Detected	-----	8.71E-002
EU-154	Not Detected	-----	1.58E-001
EU-155	Not Detected	-----	1.32E-001
FE-59	Not Detected	-----	6.34E-002
GD-153	Not Detected	-----	1.03E-001
HG-203	Not Detected	-----	2.84E-002
I-131	Not Detected	-----	3.18E-002
IR-192	Not Detected	-----	2.44E-002
K-40	2.21E+001	3.03E+000	1.92E-001
MN-52	Not Detected	-----	3.70E-002
MN-54	Not Detected	-----	3.08E-002
MO-99	Not Detected	-----	4.82E-001
NA-22	Not Detected	-----	3.52E-002
NA-24	Not Detected	-----	1.18E+000
NB-95	Not Detected	-----	2.87E-001
ND-147	Not Detected	-----	2.04E-001
NI-57	Not Detected	-----	2.03E-001
RU-103	Not Detected	-----	2.53E-002
RU-106	Not Detected	-----	2.40E-001
SE-122	Not Detected	-----	8.36E-002
SE-124	Not Detected	-----	2.51E-002
SE-125	Not Detected	-----	6.83E-002
SN-113	Not Detected	-----	3.21E-002
SR-85	Not Detected	-----	3.31E-002
TA-182	Not Detected	-----	1.32E-001
TA-183	Not Detected	-----	6.56E-001
TC-99m	Not Detected	-----	3.09E+002
TL-201	Not Detected	-----	3.78E-001
XE-133	Not Detected	-----	3.93E-001
Y-88	Not Detected	-----	2.13E-002
ZN-65	Not Detected	-----	8.75E-002
ZR-95	Not Detected	-----	4.79E-002

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 7/17/99 1:26:24 AM *

* Analyzed by: *[Signature]* 7/21/99 Reviewed by: S.T. Shanks 7/21/99 *

Customer : BYRD/SALMI
 Customer Sample ID : 047290-001
 Lab Sample ID : 90141622 CCA-09-GR-046-0.5-1.0-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 835.000 gram
 Sample Date/Time : 7/13/99 1:27:00 PM
 Acquire Start Date/Time : 7/16/99 11:46:09 PM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma p
 interferes. Either isotope
 may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	3.62E+000	2.04E+000	6.15E-001
RA-226	2.66E+000	8.65E-001	5.43E-001
PB-214	6.12E-001	1.23E-001	3.95E-002
BI-214	5.35E-001	4.76E-001	3.62E-002
PB-210	Not Detected	-----	3.30E+001
TH-232	Not Detected	-----	1.25E-001
RA-228	8.53E-001	2.90E-001	1.16E-001
AC-228	8.73E-001	2.32E-001	7.50E-002
TH-228	9.11E-001	3.71E-001	3.73E-001
RA-224	8.28E-001	2.02E-001	5.59E-002
PB-212	7.91E-001	2.48E-001	3.41E-002
BI-212	9.80E-001	2.46E-001	2.34E-001
TL-208	6.86E-001	1.58E-001	5.88E-002
U-235	Not Detected	-----	9.19E-002
TH-231	Not Detected	-----	1.68E+000
PA-231	Not Detected	-----	1.17E+000
TH-227	Not Detected	-----	3.29E-001
RA-223	Not Detected	-----	2.20E-001
RN-219	Not Detected	-----	3.15E-001
PB-211	Not Detected	-----	7.03E-001
TL-207	Not Detected	-----	1.10E+001
AM-241	Not Detected	-----	4.72E-001
PU-239	Not Detected	-----	3.76E+002
NP-237	Not Detected	-----	3.62E-001
PA-233	Not Detected	-----	4.81E-002
TH-229	Not Detected	-----	2.32E-001

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 7/17/99 3:08:12 AM *

* Analyzed by: *[Signature]* 7/21/99 Reviewed by: *S.T. Shultz* 7/21/99 *

Customer : BYRD/SALMI
 Customer Sample ID : 047292-001
 Lab Sample ID : 90141623 *CCTA-09-GR-047-0.5-1.0-5*

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 764.000 gram
 Sample Date/Time : 7/13/99 1:32:00 PM
 Acquire Start Date/Time : 7/17/99 1:27:57 AM Note: Ra-226 and U-235 gamma peak
 Detector Name : LAB02 interfere. Either isotope
 Elapsed Live/Real Time : 6000 / 6004 seconds May be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	4.07E+000	3.07E+000	6.48E-001
RA-226	2.90E+000	3.48E+000	5.35E-001
PB-214	6.95E-001	8.21E-001	4.06E-002
BI-214	6.43E-001	1.45E-001	4.64E-002
PB-210	Not Detected	-----	3.65E+001
TH-232	1.08E+000	7.99E-001	1.48E-001
RA-228	1.04E+000	2.89E-001	1.27E-001
AC-228	9.77E-001	2.52E-001	7.67E-002
TH-228	Not Detected	-----	4.54E-001
RA-224	1.11E+000	2.66E-001	6.29E-002
PB-212	9.40E-001	1.77E-001	3.64E-002
BI-212	Not Detected	-----	2.68E-001
TL-208	8.82E-001	1.86E-001	6.48E-002
U-235	3.15E-001	1.86E-001	2.35E-001
TH-231	Not Detected	-----	1.86E+000
RA-231	Not Detected	-----	1.32E+000
TH-227	Not Detected	-----	3.63E-001
PA-223	Not Detected	-----	2.54E-001
FN-219	Not Detected	-----	3.47E-001
PB-211	Not Detected	-----	7.72E-001
TL-207	Not Detected	-----	1.31E+001
AM-241	Not Detected	-----	5.10E-001
PU-239	Not Detected	-----	4.43E+002
NP-237	Not Detected	-----	4.06E-001
FR-223	Not Detected	-----	5.33E-002
TH-229	Not Detected	-----	2.65E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.58E-002
AG-110m	Not Detected	-----	3.60E-002
BA-133	Not Detected	-----	4.58E-002
BE-7	Not Detected	-----	2.53E-001
CD-109	1.93E-001	1.36E-000	1.08E+000
CD-115	Not Detected	-----	1.93E-001
CE-139	Not Detected	-----	2.82E-002
CE-141	Not Detected	-----	5.36E-002
CE-144	Not Detected	-----	2.34E-001
CO-56	Not Detected	-----	3.18E-002
CO-57	Not Detected	-----	3.08E-002
CO-58	Not Detected	-----	3.06E-002
CO-60	Not Detected	-----	3.36E-002
CR-51	Not Detected	-----	2.29E-001
CS-134	Not Detected	-----	3.89E-002
CS-137	1.06E-001	4.38E-002	2.02E-002
EU-152	Not Detected	-----	9.23E-002
EU-154	Not Detected	-----	1.72E-001
EU-155	Not Detected	-----	1.43E-001
FE-59	Not Detected	-----	7.11E-002
GD-153	Not Detected	-----	1.11E-001
HG-203	Not Detected	-----	3.12E-002
I-131	Not Detected	-----	3.39E-002
IR-192	Not Detected	-----	2.60E-002
K-40	2.18E+001	3.01E+000	2.27E-001
MN-52	Not Detected	-----	4.34E-002
MN-54	Not Detected	-----	3.24E-002
MO-99	Not Detected	-----	5.08E-001
NA-22	Not Detected	-----	3.86E-002
NA-24	Not Detected	-----	1.48E+000
NB-95	Not Detected	-----	3.13E-001
ND-147	Not Detected	-----	2.27E-001
NI-57	Not Detected	-----	1.41E-001
RU-103	Not Detected	-----	2.61E-002
RU-106	Not Detected	-----	2.68E-001
SB-122	Not Detected	-----	9.42E-002
SB-124	Not Detected	-----	2.62E-002
SB-125	Not Detected	-----	7.45E-002
SN-113	Not Detected	-----	3.61E-002
SR-85	Not Detected	-----	3.50E-002
TA-182	Not Detected	-----	1.44E-001
TA-183	Not Detected	-----	7.01E-001
TC-99m	Not Detected	-----	4.74E+002
TL-201	Not Detected	-----	4.11E-001
XE-133	Not Detected	-----	4.47E-001
Y-88	Not Detected	-----	2.09E-002
ZN-65	Not Detected	-----	9.52E-002
ZR-95	Not Detected	-----	5.20E-002

*not Detected
7/21/09*

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

7/17/99 4:50:00 AM

Analyzed by: *[Signature]*

7/21/99

Reviewed by: *S.T. Shanks 7/21/99*

Customer : BYRD/SALMI
 Customer Sample ID : 047293-001
 Lab Sample ID : 90141624 *CLTA-09-GR-048-D-05-S*

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 703.000 gram
 Sample Date/Time : 7/13/99 1:35:00 PM
 Acquire Start Date/Time : 7/17/99 3:09:45 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	4.92E+000	3.06E+000	7.11E-001
RA-226	1.34E+000	9.67E-001	6.09E-001
PB-214	6.35E-001	1.32E-001	4.60E-002
BI-214	5.60E-001	1.12E-001	4.62E-002
PB-210	Not Detected	-----	3.71E+001
TH-232	Not Detected	-----	1.56E-001
RA-228	9.58E-001	3.62E-001	1.40E-001
AC-228	9.37E-001	2.66E-001	8.56E-002
TH-228	Not Detected	-----	6.91E-001
RA-224	9.02E-001	2.23E-001	6.09E-002
PB-212	8.79E-001	6.52E-001	3.98E-002
BI-212	9.16E-001	5.71E-001	3.29E-001
TL-208	8.18E-001	1.91E-001	7.16E-002
U-235	1.13E-001	4.38E-002	1.58E-001
TH-231	Not Detected	-----	1.86E+000
PA-231	Not Detected	-----	1.35E+000
TH-227	Not Detected	-----	3.72E-001
RA-223	Not Detected	-----	2.66E-001
PN-219	Not Detected	-----	3.54E-001
PB-211	Not Detected	-----	7.92E-001
TL-207	Not Detected	-----	1.32E+001
AM-241	Not Detected	-----	5.25E-001
PU-239	Not Detected	-----	4.26E+002
NP-237	Not Detected	-----	3.60E-001
PA-233	Not Detected	-----	5.50E-002
TH-229	Not Detected	-----	2.61E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.63E-002
AG-110m	Not Detected	-----	3.21E-002
BA-133	Not Detected	-----	4.68E-002
BE-7	Not Detected	-----	2.56E-001
CD-109	1.99E-000	1.25E-000	1.23E+000
CD-115	Not Detected	-----	2.00E-001
CE-139	Not Detected	-----	2.80E-002
CE-141	Not Detected	-----	5.40E-002
CE-144	Not Detected	-----	2.25E-001
CO-56	Not Detected	-----	3.16E-002
CO-57	Not Detected	-----	3.04E-002
CO-58	Not Detected	-----	3.21E-002
CO-60	Not Detected	-----	3.58E-002
CR-51	Not Detected	-----	2.31E-001
CS-134	Not Detected	-----	3.87E-002
CS-137	4.23E-002	3.67E-002	1.87E-002
EU-152	Not Detected	-----	9.15E-002
EU-154	Not Detected	-----	1.74E-001
EU-155	Not Detected	-----	1.44E-001
FE-59	Not Detected	-----	6.60E-002
GD-153	Not Detected	-----	1.10E-001
HG-203	Not Detected	-----	3.13E-002
I-131	Not Detected	-----	3.50E-002
IR-192	Not Detected	-----	2.67E-002
K-40	2.14E+001	2.95E+000	2.24E-001
MN-52	Not Detected	-----	4.68E-002
MN-54	Not Detected	-----	3.36E-002
MO-99	Not Detected	-----	5.42E-001
NA-22	Not Detected	-----	4.11E-002
NA-24	Not Detected	-----	1.68E+000
NE-95	Not Detected	-----	3.22E-001
ND-147	Not Detected	-----	2.27E-001
NI-57	Not Detected	-----	1.26E-001
RU-103	Not Detected	-----	2.85E-002
RU-106	Not Detected	-----	2.66E-001
SB-122	Not Detected	-----	9.17E-002
SB-124	Not Detected	-----	2.87E-002
SB-125	Not Detected	-----	7.41E-002
SN-113	Not Detected	-----	3.46E-002
SR-85	Not Detected	-----	3.57E-002
TA-182	Not Detected	-----	1.44E-001
TA-183	Not Detected	-----	7.24E-001
TC-99m	Not Detected	-----	5.79E+002
TL-201	Not Detected	-----	4.12E-001
XE-133	Not Detected	-----	4.59E-001
Y-88	Not Detected	-----	2.21E-002
ZN-65	Not Detected	-----	9.94E-002
ZR-95	Not Detected	-----	5.39E-002

NOT Detected
2/21/00

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 7/17/99 6:31:48 AM *

 * Analyzed by: *[Signature]* 7/21/99 Reviewed by: S.T. Shank 7/21/99 *

Customer : BYRD/SALMI
 Customer Sample ID : 047294-001 CTA-09-GR-048-D.5-1.0-5
 Lab Sample ID : 90141625

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 737.000 gram
 Sample Date/Time : 7/13/99 1:37:00 PM
 Acquire Start Date/Time : 7/17/99 4:51:33 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	3.61E+000	3.11E+000	6.47E-001
RA-226	Not Detected	-----	5.42E-001
PB-214	6.55E-001	4.86E-001	4.26E-002
BI-214	5.18E-001	1.23E-001	4.21E-002
PB-210	Not Detected	-----	3.55E+001
TH-232	8.35E-001	4.34E-001	1.35E-001
RA-228	8.14E-001	2.66E-001	1.46E-001
AC-228	9.13E-001	2.30E-001	8.20E-002
TH-228	9.55E-001	5.94E-001	3.93E-001
RA-224	8.63E-001	2.13E-001	5.71E-002
PB-212	8.68E-001	1.54E-001	3.79E-002
BI-212	1.04E+000	5.46E-001	2.59E-001
TL-208	7.78E-001	1.71E-001	6.45E-002
U-235	Not Detected	-----	1.43E-001
TH-231	Not Detected	-----	1.83E+000
PA-231	Not Detected	-----	1.30E+000
TH-227	Not Detected	-----	3.58E-001
RA-223	Not Detected	-----	2.49E-001
RN-219	Not Detected	-----	3.46E-001
PB-211	Not Detected	-----	7.71E-001
TL-207	Not Detected	-----	1.13E+001
AM-241	Not Detected	-----	5.19E-001
PO-239	Not Detected	-----	4.18E+002
PF-237	4.59E-001	4.69E-001	3.34E-001
PA-233	Not Detected	-----	5.25E-002
TH-229	Not Detected	-----	2.56E-001

not detected
[Signature]
 7/21/99

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.38E-002
AG-110m	Not Detected	-----	3.08E-002
BA-133	Not Detected	-----	4.26E-002
BE-7	Not Detected	-----	2.49E-001
CD-109	Not Detected	-----	1.33E+000
CD-115	Not Detected	-----	1.89E-001
CE-139	Not Detected	-----	2.78E-002
CE-141	Not Detected	-----	5.34E-002
CE-144	Not Detected	-----	2.24E-001
CO-56	Not Detected	-----	2.98E-002
CO-57	Not Detected	-----	2.96E-002
CO-58	Not Detected	-----	2.89E-002
CO-60	Not Detected	-----	3.17E-002
CR-51	Not Detected	-----	2.26E-001
CS-134	Not Detected	-----	3.68E-002
CS-137	2.85E-002	3.50E-002	1.86E-002
EU-152	Not Detected	-----	8.83E-002
EU-154	Not Detected	-----	1.66E-001
EU-155	Not Detected	-----	1.36E-001
FE-59	Not Detected	-----	6.61E-002
GD-153	Not Detected	-----	1.06E-001
HG-203	Not Detected	-----	3.09E-002
I-131	Not Detected	-----	3.24E-002
IR-192	Not Detected	-----	2.56E-002
K-40	2.03E+001	2.80E+000	2.19E-001
MN-52	Not Detected	-----	4.02E-002
MN-54	Not Detected	-----	3.18E-002
MO-99	Not Detected	-----	5.24E-001
NA-22	Not Detected	-----	3.86E-002
NA-24	Not Detected	-----	1.63E+000
NE-95	Not Detected	-----	3.15E-001
ND-147	Not Detected	-----	2.20E-001
NI-57	Not Detected	-----	2.40E-001
RU-103	Not Detected	-----	2.79E-002
RU-106	Not Detected	-----	2.67E-001
SE-122	Not Detected	-----	9.59E-002
SE-124	Not Detected	-----	2.76E-002
SE-125	Not Detected	-----	7.21E-002
SN-113	Not Detected	-----	3.47E-002
SR-85	Not Detected	-----	3.41E-002
TA-182	Not Detected	-----	1.39E-001
TA-183	Not Detected	-----	7.29E-001
TC-99m	Not Detected	-----	6.81E+002
TL-201	Not Detected	-----	4.18E-001
XE-133	Not Detected	-----	4.52E-001
Y-88	Not Detected	-----	2.14E-002
ZN-65	Not Detected	-----	8.89E-002
ZR-95	Not Detected	-----	5.12E-002

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 7/17/99 8:13:33 AM *
 *
 * Analyzed by: *[Signature]* 7/21/99 Reviewed by: S.T. Shanko 7/21/99 *

Customer : BYRD/SALMI
 Customer Sample ID : 047295-001
 Lab Sample ID : 90141626 CCA-09-GR-049-D-0.5-S

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 739.000 gram
 Sample Date/Time : 7/13/99 1:45:00 PM
 Acquire Start Date/Time : 7/17/99 6:33:19 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma
 interfere. Either isotope
 may be over-estimated

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	4.82E+000	3.33E+000	6.53E-001
RA-226	Not Detected	-----	5.26E-001
PB-214	5.99E-001	1.52E-001	4.19E-002
BI-214	5.17E-001	1.15E-001	4.20E-002
PB-210	Not Detected	-----	3.62E+001
TH-232	8.64E-001	1.55E+000	1.41E-001
RA-228	9.16E-001	2.88E-001	1.32E-001
AC-228	8.93E-001	2.39E-001	8.35E-002
TH-228	8.40E-001	6.58E-001	4.00E-001
RA-224	1.03E+000	2.48E-001	6.01E-002
PB-212	9.02E-001	1.68E-001	3.71E-002
BI-212	1.09E+000	4.89E-001	3.09E-001
TL-208	8.55E-001	1.31E+000	6.27E-002
U-235	1.35E-001	1.23E-001	1.53E-001
TH-231	Not Detected	-----	1.81E+000
PA-231	Not Detected	-----	1.31E+000
TH-227	Not Detected	-----	3.64E-001
PA-223	Not Detected	-----	2.52E-001
RN-219	Not Detected	-----	3.49E-001
PB-211	Not Detected	-----	7.68E-001
TL-207	Not Detected	-----	1.17E+001
AM-241	Not Detected	-----	5.13E-001
FU-239	Not Detected	-----	4.19E+002
NP-237	Not Detected	-----	2.80E-001
PA-233	Not Detected	-----	5.42E-002
TH-229	Not Detected	-----	2.58E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.49E-002
AG-110m	Not Detected	-----	3.95E-002
BA-133	Not Detected	-----	4.41E-002
BE-7	Not Detected	-----	1.58E-001
CD-109	2.30E+000	1.70E+000	9.52E-001
CD-115	Not Detected	-----	1.97E-001
CE-139	Not Detected	-----	2.73E-002
CE-141	Not Detected	-----	5.33E-002
CE-144	Not Detected	-----	2.20E-001
CO-56	Not Detected	-----	3.02E-002
CO-57	Not Detected	-----	2.91E-002
CO-58	Not Detected	-----	2.74E-002
CO-60	Not Detected	-----	3.04E-002
CR-51	Not Detected	-----	2.29E-001
CS-134	Not Detected	-----	3.59E-002
CS-137	1.30E-001	4.76E-002	2.08E-002
EU-152	Not Detected	-----	8.74E-002
EU-154	Not Detected	-----	1.70E-001
EU-155	Not Detected	-----	1.40E-001
FE-59	Not Detected	-----	6.74E-002
GD-153	Not Detected	-----	1.07E-001
HG-203	Not Detected	-----	2.98E-002
I-131	Not Detected	-----	3.44E-002
IR-192	Not Detected	-----	2.54E-002
K-40	1.93E+001	2.67E+000	2.12E-001
MN-52	Not Detected	-----	4.09E-002
MN-54	Not Detected	-----	3.08E-002
MO-99	Not Detected	-----	5.33E-001
NA-22	Not Detected	-----	3.59E-002
NA-24	Not Detected	-----	1.81E+000
NB-95	Not Detected	-----	3.24E-001
ND-147	Not Detected	-----	2.25E-001
NI-57	Not Detected	-----	2.37E-001
RU-103	Not Detected	-----	2.71E-002
RU-106	Not Detected	-----	2.47E-001
SB-122	Not Detected	-----	9.61E-002
SB-124	Not Detected	-----	2.67E-002
SB-125	Not Detected	-----	7.24E-002
SN-113	Not Detected	-----	3.43E-002
SR-85	Not Detected	-----	3.55E-002
TA-182	Not Detected	-----	1.39E-001
TA-183	Not Detected	-----	7.21E-001
TC-99m	Not Detected	-----	7.97E+002
TL-201	Not Detected	-----	4.21E-001
XE-133	Not Detected	-----	4.57E-001
Y-88	Not Detected	-----	2.34E-002
ZN-65	Not Detected	-----	9.05E-002
ZR-95	Not Detected	-----	5.17E-002

Not Detected
 7/21/99

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 7/17/99 9:55:19 AM *

* Analyzed by: *[Signature]* 7/21/99 Reviewed by: S.T. *[Signature]* 7/21/99 *

Customer : BYRD/SALMI
 Customer Sample ID : 047297-001
 Lab Sample ID : 90141627

CCTA-09-GR-049-0.5-1.0-5

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 712.000 gram
 Sample Date/Time : 7/13/99 1:47:00 PM
 Acquire Start Date/Time : 7/17/99 8:15:05 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma p
 interfere. Either isotope
 may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	6.47E-001
RA-226	2.80E+000	4.20E+000	4.85E-001
PB-214	5.99E-001	1.18E-001	4.45E-002
BI-214	5.46E-001	2.85E-001	4.22E-002
PB-210	Not Detected	-----	3.78E+001
TH-232	Not Detected	-----	1.33E-001
RA-228	9.01E-001	3.24E-001	1.34E-001
AC-228	8.24E-001	2.18E-001	8.19E-002
TH-228	Not Detected	-----	4.02E-001
RA-224	9.35E-001	2.30E-001	6.59E-002
PB-212	8.96E-001	3.06E-001	4.03E-002
BI-212	8.41E-001	6.42E-001	2.51E-001
TL-208	8.05E-001	1.54E+000	6.52E-002
U-235	1.24E-001	1.81E-001	2.30E-001
TH-231	Not Detected	-----	1.88E+000
PA-231	Not Detected	-----	1.31E+000
TH-227	Not Detected	-----	3.72E-001
PA-223	Not Detected	-----	2.55E-001
RN-219	Not Detected	-----	3.50E-001
PB-211	Not Detected	-----	7.79E-001
TL-207	Not Detected	-----	1.24E+001
AM-241	Not Detected	-----	5.09E-001
FC-239	Not Detected	-----	4.20E+002
NP-237	Not Detected	-----	3.24E-001
PA-233	Not Detected	-----	5.22E-002
TH-229	Not Detected	-----	2.60E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.48E-002
AG-110m	Not Detected	-----	4.08E-002
BA-133	Not Detected	-----	4.54E-002
BE-7	Not Detected	-----	2.49E-001
CD-109	Not Detected	-----	1.10E+000
CD-115	Not Detected	-----	2.05E-001
CE-139	Not Detected	-----	2.74E-002
CE-141	Not Detected	-----	5.37E-002
CE-144	Not Detected	-----	2.25E-001
CO-56	Not Detected	-----	3.13E-002
CO-57	Not Detected	-----	2.99E-002
CO-58	Not Detected	-----	3.10E-002
CO-60	Not Detected	-----	3.31E-002
CR-51	Not Detected	-----	2.34E-001
CS-134	Not Detected	-----	3.78E-002
CS-137	1.34E-001	4.89E-002	2.16E-002
EU-152	Not Detected	-----	8.92E-002
EU-154	Not Detected	-----	1.70E-001
EU-155	Not Detected	-----	1.41E-001
FE-59	Not Detected	-----	6.68E-002
GD-153	Not Detected	-----	1.08E-001
HG-203	Not Detected	-----	3.12E-002
I-131	Not Detected	-----	3.45E-002
IR-192	Not Detected	-----	2.54E-002
K-40	1.96E+001	2.71E+000	2.08E-001
MN-52	Not Detected	-----	4.17E-002
MN-54	Not Detected	-----	3.34E-002
MO-99	Not Detected	-----	5.54E-001
NA-22	Not Detected	-----	3.79E-002
NA-24	Not Detected	-----	1.96E+000
NB-95	Not Detected	-----	3.36E-001
ND-147	Not Detected	-----	2.36E-001
NI-57	Not Detected	-----	1.61E-001
RU-103	Not Detected	-----	2.78E-002
RU-106	Not Detected	-----	2.65E-001
SE-122	Not Detected	-----	9.49E-002
SE-124	Not Detected	-----	2.76E-002
SE-125	Not Detected	-----	7.74E-002
SN-113	Not Detected	-----	3.53E-002
SR-85	Not Detected	-----	3.55E-002
TA-182	Not Detected	-----	1.31E-001
TA-183	Not Detected	-----	7.28E-001
TC-99m	Not Detected	-----	9.96E+002
TL-201	Not Detected	-----	4.27E-001
XE-133	Not Detected	-----	4.79E-001
Y-88	Not Detected	-----	2.53E-002
ZN-65	Not Detected	-----	8.74E-002
ZR-95	Not Detected	-----	5.29E-002

 * Sandia National Laboratories *
 * Radiation Protection Sample Diagnostics Program [806 Laboratory] *
 * 7/17/99 11:37:05 AM *

* Analyzed by: *[Signature]* 7/21/99 Reviewed by: *S-T. Shanks* 7/21/99 *

Customer : BYRD/SALMI
 Customer Sample ID : 047299-001
 Lab Sample ID : 90141628 *CCRA-09-GR-050-0.5-1.0-5*

Sample Description : SOIL MARINELLI SAMPLE
 Sample Quantity : 873.000 gram
 Sample Date/Time : 7/13/99 1:52:00 PM
 Acquire Start Date/Time : 7/17/99 9:56:51 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 6000 / 6004 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	-----	6.01E-001
RA-226	1.87E+000	7.69E-001	4.77E-001
PB-214	5.61E-001	1.12E-001	3.91E-002
BI-214	4.73E-001	1.02E-001	3.77E-002
PB-210	Not Detected	-----	3.16E+001
TH-232	9.02E-001	4.55E-001	1.27E-001
RA-228	8.15E-001	2.24E-001	1.14E-001
AC-228	7.50E-001	2.10E-001	7.42E-002
TH-228	7.39E-001	5.61E-001	3.89E-001
RA-224	8.56E-001	2.07E-001	5.15E-002
PB-212	7.75E-001	8.39E-001	3.44E-002
BI-212	8.88E-001	5.01E-001	2.61E-001
TL-208	6.75E-001	1.55E-001	6.01E-002
U-235	8.06E-002	1.59E-001	2.01E-001
TH-231	Not Detected	-----	1.65E+000
PA-231	Not Detected	-----	1.19E+000
TH-227	Not Detected	-----	3.17E-001
RA-223	Not Detected	-----	2.20E-001
RN-219	Not Detected	-----	3.02E-001
PB-211	Not Detected	-----	6.77E-001
TL-207	Not Detected	-----	1.16E+001
AM-241	Not Detected	-----	4.47E-001
PO-239	Not Detected	-----	3.69E+002
NP-237	Not Detected	-----	3.45E-001
PA-233	Not Detected	-----	4.70E-002
TH-229	Not Detected	-----	2.22E-001

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	-----	3.16E-002
AG-110m	Not Detected	-----	2.89E-002
BA-133	Not Detected	-----	3.89E-002
BE-7	Not Detected	-----	2.14E-001
CD-109	Not Detected	-----	8.23E-001
CD-115	Not Detected	-----	1.87E-001
CE-139	Not Detected	-----	2.38E-002
CE-141	Not Detected	-----	4.77E-002
CE-144	Not Detected	-----	2.01E-001
CO-56	Not Detected	-----	2.76E-002
CO-57	Not Detected	-----	2.66E-002
CO-58	Not Detected	-----	2.69E-002
CO-60	Not Detected	-----	2.95E-002
CR-51	Not Detected	-----	2.08E-001
CS-134	Not Detected	-----	3.14E-002
CS-137	4.92E-002	3.06E-002	1.86E-002
EU-152	Not Detected	-----	7.97E-002
EU-154	Not Detected	-----	1.51E-001
EU-155	Not Detected	-----	1.27E-001
FE-59	Not Detected	-----	6.26E-002
GD-153	Not Detected	-----	9.33E-002
HG-203	Not Detected	-----	2.79E-002
I-131	Not Detected	-----	3.14E-002
IR-192	Not Detected	-----	2.27E-002
K-40	2.23E+001	3.06E+000	1.96E-001
MN-52	Not Detected	-----	3.88E-002
MN-54	Not Detected	-----	2.80E-002
MO-99	Not Detected	-----	4.88E-001
NA-22	Not Detected	-----	3.54E-002
NA-24	Not Detected	-----	1.92E+000
NB-95	Not Detected	-----	2.89E-001
ND-147	Not Detected	-----	2.03E-001
NI-57	Not Detected	-----	2.35E-001
RU-103	Not Detected	-----	2.36E-002
RU-106	Not Detected	-----	2.28E-001
SE-122	Not Detected	-----	8.78E-002
SE-124	Not Detected	-----	2.41E-002
SE-126	Not Detected	-----	6.59E-002
SN-113	Not Detected	-----	3.12E-002
SR-85	Not Detected	-----	3.05E-002
TA-182	Not Detected	-----	1.23E-001
TA-183	Not Detected	-----	6.45E-001
TC-99m	Not Detected	-----	1.05E+003
TL-201	Not Detected	-----	3.86E-001
XE-133	Not Detected	-----	4.18E-001
Y-88	Not Detected	-----	1.94E-002
ZN-65	Not Detected	-----	8.36E-002
ZR-95	Not Detected	-----	4.71E-002

* Analyzed by: *[Signature]* 7/21/99 Reviewed by: S.T. Shank 7/21/99 *

Customer : BYRD/SALMI
 Customer Sample ID : LAB CONTROL SAMPLE USING CG134
 Lab Sample ID : 90141629

Sample Description : MIXED GAMMA STANDARD_CG134
 Sample Quantity : 17000 Each
 Sample Date/Time : 11/01/90 12:00:00 PM
 Acquire Start Date/Time : 7/19/99 7:27:45 AM
 Detector Name : LAB02
 Elapsed Live/Real Time : 600 / 605 seconds

Comments:

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	-----	4.08E+003
RA-226	Not Detected	-----	5.37E+003
PB-214	Not Detected	-----	5.99E+002
BI-214	Not Detected	-----	5.42E+002
PB-210	Not Detected	-----	2.62E+005
TH-232	Not Detected	-----	1.84E+003
RA-228	Not Detected	-----	2.15E+003
AC-228	Not Detected	-----	1.29E+003
TH-228	Not Detected	-----	1.38E+005
RA-224	Not Detected	-----	3.31E+003
PB-212	Not Detected	-----	1.07E+004
BI-212	Not Detected	-----	8.34E+004
TL-208	Not Detected	-----	1.95E+004
U-235	Not Detected	-----	1.54E+003
TH-231	Not Detected	-----	1.15E+004
PA-231	Not Detected	-----	1.27E+004
TH-227	Not Detected	-----	2.36E+003
RA-223	Not Detected	-----	1.00E+026
RN-219	Not Detected	-----	5.23E+003
PB-211	Not Detected	-----	1.18E+004
TL-207	Not Detected	-----	1.90E+005
AM-241	7.74E+004	1.40E+004	2.87E+003
PC-239	Not Detected	-----	2.71E+006
NP-237	Not Detected	-----	2.05E+003
PA-233	Not Detected	-----	5.34E+002
TH-229	Not Detected	-----	1.62E+003

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	-----	2.72E+002
AG-110m	Not Detected	-----	1.04E+007
BA-133	Not Detected	-----	6.55E+002
BE-7	Not Detected	-----	2.83E+021
CD-109	Not Detected	-----	7.93E+005
CD-115	Not Detected	-----	1.00E+026
CE-139	Not Detected	-----	1.80E+009
CE-141	Not Detected	-----	1.00E+026
CE-144	Not Detected	-----	3.48E+006
CO-56	Not Detected	-----	7.76E+014
CO-57	Not Detected	-----	6.78E+005
CO-58	Not Detected	-----	9.36E+015
CO-60	7.74E+004	1.04E+004	3.95E+002
CR-51	Not Detected	-----	1.00E+026
CS-134	Not Detected	-----	4.79E+003
CS-137	6.92E+004	9.19E+003	2.41E+002
EU-152	Not Detected	-----	9.54E+002
EU-154	Not Detected	-----	2.40E+003
EU-155	Not Detected	-----	3.15E+003
FE-59	Not Detected	-----	1.00E+026
GD-153	Not Detected	-----	6.10E+006
HG-203	Not Detected	-----	1.00E+026
I-131	Not Detected	-----	1.00E+026
IR-192	Not Detected	-----	2.34E+015
K-40	Not Detected	-----	1.25E+003
MN-52	Not Detected	-----	1.00E+026
MN-54	Not Detected	-----	3.51E+005
MO-99	Not Detected	-----	1.00E+026
NA-22	Not Detected	-----	1.93E+003
NA-24	Not Detected	-----	1.00E+026
NB-95	Not Detected	-----	1.00E+026
ND-147	Not Detected	-----	1.00E+026
NI-57	Not Detected	-----	1.00E+026
RU-103	Not Detected	-----	1.00E+026
RU-106	Not Detected	-----	1.01E+006
SB-122	Not Detected	-----	1.00E+026
SB-124	Not Detected	-----	2.11E+018
SB-125	Not Detected	-----	8.91E+003
SN-113	Not Detected	-----	8.07E+010
SR-85	Not Detected	-----	1.96E+017
TA-182	Not Detected	-----	2.01E+011
TA-183	Not Detected	-----	1.00E+026
TC-99m	Not Detected	-----	1.00E+026
TL-201	Not Detected	-----	1.00E+026
XE-133	Not Detected	-----	1.00E+026
Y-88	Not Detected	-----	1.33E+011
ZN-65	Not Detected	-----	5.87E+006
ZR-95	Not Detected	-----	3.94E+017

ANNEX 10-D
Data Validation Results
1999 Confirmatory Sampling

Memorandum

Date: 10/05/99
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation
Site: CCTA 09
AR/COC: 602158
Case: 7215.2201
Laboratory: GEL
SDG: 990758

See attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and with specified methods (ICP EPA6010, CVAA EPA7470). All components were successfully analyzed.

Qualifications were applied to metals sample results due to: blank contamination; failure to meet MS recovery acceptance criteria; failure to meet ICS acceptance criteria; and failure to meet field duplicate RPD acceptance criteria.

Holding Times

The samples were analyzed within the prescribed holding times.

Calibration

Initial and continuing calibration met QC acceptance criteria for both methods.

Blanks

Several samples exhibited target analytes at less than the associated continuing calibration blank absolute values. Positive sample results were qualified JB3; non-detect results were qualified UJB3. See attached Sample Findings Summary.

No samples exhibited additional target analytes at less than the associated method blank values.

Matrix Spike Analysis

Matrix spike recovery was <30% for barium and antimony. Positive sample results were qualified JA2; non-detect results were qualified RA2. See attached Sample Findings Summary.

Laboratory Control/Laboratory Control Duplicate Samples

The LCS/LCSD samples met QC acceptance criteria for both methods.

ICP Interference check sample (ICS) Analysis

The ICS analysis failed to meet acceptance criteria for potassium and sodium. Positive sample results were qualified J.

Laboratory Replicate Analysis

The laboratory replicate analysis failed to meet RPD acceptance criteria for barium. No further qualifications were applied (see MS/MSD section).

Note: The QC Summary Report indicates that the replicate RPD for uranium was 136%, but the Duplicate Summary correctly indicates a 5.7% RPD.

Serial Dilution

The serial dilution analysis failed to meet acceptance criteria for potassium. No further qualifications were applied (see ICS section above).

Other QC

Field duplicate samples failed to meet RPD acceptance criteria for As, Ba, Ca, Cr, Na, and U. Sample results for As, Ca, Cr, and U were qualified J. No further qualifications were applied to Ba or Na sample results (see previous sections).

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

A handwritten signature in black ink, appearing to be 'J. M. ...', written in a cursive style.

10/5/99

SAMPLE FINDINGS SUMMARY

Site: CCTA 09

AR/COC: 602158

Data Classification: Radiometric, Inorganic, Organic

Sample/ Fraction No.	Analysis	DV Qualifiers	Comments
	In Organic - See Attached Table		
	Radio metric - See Attached Table		
	<u>Organic</u>		
	67-66-3 chloroform	mtt Lott	
CCTA-09-G-R- 007-0-0.5-S	67-66-3 chloroform	1.0U	
-007-0-0.5 DU			
-007-0.5-1.0-S			
-008-0-0.5-S			
-008-0.5-1.0-S			
-009-0-0.5-S			
-009-0.5-1.0-S			

Sample No./Fraction No. - This value is located on the Chain of Custody in the ER Sample Id field.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470/1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HE, PCBRISC

Reviewed by: [Signature] Date: 10/5/99

INORGANIC METALS:

SITE/PROJECT: CCTA-09 ARCO# 602158
 LABORATORY: CEL LABORATORY REPORT #: 990758
 METHODS: _____

QC Element/ Analyte	ICV	CCV	ICB	CCB	Method Blks	LCS	LCSD	LCSD RPD	MS	MSD	MSD RPD	REP RPD	ICS AB	Serial Dilution	Field Dup RPD	Eq Blks	Field Blks			
7429-90-5 Al	✓	✓								1/9	1/6									
7440-39-3 Ba									0			41/9			38					
7440-41-7 Be					-035															
7440-43-9 Cd																				
7440-70-3 Ca															67					
7440-47-3 Cr															48					
7440-48-4 Co																				
7440-50-8 Cu																				
7439-89-6 Fe																				
7439-95-4 Mg																				
7439-96-5 Mn																				
7440-02-0 Ni														11.0						
7440-09-7 K													1228	122.8	20					
7440-32-4 Ag					26	✓							1211	1211	95					
7440-23-5 Na																				
7440-62-2 V																				
7440-66-6 Zn																				
7440-61-1 U					02	✓	✓	✓	✓	=	=	126		✓	48					
7439-92-1 Pb										1/9	1/6									
7440-49-3 Se																				
7440-38-2 As																				
7440-36-0 Sb									246											
7440-78-0 Tl																				
7439-97-4 Hg					-1					✓	✓	✓								
Cyanide CN																				

mg/kg = ug/g * [(ug/g) x (sample mass (g) / sample vol (ml)) x (1000ml / liter)] / Dilution Factor = ug/l

Comments:

REVIEWED BY: [Signature] DATE: 10/5/99

Memorandum

Date: 10/05/99

To: File

From: Marcia Hilchey

Subject: Organic Data Review and Validation

Site: CCTA 09

AR/COC: 602158

Case: 7215.2201

Laboratory: GEL

SDG: 9907538

See attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and with specified methods (VOC EPA8260). All compounds were successfully analyzed.

Qualifications were applied to VOC sample data due to blank contamination.

Holding Times

The samples were analyzed within the prescribed holding times.

Calibration

Initial and continuing calibration met acceptance criteria.

Blanks

Chloroform was detected in all of the samples at less than the RL and less than 5 times the method blank value. Sample results for chloroform were qualified U at the RL.

Surrogates

All surrogate recoveries met acceptance criteria.

Matrix Spike/Matrix Spike Duplicates (MS/MSD)

No matrix spike samples were analyzed with this SDG. No sample results were qualified, but it should be noted that no matrix interference information is available for these samples.

Internal Standards

All internal standard QC acceptance criteria were met.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

LCS/LCSD samples met all acceptance criteria.

Other QC

The field duplicate analysis met PRD acceptance criteria.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

 10/5/99

SITE/PROJECT: CCTA 09 ARCO# 602158
 LABORATORY: GEL LABORATORY REPORT # 9907538

IS	GC/MS		Min	Intercept	Calib	Calib	CCV	Method	LCS	LCSD	LCS	MS	MSD	MS	Field Dup	Eq	Trip			
	Name	CAS #	RF		RF	RSD / R ²	RPD	Hks			RPD			RPD	RPD	Hks	Hks			
					> .05	< 20% / 0.99	< 20%	mg/kg												
1	Chloromethane	74-87-3	0.10	✓			✓	✓												
1	Bromomethane	74-83-9	0.10																	
1	vinyl chloride	75-01-4	0.10																	
1	Chloroethane	75-00-3	0.01																	
1	methylene chloride (10xblk)	75-09-2	0.01																	
1	acetone (10xblk)	67-64-1	0.01																	
1	carbon disulfide	75-15-0	0.10																	
1	1,1-dichloroethane	75-35-4	0.20						✓	✓	✓									
1	1,1-dichloroethane	75-34-3	0.10																	
1	Chloroform	67-66-3	0.20					86												
1	1,2-dichloroethane	107-06-7	0.10																	
1	2-butanone (10xblk)	78-93-3	0.01																	
2	1,1,1-trichloroethane	71-55-6	0.10																	
2	carbon tetrachloride	56-23-5	0.10																	
2	Bromodichloromethane	75-27-4	0.20																	
2	1,2-dichloropropane	78-87-3	0.01																	
2	cis-1,3-dichloropropene	10061-01-5	0.20																	
2	Trichloroethene	79-01-6	0.30						✓	✓	✓									
2	Dibromochloromethane	124-48-1	0.10																	
2	1,1,2-trichloroethane	79-00-3	0.10																	
2	Benzene	71-43-2	0.30						✓	✓	✓									
2	trans-1,3-dichloropropene	10061-02-6	0.10																	
2	Bromoform	75-25-2	0.10																	
3	4-methyl-2-pentanone	108-10-1	0.10																	
3	2-hexanone	591-78-6	0.01																	
3	Tetrachloroethene	127-18-4	0.20																	
3	1,1,2,2-tetrachloroethane	79-34-5	0.30																	
3	toluene (10xblk)	108-88-3	0.40						✓	✓	✓									
3	Chlorobenzene	108-90-7	0.30						✓	✓	✓									
3	Ethylbenzene	100-41-4	0.10																	
3	Styrene	100-42-5	0.30																	
3	xylene (total)	1330-20-7	0.30																	
3	1,2-dichloroethylene (total)	540-59-0	0.01																	
	2-chloroethyl vinyl ether	110-75-8		✓	✓	.98	✓	✓												

Comments:

M. M. M. M. M.

DATE: 10/5/99

INORGANIC METALS:

SITE/PROJECT: CCTA -09 ARCO# : 602158
 LABORATORY: CEL LABORATORY REPORT #: 990758
 METHODS: _____

QC Element/ Analyte	ICV	CCV	ICB	CCB	Method Blks	LCS	LCSD	LCSD RPD	MS	MSD	MSD RPD	REP RPD	ICS AB	Serial Dilution	Field Dup RPD	E4 Blks	Field Blks			
7429-90-5 Al	✓	✓								n/a	n/a									
7440-39-3 Ba									0			41.9			38					
7440-41-7 Bc					- .035															
7440-43-9 Cd																				
7440-70-2 Ca															67					
7440-47-3 Cr															48					
7440-48-4 Co																				
7440-50-8 Cu																				
7439-89-6 Fe																				
7439-93-4 Mg																				
7439-96-5 Mn																				
7440-02-0 Ni														11.0						
7440-09-7 K													1222	122.8	12.0					
7440-33-4 Ag					.26	✓														
7440-23-3 Na													1211	121.1	12.1					
7440-62-3 V																				
7440-66-6 Zn																				
7440-61-1 U					.02	✓	✓	✓	✓	-	-	126			48					
7439-97-1 Pb										n/a	n/a									
7440-39-3 Ba																				
7440-38-2 As																				
7440-36-0 Sb									28.6											
7440-38-0 Ti																				
7439-97-4 Hg										✓	✓	✓								
Cyanide CN																				

mg/kg = ug/g. ((ug/g) x (sample mass (g) / sample vol. (ml)) x (1000ml / liter)) / Dilution Factor = ug/l

Comments:

REVIEWED BY: [Signature]

DATE: 10/15/99

MEMORANDUM

Date: 10/05/99
To: File
From: Marcia Hilchey
Subject: Radiometric Data Review and Validation
Site: CCTA 09
AR/COC: 602158
Case: 7215.2201
Laboratory: GEL
SDG: 9907538

See the attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and specified methods (gross alpha/beta EPA 900.0). All components were successfully analyzed.

Sample results were qualified due to failure to meet laboratory replicate RER acceptance criteria.

Holding Times

The samples were analyzed within the prescribed holding times.

Calibration

Calibration met acceptance criteria.

Laboratory Control Sample Analyses

The LCS met acceptance criteria.

Blanks

No target analytes were detected above the reporting limits in the method blanks.

Matrix Spike Analysis

The matrix spike samples met acceptance criteria.

Replicate

The laboratory duplicates met the QC acceptance criteria for gross beta.

The laboratory duplicate RER for gross alpha for lab batch 154031 was 1.87. Associated sample results were qualified J. See Sample Findings Summary.

Other QC

Field duplicate sample analyses met RER acceptance criteria.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

 10/5/99

RADIOCHEMISTRY:

SITE/PROJECT: CCTA 09 ARCO #: 602158
 LABORATORY: GEL LABORATORY REPORT #: 9907538
 METHODS: GAB

n/a n/a

QC Element/ Analyte	Method Blks	LCS	MS	Rep RER	Eq. Blks	Field Dup RER	Field Blks	-	Sample ID	Isotope	IS/Trace	Sample ID	Isotope	IS/Trace
CRITERIA	U	20%	25%	<1.0	U	<1.0	U	-			50-105			50-105
H3								-						
U-238								-						
U-234								-						
U-235/236								-						
Th-232								-						
Th-228								-						
Hr-230	2 ¹	✓	✓	✓	✓	✓	✓	-						
Pu-239/240	2 ²	✓	✓	✓	✓	✓	✓	-						
Gross Alpha	1	✓	✓	✓	187 ¹	✓	✓	-						
Nonvolatile Beta	1	✓	✓	✓	✓	✓	✓	-						
Ra226								-						
Ra228								-						
Ni-63								-						
Gamma Spec- Am241								-						
Gamma Spec- Cs137								-						
Gamma Spec- Co60								-						

Parameter	Method	Typical Tracer	Typical Carrier
Iso-U	Alpha spec	U-232	NA
Iso-Pu	Alpha spec	Pu-242	NA
Iso-Th	Alpha spec	Th-229	NA
Am-241	Alpha spec	Am-242	NA
Sr-90	Beta	Y ingrowth	NA
Ni-63	Beta	NA	Ni by ICP
Ra-226	Deamination	NA	NA
Ra-226	Alpha spec	Ba-133 or Ra-225	NA
Ra-228	Gamma spec	Ba-133	NA

Comments: ¹ = batch 154031
 samples 1-8
² = batch 154033
 samples 9-16, 18, 20, 22, 24, 26

Gamma spec LCS contains: Am-241, Cs-137, and Co-60

REVIEWED BY: [Signature] DATE: 10/5/99

DATA VALIDATION SUMMARY:

SITE/PROJECT: CCTA-09 CASE #: 7
 ARCO #: 602158
 LABORATORY: CEL
 LABORATORY REPORT #: 9907538

OF SAMPLES: 27 MATRIX: soil
 LAB SAMPLE IDs: 9907538-01 thru -27

ANALYSIS/ QC ELEMENT	VOC	SVOC	PEST/ PCB	HPLC (HE)	ICP/AES	GFAA/ AA	CVAA (Hg)	CN	RAD	OTHER
1. HOLDING TIMES/ PRESERVATION	✓				✓		✓		✓	
2. CALIBRATIONS	✓				✓		✓		✓	
3. METHOD BLANKS	U				JB3		JB3/ UJB3		✓	
4. MS/MSD	-				JA2		✓		✓	
5. LABORATORY CONTROL SAMPLES	✓				✓		✓		✓	
6. REPLICATES					J		✓		J	
7. SURROGATES	✓									
8. INTERNAL STDS	✓									
9. TCL COMPOUND IDENTIFICATION	✓									
10. ICP INTERFERENCE CHECK SAMPLE					J					
11. ICP SERIAL DILUTION					J					
12. CARRIER/CHEM TRACER RECOVERIES									-	
13. OTHER QC	✓				J		✓		✓	

CHECK MARK (✓) - ACCEPTABLE
 J - ESTIMATED
 U - NOT DETECTED

SHADED CELLS - NOT APPLICABLE
 UJ - NOT DETECTED, ESTIMATED
 R - UNUSABLE

REVIEWED BY: [Signature]

DATE: 10/5/99

Contract Verification Review (CVR)

Project Leader BYRD Project Name CCTA-09 Case No. 7215.2201
 AR/COC No. 602158 Analytical Lab GEL SDG No. 9907538

In the tables below, mark any information that is missing or incorrect and give an explanation.

1.0 Analysis Request and Chain of Custody Record and Log-In Information

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
1.1	All items on COC complete - data entry clerk initialed and dated	X				
1.2	Container type(s) correct for analyses requested	X				
1.3	Sample volume adequate for # and types of analyses requested	X				
1.4	Preservative correct for analyses requested	X				
1.5	Custody records continuous and complete	X				
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	X				
1.7	Date samples received	X				
1.8	Condition upon receipt information provided	X				

2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
2.1	Data reviewed, signature	X				
2.2	Method reference number(s) complete and correct	X				
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X				
2.4	Matrix spike/matrix spike duplicate data provided(if requested)	X				
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and L _c	X				
2.6	QC batch numbers provided	X				
2.7	Dilution factors provided and all dilution levels reported	X				
2.8	Data reported in appropriate units and using correct significant figures	X				
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	X				
2.10	Narrative provided	X				
2.11	TAT met	X				
2.12	Hold times met	X				
2.13	Contractual qualifiers provided	X				
2.14	All requested result and TIC (if requested) data provided	X				

Contract Verification Review (Continued)

3.0 Data Quality Evaluation

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2 Quantitation limit met for all samples	X		
3.3 Accuracy a) Laboratory control samples accuracy reported and met for all samples		X	CALCIUM RECOVERY BELOW QC LIMITS FOR LCS & LCD
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
c) Matrix spike recovery data reported and met		X	ANTIMONY & BARIUM RECOVERY BELOW QC LIMITS
3.4 Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples		X	RPD FOR MERCURY, BARIUM & URANIUM OUTSIDE QC ACCEPTANCE LIMITS
b) Matrix spike duplicate RPD data reported and met for all organic samples	X		NOT REPORTED WITH THIS SDG
3.5 Blank data a) Method or reagent blank data reported and met for all samples		X	CHLOROFORM DETECTED IN VOA METHOD BLANK
b) Sampling blank (e.g., field, trip, and equipment) data reported and met	NA		
3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"- analyte found in method blank above the MDL for organic or above the PQL for inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"- analysis done beyond the holding time	X		
3.7 Narrative addresses planchet flaming for gross alpha/beta	X		
3.8 Narrative included, correct, and complete		X	INCORRECT STATEMENTS IN METALS ANALYTICAL NARRATIVE
3.9 Second column confirmation data provided for methods 8330 (high explosives) and pesticides/PCBs	NA		

Contract Verification Review (Continued)

4.0 Calibration and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.)			
a) 12-hour tune check provided	X		
b) Initial calibration provided	X		
c) Continuing calibration provided	X		
d) Internal standard performance data provided	X		
e) Instrument run logs provided	X		
4.2 GC/HPLC (8330 and 8010)			
a) Initial calibration provided	NA		
b) Continuing calibration provided	NA		
c) Instrument run logs provided	NA		
4.3 Inorganics (metals)			
a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) ICP interference check sample data provided	X		
d) ICP serial dilution provided	X		
e) Instrument run logs provided	X		
4.4 Radiochemistry			
a) Instrument run logs provided	X		

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab Batch No. 901409

SAR/WR No. (Call 284-5514 for ARCO and Sample Numbers.)

AR/COC- 602160

Dopt. No./Mail Stop: 6134 / 1088
 Project/Task Manager: BYAD / PAVLETICH
 Project Name: CCTA-09
 Record Center Code: ER/1334/09/PAT
 Logbook Ref No: ER 051
 Service Order No.: CF 066B

Date Samples Shipped: 7/14/99
 Carrier/Waybill No: 722698
 Lab Contact: EDIE KENT
 Lab Destination: GEL
 SMO Contact/Phone: DOUG SALMI (505) 894-3110
 Send Report to SMO: SUEI JENSEN

Contract No.: AJ-2480A
 Case No.: 745.220190
 SMO Authorization: [Signature]
 Bill to: Sandia National Laboratories
 Supplier Services Department
 P.O. Box 5800 MS 0154

Parameter & Method Requested									
GROSS ALPHA / BETA	TAL METALS + U	SVOCs	HE	VOCs					

Location		Tech Area		Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)					GROSS ALPHA / BETA	TAL METALS + U	SVOCs	HE	VOCs	Lab Sample ID	
ER SITE 9							Sample Matrix	Container		Preservative	Sample Collection Method							Sample Type
Building	Room	ER Sample ID or Sample Location Detail						Type	Volume (oz)									
047230-002		CCTA-09-GR-001-0-0.5-5	0-0.5	9	7/12/99 1015	S	AG	16	4°	G	SA	X	X					
777731-777		DD1-0.5-1.0-5	0.5-1	7	1017	7	7	7	7	7	7	X	X					
		DD2-0-0.5-5	0-0.5		1015							X	X					
		DD2-0.5-1.0-5	0.5-1		1017							X	X					
		DD3-0-0.5-5	0-0.5		1040							X	X					
		DD3-0.5-1.0-5	0.5-1		1042							X	X					
		DD4-0-0.5-DU	0-0.5		1020													
		DD4-0-0.5-DU	J		1022						DU	X	X					
		DD4-0.5-1.0-5	0.5-1		1024						SA	X	X					
		DD5-0-0.5-5	0-0.5		1038							X	X					

RMMA Yes No Rel. No.

Sample Tracking: SMO USE
 Date Entered (mm/dd/yy) 7/15/99
 Entered by: [Signature]

Special Instructions/QC Requirements
 EDD Yes No
 Raw data package Yes No

Abnormal Conditions on Receipt

Turnaround Time Normal Rush Required Report Date QC Inits. [Signature]

Sample Team Members	Name	Signature	Jnit	Company/Organization/Phone
	JOE PAVLETICH	<u>[Signature]</u>	88	6024/634/505-284-2479

Released by ARCO 602160 *
 FIELD QC SAMPLES ON ARCO 602159
 Please list as separate report.

LAB USE

1. Relinquished by <u>[Signature]</u> Org. <u>6134</u> Date <u>7-13-99</u> Time <u>1545</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>7577</u> Date <u>7-13-99</u> Time <u>1545</u>	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>[Signature]</u> SMO Org. <u>7577</u> Date <u>7-14-99</u> Time <u>1230</u>	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____

ANALYSIS REQUEST AND CHAIN OF CUSTODY CONTINUATION FORM

2001 (11) 112-961
Revised (10/97) name

AR/COC- 602150

Project Name: CCTA-09 Project/Task Manager: BYRD/PAULETICH Case No.: 725.220100

Location		Tech Area		Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)					Parameter & Method Requested					Lab Sample ID			
Building		Room					Sample Matrix	Container		Preservative	Sample Collection Method	Sample Type	GROSS ALPHA/BETA	TAL METALS + U	SVOCs	HE		VOCs		
Sample No. - Fraction		ER Sample ID or Sample Location Detail						Type	Volume (oz)										Sample Type	
47240-002				0.5-1	9	7/12/99 1041	S	AG	16oz	4°	G	SA	X	X						
				0-0.5		7 1055							X	X						
				0.5-1		1057							X	X						
				0-0.5		1112							X	X						
				J		J			4			J								LAB USE
				J		J			16			DU	X	X						
				J		J			4			J								
				0.5-1		1116			16			SA	X	X						
				J		J			4			J								
				0-0.5		1118			16			J	X	X						
				J		J			4			J								
				0.5-1		1120			16			J	X	X						
				J		J			4			J								
				0-0.5		1125			16			J	X	X						
				J		J			4			J								
				0.5-1		1127			16			J	X	X						
				J		J			4			J								

Abnormal Conditions on Receipt

LAB USE

Recipient Initials: _____

WHITE - To Accompany Samples, Lab Copy
 BLUE - To Accompany Samples, Return to ERM
 YELLOW - MO Suspense Copy
 PINK - Field Copy

MEMORANDUM

DATE: October 28, 1999

TO: File

FROM: Kevin Lambert *KAL*

SUBJECT: Inorganic Data Review and Validation
CCTA -09, ARCOC No. 602159, and Project/Task No. 7214.01.05

See the attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

The samples were prepared and analyzed with accepted procedures and specified methods (ICP - EPA6010B, ICPMS - EPA6020, and CVAA - EPA7470). All analytes were successfully analyzed. Problems were identified with the data package that result in the qualification of data.

1. ICP Analysis: For the equipment blank (EB), magnesium was less than (<) five times (5x) the continuing calibration blank (CCB) concentration and will be qualified "J, B3."
2. ICPMS Analysis: For the EB, uranium was < 5x the method blank (MB) concentration and will be qualified "J, B."
3. ICP Analysis: For soil samples, silver was < 5x the concentration in the initial calibration blank (ICB), CCB, and MB will be qualified "J, B, B3."
4. ICP Analysis: For soil samples, antimony was non-detect except in one sample where it was < 5x the CCB concentration. Antimony results for this sample (9907510-25) will be qualified "J, B3."
5. CVAA Analysis: For soil samples, mercury CCB concentration was greater than (>) the reporting limit (RL) and detected mercury results were < 5x the RL. Detected sample results will be qualified "J, B3" and non-detects will be qualified "R, B3."

Data is acceptable except for mercury in two samples (9907510-09 and -15). QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

ICP, ICPMS, and CVAA Analysis: The samples were analyzed within the prescribed holding times.

Calibration

ICP, ICPMS, and CVAA Analysis: Initial and continuing calibration verification data met QC acceptance criteria.

Blanks

ICP and ICPMS Analysis: In the ICB, no target analytes were detected except for barium, cadmium, chromium, and silver. The ICB values for barium and cadmium are < the detection limit (DL); no data were qualified. Chromium sample results are > 5x the ICB value; no data were qualified. Silver results were qualified as noted above in the summary section.

ICP and ICPMS Analysis: In the CCB, no target analytes were detected except for barium, beryllium, cadmium, calcium, chromium, iron, magnesium, manganese, thallium, antimony, uranium, and silver. The CCB values for barium, beryllium, calcium, iron, and manganese are < the DL; no data were qualified. Chromium and uranium results are > 5x the ICB value; no data were qualified. Cadmium and thallium results are non-detect; no data were qualified. Silver and antimony results were qualified as noted above in the summary section.

ICP and ICPMS Analysis: In the MB, no target analytes were detected except for aluminum, silver, uranium, and zinc. Aluminum and zinc results are > 5x the MB values; no data were qualified. Silver and uranium results were qualified as noted above in the summary section.

CVAA Analysis: No mercury was detected in the ICB and MB. Mercury CCB concentration was > the RL and detected mercury results were < 5x the RL. Sample results were qualified as noted above in the summary section.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analyses

ICP, ICPMS, and CVAA Analysis: The LCS/LCSD met QC acceptance criteria except the LCS percent recovery (%R) for antimony. The LCSD %R and LCS/LCSD relative percent difference (RPD) met acceptance criteria; no data were qualified.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

ICP Analysis: No MS/MSD was run on soil samples from this sample delivery group (SDG). An MS/MSD was run on another SDG in the analytical batch and met QC acceptance criteria. The MS and laboratory replicate for the EB met QC acceptance criteria.

ICPMS Analysis: The MS for the soil samples met QC acceptance criteria. A laboratory replicate was run on another SDG in the analytical batch and did not meet QC acceptance criteria. No MS/MSD was run on EB from this SDG. An MS/MSD was run on another SDG in the analytical batch and met QC acceptance criteria.

CVAA Analysis: No MS/MSD was run on this SDG. An MS/MSD was run on another SDG in the analytical batch and met QC acceptance criteria.

ICP Interference Check Sample (ICS) Analysis

ICP and ICPMS Analysis: The ICS data met QC acceptance criteria except for potassium and sodium. Concentrations of aluminum, calcium, iron, and magnesium are \leq their concentration in the ICS; no data were qualified.

ICP Serial Dilution

No serial dilution was run on this SDG. The serial dilution was run on another SDG in the analytical batch and met QC acceptance criteria.

Other QC

ICP and ICPMS Analysis: No target analytes were detected in the EB except for calcium, iron, magnesium, potassium, silver, sodium, uranium, and zinc. Sample results are $> 5x$ EB values; no data were qualified. The field duplicate pair met QC acceptance criteria. No field blank (FB) was submitted on the ARCOG.

CVAA Analysis: No target analytes were detected in the EB. The field duplicate pair met QC acceptance criteria. No field blank (FB) was submitted on the ARCOG.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

INORGANIC METALS:

Soil

Lab#

Batch#

SITE/PROJECT: CCTA-09 ARCO# : 602159
 LABORATORY: GEL LABORATORY REPORT #: 9907510
 METHODS: EPA 6010B(ICP) 6020(ICP-MS) & 7470(CVAA)

9907510-07
 -09
 -11
 -13
 -15
 -17 (Dw)

9907510-19(Dw)
 -21
 -23
 -25
 -27
 -29

153802 (U)
 153795 (Hg)
 153628

QC Element/ Analyte	ICV	CCV	ICB ng/l	CCB ng/l	Method Blks	LCS	LCSD	LCSD RPD	MS	MSD	MSD RPD	REP RPD	ICS AB	Serial Dilution	Field Dup RPD	Eq Blks	Field Blks	TAL
7429-90-5 Al	✓	✓	✓	✓	1.33J	✓	✓	✓					✓		✓	✓	NA	✓
7440-39-3 Ba			0.0003	0.0004	✓	✓	✓	✓							✓	✓		✓
7440-41-7 Be			✓	0.0002	✓	✓	✓	✓		Not Run					✓	✓		✓
7440-43-9 Cd			✓		✓	✓	✓	✓							✓	✓		✓
7440-70-2 Ca			✓	0.0165	✓	✓	✓	✓		on this					✓	0.0932J		✓
7440-47-3 Cr			0.003	0.0008	✓	✓	✓	✓							✓	✓		✓
7440-48-4 Co			✓	✓	✓	✓	✓	✓		SDG for					✓	✓		✓
7440-50-8 Cu			✓	✓	✓	✓	✓	✓							✓	✓		✓
7439-89-6 Fe			✓	✓	✓	✓	✓	✓		ICP & CVAA					✓	0.0440J		✓
7439-95-4 Mg			✓	✓	✓	✓	✓	✓							✓	0.00582J		✓
7439-96-5 Mn			✓	0.0003	✓	✓	✓	✓		Run on					✓	✓		✓
7440-02-0 Ni			✓	✓	✓	✓	✓	✓							✓	✓		✓
7440-09-7 K			✓	✓	✓	✓	✓	✓		Another SDG			126.1		✓	0.201J		✓
7440-22-4 Ag			0.001	0.0027	0.161J	✓	✓	✓							✓	✓		✓
7440-23-5 Na			✓	✓	✓	✓	✓	✓		AND met			123.9		✓	0.359		✓
7440-62-2 V			✓	✓	✓	✓	✓	✓							✓	✓		✓
7440-66-6 Zn			✓	✓	✓	✓	✓	✓		CRITERIA					✓	0.0154		✓
7439-92-1 Pb			✓	✓	✓	✓	✓	✓		The DUP for					✓	✓		✓
7782-49-2 Se			✓	✓	✓	✓	✓	✓							✓	✓		✓
7440-38-2 As			✓	✓	✓	✓	✓	✓		UNANIUM did					✓	✓		✓
7440-36-0 Sb			✓	0.0036	✓	217	✓	✓							✓	✓		✓
7440-28-0 Tl			✓	✓	✓	✓	✓	✓		NOT met					✓	✓		✓
7439-97-6 Hg		✓	✓	0.0001	✓	✓	✓	✓		RPD criteria				NA	✓	✓		✓
Cyanide CN																		
URANIUM		✓	0.0	0.0	0.00625J	✓	✓	✓	✓					✓	✓	0.000131J		✓

mg/kg = ug/g : [(ug/g) x (sample mass (g) / sample vol. (ml)) x (1000ml / liter)] / Dilution Factor = ug/l

NA - Not Applicable TAL - Target Analytes List

- Comments:
- ① Ba blank value < DL; NO data qualified. CR sample results > 5x blank value; NO data qualified. Ag sample results < 5x blank value; detects will be "J" coded.
 - ② Ba, Be, Ca, & Mn blank values < DL; NO data qualified. CR sample result > 5x blank value. NO data qualified. Ag sample results < 5x blank value; "J" code detects. Sb is ND except one sample that < 5x blank value; "J" code one sample. Hg sample results < 5x RL and blank value > RL; detects < 5x RL are "J" coded, ND are "R"
 - ③ Al & U sample results > 5x blank value; NO data qualified. Ag sample results < 5x blank value; "J" code detects
 - ④ Sample results > 5x blank values; NO data qualified.

REVIEWED BY: Kevin A Lambert DATE: 10-28-99

⑤ Concentration of Al, Ca, Fe & Mg in sample are ≤ their concentration in ICS, NO data qualification necessary
 ⑥ ICS % R < 1.0% above upper limit. LCSD % R met criteria. NO data qualified

INORGANIC METALS:

Aqueous

Lab#

9907510-02 (EB)

Batch #

153936 (U)

153535 (H₂)

153761

SITE/PROJECT: CCTA-09

ARCOG #: 602159

LABORATORY: GEL

LABORATORY REPORT #: 9907510

METHODS: EPA 6010B (ICP), 6020 (ICP-MS) & 7470A (CVAA)

QC Element/ Analyte	ICV	CCV	ICB	CCB	Method Blks	LCS	LCSD	LCSD RPD	MS	MSD	MSD RPD	REP RPD	ICS AB	Serial Dilution	Field Dup RPD	Eq. Blks	Field Blks	TAL
7429-90-5 Al	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	NA	✓	✓	NA	NA	✓	NA	✓
7440-39-3 Ba			0.0001	0.0002	✓	✓	✓	✓	✓			✓	✓			✓		✓
7440-41-7 Be			✓	0.0002	✓	✓	✓	✓	✓			✓	✓			✓		✓
7440-43-9 Cd			0.0004	0.0005	✓	✓	✓	✓	✓			✓	✓			✓		✓
7440-70-2 Ca			✓	0.0348	✓	✓	✓	✓	✓			✓	✓			0.0935J		✓
7440-47-3 Cr			✓	✓	✓	✓	✓	✓	✓			✓	✓			✓		✓
7440-48-4 Co			✓	✓	✓	✓	✓	✓	✓			✓	✓			✓		✓
7440-50-8 Cu			✓	✓	✓	✓	✓	✓	✓			✓	✓			✓		✓
7439-89-6 Fe			✓	0.0167	✓	✓	✓	✓	✓			✓	✓			0.0440J		✓
7439-95-4 Mg			✓	0.0345	✓	✓	✓	✓	✓			✓	✓			0.00582J		✓
7439-96-5 Mn			✓	0.0002	✓	✓	✓	✓	✓			✓	✓			✓		✓
7440-02-0 Ni			✓	✓	✓	✓	✓	✓	✓			✓	✓			✓		✓
7440-09-7 K			✓	✓	✓	✓	✓	✓	✓			✓	✓			0.0201J		✓
7440-22-4 Ag			✓	✓	✓	✓	✓	✓	✓			✓	✓			✓		✓
7440-23-5 Na			✓	✓	✓	✓	✓	✓	✓			✓	126.9			0.359		✓
7440-62-2 V			✓	✓	✓	✓	✓	✓	✓			✓	✓			✓		✓
7440-66-6 Zn			✓	✓	0.00239J	✓	✓	✓	✓			✓	✓			0.0154		✓
					✓ KAL 10-19-99								✓ KAL 10-19-99			✓ KAL 10-19-99		
7439-92-1 Pb			✓	✓	✓	✓	✓	✓	✓			✓	✓			✓		✓
7782-49-2 Se			✓	✓	✓	✓	✓	✓	✓			✓	✓			✓		✓
7440-38-2 As			✓	✓	✓	✓	✓	✓	✓			✓	✓			✓		✓
7440-36-0 Sb			✓	✓	✓	✓	✓	✓	✓			✓	✓			✓		✓
7440-28-0 Tl			✓	0.004	✓	✓	✓	✓	✓			✓	✓			✓		✓
7439-97-6 Hg			✓	✓	✓	✓	✓	✓	NA	NA	NA	NA	NA			✓		✓
Cyanide CN																		
URANIUM	✓	✓	✓	0.00010	0.000062J	✓	✓	✓	NA	NA	NA	NA	✓			0.000131J		✓

mg/kg = ug/g : [(ug/g) x (sample mass (g) / sample vol. (ml))] x (1000ml / liter) / Dilution Factor = ug/l

NA-Not Applicable

TAL-Target Analytes List

Comments:

- ① Ba + Cd < DL; no data were qualified.
- ② Ba, Be, Ca, Fe, + Mn < DL; no data were qualified. Cd, Mg, Tl, + U > DL; Cd + Tl sample results are ND and no data were qualified; Mg sample result < 5x blank value and will be "J" coded; U sample result > 5x blank value and no data was qualified.
- ③ U + Zn > DL: U sample result < 5x blank value and will be qualified "J"; Zn sample result > 5x blank value and no data were qualified.
- ④ Concentration of Al, Co, Fe, + Mg in sample are ≤ their concentration in ICS; no data qualification necessary.

REVIEWED BY: Lynn A Lambert

DATE: 10-28-99

MEMORANDUM

DATE: October 28, 1999

TO: File

FROM: Kevin Lambert *KAL*

SUBJECT: Organic Data Review and Validation
CCTA -09, ARCOG No. 602159, and Project/Task No. 7214.01.05

See the attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

The samples were prepared and analyzed with accepted procedures and specified method (VOC - EPA8260, SVOC - EPA 8270, and HE - EPA8330). Problems were identified with the data package that result in the qualification of data.

1. VOC Analysis: For the equipment blank (EB) and trip blank (TB), the calibration response factor (RF) for 2-butanone was less than (<) the required minimum but greater than (>) 0.01. Also, the continuing calibration verification (CCV) percent difference (%D) was > 20% but < 40%. Sample results are non-detect and will be qualified "UJ." The RF for trichloroethene was < the required minimum. Sample results are non-detect and will be qualified "UJ."
2. VOC Analysis: For the EB and TB, methylene chloride was observed at an estimated value ("J" coded) in the method blank (MB). Sample results are < 10 times (10x) the blank concentration and will be qualified "U, B."
3. VOC Analysis: For soil samples, chloroform was observed at an estimated value ("J" coded) in the MB. Sample results are < 5x the MB concentration and will be qualified "U1, B."
4. VOC Analysis: For the field duplicate pair, xylenes (total) did not meet acceptance criteria. The difference between the original result and duplicate result was > the reporting limit (RL). Detected sample results will be qualified "J" and non-detects will be qualified "UJ."
5. SVOC Analysis: For soil samples, the calibration correlation coefficient (R^2) for benzo(b)fluoranthrene was < 0.99 but > 0.90. Also, the CCV %D was > 20% but < 40%. Sample results are non-detect and will be qualified "UJ." The CCV %D for 4-nitrophenol and 4-nitroaniline were > 40% but < 60%. Sample results are non-detect and will be qualified "UJ."

Data is acceptable and QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

VOC, SVOC, and HE Analysis: The samples were extracted and analyzed within the prescribed holding times.

Calibration

VOC Analysis: The initial and continuing calibration data met QC acceptance criteria except as noted above in the summary section. For the EB, the RF for 1,1,2,2-tetrachloroethene was slightly < the acceptance criteria and for the soil samples, the RF for trichloroethene was slightly < the acceptance criteria. Sample results are non-detect; no data were qualified. The CCV %D met QC acceptance criteria except as noted above in the summary section. For the EB, the CCV %D for bromomethane was > 20% but < 40% and for the soil samples, the CCV %D for 2-butanone, carbon tetrachloride, bromoform, 4-methyl-2-pentanone, 2-hexanone, and styrene were > 20% but < 40%. Sample results are non-detect; no data were qualified.

SVOC Analysis: The initial and continuing calibration data met QC acceptance criteria except as noted above in summary section. For the EB, the RF for acenaphthene was slightly < the acceptance criteria. Sample results are non-detect; no data were qualified. For the soil samples, the R² for bis(2-chloroisopropyl)ether and 2,4-dinitrophenol were slightly < 0.99 but > 0.90. All other QC met acceptance criteria and sample results are non-detect; no data were qualified. For the EB, the CCV %D for bis(2-chloroethyl)ether, bis(2-chloroisopropyl)ether, and 2,4-dinitrophenol were slightly > 20% but < 40%. Sample results are non-detect; no data were qualified. For the soil samples, the CCV %D for hexachloroethane, 3-nitroaniline, dibenz(a,h)anthracene, and benzoic acid were slightly > 20% but < 40%. Sample results are non-detect; no data were qualified.

HE Analysis: The initial and continuing calibration data met QC acceptance criteria.

Blanks

VOC Analysis: For the EB, no target analytes were detected in the MB except for methylene chloride. The sample result was < 10x the EB value already qualified as noted above in the summary section. For the soil samples, no target analytes were detected in the MB except for chloroform. Sample results are < 5x the MB concentration and are already qualified as noted above in the summary section.

SVOC and HE Analysis: No target analytes were detected in the MBs.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

VOC Analysis: The MS/MSD met QC acceptance criteria.

SVOC Analysis: For the soil samples, the MS/MSD met QC acceptance criteria except the MSD %R for phenol (52.2) was slightly < the lower limit (55.3). All other QC met acceptance criteria and sample results are non-detect; no data were qualified. For the EB, No MS/MSD was run on this SDG. An MS/MSD was run on another SDG in the analytical batch and met QC acceptance criteria except for 1,4-dichlorobenzene.

HE Analysis: For the soil samples, the MS/MSD met QC acceptance criteria except the MS/MSD RPD for tetryl (35.4) was slightly outside the control limit (30). All other QC met acceptance criteria and sample results are non-detect; no data were qualified. For the EB, the MS/MSD met QC acceptance criteria except the MS/MSD RPD for nitrobenzene (34.0) was outside the control limit (20.4). All other QC met acceptance criteria and sample results are non-detect; no data were qualified.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analyses

VOC, SVOC, and HE Analysis: The LCS/LCSD met QC acceptance criteria.

Surrogates

VOC, SVOC, and HE Analysis: The surrogate recoveries met QC acceptance criteria.

Internal Standards

VOC and SVOC Analysis: Internal standards met QC acceptance criteria.

Confirmation

HE Analysis: Sample results are non-detect; no confirmation analysis was necessary.

Other QC

VOC Analysis: No target analytes were detected in the TB except methylene chloride. The TB result was qualified a non-detect as noted above in the summary section. Therefore, no sample results were qualified since all compounds in the TB are non-detect. No target analytes were detected in the EB except for acetone. Sample results are non-detect; no data were qualified. Sample results for the field duplicate pair were non-detect except for xylenes (total). The QC acceptance criteria were not met and detected sample results will be qualified as noted above in the summary section. No field blank (FB) was submitted on the ARCOC.

SVOC and HE Analysis: No target analytes were detected in the EB. Sample results for the field duplicate pair were non-detect; the RPD cannot be determined. No field blank (FB) was submitted on the ARCOC.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

Soil

SITE/PROJECT: CCTA-09 ARCO# : 602159
LABORATORY: GEL LABORATORY REPORT #: 9907510

Surrogate Recovery and Internal Standard Outliers

Sample	SMC 1	SMC 2	SMC 3	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3- area	IS 3- RT			
<i>MET</i>												
<i>MET</i>												
<i>CRITERIA</i>												
<i>CRITERIA</i>												

SMC 1: 4-Bromofluorobenzene
SMC 2: 1,2-Dichloroethane-d4
SMC 3: Toluene-d8
IS 1: Bromochloromethane
IS 2: 1,4-Difluorobenzene
IS 3: Chlorobenzene-d5

- Comments:
- ② All compounds met RF criteria except for trichloroethene which was slightly below required RF. CCV %D met criteria; no data were qualified based on professional judgement
 - ③ The CCV %D for 2-butanone, carbon tetrachloride, bromoform, 4-methyl-2-pentanone, 2-heptanone, & styrene are >20% but <40%. Sample results are ND; no data were qualified

- ① All compounds were ND except for methylene chloride, chloroform, toluene, & xylenes (total). For NDs, field precision can not be assessed. Methylene chloride, chloroform, & toluene met acceptance criteria; no data were qualified. Xylenes (total) did not meet criteria; the differences between original & duplicate result is > RL. Detects will be qualified "J" and non-detects will be qualified "UJ"
- ④ Sample results are < 5x blank value for chloroform and will be qualified "U, B."
- ⑤ Acetone sample results are ND; no data were qualified
- ⑥ Methylene chloride in the trip blank was qualified "U, B" (i.e. non-detect) due to method blank contamination. Therefore, no sample results were qualified since all compounds in trip blank are non-detect.

B-9

Aqueous

Lab#

Batch #
154326

9907510-05 => EB

11 -06 => TB

SITE/PROJECT: CCTA-09 ARCO# : 602159
 LABORATORY: GEL LABORATORY REPORT #: 9907510

IS	GC/MS Name	CAS #	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Trip Blks	TAL		
					>.05	<20% / 0.99	20%								NA					
1	Chloromethane	74-87-3	0.10	✓	✓	✓	✓	✓								✓	✓	✓		
1	Bromomethane	74-83-9	0.10		✓	✓	24.2											✓		
1	vinyl chloride	75-01-4	0.10		✓	✓	✓	↓										✓		
1	Chloroethane	75-00-3	0.01		✓	✓	✓	↓										✓		
1	methylene chloride (10xblk)	75-09-2	0.01	✓	✓	✓	✓	1.9J									↓	1.5TB	✓	
1	acetone (10xblk)	67-64-1	0.01		✓	✓	✓										3.7J	✓	✓	
1	carbon disulfide	75-15-0	0.10		✓	✓	✓										✓	✓	✓	
1	1,1-dichloroethene	75-35-4	0.20		✓	✓	✓											✓		
1	1,1-dichloroethane	75-34-3	0.10		✓	✓	✓											✓		
1	Chloroform	67-66-3	0.20		✓	✓	✓											✓		
1	1,2-dichloroethane	107-06-2	0.10		✓	✓	✓											✓		
1	2-butanone (10xblk)	78-93-3	0.01		0.039	✓	30.3											✓		
2	1,1,1-trichloroethane	71-55-6	0.10		✓	✓	✓											✓		
2	carbon tetrachloride	56-23-5	0.10		✓	✓	✓											✓		
2	Bromodichloromethane	75-27-4	0.20		✓	✓	✓											✓		
2	1,2-dichloropropane	78-87-5	0.01		✓	✓	✓											✓		
2	cis-1,3-dichloropropene	10061-01-5	0.20		✓	✓	✓											✓		
2	Trichloroethene	79-01-6	0.30		0.2317	✓	✓											✓		
2	Dibromochloromethane	124-48-1	0.10		✓	✓	✓											✓		
2	1,1,2-trichloroethane	79-00-5	0.10		✓	✓	✓											✓		
2	Benzene	71-43-2	0.50		✓	✓	✓											✓		
2	trans-1,3-dichloropropene	10061-02-6	0.10		✓	✓	✓											✓		
2	Bromoform	75-25-2	0.10		✓	✓	✓											✓		
3	4-methyl-2-pentanone	108-10-1	0.10		✓	✓	✓											✓		
3	2-hexanone	591-78-6	0.01		✓	✓	✓											✓		
3	Tetrachloroethene	127-18-4	0.20		✓	✓	✓											✓		
3	1,1,2,2-tetrachloroethane	79-34-5	0.30		0.294	✓	✓											✓		
3	toluene (10xblk)	108-88-3	0.40		✓	✓	✓		✓	✓	✓	✓	✓	✓				✓		
3	Chlorobenzene	108-90-7	0.50		✓	✓	✓		✓	✓	✓	✓	✓	✓				✓		
3	Ethylbenzene	100-41-4	0.10		✓	✓	✓											✓		
3	Styrene	100-42-5	0.30		✓	✓	✓											✓		
3	xylenes (total)	1330-20-7	0.30		✓	✓	✓											✓		
	1,2-dichloroethylene (total)	540-50-0	0.01																	
	2-chloroethyl vinyl ether	110-75-8																		
	1,2-cis-dichloroethylene	156-59-2			✓	✓	✓												✓	
	1,2-trans-dichloroethylene	156-60-05			✓	✓	✓												✓	
	vinyl acetate	108-05-4			✓	✓	✓													

Comments: NA - Not Applicable

REVIEWED BY: Kevin A Lambert

DATE: 10-14-99

Aqueon

SITE/PROJECT: CCTA-09 ARCO# : 602159
 LABORATORY: GEL LABORATORY REPORT #: 9907510

Surrogate Recovery and Internal Standard Outliers

Sample	SMC 1	SMC 2	SMC 3	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3- area	IS 3- RT			

MET MET
 CRITERIA CRITERIA

SMC 1: 4-Bromofluorobenzene IS 1: Bromochloromethane
 SMC 2: 1,2-Dichloroethane-d4 IS 2: 1,4-Difluorobenzene
 SMC 3: Toluene-d8 IS 3: Chlorobenzene-d5

Comments: ① Bromomethane $CCV \%D^{slightly} > 20\%$ but less than 40%; Sample results are ND; No data were qualified.
 2-butanone RF $<$ required minimum but > 0.01 ; $CCV \%D > 20\%$ but $< 40\%$; Sample results are ND;
 Data will be qualified "UJ". Trichloroethene RF $<$ required minimum; Sample results are ND;
 Data will be qualified "UJ". 1,1,2,2-tetrachloroethene RF is slightly $<$ required minimum; Sample
 results are ND; NO data were qualified.

② Sample results is $<$ 10X blank value; Data will be qualified "U, B".

Soil

Lab# 9907510-07 9907510-15 9907510-23
 ↓ -09 -17(DU) -25
 ↓ -11 -19(DU) -27
 ↓ -13 -21 -29

SITE/PROJECT: CCTA-09 ARCO# 602159
 LABORATORY: GEL LABORATORY REPORT #: 9907510

Batch # 153703

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL
						>.05	<20% / 0.99	20%											NA
1	A	108-95-2	Phenol	0.80		✓	✓	✓	✓	✓	✓	✓	✓	52.2	✓		✓		✓
1	BN	111-44-4	bis(2-Chloroethyl)ether	0.70		✓	✓	✓											✓
1	A	95-57-8	2-Chlorophenol	0.80		✓	✓	✓		✓	✓	✓	✓		✓				✓
1	BN	541-73-1	1,3-Dichlorobenzene	0.60		✓	✓	✓											✓
1	BN	106-46-7	1,4-Dichlorobenzene	0.50		✓	✓	✓		✓	✓	✓	✓	✓	✓				✓
1	BN	95-50-1	1,2-Dichlorobenzene	0.40		✓	✓	✓											✓
1	A	95-48-7	2-Methylphenol	0.70		✓	✓	✓											✓
1	BN	108-60-1	bis(2-chloroisopropyl)ether	0.01	✓	✓	0.986	✓											✓
1	A	106-44-5	4-Methylphenol	0.60		✓	✓	✓											✓
1	BN	621-64-7	N-Nitroso-di-n-propylamine	0.50		✓	✓	✓		✓	✓	✓	✓	✓	✓				✓
1	BN	67-72-1	Hexachloroethane	0.30		✓	✓	23.5											✓
2	BN	98-95-3	Nitrobenzene	0.20		✓	✓	✓											✓
2	BN	78-59-1	Isophorone	0.40		✓	✓	✓											✓
2	A	88-75-5	2-Nitrophenol	0.10		✓	✓	✓											✓
2	A	105-67-9	2,4-Dimethylphenol	0.20		✓	✓	✓											✓
2	BN	111-91-1	bis(2-Chloroethoxy)methane	0.30		✓	✓	✓											✓
2	A	120-83-2	2,4-Dichlorophenol	0.20		✓	✓	✓											✓
2	BN	120-82-1	1,2,4-Trichlorobenzene	0.20		✓	✓	✓		✓	✓	✓	✓	✓	✓				✓
2	BN	91-20-3	Naphthalene	0.70		✓	✓	✓											✓
2	BN	106-47-8	4-Chloroaniline	0.01		✓	✓	✓											✓
2	BN	87-68-3	Hexachlorobutadiene	0.01		✓	✓	✓											✓
2	A	59-50-7	4-Chloro-3-methylphenol	0.20		✓	✓	✓		✓	✓	✓	✓	✓	✓				✓
2	BN	91-57-6	2-Methylnaphthalene	0.40		✓	✓	✓											✓
3	BN	77-47-4	Hexachlorocyclopentadiene	0.01		✓	✓	✓											✓
3	A	88-06-2	2,4,6-Trichlorophenol	0.20		✓	✓	✓											✓
3	A	95-95-4	2,4,5-Trichlorophenol	0.20		✓	✓	✓											✓

Comments: NA - Not Applicable TAL - Target Analyte List

All compounds ND, RPD cannot be determined

REVIEWED BY: Kevin A Lambert DATE: 10-14-99

Soil

SITE/PROJECT: CCTA-09 ARCO# : 602159
 LABORATORY: GEL LABORATORY REPORT #: 9907510

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL
						>.05	<20% / 0.99	20%											NA
3	BN	91-58-7	2-Chloronaphthalene	0.80		✓	✓	✓	✓								✓		✓
3	BN	88-74-4	2-Nitroaniline	0.01		✓	✓	✓											✓
3	BN	131-11-3	Dimethylphthalate	0.01		✓	✓	✓											✓
3	BN	208-96-8	Acenaphthylene	0.90		✓	✓	✓											✓
3	BN	606-20-2	2,6-Dinitrotoluene	0.20		✓	✓	✓											✓
3	BN	99-09-2	3-Nitroaniline	0.01		✓	✓	20.3											✓
3	BN	83-32-9	Acenaphthene	0.90		✓	✓	✓		✓	✓	✓	✓	✓	✓				✓
3	A	51-28-5	2,4-Dinitrophenol	0.01	✓	✓	0.9888	✓											✓
3	A	100-02-7	4-Nitrophenol	0.01		✓	✓	58.8		✓	✓	✓	✓	✓	✓				✓
3	BN	132-64-9	Dibenzofuran	0.80		✓	✓	✓											✓
3	BN	121-14-2	2,4-Dinitrotoluene	0.20		✓	✓	✓		✓	✓	✓	✓	✓	✓				✓
3	BN	84-66-2	Diethylphthalate	0.01		✓	✓	✓											✓
3	BN	7005-72-3	4-Chlorophenyl-phenylether	0.40		✓	✓	✓											✓
3	BN	86-73-7	Fluorene	0.90		✓	✓	✓											✓
3	BN	100-01-6	4-Nitroaniline	0.01		✓	✓	44.9											✓
4	A	534-52-1	4,6-Dinitro-2-methylphenol	0.01	✓	✓	✓	✓											✓
4	BN	86-30-6	N-Nitrosodiphenylamine (1)	0.01		✓	✓	✓											✓
4	BN	101-55-3	4-Bromophenyl-phenylether	0.10		✓	✓	✓											✓
4	BN	118-74-1	Hexachlorobenzene	0.10		✓	✓	✓											✓
4	BN	87-96-3	Pentachlorophenol	0.05		✓	✓	✓											✓
4	BN	85-01-8	Phenanthrene	0.70		✓	✓	✓											✓
4	BN	120-12-7	Anthracene	0.70		✓	✓	✓											✓
4	BN	86-74-8	Carbazole	0.01		✓	✓	✓											✓
4	BN	84-74-2	Di-n-butylphthalate	0.01		✓	✓	✓											✓
4	BN	206-44-0	Fluoranthene	0.60		✓	✓	✓											✓
5	BN	129-00-0	Pyrene	0.60		✓	✓	✓		✓	✓	✓	✓	✓	✓				✓
5	BN	85-68-7	Butylbenzylphthalate	0.01		✓	✓	✓											✓
5	BN	91-94-1	3,3'-Dichlorobenzidine	0.01		✓	✓	✓											✓
5	BN	56-55-3	Benzo(a)anthracene	0.80		✓	✓	✓											✓

Comments:

Soil

SITE/PROJECT: CCTA-09 ARCO# : 602159
 LABORATORY: GEL LABORATORY REPORT #: 9907510

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL
						>.05	<20% / 0.99	20%											NA
5	BN	218-01-9	Chrysene	0.70		✓	✓	✓	✓										✓
5	BN	117-81-7	bis(2-Ethylhexyl)phthalate	0.01		✓	✓	✓											✓
6	BN	117-84-0	Di-n-octylphthalate	0.01		✓	✓	✓											✓
6	BN	205-99-2	Benzo(b)fluoranthene	0.70	✓	✓	0.98976	-27.5											✓
6	BN	207-08-9	Benzo(k)fluoranthene	0.70	✓	✓	✓	✓											✓
6	BN	50-32-8	Benzo(a)pyrene	0.70	✓	✓	✓	✓											✓
6	BN	193-39-5	Indeno(1,2,3-cd)pyrene	0.50	✓	✓	✓	✓											✓
6	BN	53-70-3	Dibenz(a,h)anthracene	0.40	✓	✓	✓	-22.8											✓
6	BN	191-24-2	Benzo(g,h,i)perylene	0.50	✓	✓	✓	✓											✓
		65-95-0	benzoic acid		✓	✓	✓	-23.0											✓
		100-51-6	benzyl alcohol	10-15-99	✓	✓	✓	✓											✓
		122-66-7	1,2-diphenylhydrazine		✓	✓	✓	✓	✓										✓

RPD can not be determined
 Compound ND

Surrogate Recovery Outliers

Sample	SMC 1	SMC 2	SMC 3	SMC 4	SMC 5	SMC 6	SMC 7	SMC 8
			MET					
			CRITERIA					

SMC 1: Nitrobenzene-d5 (BN) SMC 2: 2-Fluorobiphenyl (BN) SMC 3: p-Terphenyl-d14 (BN)
 SMC 4: Phenol-d6 (A) SMC 5: 2-Fluorophenol (A) SMC 6: 2,4,6-Tribromophenol (A)
 SMC 7: 2-2-Chlorophenol-d4 (A) SMC 8: 1,2-Dichlorobenzene-d4 (BN)

Internal Standard Outliers

Sample	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3-area	IS 3-RT	IS 4-area	IS 4-RT	IS 5-area	IS 5-RT	IS 6-area	IS 6-RT

IS 1: 1,4-Dichlorobenzene-d4 (BN) IS 2: Naphthalene-d8 (BN) IS 3: Acenaphthene-d10 (BN)
 IS 4: Phenanthrene-d10 (BN) IS 5: Chrysene-d12 (BN) IS 6: Perylene-d12 (BN)

Comments: ① Three compounds R² was ^{use 10-15-99 slightly} < 0.99 but > 0.90. For bis(2-chloroisopropyl) ether and 2,4-dinitrophenol all other QC met criteria; Sample results are ND; No data were qualified. For benzo(b)-fluoranthene the CCV %D was > 20% but < 40%; Sample results are ND; Data will be qualified "UJ".

② Five compounds CCV %D was > 20% but < 40%. For Benzo(b)fluoranthene the R² was < 0.99 but > 0.90; Sample results are ND; Data will be qualified "UJ". For the remaining four compounds, sample results are ND; No data were qualified.

Two compounds CCV %D was > 40% but < 60%. Sample results for 4-nitrophenol and 4-nitroaniline are ND; Data will be qualified "UJ".

③ Phenol MSD %R was slightly below QC criteria (55.3). The MS %R, LCS/LCSD, and MS/MSD RPD met criteria; Sample results are ND; No data were qualified.

Aqueous

Lab#
 9907510-03 (EB)

Batch#
 153516

SITE/PROJECT: CCTA-09 ARCO# : 602159
 LABORATORY: GEL LABORATORY REPORT #: 9907510

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL
						>.05	<20% / 0.99	20%								NA		NA	
1	A	108-95-2	Phenol	0.80		✓	✓	✓	✓	✓	✓	✓		Not Run			✓		✓
1	BN	111-44-4	bis(2-Chloroethyl)ether	0.70		✓	✓	24.1											✓
1	A	95-57-8	2-Chlorophenol	0.80		✓	✓	✓		✓	✓	✓		on this					✓
1	BN	541-73-1	1,3-Dichlorobenzene	0.60		✓	✓	✓											✓
1	BN	106-46-7	1,4-Dichlorobenzene	0.50		✓	✓	✓		✓	✓	✓		SDG					✓
1	BN	95-50-1	1,2-Dichlorobenzene	0.40		✓	✓	✓											✓
1	A	95-48-7	2-Methylphenol	0.70		✓	✓	✓						Run on					✓
1	BN	108-60-1	bis(2-chloroisopropyl)ether	0.01		✓	✓	23.3											✓
1	A	106-44-5	4-Methylphenol	0.60		✓	✓	✓						similar					✓
1	BN	621-64-7	N-Nitroso-di-n-propylamine	0.50		✓	✓	✓		✓	✓	✓							✓
1	BN	67-72-1	Hexachloroethane	0.30		✓	✓	✓						matrix					✓
2	BN	98-95-3	Nitrobenzene	0.20		✓	✓	✓						from					✓
2	BN	78-59-1	Isophorone	0.40		✓	✓	✓											✓
2	A	88-75-5	2-Nitrophenol	0.10		✓	✓	✓						another					✓
2	A	105-67-9	2,4-Dimethylphenol	0.20		✓	✓	✓											✓
2	BN	111-91-1	bis(2-Chloroethoxy)methane	0.30		✓	✓	✓											✓
2	A	120-83-2	2,4-Dichlorophenol	0.20		✓	✓	✓						SDG					✓
2	BN	120-82-1	1,2,4-Trichlorobenzene	0.20		✓	✓	✓		✓	✓	✓							✓
2	BN	91-20-3	Naphthalene	0.70		✓	✓	✓						Met					✓
2	BN	106-47-8	4-Chloroaniline	0.01		✓	✓	✓											✓
2	BN	87-68-3	Hexachlorobutadiene	0.01		✓	✓	✓						Criteria					✓
2	A	59-50-7	4-Chloro-3-methylphenol	0.20		✓	✓	✓		✓	✓	✓		except for					✓
2	BN	91-57-6	2-Methylnaphthalene	0.40		✓	✓	✓						1,4-dichlorobenzene					✓
3	BN	77-47-4	Hexachlorocyclopentadiene	0.01		✓	✓	✓						which fails					✓
3	A	88-06-2	2,4,6-Trichlorophenol	0.20		✓	✓	✓						low					✓
3	A	95-95-4	2,4,5-Trichlorophenol	0.20		✓	✓	✓											✓

Comments: NA- Not Applicable TAL- Target Analyte List

REVIEWED BY: Kevin A Lambert DATE: 10-14-99

Aqueous

SITE/PROJECT: CCTA-09 ARCO# : 602159
 LABORATORY: GEL LABORATORY REPORT #: 9907510

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAI
						>.05	<20% / 0.99	20%								NA		NA	
3	BN	91-58-7	2-Chloronaphthalene	0.80		✓	✓	✓	✓				Not Run				✓		✓
3	BN	88-74-4	2-Nitroaniline	0.01		✓	✓	✓					ON THIS						✓
3	BN	131-11-3	Dimethylphthalate	0.01		✓	✓	✓					SDG						✓
3	BN	208-96-8	Acenaphthylene	0.90		✓	✓	✓					SDG						✓
3	BN	606-20-2	2,6-Dinitrotoluene	0.20		✓	✓	✓					SDG						✓
3	BN	99-09-2	3-Nitroaniline	0.01		✓	✓	✓					SDG						✓
3	BN	83-32-9	Acenaphthene	0.90		0.8686	✓	✓		✓	✓	✓	Run on						✓
3	A	51-28-5	2,4-Dinitrophenol	0.01	✓	✓	✓	21.2					Run on						✓
3	A	100-02-7	4-Nitrophenol	0.01		✓	✓	✓		✓	✓	✓	Another						✓
3	BN	132-64-9	Dibenzofuran	0.80		✓	✓	✓					SDG						✓
3	BN	121-14-2	2,4-Dinitrotoluene	0.20		✓	✓	✓		✓	✓	✓	SDG						✓
3	BN	84-66-2	Diethylphthalate	0.01		✓	✓	✓					SDG						✓
3	BN	7005-72-3	4-Chlorophenyl-phenylether	0.40		✓	✓	✓					with						✓
3	BN	86-73-7	Fluorene	0.90		✓	✓	✓					SDG						✓
3	BN	100-01-6	4-Nitroaniline	0.01		✓	✓	✓					SDG						✓
4	A	534-52-1	4,6-Dinitro-2-methylphenol	0.01	✓	✓	✓	✓					SDG						✓
4	BN	86-30-6	N-Nitrosodiphenylamine (I)	0.01		✓	✓	✓					SDG						✓
4	BN	101-55-3	4-Bromophenyl-phenylether	0.10		✓	✓	✓					SDG						✓
4	BN	118-74-1	Hexachlorobenzene	0.10		✓	✓	✓					SDG						✓
4	A	87-86-5	Pentachlorophenol	0.05		✓	✓	✓					SDG						✓
4	BN	85-01-8	Phenanthrene	0.70		✓	✓	✓					SDG						✓
4	BN	120-12-7	Anthracene	0.70		✓	✓	✓					SDG						✓
4	BN	86-74-8	Carbazole	0.01		✓	✓	✓					SDG						✓
4	BN	84-74-2	Di-n-butylphthalate	0.01		✓	✓	✓					SDG						✓
4	BN	206-44-0	Fluoranthene	0.60		✓	✓	✓					SDG						✓
5	BN	129-00-0	Pyrene	0.60		✓	✓	✓		✓	✓	✓	SDG						✓
5	BN	85-68-7	Butylbenzylphthalate	0.01		✓	✓	✓					SDG						✓
5	BN	91-94-1	3,3'-Dichlorobenzidine	0.01		✓	✓	✓					SDG						✓
5	BN	56-55-3	Benzo(a)anthracene	0.80		✓	✓	✓					SDG						✓

Comments:

Aqueous

SITE/PROJECT: CCTA-09 ARCO# : 602159
 LABORATORY: GEL LABORATORY REPORT #: 9907510

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq Blks	Field Blks	TAL
						>.05	<20% / 0.99	20%								NA		NA	
5	BN	218-01-9	Chrysene	0.70		✓	✓	✓	✓								✓		✓
5	BN	117-81-7	bis(2-Ethylhexyl)phthalate	0.01		✓	✓	✓											✓
6	BN	117-84-0	Di-n-octylphthalate	0.01		✓	✓	✓											✓
6	BN	205-99-2	Benzo(b)fluoranthene	0.70		✓	✓	✓											✓
6	BN	207-08-9	Benzo(k)fluoranthene	0.70		✓	✓	✓											✓
6	BN	50-32-8	Benzo(a)pyrene	0.70		✓	✓	✓											✓
6	BN	193-39-5	Indeno(1,2,3-cd)pyrene	0.50		✓	✓	✓											✓
6	BN	53-70-3	Dibenz(a,h)anthracene	0.40	✓	✓	✓	✓											✓
6	BN	191-24-2	Benzo(g,h,i)perylene	0.50		✓	✓	✓											✓
		65-85-0	benzoic acid		✓	✓	✓	✓											✓
		100-51-6	benzyl alcohol			✓	✓	✓											✓
		122-66-7	1,2-diphenylhydrazine			✓	✓	✓											✓

SEE PREVIOUS PAGES

Surrogate Recovery Outliers

Sample	SMC 1	SMC 2	SMC 3	SMC 4	SMC 5	SMC 6	SMC 7	SMC 8
MEET CRITERIA								

Comments: ① Acenaphthene RF was slightly < the required RF; Sample results are ND; CCV %D met criteria; No data were qualified
 ② Three compounds CCV %D were slightly > 20% but < 40%; Sample results are ND; NO data were qualified.

SMC 1: Nitrobenzene-d5 (BN) SMC 2: 2-Fluorobiphenyl (BN) SMC 3: p-Terphenyl-d14 (BN)
 SMC 4: Phenol-d6 (A) SMC 5: 2-Fluorophenol (A) SMC 6: 2,4,6-Tribromophenol (A)
 SMC 7: 2-2-Chlorophenol-d4 (A) SMC 8: 1,2-Dichlorobenzene-d4 (BN)

Internal Standard Outliers

Sample	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3-area	IS 3-RT	IS 4-area	IS 4-RT	IS 5-area	IS 5-RT	IS 6-area	IS 6-RT
MEET CRITERIA												

IS 1: 1,4-Dichlorobenzene-d4 (BN) IS 2: Naphthalene-d8 (BN) IS 3: Acenaphthene-d10 (BN)
 IS 4: Phenanthrene-d10 (BN) IS 5: Chrysene-d12 (BN) IS 6: Perylene-d12 (BN)

HIGH EXPLOSIVES:
SW846 Method 8330

Soil

Lab# 9907510-07 9907510-15 9907510-23
 ↓ -09 ↓ -17(DU) ↓ -25
 ↓ -11 ↓ -19(DU) ↓ -27
 ↓ -13 ↓ -21 ↓ -29

QACCA # 125672

SITE/PROJECT: CCTA-09 ARCO #: 602159
 LABORATORY: GEL LABORATORY REPORT #: 9907510

①

NAME	CAS #	Intercept	Curve R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL	
			.99	20%	U			20%			20%	RPD	U	U		
HMX	2691-41-0		✓	✓	✓	✓	✓	✓	✓	✓	✓	RPD	✓	NA	✓	
RDX	121-82-4		✓	✓		✓	✓	✓	✓	✓	✓	RPD			✓	
1,3,5-Trinitrobenzene	99-35-4		✓	✓		✓	✓	✓	✓	✓	✓	Sample Results ND RPD can not be determined			✓	
1,3-dinitrobenzene	99-65-0		✓	✓		✓	✓	✓	✓	✓	✓				✓	
Nitrobenzene	98-95-3		✓	✓		✓	✓	✓	✓	✓	✓				✓	
Tetryl	479-45-8		✓	✓		✓	✓	✓	✓	✓	35.4				✓	
2,4,6-trinitrotoluene	118-96-7		✓	✓		✓	✓	✓	✓	✓	✓				✓	
2-amino-4,6-dinitrotoluene	35572-78-2		✓	✓		✓	✓	✓	✓	✓	✓				✓	
4-amino-2,6-dinitrotoluene	19406-51-0		✓	✓		✓	✓	✓	✓	✓	✓				✓	
2,4-dinitrotoluene	121-14-2		✓	✓		✓	✓	✓	✓	✓	✓				✓	
2,6-dinitrotoluene	606-20-2		✓	✓		✓	✓	✓	✓	✓	✓				✓	
2-nitrotoluene	88-72-2		✓	✓		✓	✓	✓	✓	✓	✓				✓	
4-nitrotoluene	99-99-0		✓	✓		✓	✓	✓	✓	✓	✓				✓	
3-nitrotoluene	99-08-1		✓	✓		✓	✓	✓	✓	✓	✓				✓	
PEPN	78-11-5															

Sample	SMC %REC	SMC RT	Sample	SMC %REC	SMC RT
MEF					
CRITERIA					

Sample	CAS #	RPD > 25%	Sample	CAS #	RPD > 25%
NOT PROVIDED					

NA - Not Applicable TAL - Target Analyte List
 Comments:
 ① MS/MSD RPD for tetryl is outside QC criteria (30). MS, MSD, LCS/LCSD and surrogate recoveries met criteria; Sample results are ND; no data were qualified

mg/kg = ug/g : [(ug/g) x (sample mass (g) / sample vol. (ml)) x (1000ml / liter)] / Dilution Factor = ug/l

REVIEWED BY: Kevin A Lambert DATE: 10-15-99

HIGH EXPLOSIVES:
SW846 Method 8330

Aqueous

Lab #

Batch #

9907510-04 (EB)

153526

SITE/PROJECT: CCTA-09

ARCO #: 602159

LABORATORY: GEL

LABORATORY REPORT #: 9907510

①

NAME	CAS #	Intercept	Curve R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL
			.99	20%	U			10-15-99 KAL 20%			20%		U	U	
HMX	2691-41-0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	NA	✓
RDX	121-82-4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1,3,5-Trinitrobenzene	99-35-4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1,3-dinitrobenzene	99-65-0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrobenzene	98-95-3	✓	✓	✓	✓	✓	✓	✓	✓	✓	34.0	✓	✓	✓	✓
Tetryl	479-45-8	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2,4,6-trinitrotoluene	118-96-7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2-amino-4,6-dinitrotoluene	35572-78-2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4-amino-2,6-dinitrotoluene	19406-51-0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2,4-dinitrotoluene	121-14-2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2,6-dinitrotoluene	606-20-2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2-nitrotoluene	88-72-2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4-nitrotoluene	99-99-0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3-nitrotoluene	99-08-1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PETN	78-11-5														

Sample	SMC %REC	SMC RT	Sample	SMC %REC	SMC RT
MEET CRITERIA					
Confirmation					
Sample	CAS #	RPD > 25%	Sample	CAS #	RPD > 25%
Sample Results are ND					
NOT RUN					

NA - Not Applicable TAL - Target Analyte List
 Comments: ^{MSF KAL 10-15-99}
 ① Nitrobenzene ^{MSD} RPD is outside QC criteria (20.4). MS, MSD, LCS/LCSD and Surrogate recoveries met criteria. Sample result is ND; no data is qualified

mg/kg = ug/g : [(ug/g) x (sample mass (g) / sample vol. (ml)) x (1000ml / 1liter)] / Dilution Factor = ug/l

REVIEWED BY: Kevin A Lambert

DATE: 10-15-99

MEMORANDUM

DATE: October 28, 1999

TO: File

FROM: Kevin Lambert *KAL*

SUBJECT: Radiochemical Data Review and Validation
CCTA -09, ARCOG No. 602159, and Project/Task No. 7214.01.05

See the attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

The samples were prepared and analyzed with accepted procedures and specified methods (Gross Alpha/Beta - EPA900.0). All analytes were successfully analyzed. No problems were identified with the data package that result in the qualification of data.

Data is acceptable and QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

The samples were analyzed within the prescribed holding times.

Calibration

No calibration data was provided. Case narrative states instrument was properly calibrated.

Blanks

No target analytes were detected in the method blank (MB).

Laboratory Control Sample (LCS) Analyses

The LCS met QC acceptance criteria.

Matrix Spike (MS) Analyses

No MS was run on this sample delivery group (SDG). An MS was run on another SDG in the analytical batch and met QC acceptance criteria.

Replicate Analysis

No replicate was run on this sample delivery group (SDG). A replicate was run on another SDG in the analytical batch and met QC acceptance criteria.

Other QC

No target analytes were observed in the equipment blank (EB) except for gross alpha. Sample results are $> 5x$ EB value; no data were qualified. The field duplicate pair met QC acceptance criteria. No field blank (FB) was submitted on the ARCOC.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

RADIOCHEMISTRY:

Soil

Lab# 9907510-07 9907510-19(Du) Batch #
 -09 -21
 -11 -23
 -13 -25
 -15 -27
 -17(Du) -29
 154031

SITE/PROJECT: CLTA-09 ARCO# 602159
 LABORATORY: GEL LABORATORY REPORT #: 9907510
 METHODS: EPA 900.0 - GROSS Alpha/Beta

QC Element/ Analyte	Method Blks	LCS	MS	Rep RER	Eq. Blks	Field Dup RER	Field Blks	-	Sample ID	Isotope	IS/Trace	Sample ID	Isotope	IS/Trace
CRITERIA	U	20%	25%	<1.0	U	<1.0	U	-			50-105			50-105
H3			NA	NA			NA	-						
U-238														
U-234														
U-235/236														
Th-232														
Th-228														
Th-230														
Pu-239/240														
Gross Alpha	✓	✓			1.02	✓		-						
Nonvolatile Beta	✓	✓				✓		-						
Ra226								-						
Ra228								-						
Ni-63								-						
Gamma Spec- Am241								-						
Gamma Spec- Cs137								-						
Gamma Spec- Co60								-						
								-						

Parameter	Method	Typical Tracer	Typical Carrier
Iso-U	Alpha spec	U-232	NA
Iso-Pu	Alpha spec	Pu-242	NA
Iso-Th	Alpha spec	Th-229	NA
Am-241	Alpha spec	Am-242	NA
Sr-90	Beta	Y ingrowth	NA
Ni-63	Beta	NA	Ni by ICP
Ra-226	Deamination	NA	NA
Ra-226	Alpha spec	Ba-133 or Ra-225	NA
Ra-228	Gamma spec	Ba-133	NA

Comments:

①+② Run on other SDG in batch and met acceptance criteria
 ③ Sample results > 5x blank value; No data qualified qualified
 KAL 10-28-99

Gamma spec LCS contains: Am-241, Cs-137, and Co-60

REVIEWED BY: Kevin A Lambert DATE: 10-28-99

RADIOCHEMISTRY:

Aqueous

Lab #

9907510-01 (EB)

Batch #

154043

SITE/PROJECT: CCTA-09 ARCO #: 602159
 LABORATORY: GEL LABORATORY REPORT #: 9907510
 METHODS: EPA 900.00 - Gross Alpha/Beta

① ②

QC Element/ Analyte	Method Blks	LCS	MS	Rep RER	Eq. Blks	Field Dup RER	Field Blks	-	Sample ID	Isotope	IS/Trace	Sample ID	Isotope	IS/Trace
CRITERIA	U	20%	25%	<1.0	U	<1.0	U	-			50-105			50-105
H3			NA	NA	NA	NA	NA	-						
U-238														
U-234														
U-235/236								-						
Th-232														
Th-228														
Th-230								-						
Pu-239/240														
Gross Alpha	✓	✓						-						
Nonvolatile Beta	✓	✓												
Ra226								-						
Ra228								-						
Ni-63								-						
Gamma Spec- Am241								-						
Gamma Spec- Cs137								-						
Gamma Spec- Co60								-						
			↓	↓	↓	↓	↓	-						

Parameter	Method	Typical Tracer	Typical Carrier
Iso-U	Alpha spec	U-232	NA
Iso-Pu	Alpha spec	Pu-242	NA
Iso-Th	Alpha spec	Th-229	NA
Am-241	Alpha spec	Am-242	NA
Sr-90	Beta	Y ingrowth	NA
Ni-63	Beta	NA	Ni by ICP
Ra-226	Deamination	NA	NA
Ra-226	Alpha spec	Ba-133 or Ra-225	NA
Ra-228	Gamma spec	Ba-133	NA

Comments:

① & ② Run on other SDG in batch and met acceptance criteria

Gamma spec LCS contains: Am-241, Cs-137, and Co-60

REVIEWED BY:

Kevin A. Lambert

DATE:

10-28-99

DATA VALIDATION SUMMARY:

SITE/PROJECT: CCTA-09 CASE #: 7215.2201
 ARCO #: 602159
 LABORATORY: GEL
 LABORATORY REPORT #: 9907510

OF SAMPLES: 30 MATRIX: 24 soil; 6 aqueous
 LAB SAMPLE IDS: 9907510-01 to -06 ⇒ aqueous
11 -07 to -30 ⇒ soil

ANALYSIS/ QC ELEMENT	VOC	SVOC	PEST/ PCB	HPLC (HE)	ICP/AES	GFAA/ AA	CVAA (Hg)	CN	RAD	OTHER
1. HOLDING TIMES/ PRESERVATION	✓	✓	NA	✓	✓	NA	✓	NA	✓	NA
2. CALIBRATIONS	UJ	UJ		✓	J		KAL 10-28-99 JR		✓	
3. METHOD BLANKS	U, B U, B	✓		✓	J		✓		✓	
4. MS/MSD	✓	NA KAL 10-15-99		✓	NA		KAL 10-28-99 AA ✓		NA	
5. LABORATORY CONTROL SAMPLES	✓	✓		✓	✓		✓		✓	
6. REPLICATES					NA		NA		NA	
7. SURROGATES	✓	✓		✓						
8. INTERNAL STDS	✓	✓								
9. TCL COMPOUND IDENTIFICATION	✓	✓								
10. ICP INTERFERENCE CHECK SAMPLE					✓					
11. ICP SERIAL DILUTION					NA					
12. CARRIER/CHEM TRACER RECOVERIES									NA	
13. OTHER QC	UJ	✓	↓	✓	J	↓	✓	↓	✓	↓

CHECK MARK (✓) - ACCEPTABLE
 J - ESTIMATED
 U - NOT DETECTED

SHADED CELLS - NOT APPLICABLE
 UJ - NOT DETECTED, ESTIMATED
 R - UNUSABLE

NA - Not Applicable

REVIEWED BY: Kevin A Lambert

DATE: 10-28-99

Contract Verification Review (CVR)

Project Leader BYRD Project Name CCTA-09 Case No. 7215.2201
 AR/COC No. 602159 Analytical Lab GEL SDG No. 9907510

In the tables below, mark any information that is missing or incorrect and give an explanation.

1.0 Analysis Request and Chain of Custody Record and Log-In Information

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
1.1	All items on COC complete - data entry clerk initialed and dated	X				
1.2	Container type(s) correct for analyses requested	X				
1.3	Sample volume adequate for # and types of analyses requested	X				
1.4	Preservative correct for analyses requested	X				
1.5	Custody records continuous and complete	X				
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct		X	SNL NUMBERS INCORRECT FOR SAMPLES #9907510-29 & 9907510-30		
1.7	Date samples received	X				
1.8	Condition upon receipt information provided	X				

2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
2.1	Data reviewed, signature	X				
2.2	Method reference number(s) complete and correct	X				
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X				
2.4	Matrix spike/matrix spike duplicate data provided(if requested)	X				
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and L _c	X				
2.6	QC batch numbers provided	X				
2.7	Dilution factors provided and all dilution levels reported	X				
2.8	Data reported in appropriate units and using correct significant figures	X				
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	X				
2.10	Narrative provided	X				
2.11	TAT met	X				
2.12	Hold times met	X				
2.13	Contractual qualifiers provided	X				
2.14	All requested result and TIC (if requested) data provided	X				

Contract Verification Review (Continued)

3.0 Data Quality Evaluation

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2 Quantitation limit met for all samples	X		
3.3 Accuracy a) Laboratory control samples accuracy reported and met for all samples		X	ANTIMONY FAILED RECOVERY LIMITS FOR LCS/LCD
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
c) Matrix spike recovery data reported and met		X	PHENOL ABOVE RECOVERY LIMITS FOR SOIL MSD
3.4 Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples		X	RPD FOR TOTAL URANIUM ABOVE ACCEPTANCE LIMITS RPD FOR IRON, MAGNESIUM & POTASSIUM ABOVE ACCEPTANCE LIMITS
b) Matrix spike duplicate RPD data reported and met for all organic samples		X	RPD FOR TETRYL ABOVE ACCEPTANCE LIMITS FOR 9907510-09 MS/MSD RPD FOR NITROBENZENE ABOVE ACCEPTANCE LIMITS FOR 9907510-04 MS/MSD
3.5 Blank data a) Method or reagent blank data reported and met for all samples		X	METHYLENE CHLORIDE & CHLOROFORM DETECTED IN VOA METHOD BLANKS
b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	SEVERAL ANALYTES DETECTED IN EQUIPMENT & FIELD BLANKS
3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"-analyte found in method blank above the MDL for organic or above the PQL for inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"-analysis done beyond the holding time	X		
3.7 Narrative addresses planchet flaming for gross alpha/beta	X		
3.8 Narrative included, correct, and complete	X		
3.9 Second column confirmation data provided for methods 8330 (high explosives) and pesticides/PCBs	X		

Contract Verification Review (Continued)

4.0 Calibration and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.)			
a) 12-hour tune check provided	X		
b) Initial calibration provided	X		
c) Continuing calibration provided	X		
d) Internal standard performance data provided	X		
e) Instrument run logs provided	X		
4.2 GC/HPLC (8330 and 8010)			
a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) Instrument run logs provided	X		
4.3 Inorganics (metals)			
a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) ICP interference check sample data provided	X		
d) ICP serial dilution provided	X		
e) Instrument run logs provided	X		
4.4 Radiochemistry			
a) Instrument run logs provided	X		

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab Batch No. 901409

SAR/WR No. _____

(Call 284-5514 for ARCOC and Sample Numbers.)

AR/COC- 602159

Dept. No./Mail Stop: 6134 / 108B
 Project/Task Manager: BYRD / PAVLETICH
 Project Name: CCTA - 09
 Record Center Code: ER/1334/09/DAT
 Logbook Ref No: ER 051
 Service Order No.: CF 066B

Date Samples Shipped: 7/14/99 SMO USE:
 Carrier/Waybill No.: 722698
 Lab Contact: EDIE KEPT
 Lab Destination: GEL
 SMO Contact/Phone: DOUG SALMI (505) 894-3110
 Send Report to SMO SUEI JENSEN

Contract No.: AJ-2480A
 Case No.: 745,229100
 SMO Authorization: [Signature]
 Bill to: Sandia National Laboratories
 Supplier Services Department
 P.O. Box 5800 MS 0154

Parameter & Method Requested

Location		Tech Area		Beginning Depth in FT.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)				Sample Matrix	Type	Volume (OE)	Preservative	Sample Collection Method	Sample Type	GROSS ALPHA/BETA	TAL METALS + U	SUDCS	HE	VOCs	Lab Sample ID
Building	Room	ER Sample ID or Sample Location Detail					Container Type	Volume	Preservative	Sample Collection Method												
<u>ER SITE 9</u>																						
047250-003		<u>CCTA-09-GR-029-3.0-3.5-5</u>		<u>3-3.5</u>	<u>9</u>	<u>7-12-99 1325</u>	<u>S</u>	<u>AG</u>	<u>16</u>	<u>4°</u>	<u>G</u>	<u>SA</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>					<u>07</u>	
		<u>↓</u>		<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>4</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>					<u>08</u>	
		<u>030-0-0.5-5</u>		<u>0-0.5</u>	<u>↓</u>	<u>1330</u>	<u>↓</u>	<u>AG</u>	<u>16</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>					<u>09</u>	
		<u>↓</u>		<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>4</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>					<u>10</u>	
		<u>030-0.5-1.0-5</u>		<u>0.5-1</u>	<u>↓</u>	<u>1332</u>	<u>↓</u>	<u>↓</u>	<u>16</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>					<u>11</u>	
		<u>↓</u>		<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>4</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>					<u>12</u>	
		<u>031-0-0.5-5</u>		<u>0-0.5</u>	<u>↓</u>	<u>1340</u>	<u>↓</u>	<u>↓</u>	<u>16</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>					<u>13</u>	
		<u>↓</u>		<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>4</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>					<u>14</u>	
		<u>031-0.5-1.0-5</u>		<u>0.5-1</u>	<u>↓</u>	<u>1342</u>	<u>↓</u>	<u>↓</u>	<u>16</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>					<u>15</u>	
		<u>↓</u>		<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>4</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>					<u>16</u>	

RMMA Yes No Ref. No. _____

Sample Disposal Return to Client Disposal by lab

Turnaround Time Normal Rush Required Report Date _____

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone
	<u>JOE PAVLETICH</u>	<u>[Signature]</u>	<u>JP</u>	<u>6021/6134/SDE-284-2479</u>

Sample Tracking SMO USE

Date Entered (mm/dd/yy) _____ Entered by: _____

QC Inits: _____

Special Instructions/QC Requirements

EDD Yes No

Raw data package Yes No

Released by ARCOC 602160 X

Abnormal Conditions on Receipt

[Signature]
HOUSE

1. Relinquished by <u>[Signature]</u> Org. <u>6134</u> Date <u>7-13-99</u> Time <u>1530</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>7577</u> Date <u>7-13-99</u> Time <u>1530</u>	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>[Signature]</u> Org. <u>7577</u> Date <u>7-14-99</u> Time <u>1230</u>	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by <u>[Signature]</u> Org. <u>GEL</u> Date <u>7/15/99</u> Time <u>900</u>	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____

CONTINUATION FORM

AR/COC- 60617

9907510
 9907510

Project Name: CCTA-09 Project/Task Manager: BYRD/PAULETICH Case No.: 7215.220100

Location										Reference LOV (available at SMO)										Parameter & Method Requested					Lab Sample ID								
Tech Area <u>ER SITE 9</u>										Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Container		Preservative	Sample Collection Method	Sample Type	GROSS ALPHA/BETA	TAL METALS + U	SVOCs	HE	VOCs											
Building <u>ER SITE 9</u> Room <u></u>													Sample Matrix	Type											Volume (oz)		Sample Type						
0	4	7	2	5	5	-	0	0	3	<u>CCTA-09-GR-032-D-0.5-S</u>	<u>0-0.5</u>	<u>9</u>	<u>7-12-99 1350</u>	<u>S</u>	<u>AG</u>	<u>16</u>	<u>40</u>	<u>G</u>	<u>SA</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u>17</u>
										<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u>18</u>		
										<u>032-D-0.5-DU</u>	<u>↓</u>	<u>↓</u>	<u>1352</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>DU</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u>19</u>		
										<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u>20</u>		
										<u>032-D-0.5-10-S</u>	<u>0.5-1</u>	<u>↓</u>	<u>1354</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>SA</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u>21</u>		
										<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u>22</u>		
										<u>033-0-0.5-S</u>	<u>0-0.5</u>	<u>↓</u>	<u>1355</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u>23</u>		
										<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u>24</u>		
										<u>033-0.5-10-S</u>	<u>0.5-1</u>	<u>↓</u>	<u>1357</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u>25</u>		
										<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u>26</u>		
										<u>034-D-0.5-S</u>	<u>0-0.5</u>	<u>↓</u>	<u>1400</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u>27</u>		
										<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u>28</u>		
										<u>034-D-0.5-LDS</u>	<u>0.5-1</u>	<u>↓</u>	<u>1402</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u>29</u>		
										<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u>30</u>		
										<u>000-EB</u>	<u>NA</u>	<u>↓</u>	<u>0940</u>	<u>DIW</u>	<u>P</u>	<u>500ml</u>	<u>HNO3</u>	<u>EB</u>	<u>↓</u>	<u>X</u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u>01</u>		
										<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u>02</u>		
										<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u>03</u>		
										<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u>04</u>		

Abnormal Conditions on Receipt: LAB USE

Recipient Initials: LAB USE

Memorandum

Date: 10/15/99
To: File
From: Marcia Hilchey
Subject: Inorganic Data Review and Validation
Site: CCTA-09
AR/COC: 602162
Case: 7215.2201
Laboratory: GEL
SDG: 9907543

See attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and with specified methods (ICP EPA6010, CVAA EPA7470, ICPMS EPA6020). All components were successfully analyzed.

Qualifications were applied to metals sample results due to: failure to meet MS recovery acceptance criteria; blank contamination; failure to meet laboratory replicate PRD acceptance criteria; and failure to meet field duplicate RPD acceptance criteria.

Holding Times

The samples were analyzed within the prescribed holding times.

Calibration

Initial and continuing calibration met QC acceptance criteria for all methods.

Blanks

Initial and continuing calibration blanks were free of target analytes above reporting limits in ICP and ICPMS analyses.

All samples exhibited mercury at less than 5 times the value of the CVAA initial calibration blank. Sample results were qualified JB3.

The method blanks were free of target analytes above reporting limits.

Matrix Spike Analysis

The CVAA and ICPMS matrix spike samples met QC acceptance criteria.

The ICP matrix spike sample failed to meet %R acceptance limits (high) for barium and manganese. Sample results were qualified JA2. The ICP matrix spike sample failed to meet %R acceptance limits (low) for antimony. Non-detect sample results were qualified RA2; positive results were qualified JA2.

Laboratory Control/Laboratory Control Duplicate Samples

The LCS/LCSD samples met QC acceptance criteria for all methods.

ICP Interference check sample (ICS) Analysis

The ICP ICS analysis failed to meet acceptance criteria (high) for sodium and potassium. Since Al, Ca, Fe, and Mg sample results were less than the ICS concentrations, no sample data were qualified.

Laboratory Replicate Analysis

Laboratory replicate samples failed to meet acceptance criteria for copper, iron, nickel, and uranium. Sample results were J qualified.

Serial Dilution

Serial dilution analyses met acceptance criteria.


Other QC

Field duplicate sample analyses failed to meet acceptance criteria for copper, nickel, sodium, and zinc. No further qualifications were applied to copper or nickel results (see Laboratory Replicate section above). Sample results for sodium and zinc were J qualified.

No field blanks were submitted with this COC. It is likely that the field blanks submitted with COC 602163 apply to samples in this data package. Assessment of the sample results in this data package in light of the field blank information must be performed by the AT/ATL.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

A handwritten signature in black ink, consisting of several overlapping, stylized loops and lines, positioned at the bottom center of the page.

SAMPLE FINDINGS SUMMARY

Site: CLTA-09

AR/COC: 602162

Data Classification: Inorganic

Sample/ Fraction No.	Analysis	DV Qualifiers	Comments
<i>See Attached Table</i>			

Sample No./Fraction No. - This value is located on the Chain of Custody in the ER Sample Id field.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470/1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HE, PCBRISC

Reviewed by: *[Signature]* Date: 10/15/99

INORGANIC METALS:

SITE/PROJECT: CCTA-09 ARCO# : 602162
 LABORATORY: GEL LABORATORY REPORT #: 9907543
 METHODS: ICP, ICPMS, CVA

ICS
A02
ICS
A03

QC Element/ Analyte	ICV	CCV	ICB	CCB mg/l	Method Blks mg/kg	LCS	LCS D	LCS D RPD	MS	MS D	MS D RPD	REP RPD	ICS AB	Serial Dilution	Field Dup RPD	Eq. Blks	Field Blks	CCB 7	CCB 8	CCB 9
7429-90-5 Al	✓	✓		6	✓	✓	✓	✓	✓	n/a	n/a	✓	✓	✓						
7440-39-3 Ba									13.6									.3	.3	
7440-41-7 Be			.1	.2														.3	.2	
7440-43-9 Cd																		.4		
7440-70-2 Ca																			16	
7440-47-3 Cr																				
7440-48-4 Co																				
7440-50-8 Cu												66.1			95					
7439-89-6 Fe												42.4								
7439-95-4 Mg																			6.3	
7439-96-5 Mn									18.6									.4	.4	
7440-02-0 Ni					.116							41.7			36					
7440-09-7 K													128.6			132.4	124.9			
7440-22-4 Ag																				
7440-23-5 Na															39	138.9	126.9			
7440-62-2 V																				
7440-66-6 Zn				-1.2											131			-1.0	-1.1	-1.6
7440-61-1 U			.1	.1								36.4								
7439-92-1 Pb																				
7782-49-2 Se																				
7440-38-2 As									16.4											
7440-36-0 Sb																				
7440-28-0 Tl																				
7439-97-6 Hg			.1	✓					✓	✓	✓	✓								
Cyanide CN																				

mg/kg = ug/g : [(ug/g) x (sample mass {g} / sample vol. {ml}) x (1000ml / liter)] / Dilution Factor = ug/l

Comments:

REVIEWED BY: 

DATE: 10/15/99

SAMPLE FINDINGS SUMMARY

Site: CCTA-09

AR/COC: 602162

Data Classification: Organics

Sample/ Fraction No.	Analysis	DV Qualifiers	Comments
<i>See Attached Table</i>			

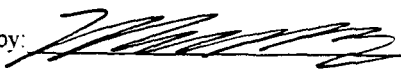
Sample No./Fraction No. - This value is located on the Chain of Custody in the ER Sample Id field.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470/1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HE, PCBRI5C

Reviewed by:  Date: 10/15/99

COC: 602162 Sample Number	HMX (2691-41-0)	RDX (121-82-4)	tetra (479-45-8)	2,4,6-trinitrotoluene (118-96-7)	2-amino-4,6-dinitrotoluene (35572-78-2)	4-amino-2,6-dinitrotoluene (1946-51-0)														
CCTA-09-GR-035-0-0.5-S	J	J	UJA																	
CCTA-09-GR-035-0.5-1.0-S	UJ	J	UJA																	
CCTA-09-GR-036-0-0.5-S	J	J	UJA																	
CCTA-09-GR-036-0.5-1.0-S	J	J	UJA																	
CCTA-09-GR-036-0.5-1.0-DU	J	J	UJA																	
CCTA-09-GR-037-0-0.5-S	J	J	UJA																	
CCTA-09-GR-037-0.5-1.0-S	J	J	UJA																	
CCTA-09-GR-038-0-0.5-S	J	J	UJA																	
CCTA-09-GR-038-0.5-1.0-S	J	J	UJA																	
CCTA-09-GR-039-0-0.5-S	UJ	UJ	UJA																	
CCTA-09-GR-039-0.5-1.0-S	UJ	UJ	UJA																	
CCTA-09-GR-040-0-0.5-S	J	J	UJA																	
CCTA-09-GR-040-0.5-1.0-S	J	J	UJA																	
CCTA-09-GR-041-0-0.5-S	J	J	UJA																	
CCTA-09-GR-041-0-0.5-DU	J	J	UJA																	
CCTA-09-GR-041-0.5-1.0-S	J	J	UJA																	
CCTA-09-GR-042-0-0.5-S	J	J	UJA	J	J	J														
CCTA-09-GR-042-0.5-1.0-S	J	J	UJA																	
CCTA-09-GR-043-0-0.5-S	UJ	UJ	UJA																	
CCTA-09-GR-043-0.5-1.0-S	UJ	UJ	UJA																	

[Handwritten Signature] 10/15/99

Memorandum

Date: 10/15/99

To: File

From: Marcia Hilchey

Subject: Organic Data Review and Validation

Site: CCTA-09

AR/COC: 602162

Case: 7215.2201

Laboratory: GEL

SDG: 9907543

See attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and with specified methods (VOC EPA8260, SVOC EPA8270, HE EPA8330). All compounds were successfully analyzed.

No qualifications were applied to VOC sample data.

No qualifications were applied to SVOC sample data.

Qualifications were applied to HE sample data due to failure to meet acceptance criteria for: surrogate recovery; LCS/LCSD recovery and RPD; and field duplicate RPD.

Holding Times

The SVOC and HE samples were analyzed within the prescribed holding times.

VOC samples CCTA-09-GR-042-0.5-1.0-S, CCTA-09-GR-043-0.5-1.0-S, and the MS and MSD samples were analyzed slightly out of hold time due to instrument problems. All QC for these samples was acceptable. No sample results were qualified.

Calibration

Initial and continuing calibration met acceptance criteria for HE analyses.

Several VOC and SVOC CCV RPDs were >20 and <40. Other QC acceptance criteria were met for these analytes. No qualifications were applied.

Blanks

No target analytes were detected above the reporting limit in the method blanks.

Surrogates

Surrogate recoveries met acceptance criteria for VOC.

HE surrogate recovery failed high for sample CCTA-09-GR-042-0-0.5-S. The laboratory stated that the failure was due to matrix interference. Positive results for this sample were qualified J.

SVOC samples CCTA-09-GR-040-0.5-1.0-S and CCTA-09-GR-042-0.5-1.0-S were diluted due to matrix interference (low IS recovery). Reanalysis resulted in acceptable IS recovery and very low (diluted out) surrogate recovery. Diluted and reanalyzed sample results were comparable (all ND). Reanalyzed sample results were reported. No sample results were qualified.

Matrix Spike/Matrix Spike Duplicates (MS/MSD)

Matrix spike sample analysis for HE met acceptance criteria.

VOC MS/MSD recovery was slightly low for 1,1-dichloroethene and benzene by laboratory criteria, however these recoveries fell within the +/- 35% acceptance limits used for assessment purposes. No sample results were qualified.

SVOC MS recovery was slightly low for pentachlorophenol. MSD recovery was acceptable, as were LCS/LCSD. No sample results were qualified.

Internal Standards

Internal standards met all QC acceptance criteria.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

LCS/LCSD samples met all acceptance criteria for VOC and SVOC analyses.

HE LCS %recovery and LCSD RPD failed to meet acceptance criteria for tetryl. Non-detect sample results were qualified UJA.

Other QC

No field blanks were submitted with this COC. It is likely that the field blanks submitted with COC 602163 apply to samples in this data package. Assessment of the sample results in this data package in light of the field blank information must be performed by the AT/ATL.

Field duplicate analysis met acceptance criteria for VOC and SVOC methods.

Field duplicate analysis failed to meet RPD acceptance criteria for HE analytes HMX and RDX. Positive sample results were J qualified; non-detect results were qualified UJ.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.



Handwritten signature and date: 10/15/99

SITE/PROJECT: CCTA-9 ARCO #: 602162
 LABORATORY: GEL LABORATORY REPORT #: 9907543

1/27 all all

7/27
 7/27

IS	GC/MS		Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Trip Blks	CCV %D
	Name	CAS #			>.05	<20% / 0.99	20%	✓							✓			✓
1	Chloromethane	74-87-3	0.10	✓	✓	✓	✓											
1	Bromomethane	74-83-9	0.10															
1	vinyl chloride	75-01-4	0.10															
1	Chloroethane	75-00-3	0.01															
1	methylene chloride (10xblk)	75-09-2	0.01															
1	acetone(10xblk)	67-64-1	0.01															
1	carbon disulfide	75-15-0	0.10															
1	1,1-dichloroethene	75-35-4	0.20						✓	✓	✓	77.9	77.2	✓				
1	1,1-dichloroethane	75-34-3	0.10															
1	Chloroform	67-66-3	0.20															
1	1,2-dichloroethane	107-06-2	0.10															
1	2-butanone(10xblk)	78-93-3	0.01			2	34.1											
2	1,1,1-trichloroethane	71-55-6	0.10															
2	carbon tetrachloride	56-23-5	0.10															
2	Bromodichloromethane	75-27-4	0.20															
2	1,2-dichloropropane	78-87-3	0.01															
2	cis-1,3-dichloropropene	10061-01-5	0.20	/														
2	Trichloroethene	79-01-6	0.30						✓	✓	✓	✓	✓	✓				
2	Dibromochloromethane	124-48-1	0.10															
2	1,1,2-trichloroethane	79-00-5	0.10															
2	Benzene	71-43-2	0.50						✓	✓	✓	72.9	✓	✓				
2	trans-1,3-dichloropropene	10061-02-6	0.10															
2	Bromoform	75-25-2	0.10															21.6
3	4-methyl-2-pentanone	108-10-1	0.10															
3	2-hexanone	591-78-6	0.01															
3	Tetrachloroethene	127-18-4	0.20															
3	1,1,2,2-tetrachloroethane	79-34-5	0.30															
3	toluene(10xblk)	108-88-3	0.40						✓	✓	✓	✓	✓	✓				
3	Chlorobenzene	108-90-7	0.50						✓	✓	✓	✓	✓	✓				
3	Ethylbenzene	100-41-4	0.10															
3	Styrene	100-42-5	0.30															
3	xylene(total)	1330-20-7	0.30															
	1,2-dichloroethylene(total)	540-59-0	0.01															
	2-chloroethanol incl ether	110-75-8																
	Vinyl acetate	108-05-4																73.0

Comments:

REVIEWED BY 

DATE: 10/15/99

SITE/PROJECT: _____ ARCO# #: 602162
LABORATORY: _____ LABORATORY REPORT #: _____

Surrogate Recovery and Internal Standard Outliers

Sample	SMC 1	SMC 2	SMC 3	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3- area	IS 3- RT			

OK

SMC 1: 4-Bromofluorobenzene IS 1: Bromochloromethane
SMC 2: 1,2-Dichloroethane-d4 IS 2: 1,4-Difluorobenzene
SMC 3: Toluene-d8 IS 3: Chlorobenzene-d5

Comments:

SEMI-VOLATILE ORGANICS:
SW-846 - Method 8270

SITE/PROJECT: CCTA-9 ARCO #: 602162
LABORATORY: GEL LABORATORY REPORT #: 9907543

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV RPD	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	CCV	CCV
						>.05	<20% / 0.99	<20%								✓			✓	✓
1	A	108-95-2	Phenol	0.80	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
1	BN	111-44-4	bis(2-Chloroethyl)ether	0.70																
1	A	95-57-8	2-Chlorophenol	0.80						✓	✓	✓	✓	✓	✓					
1	BN	541-73-1	1,3-Dichlorobenzene	0.60																
1	BN	106-46-7	1,4-Dichlorobenzene	0.50						✓	✓	✓	✓	✓	✓					
1	BN	95-50-1	1,2-Dichlorobenzene	0.40																
1	A	95-48-7	2-Methylphenol	0.70																
1	BN	108-60-1	bis(2-chloroisopropyl)ether	0.01															21.7	
1	A	106-44-5	4-Methylphenol	0.60																
1	BN	621-64-7	N-Nitroso-di-n-propylamine	0.50						✓	✓	✓	✓	✓	✓					
1	BN	67-72-1	Hexachloroethane	0.30																
2	BN	98-95-3	Nitrobenzene	0.20																
2	BN	78-59-1	Isophorone	0.40																
2	A	88-75-5	2-Nitrophenol	0.10																
2	A	105-67-9	2,4-Dimethylphenol	0.20																
2	BN	111-91-1	bis(2-Chloroethoxy)methane	0.30																
2	A	120-83-2	2,4-Dichlorophenol	0.20																
2	BN	120-82-1	1,2,4-Trichlorobenzene	0.20						✓	✓	✓	✓	✓	✓					
2	BN	91-20-3	Naphthalene	0.70																
2	BN	106-47-8	4-Chloroaniline	0.01																
2	BN	87-68-3	Hexachlorobutadiene	0.01																
2	A	59-50-7	4-Chloro-3-methylphenol	0.20						✓	✓	✓	✓	✓	✓					
2	BN	91-57-6	2-Methylnaphthalene	0.40																
3	BN	77-47-4	Hexachlorocyclopentadiene	0.01																
3	A	88-06-2	2,4,6-Trichlorophenol	0.20																
3	A	95-95-4	2,4,5-Trichlorophenol	0.20																

n/a - 1 8/9 8/11

Comments:

REVIEWED BY: [Signature] DATE: 10/15/99

SITE/PROJECT: _____ ARCO #: 602162
 LABORATORY: _____ LABORATORY REPORT #: _____

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV RPD	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	CCV (61)	CCV
						>.05	<20% / 0.99	<20%												
3	BN	91-58-7	2-Chloronaphthalene	0.80	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
3	BN	88-74-4	2-Nitroaniline	0.01				33.9											37.4	27.2
3	BN	131-11-3	Dimethylphthalate	0.01				✓												
3	BN	208-96-8	Acenaphthylene	0.90																
3	BN	606-20-2	2,6-Dinitrotoluene	0.20																
3	BN	99-09-2	3-Nitroaniline	0.01																
3	BN	83-32-9	Acenaphthene	0.90						✓	✓	✓	✓	✓	✓					
3	A	51-28-5	2,4-Dinitrophenol	0.01																
3	A	100-02-7	4-Nitrophenol	0.01						✓	✓	✓	✓	✓	✓					
3	BN	132-64-9	Dibenzofuran	0.80																
3	BN	121-14-2	2,4-Dinitrotoluene	0.20																
3	BN	84-66-2	Diethylphthalate	0.01																
3	BN	7005-72-3	4-Chlorophenyl-phenylether	0.40																
3	BN	86-73-7	Fluorene	0.90																
3	BN	100-01-6	4-Nitroaniline	0.01																
4	A	534-52-1	4,6-Dinitro-2-methylphenol	0.01				22.8												
4	BN	86-30-6	N-Nitrosodiphenylamine (I)	0.01				✓												
4	BN	101-55-3	4-Bromophenyl-phenylether	0.10																
4	BN	118-74-1	Hexachlorobenzene	0.10																
4	A	87-86-5	Pentachlorophenol	0.05																
4	BN	85-01-8	Phenanthrene	0.70																
4	BN	120-12-7	Anthracene	0.70																
4	BN	86-74-8	Carbazole	0.01																
4	BN	84-74-2	Di-n-butylphthalate	0.01																
4	BN	206-44-0	Fluoranthene	0.60																
5	BN	129-00-0	Pyrene	0.60				26.9		✓	✓	✓	✓	✓	✓					27.7
5	BN	85-68-7	Butylbenzylphthalate	0.01				✓												24.9
5	BN	91-94-1	3,3'-Dichlorobenzidine	0.01				✓												✓
5	BN	56-55-3	Benzo(a)anthracene	0.80				✓												✓

Comments:

REVIEWED BY: [Signature]

DATE: 10/15/99

SEMI-VOLATILE ORGANICS: page 3
SW 846 - Method 8270

SITE/PROJECT: _____ ARCO #: 602162
LABORATORY: _____ LABORATORY REPORT #: _____

8/1

1/a 8/9 8/11

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV RPD	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	CCV	CCV
						>.05	<20% / 0.99	<20% /	✓							✓				✓
5	BN	218-01-9	Chrysene	0.70	/	✓	✓	✓												27.0
5	BN	117-81-7	bis(2-Ethylhexyl)phthalate	0.01																✓
6	BN	117-84-0	Di-n-octylphthalate	0.01																
6	BN	205-99-2	Benzo(b)fluoranthene	0.70																
6	BN	207-08-9	Benzo(k)fluoranthene	0.70																
6	BN	50-32-8	Benzo(a)pyrene	0.70																
6	BN	193-39-5	Indeno(1,2,3-cd)pyrene	0.50				25.5												29.2
6	BN	53-70-3	Dibenz(a,h)anthracene	0.40				25.9												29.8
6	BN	191-24-2	Benzo(g,h,i)perylene	0.50	✓			29.0												33.5

Surrogate Recovery Outliers

Sample	SMC 1	SMC 2	SMC 3	SMC 4	SMC 5	SMC 6	SMC 7	SMC 8
9907543-25	0.0	0.0	0.0	✓	✓	✓		
-35	22.6	0.0	20.3	22.3	19.9	19.7		

Comments:

- SMC 1: Nitrobenzene-d5 (BN) SMC 2: 2-Fluorobiphenyl (BN) SMC 3: p-Terphenyl-d14 (BN)
SMC 4: Phenol-d5 (A) SMC 5: 2-Fluorophenol (A) SMC 6: 2,4,6-Tribromophenol (A)
SMC 7: 2-2-Chlorophenol-d4 (A) SMC 8: 1,2-Dichlorobenzene-d4 (BN)

Internal Standard Outliers

Sample	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3-area	IS 3-RT	IS 4-area	IS 4-RT	IS 5-area	IS 5-RT	IS 6-area	IS 6-RT
				OK								

- IS 1: 1,4-Dichlorobenzene-d4 (BN) IS 2: Naphthalene-d8 (BN) IS 3: Acenaphthene-d10 (BN)
IS 4: Phenanthrene-d10 (BN) IS 5: Chrysene-d12 (BN) IS 6: Perylene-d12 (BN)

REVIEWED BY: [Signature]

DATE: 10/15/99

HIGH EXPLOSIVES:

SW846 Method 8330

SITE/PROJECT: CCTA-9 ARCO #: 602162
 LABORATORY: GEL LABORATORY REPORT #: 9907543

n/a

NAME	CAS #	Intercept	Curve R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks
HMX	2691-41-0	✓	.99	20%	U	✓	✓	20%	✓	✓	20%		U	U
RDX	121-82-4											40		
1,3,5-Trinitrobenzene	99-35-4											60		
1,3-dinitrobenzene	99-65-0													
Nitrobenzene	98-95-3													
Tetryl	479-45-8					43.1	41.7	41.7						
2,4,6-trinitrotoluene	118-96-7													
2-amino-4,6-dinitrotoluene	35572-78-2													
4-amino-2,6-dinitrotoluene	19406-51-0													
2,4-dinitrotoluene	121-14-2													
2,6-dinitrotoluene	606-20-2													
2-nitrotoluene	88-72-2													
4-nitrotoluene	99-99-0													
3-nitrotoluene	99-08-1													
PEIN	78-11-5													

Sample	SMC %REC	SMC RT	Sample	SMC %REC	SMC RT
9907543-33	123				


Comments:

RDX field dup RPD = 56

Confirmation

Sample	CAS #	RPD > 25%	Sample	CAS #	RPD > 25%

mg/kg ug/g [(ug/g) x (sample mass {g} / sample vol {ml}) x (1000ml / liter)] / Dilution Factor = ug/l

REVIEWED BY: 

DATE: 10/15/99

MEMORANDUM

Date: 10/15/99

To: File

From: Marcia Hilchey

Subject: Radiometric Data Review and Validation

Site: CCTA-09

AR/COC: 602162

Case: 7215.220

Laboratory: GEL

SDG: 9907543

See the attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and specified methods (gross alpha/beta EPA 900.0). All components were successfully analyzed.

No problems were identified with the data package that result in the qualification of data.

Holding Times

The samples were analyzed within the prescribed holding times.

Calibration

Calibration met acceptance criteria.

Laboratory Control Sample Analyses

The LCS met acceptance criteria.

Blanks

No target analytes were detected above the reporting limits in the method blank.

Matrix Spike Analysis

The matrix spike sample met acceptance criteria.

Replicate

The laboratory duplicate met the QC acceptance criteria.

Other QC

The field duplicate analyses met QC acceptance criteria.

No field blanks were submitted with this COC. It is likely that the field blanks submitted with COC 602163 apply to samples in this data package. Assessment of the sample results in this data package in light of the field blank information must be performed by the AT/ATL.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

A handwritten signature in black ink, consisting of several loops and a long horizontal stroke at the end.

SAMPLE FINDINGS SUMMARY

Site: CCTA-09

AR/COC: 602162

Data Classification: Radiometric

Sample/ Fraction No.	Analysis	DV Qualifiers	Comments
<i>No qualifications applied</i>			

Sample No./Fraction No. - This value is located on the Chain of Custody in the ER Sample Id field.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470/1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HE, PCBRISC

Reviewed by: *[Signature]* Date: 10/15/99

RADIOCHEMISTRY:

SITE/PROJECT: CCTA-09 ARCO# : 602162
 LABORATORY: GEL LABORATORY REPORT #: 9907543
 METHODS: GAS

QC Element/ Analyte	Method Blks	LCS	MS	Rep RER	Eq. Blks	Field Dup RER	Field Blks	-	Sample ID	Isotope	IS/Trace	Sample ID	Isotope	IS/Trace
CRITERIA	U	20%	25%	<1.0	U	<1.0	U	-			50-105			50-105
H3								-						
U-238								-						
U-234								-						
U-235/236								-						
Th-232								-						
Th-228								-						
Th-230								-						
Pu-239/240								-						
Gross Alpha	✓	✓	✓	✓		✓		-						
Nonvolatile Beta	✓	✓	✓	✓		✓		-						
Ra226								-						
Ra228								-						
Ni-63								-						
Gamma Spec- Am241								-						
Gamma Spec- Cs137								-						
Gamma Spec- Co60								-						
								-						
								-						

Parameter	Method	Typical Tracer	Typical Carrier
Iso-U	Alpha spec	U-232	NA
Iso-Pu	Alpha spec	Pu-242	NA
Iso-Th	Alpha spec	Th-229	NA
Am-241	Alpha spec	Am-242	NA
Sr-90	Beta	Y ingrowth	NA
Ni-63	Beta	NA	Ni by ICP
Ra-226	Deamination	NA	NA
Ra-226	Alpha spec	Ba-133 or Ra-225	NA
Ra-228	Gamma spec	Ba-133	NA

Comments:

Gamma spec LCS contains: Am-241, Cs-137, and Co-60

DATA VALIDATION SUMMARY:

SITE/PROJECT: CCTA-9 CASE # 7215.2201
 ARCO # 60216
 LABORATORY: CEL
 LABORATORY REPORT #: 9907543

OF SAMPLES: 40 MATRIX: soil
 LAB SAMPLE ID: 9907543-01 thru -40

ANALYSIS/ QC ELEMENT	VOC	SVOC	PEST/ PCB	HPLC (HE)	ICP/AES	ICPMS		CN	RAD	OTHER
						GFAA AA	CVAA (Hg)			
1. HOLDING TIMES/ PRESERVATION	✓	✓		✓	✓	✓	✓		✓	
2. CALIBRATIONS	✓	✓		✓	✓	✓	✓		✓	
3. METHOD BLANKS	✓	✓		✓	✓	✓	JB3		✓	
4. MS/MSD	✓	✓		✓	RA3/ JAZ	✓	✓		✓	
5. LABORATORY CONTROL SAMPLES	✓	✓		UJA	✓	✓	✓		✓	
6. REPLICATES					J	J	✓		✓	
7. SURROGATES	✓	✓		J						
8. INTERNAL STDS	✓	✓								
9. TCL COMPOUND IDENTIFICATION	✓	✓								
10. ICP INTERFERENCE CHECK SAMPLE					✓					
11. ICP SERIAL DILUTION					✓					
12. CARRIER/CHEM TRACER RECOVERIES										
13. OTHER QC				J/WJ	J	✓	✓		✓	

CHECK MARK (✓) - ACCEPTABLE
 J - ESTIMATED
 U - NOT DETECTED

SHADED CELLS - NOT APPLICABLE
 UJ - NOT DETECTED, ESTIMATED
 R - UNUSABLE

REVIEWED BY: [Signature]

DATE: 10/15/99

Contract Verification Review (CVR)

Project Leader BYRD Project Name CCTA-09 Case No. 7215.2201
 AR/COC No. 602162 Analytical Lab GEL SDG No. 9907543

In the tables below, mark any information that is missing or incorrect and give an explanation.

1.0 Analysis Request and Chain of Custody Record and Log-In Information

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
1.1	All items on COC complete - data entry clerk initialed and dated	X				
1.2	Container type(s) correct for analyses requested	X				
1.3	Sample volume adequate for # and types of analyses requested	X				
1.4	Preservative correct for analyses requested	X				
1.5	Custody records continuous and complete	X				
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	X				
1.7	Date samples received	X				
1.8	Condition upon receipt information provided	X				

2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
2.1	Data reviewed, signature	X				
2.2	Method reference number(s) complete and correct	X				
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X				
2.4	Matrix spike/matrix spike duplicate data provided(if requested)	X				
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and L _c	X				
2.6	QC batch numbers provided	X				
2.7	Dilution factors provided and all dilution levels reported	X				
2.8	Data reported in appropriate units and using correct significant figures	X				
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	X				
2.10	Narrative provided	X				
2.11	TAT met	X				
2.12	Hold times met		X	VOA SAMPLES #9907543-36 & 9907543-40 ANALYZED OUTSIDE OF HOLDING TIME		X
2.13	Contractual qualifiers provided	X				
2.14	All requested result and TIC (if requested) data provided	X				

Contract Verification Review (Continued)

3.0 Data Quality Evaluation

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2 Quantitation limit met for all samples	X		
3.3 Accuracy a) Laboratory control samples accuracy reported and met for all samples		X	RECOVERY FOR TETRYL BELOW ACCEPTANCE LIMITS
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique		X	SEVERAL SVOC SURROGATES BELOW QC RECOVERY LIMITS FOR SAMPLES #9907543-25 & 9907543-35
c) Matrix spike recovery data reported and met		X	1,1-DCE & BENZENE BELOW RECOVERY LIMITS FOR VOA MS 1,1-DCE BELOW RECOVERY LIMITS FOR MSD RECOVERY FOR PENTACHLOROPHENOL BELOW ACCEPTANCE LIMITS FOR SVOC MS RECOVERY FOR ANTIMONY, BARIUM & MANGANESE OUTSIDE ACCEPTANCE LIMITS
3.4 Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples		X	RPD FOR MERCURY & URANIUM ABOVE QC LIMITS MANY METALS ANALYTES OUTSIDE RPD LIMITS
b) Matrix spike duplicate RPD data reported and met for all organic samples		X	RPD FOR TETRYL ABOVE QC ACCEPTANCE LIMITS
3.5 Blank data a) Method or reagent blank data reported and met for all samples	X		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met	NA		
3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"-analyte found in method blank above the MDL for organic or above the PQL for inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"-analysis done beyond the holding time	X		
3.7 Narrative addresses planchet flaming for gross alpha/beta	X		
3.8 Narrative included, correct, and complete	X		
3.9 Second column confirmation data provided for methods 8330 (high explosives) and pesticides/PCBs	X		

Contract Verification Review (Continued)

4.0 Calibration and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.)			
a) 12-hour tune check provided	X		
b) Initial calibration provided	X		
c) Continuing calibration provided	X		
d) Internal standard performance data provided	X		
e) Instrument run logs provided	X		
4.2 GC/HPLC (8330 and 8010)			
a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) Instrument run logs provided	X		
4.3 Inorganics (metals)			
a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) ICP interference check sample data provided	X		
d) ICP serial dilution provided	X		
e) Instrument run logs provided	X		
4.4 Radiochemistry			
a) Instrument run logs provided	X		

Contract Verification Review (Concluded)

5.0 Problem Resolution

Summarize the findings in the table below. List only samples/fractions for which deficiencies have been noted.

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions

Were deficiencies unresolved? Yes No

Based on the review, this data package is complete. Yes No

If no, provide nonconformance report or correction request number _____ and date correction request was submitted: _____

Reviewed by: W. Palencia Date: 8-30-99 Closed by: _____ Date: _____

ANALYSIS REQUEST AND CHAIN OF CUSTODY

SF 2001-COC (5-97)

Internal Lab

Batch No. _____

SAR/WR No. _____

(Call 284-5514 for ARCOC and Sample Numbers.)

AR/COC- _____

602162

Dept. No./Mail Stop: 6134 / 108B
 Project/Task Manager: BYRD / PAVLETICH
 Project Name: CCTA-09
 Record Center Code: ER/1334/09/DAT
 Logbook Ref No: ER 051
 Service Order No.: CF 0668

Date Samples Shipped: 901417 (MM/DD/YY)
 Carrier/Waybill No.: 722699
 Lab Contact: ERIE KENT
 Lab Destination: GEL
 SMO Contact/Phone: DOUG SALMI (505) 894-3110
 Send Report to SMO: SUEI JENSEN

Contract No.: AS-2480A
 Case No.: 245, 220900
 SMO Authorization: [Signature]
 Bill to: Sandia National Laboratories
 Supplier Services
 Department
 P.O. Box 5800 MS 0154

Parameter & Method Requested

Location		Tech Area		Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)					Parameter & Method Requested					Lab Samp ID
Building		Room					SOIL Sample Matrix	Container		4°C Preservative	Sample Collection Method						
Sample No. - Fraction		ER Sample ID or Sample Location Detail						Type	Volume (oz)			Gross	TAL	SVDES	HE	VPLS	
ER SITE 9						7/13/99											
047264-003		CCTA-09-ER-035-0-0.5-5		0-0.5	9	7-13-99 1000	S	AG	16	4°	G	SA	X	X	X	X	
777764-774		↓		↓		↓		7	4								
		035-0.5-1.0-5		0.5-1		1002			16				X	X	X	X	
		↓		↓		↓			4								
		036-0-0.5-5		0-0.5		1004			16				X	X	X	X	
		↓		↓		↓			4								
		036-0.5-1.0-5		0.5-1		1006			16				X	X	X	X	
		↓		↓		↓			4								
		036-0.5-1.0-5		0.5-1		1008			16			DU	X	X	X	X	
		↓		↓		↓			4								

RMMA Yes No Ref. No. _____

Sample Tracking Date Entered (mm/dd/yy) 7/15/99

Special Instructions/QC Requirements

Abnormal Conditions on Receipt

Sample Disposal Return to Client Disposal by lab

Entered by: [Signature]

EDD Yes No

LAB USE

Turnaround Time Normal Rush Required Report Date _____

QC Inits: [Signature]

Raw data package Yes No

LAB USE

Sample Team Members	Name	Signature	Init.	Company/Organization/Phone
	JOE PAVLETICH	<u>[Signature]</u>	<u>[Init.]</u>	60004/6134/SDE-204-2479

RELEASED BY ARCOC 602164 *X
 FIELD DC SAMPLES ON ARCOC 602163
 Please list as separate report.

LAB USE

1. Relinquished by <u>[Signature]</u> Org. <u>6134</u> Date <u>7-14-99</u> Time <u>1115</u>	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <u>[Signature]</u> Org. <u>7577</u> Date <u>7-14-99</u> Time <u>1115</u>	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <u>[Signature]</u> Org. <u>7577</u> Date <u>7-15-99</u> Time <u>1245</u>	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____

ANALYSIS REQUEST AND CHAIN OF CUSTODY CONTINUATION FORM

SF 2001-001 (12-96)
Supersede SF 10-91 issue

AR/COC- 602162

Project Name: <u>CCTA-09</u>										Project/Task Manager: <u>BYRD/PAULETICH</u>										Case No.: <u>7215.220100</u>																		
Location										Tech Area _____										Reference LOV (available at SMO)																		
Building <u>ER SITE 9</u>					Room _____					Beginning Depth in Ft. _____					ER Site No. <u>7/13/99</u>															Date/Time Collected _____								
Sample No. - Fraction					ER Sample ID or Sample Location Detail															Soil Sample Matrix		Container		4°C	Sample Collection Method	Sample Type	Preservative	GROSS ALPHA/BETA	TAL METALS + U						SVOCs	HE	VOCs	LI
0	0	4	7	2	6	9	-	0	0	3	<u>CCTA-09-GR-037-0-0.5-S</u>					0-0.5	9	7/13/99	1010	Soil	AG	16	4°	G	SA	X	X	X	X									
3	7	7	7	7	6	9	-	9	3	4	↓					↓	7		↓	7	7	4	7		7													
0					2	7	0	-		3	<u>D37-0.5-1.0-S</u>					0.5-1			1012			16					X	X	X	X								
1					7	0	-			4	↓					↓			↓			4																
0					7	1	-			3	<u>D38-0-0.5-S</u>					0-0.5			1015			16					X	X	X	X								
0					7	1	-			4	↓					↓			↓			4																
0					7	2	-			3	<u>D38-0.5-1.0-S</u>					0.5-1			1017			16					X	X	X	X								
2					7	2	-			4	↓					↓			↓			4																
0					7	3	-			3	<u>D39-0-0.5-S</u>					0-0.5			1030			16					X	X	X	X								
0					7	3	-			4	↓					↓			↓			4																
0					7	4	-			3	<u>D39-0.5-1.0-S</u>					0.5-1			1032			16					X	X	X	X								
3					7	4	-			4	↓					↓			↓			4																
3					7	5	-			3	<u>D40-0-0.5-S</u>					0-0.5			1034			16					X	X	X	X								
0					7	5	-			4	↓					↓			↓			4																
0					7	6	-			3	<u>D40-0.5-1.0-S</u>					0.5-1			1036			16					X	X	X	X								
0					7	6	-			4	↓					↓			↓			4																
0					7	7	-			3	<u>D41-0-0.5-S</u>					0-0.5			1038			16					X	X	X	X								
0					7	7	-			4	↓					↓			↓			4																

Abnormal Conditions on Receipt _____

LAB USE

Recipient Initials _____

MEMORANDUM

DATE: October 22, 1999

TO: File

FROM: Kenneth Salaz *KAS*

SUBJECT: Inorganic Data Review and Validation
CCTA-09, ARCO #602163, Case No. 7215.2201

See the attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and specified methods: EPA6010B (ICP metals), EPA6020 (Uranium), and EPA7470/1A (Hg). Problems were identified with the data package that result in the qualification of data.

- ICP Analysis: In the continuing calibration blank (CCB), cadmium (Cd) was detected. The associated results of samples 9907542-13, -19, -21, -23, -27, and -29 were positive, less than ($<$) 5X the blank concentration, and will be qualified "J,B3."

HG Analysis: In the initial calibration blank (ICB), mercury (Hg) was detected. The associated results of samples 9907542-19, -21, -23, -25, -27, and -29 were positive, $<$ 5X the blank concentration, and will be qualified "J,B3."
- ICP Analysis: The MS percent recovery (%REC) of antimony (Sb) was $<$ 30%. The associated results of samples 9907542-09, -11, -13, -15, -17, -21, -23, -25, -27, and -29 were non-detect (ND) and will be qualified "R,A2" (unusable). The associated results of samples -01, -03, -05, -07, and -19 were positive and will be qualified "J,A2."
- U Analysis: The replicate relative percent difference (RPD) of U was greater than ($>$) 35%. The associated results of samples 9907542-01, -03, -05, -07, -09, -11, -13, -15, -17, -19, -21, -23, -25, -27, and -29 were positive and will be qualified "J."
- ICP Analysis: In the equipment blank (EB), sodium (Na) was detected. The associated results of samples 9907542-11, -13, -15, -17, -19, -21, -23, -25, -27, and -29 were positive, $<$ 5X the blank concentration, and will be qualified "J,B2."

Data are acceptable except as noted above. QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

All Analyses: All samples were extracted and analyzed within the prescribed holding times.

Calibration

All Analyses: The initial and continuing calibrations met QC acceptance criteria.

Blanks

ICP Analysis: No target analytes were detected in the blanks except as noted above in the summary section and the following. Calcium (Ca) and silver (Ag) were detected in the CCB for the EB. However, the absolute value of the Ca blank concentration was < the detection limit (DL), and all associated Ag results were ND. Thus, no data were qualified. Beryllium (Be) was detected in the ICB for the field samples. The absolute value of the blank concentration was < the DL. Aluminum (Al), barium (Ba), Be, Ca, magnesium (Mg), manganese (Mn), and zinc (Zn) were detected in the CCB. However, the absolute values of the Ca, Mn, and Zn blank concentrations were < the DLs, and the associated Al, Ba, Be, and Mg sample results were > 5X the blank concentrations. Al and Mg were detected in the method blank. However, the associated sample results were > 5X the blank concentrations. Thus, no data were qualified.

U Analysis: No target analytes were detected in the blanks except the following. Uranium was detected in the method blank for the EB, as well as the ICB and CCB for the field samples. However, all associated sample results were either ND or > 5X the blank concentration. Thus, no data were qualified.

Hg Analysis: No target analytes were detected in the blanks except as noted above in the summary section.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

ICP Analysis: The MS met QC acceptance criteria except as noted above in the summary section. No MSD was performed. However, a replicate analysis was performed as a measure of laboratory precision.

U Analysis: The MS met QC acceptance criteria. No MSD was performed. However, a replicate analysis was performed as a measure of laboratory precision.

Hg Analysis: The MS/MSD met QC acceptance criteria.

Laboratory Control Samples (LCS/LCSD)

All Analyses: The LCS/LCSD met QC acceptance criteria.

Replicates

ICP/Hg Analyses: The replicate analyses met QC acceptance criteria.

U Analysis: The replicate analysis met QC acceptance criteria except as noted above in the summary section.

ICP Interference Check Sample (ICS)

ICP Analysis: The ICP ICS met QC acceptance criteria except for the following. The %RECs of potassium (K) and Na were > 120%. However, the sample concentrations of Al, Ca, iron (Fe), and Mg were < the associated concentrations in the ICS. Thus, no data were qualified.

U Analysis: The ICP-MS ICS met QC acceptance criteria.

Hg Analysis: No ICS was required for this method.

ICP Serial Dilution

ICP/U Analyses: The serial dilutions met QC acceptance criteria.

Hg Analysis: No serial dilution was required for this method.

Other QC

ICP Analysis: The field duplicate met QC acceptance criteria. No target analytes were detected in the EB except as noted above in the summary section and the following. Al, Ca, Mg, K, and Zn were detected. However, the associated sample results were > 5X the blank concentrations. Thus, no data were qualified. No field blank (FB) was submitted on the ARCOC.

U/Hg Analyses: The field duplicate met QC acceptance criteria. No target analytes were detected in the EB. No FB was submitted on the ARCOC.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

Site: CCTA-09

AR/COC: 602163

Data Classification: Inorganics (EPA 6010B
↓ 6020
747011A)

Sample Fraction No.	Analysis	DV Qualifiers	Comments
=> Note: See attached spreadsheet for data qualifications.			
Data are acceptable (except as noted on spreadsheet.)			
QC Measures appear to be adequate.			

Sample No./Fraction No. - This value is located on the Chain of Custody in the ER Sample Id field.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470/1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HE, PCBRISC

Reviewed by: [Signature] Date: 10/22/99

of Samples: 10
Matrix: so.1

Sample IDs: 9907542-01, -03, -05, -07, -09, -11, -13, -15, -17, -19, -21, -23, -25, -27, -29

INORGANIC METALS:

Hg: Batch # 153927 (-01 → -15)
" 154128 (-17 → -29)

SITE/PROJECT: CTA-09 ARCO #: 602163
LABORATORY: GEL LABORATORY REPORT #: 9907542
METHODS: EPA 6010B (ICP), EPA 6020 (ICP-MS), EPA 7471A (Hg)

QC Element/ Analyte	ICV	CCV	ICB (%)	CCB (%)	Method Blks	LCS	LCSD	LCSD RPD	MS (%)	MSD	MSD RPD	REP RPD	ICS AB	Serial Dilution	Field Dup RPD	Eq. Blks (%)	Field Blks (%)	CCB (%)	CCB (%)	CCB (%)
7429-90-5 Al	✓	✓	✓	28.1	1.82 J	✓	✓	✓	NA	NA	NA	✓	✓	✓	✓	24.3	NA	26.5	31.6	35.6
7440-39-3 Ba	↓	↓	✓	0.3	✓	↓	↓	↓	✓	✓	↓	✓	↓	✓	✓	✓	↓	0.4	0.4	0.3
7440-41-7 Be	↓	↓	0.1	0.3	↓	↓	↓	↓	✓	✓	↓	NA	↓	✓	✓	✓	↓	0.3	0.3	0.3
7440-43-9 Cd	↓	↓	✓	✓	↓	↓	↓	↓	✓	✓	↓	NA	↓	✓	✓	✓	↓	0.5	0.5	0.4
7440-70-2 Ca	↓	↓	↓	16.9	↓	↓	↓	↓	NA	✓	↓	✓	↓	✓	✓	95.8	↓	12.6	11.7	6.7
7440-47-3 Cr	↓	↓	↓	✓	↓	↓	↓	↓	✓	✓	↓	✓	↓	✓	✓	✓	↓	✓	✓	✓
7440-48-4 Co	↓	↓	↓	↓	↓	↓	↓	↓	↓	✓	↓	✓	↓	NA	✓	↓	↓	↓	↓	↓
7440-50-8 Cu	↓	↓	↓	↓	↓	↓	↓	↓	↓	✓	↓	✓	↓	NA	✓	↓	↓	↓	↓	↓
7439-89-6 Fe	↓	↓	↓	↓	↓	↓	↓	↓	NA	✓	↓	✓	↓	✓	✓	↓	↓	↓	↓	↓
7439-95-4 Mg	↓	↓	↓	16.8	0.523 T	↓	↓	↓	↓	✓	↓	✓	↓	✓	✓	14.1	↓	8.1	8.1	↓
7439-96-5 Mn	↓	↓	↓	0.3	✓	↓	↓	↓	↓	✓	↓	✓	↓	↓	✓	✓	↓	0.5	0.5	0.4
7440-02-0 Ni	↓	↓	↓	✓	↓	↓	↓	↓	✓	✓	↓	✓	↓	NA	✓	✓	↓	✓	✓	✓
7440-09-7 K	↓	↓	↓	↓	↓	↓	↓	↓	NA	✓	↓	✓	128.6	✓	✓	22.6	↓	✓	✓	✓
7440-22-4 Ag	↓	↓	↓	↓	↓	↓	↓	↓	✓	✓	↓	NA	✓	NA	✓	✓	↓	↓	↓	↓
7440-23-5 Na	↓	↓	↓	↓	↓	↓	↓	↓	✓	✓	↓	✓	120.5	NA	✓	33.1	↓	↓	↓	↓
7440-62-2 V	↓	↓	↓	↓	↓	↓	↓	↓	✓	✓	↓	✓	✓	NA	✓	✓	↓	↓	↓	↓
7440-66-6 Zn	↓	↓	↓	↓	↓	↓	↓	↓	↓	✓	↓	✓	✓	✓	✓	6.41	↓	✓	-0.7	-1.1
7439-92-1 Pb	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	NA	✓	✓	NA	✓	✓	↓	✓	✓	✓
7782-49-2 Se	↓	↓	↓	↓	↓	↓	↓	↓	↓	✓	↓	✓	↓	NA	✓	↓	↓	↓	↓	↓
7440-38-2 As	↓	↓	↓	↓	↓	↓	↓	↓	↓	✓	↓	✓	↓	NA	✓	↓	↓	↓	↓	↓
7440-36-0 Sb	↓	↓	↓	↓	↓	↓	↓	↓	27.6	✓	↓	NA	↓	NA	✓	↓	↓	↓	↓	↓
7440-28-0 Tl	↓	↓	↓	↓	↓	↓	↓	↓	✓	✓	↓	NA	↓	NA	✓	↓	↓	↓	↓	↓
7439-97-6 Hg	✓	✓	-0.1	-0.1	✓	✓	✓	✓	✓	✓	✓	✓	NA	NA	✓	✓	↓	↓	↓	↓
" "	✓	✓	0.1	✓	✓	✓	✓	✓	✓	✓	✓	NA	NA	NA	✓	✓	↓	↓	↓	↓
Cyanide CN	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Uranium U	✓	✓	0.1	0.3	✓	✓	✓	✓	✓	NA	NA	118	✓	✓	✓	✓	↓	↓	↓	↓

mg/kg = ug/g [(ug/g) x (sample mass [g]) / (sample vol [ml]) x (1000ml / liter)] / Dilution Factor = ug/l

NA = Not Applicable

Comments:

- ① MS criteria do not apply to sample concs > 4X the spike concs.
- ② Replicate criteria do not apply to sample results < the RL.
- ③ Serial dilution " " " " " " " " < 50X the RL.
- ④ No FB submitted on the COCs

* Summary → See back of this page.

127
128

of Samples: 1
 Matrix: aqueous

Sample #s: 1101542 322251

INORGANIC METALS:

SITE/PROJECT: CCTA-09 ARCO# 602163
 LABORATORY: GEL LABORATORY REPORT #: 9907542
 METHODS: EPA 6010B (ICP), EPA 6020 (ICP-MS), EPA 7470A (Hg)

QC Element/ Analyte	ICV	CCV	ICB	CCB	Method Blks	LCS	LCS D	LCS D RPD	MS	MS D	(1)		(2)		(3)		Field Blks	Field Blks
											MSD RPD	REP RPD	ICS AB	Serial Dilution	Field Dup RPD	Eq. Blks		
7429-90-5 Al	✓	✓	✓	✓	✓	✓	✓	✓	NA	NA	NA	NA	✓	NA	NA	NA	NA	NA
7440-39-3 Ba	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
7440-41-7 Be	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
7440-43-9 Cd	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
7440-70-2 Ca	↓	↓	↓	-17.5	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
7440-47-3 Cr	↓	↓	↓	✓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
7440-48-4 Co	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
7440-50-8 Cu	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
7439-89-6 Fe	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
7439-95-4 Mg	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
7439-96-5 Mn	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
7440-02-0 Ni	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
7440-09-7 K	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	12.8	↓	↓	↓	↓	↓
7440-22-4 Ag	↓	↓	↓	2.2	↓	↓	↓	↓	↓	↓	↓	↓	✓	↓	↓	↓	↓	↓
7440-23-5 Na	↓	↓	↓	✓	↓	↓	↓	↓	↓	↓	↓	↓	121.1	↓	↓	↓	↓	↓
7440-62-2 V	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	✓	↓	↓	↓	↓	↓
7440-66-6 Zn	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	✓	↓	↓	↓	↓	↓
7439-92-1 Pb	✓	✓	✓	✓	✓	✓	✓	✓	↓	↓	↓	↓	✓	↓	↓	↓	↓	↓
7782-49-2 Se	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
7440-38-2 As	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
7440-36-0 Sb	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
7440-28-0 I	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
7439-97-6 Hg	✓	✓	✓	✓	✓	✓	✓	✓	↓	↓	↓	↓	NA	NA	↓	↓	↓	↓
Cyanide (N)	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Uranium U	✓	✓	✓	✓	0.062 J	✓	✓	✓	✓	NA	NA	✓	NA	NA	↓	↓	↓	↓

mg/kg ug/g [(ug/g) x (sample mass (g) / sample vol. (ml)) x (1000ml / liter)] / Dilution Factor = ug/l

NA = Not Applicable

Comments:

- MS and replicate analysis for ICP and Hg performed on a sample from another SDG.
- Serial dilution for ICP performed on another sample from another SDG. For ICP-MS, sample result was < SOX the RL; no criteria apply.
- Sample is an EB. No field dup. or FB submitted on the COC.

* Summary
 => All QC criteria were met.
 No data were qualified.

MEMORANDUM

DATE: October 22, 1999

TO: File

FROM: Kenneth Salaz *KS*

SUBJECT: Organic Data Review and Validation
CCTA-09, ARCO #602163, Case No. 7215.2201

See the attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and specified methods: EPA8260A/B (VOCs), EPA8270 (SVOCs), and EPA8330 (HEs). Problems were identified with the data package that result in the qualification of data.

- VOC Analysis: The continuing calibration verification (CCV) percent differences (%Ds) of chloromethane were less than (<) -40% and <-60%. The associated results of samples 9907542-02, -04, -06, -08, -35, and -36 were non-detect (ND) and will be qualified "UJ." The associated results of samples -10, -12, -14, -16, -18, -20, -22, -24, -26, -28, and -30 were also ND and will be qualified "R" (unusable).

SVOC Analysis: The CCV %D of bis(2-chloroethyl)ether was <-60%. The associated results of samples 9907542-27 and -29 were ND and will be qualified "R" (unusable).
- VOC Analysis: In the method blank, chloroform was detected. The associated results of samples 9907542-02, -12, -14, and -20 were positive, < 5X the blank concentration, < the reporting limit (RL), and will be qualified "1.0U1,B." The associated results of samples -16 and -18 were positive, < 5X the blank concentration, > the RL, and will be qualified "1.1U1,B" and "1.2U1,B," respectively.
- VOC Analysis: The MS/MSD percent recoveries (%RECs) of 1,1-dichloroethene were < QC limits. The associated results of samples 9907542-02, -04, -06, -08, -10, -12, -14, -16, -18, -20, -22, -24, -26, -28, and -30 were ND and will be qualified "UJ,A2."
- VOC Analysis: In the equipment blank (EB), methylene chloride was detected. The associated results of samples 9907542-24 and -28 were positive, < 10X the blank concentration, < the RL, and will be qualified "5U,B2."

5. HE Analysis: The field duplicate relative percent difference (RPD) of HMX was greater than (>) 35%. The associated results of samples 9907542-01, -03, -05, -07, -09, -13, and -15 were positive and will be qualified "J." The associated results of samples -11, -17, -19, -21, -23, -25, -27, and -29 were ND and will be qualified "UJ."

Data are acceptable except as noted above in the summary section. QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

All Analyses: All samples were analyzed within the prescribed holding times.

Calibration

VOC Analysis: The initial and continuing calibrations met QC acceptance criteria except as noted above in the summary section and the following. Carbon tetrachloride and bromoform had %Ds > 20%. However, the associated sample results were ND. Thus, no data were qualified.

SVOC Analysis: The initial and continuing calibrations met QC acceptance criteria except as noted above in the summary section and the following. Bis(2-chloroethyl)ether, bis(2-chloroisopropyl)ether, and 2,4-dinitrophenol had CCV %Ds > 20% for the EB. Also, benzoic acid, 2-chlorophenol, 3-nitroaniline, 4-nitrophenol, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene had CCV %Ds < -20% for the field samples. However, the associated sample results were ND. Thus, no data were qualified.

HE Analysis: The initial and continuing calibrations met QC acceptance criteria.

Blanks

VOC Analysis: No target analytes were detected in the method blank except as noted above in the summary section.

SVOC/HE Analyses: No target analytes were detected in the method blanks.

Surrogates

VOC Analysis: The surrogate %RECs met QC acceptance criteria except for the following. The %RECs of SMC #3 were slightly < QC limits for samples 9907542-08 and -26. However, a reanalysis was performed, and the %RECs met QC acceptance criteria. Also, the analyte recoveries were similar to the initial analysis. Thus, no data were qualified.

SVOC/HE Analyses: The surrogate %RECs and retention times (RTs) met QC acceptance criteria.

SAMPLE FINDINGS SUMMARY

Site: CCTA-09

(EPA 8260A/B)
8270
↓
8330

AR/COC: 602163

Data Classification: Organics

Sample Fraction No.	Analysis	DV Qualifiers	Comments
	⇒ Note: See attached spreadsheet for data qualifications.		
	Data are acceptable (except as noted on spreadsheet.)		
	QC Measures appear to be adequate.		

Sample No./Fraction No. - This value is located on the Chain of Custody in the ER Sample Id field.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470.1, EPA8015B, EPAS081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HE, PCBRISC

Reviewed by: [Signature] Date: 10/22/99

ARCO #602163 Organic Analyses (VOCs, SVOCs, HEs) Sample Number	VOCs:				SVOCs:		HEs:											
	74-87-3 (chloromethane)	75-09-2 (methylene chloride)	75-35-4 (1,1-dichloroethene)	67-66-3 (chloroform)	111-44-4 (bis(2-chloroethyl)ether)	2691-41-0 (HMX)												
047284-004 CCTA-09-GR-044-0-0.5-S	UJ		UJ,A2	1.0U1,B														
047285-004 CCTA-09-GR-044-0.5-1.0-S	UJ		UJ,A2															
047286-004 CCTA-09-GR-045-0-0.5-S	UJ		UJ,A2															
047287-004 CCTA-09-GR-045-0-0.5-DU	UJ		UJ,A2															
047288-004 CCTA-09-GR-045-0.5-1.0-S	R		UJ,A2															
047289-004 CCTA-09-GR-046-0-0.5-S	R		UJ,A2	1.0U1,B														
047290-004 CCTA-09-GR-046-0.5-1.0-S	R		UJ,A2	1.0U1,B														
047291-004 CCTA-09-GR-047-0-0.5-S	R		UJ,A2	1.1U1,B														
047292-004 CCTA-09-GR-047-0.5-1.0-S	R		UJ,A2	1.2U1,B														
047293-004 CCTA-09-GR-048-0-0.5-S	R		UJ,A2	1.0U1,B														
047294-004 CCTA-09-GR-048-0.5-1.0-S	R		UJ,A2															
047295-004 CCTA-09-GR-049-0-0.5-S	R	5U,B2	UJ,A2															
047297-004 CCTA-09-GR-049-0.5-1.0-S	R		UJ,A2															
047298-004 CCTA-09-GR-050-0-0.5-S	R	5U,B2	UJ,A2															
047299-004 CCTA-09-GR-050-0.5-1.0-S	R		UJ,A2															
047300-011 CCTA-09-GR-000-EB	UJ																	
047300-012 CCTA-09-GR-000-TB	UJ																	
047284-003 CCTA-09-GR-044-0-0.5-S										J								
047285-003 CCTA-09-GR-044-0.5-1.0-S										J								
047286-003 CCTA-09-GR-045-0-0.5-S										J								
047287-003 CCTA-09-GR-045-0-0.5-DU										J								
047288-003 CCTA-09-GR-045-0.5-1.0-S										J								
047289-003 CCTA-09-GR-046-0-0.5-S										UJ								
047290-003 CCTA-09-GR-046-0.5-1.0-S										J								
047291-003 CCTA-09-GR-047-0-0.5-S										J								
047292-003 CCTA-09-GR-047-0.5-1.0-S										UJ								
047293-003 CCTA-09-GR-048-0-0.5-S										UJ								
047294-003 CCTA-09-GR-048-0.5-1.0-S										UJ								
047295-003 CCTA-09-GR-049-0-0.5-S										UJ								
047297-003 CCTA-09-GR-049-0.5-1.0-S										UJ								
047298-003 CCTA-09-GR-050-0-0.5-S									R	UJ								
047299-003 CCTA-09-GR-050-0.5-1.0-S									R	UJ								

11/20/89

U of Samples: 15
 Matrix: Soil

Sample IDs: 1101542-02, -04, -06, -08, -10, -12, -14, -16,
11 -18, -20, -22, -24, -26, -28, -30

VOLATILE ORGANICS: Page 1 of 2
 SW-846 - Method 8260

SITE/PROJECT: CCTA-09
 LABORATORY: GEL

ARCO# : 602163
 LABORATORY REPORT #: 9907542

IS	GC/MS Name	CAS #	Min RF	Intercept	Calib RF	Calib RSD/R ²	CCV % ^(D)	Method Blks	I.CS	I.CSD	I.CS RPD	MS	MSD	MS RPD	Field Dup RPD	(M/L)			TAL	CCV % ^(D)	Method Blank	
																Eq Blks	Trip Blks					
1	Chloromethane	74-87-3	0.10	NA	✓	✓	-51.1	✓							✓	✓	✓	✓	✓	✓	✓	✓
1	Bromomethane	74-83-9	0.10	✓	✓	✓	✓														✓	
1	vinyl chloride	75-01-4	0.10	NA	✓	✓															✓	
1	Chloroethane	75-00-3	0.01	✓	✓	✓															✓	
1	methylene chloride (10xblk)	75-09-2	0.01	✓	✓	✓															✓	
1	acetone(10xblk)	67-64-1	0.01	✓	✓	✓															✓	
1	carbon disulfide	75-15-0	0.10	NA	✓	✓															✓	
1	1,1-dichloroethene	75-35-4	0.20		✓	✓			✓	✓	✓	84.5	78.8	✓							✓	
1	1,1-dichloroethane	75-34-3	0.10		✓	✓															✓	
1	Chloroform	67-66-3	0.20		✓	✓															✓	0.73
1	1,2-dichloroethane	107-06-2	0.10		✓	✓															✓	
1	2-butanone(10xblk)	78-93-3	0.01		✓	✓															✓	
2	1,1,1-trichloroethane	71-55-6	0.10		✓	✓															✓	
2	carbon tetrachloride	56-23-5	0.10		✓	✓	22.0														✓	
2	Bromodichloromethane	75-27-4	0.20		✓	✓	✓														✓	
2	1,2-dichloropropane	78-87-5	0.01		✓	✓															✓	
2	cis-1,3-dichloropropene	10061-01-5	0.20		✓	✓															✓	
2	Trichloroethene	79-01-6	0.30		✓	✓			✓	✓	✓	✓	✓	✓							✓	
2	Dibromochloromethane	124-48-1	0.10		✓	✓															✓	
2	1,1,2-trichloroethane	79-00-5	0.10		✓	✓															✓	
2	Benzene	71-43-2	0.50		✓	✓			✓	✓	✓	74.5	✓	✓							✓	
2	trans-1,3-dichloropropene	10061-02-6	0.10		✓	✓															✓	
2	Bromoform	75-25-2	0.10	✓	✓	✓	25.0														✓	
3	4-methyl-2-pentanone	108-10-1	0.10	NA	✓	✓	✓														✓	
3	2-hexanone	591-78-6	0.01		✓	✓															✓	
3	Tetrachloroethene	127-18-4	0.20		✓	✓															✓	
3	1,1,2,2-tetrachloroethane	79-34-5	0.30		✓	✓															✓	
3	toluene(10xblk)	108-88-3	0.40		✓	✓			✓	✓	✓	69.0	✓	✓							✓	
3	Chlorobenzene	108-90-7	0.50		✓	✓			✓	✓	✓	66.9	✓	✓							✓	
3	Ethylbenzene	100-41-4	0.10		✓	✓															✓	
3	Styrene	100-42-5	0.30	✓	✓	✓															✓	
3	xylenes(total)	1330-20-7	0.30	NA	✓	✓															✓	
	1,2-dichloroethylene(total)	540-59-0	0.01		✓	✓															✓	
	2-chloroethyl vinyl ether	110-75-8		NA	NA	NA	NA	NA													NA	NA
	Vinyl Acetate	108-05-4		✓	✓	✓	✓	✓													✓	✓

Comments: (D) CCV %D applies to samples -02, -04, -06, and -08 only. (method blank also)
 (D) CCV %D and method blank apply to samples -10, -12, -14, -16, -18, -20, -22, -24, -26, -28, and -30.

REVIEWED BY: [Signature]

DATE: 10/22/99

SITE/PROJECT: CCTA-09 ARCO# 602163
 LABORATORY: GEL LABORATORY REPORT #: 9907542

Surrogate Recovery and Internal Standard Outliers

Sample	SMC 1	SMC 2	SMC 3	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3-area	IS 3-RT
9907542-04	✓	✓	✓	✓	✓	✓	✓	low	✓
↓ -06	↓	↓	✓	↓	↓	↓	↓	low	↓
↓ -08	↓	↓	70.8 ↓	↓	↓	↓	↓	low	↓
↓ -26	↓	↓	67.4 ↓	↓	↓	↓	↓	✓	↓

SMC 1: ~~1,2-Dibromofluorobenzene~~ Bromofluorobenzene
 SMC 2: ~~1,2-Dichloroethane-d4~~ 1,2-Dichloroethane
 SMC 3: Toluene-d8
 Comments: Dibromofluorobenzene
 IS 1: Bromochloromethane Fluorobenzene
 IS 2: 1,4-Difluorobenzene-d4
 IS 3: Chlorobenzene-d5
 10/15/99

Summary:

CCV%:
 => chloromethane had CCV%Os < -40% and < -60%. The assoc. results of -04, -06, -08 were ND and will be qualified "U.S." The other assoc. results were also ND and will be qualified "R."
 => carbon tetrachloride and bromoform had %Os > 20%. Results were ND, no data qual.
Method blank:
 => chloroform was detected. Assoc. results of -02, -12, -14, -16, -18, -20 were < 5X the blank conc., and will be qualified "U.S." MS/MSD:
 => 1,1-dichloroethane had %RECs < QC limits. All assoc. results were ND and will be qualified "U.S., A2."
 => Benzene, toluene, and chlorobenzene had MS %RECs slightly below QC limits. The MSD passed and all other QC were met. Thus, no data were qualified.
 EB: Methylene chloride was detected. The assoc. results of sample -24 and -28 were < 4X the blank conc., and will be qualified "U.S., A2."
Surrogate/IS: SMC # 3 and IS # 3 were slightly below QC limits. A reanalysis was performed, and all QC criteria were met. Thus, no data were qualified.

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11 of samples:

Sample LODs: 7407542-35 (E0)

Matrix: aqueous

" -36 (T0)

VOLATILE ORGANICS: Page 1 of 2
SW-846 - Method 8260

SITE/PROJECT: CCTA-09 ARCO# : 602163
LABORATORY: GEL LABORATORY REPORT #: 9907542

IS	GC/MS Name	CAS #	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Trip Blks	TAL
					>.05	<20% / 0.99	20%											
1	Chloromethane	74-87-3	0.10	NA	✓	✓	51.1	✓				NA	NA	NA	NA	NA	NA	✓
1	Bromomethane	74-83-9	0.10	✓	✓	✓	✓											✓
1	vinyl chloride	75-01-4	0.10	NA	✓	✓	✓											✓
1	Chloroethane	75-00-3	0.01	✓	✓	✓	✓											✓
1	methylene chloride (10xblk)	75-09-2	0.01	✓	✓	✓	✓											✓
1	acetone(10xblk)	67-64-1	0.01	✓	✓	✓	✓											✓
1	carbon disulfide	75-15-0	0.10	NA	✓	✓	✓											✓
1	1,1-dichloroethene	75-35-4	0.20		✓	✓	✓		✓	✓	✓							✓
1	1,1-dichloroethane	75-34-3	0.10		✓	✓	✓											✓
1	Chloroform	67-66-3	0.20		✓	✓	✓											✓
1	1,2-dichloroethane	107-06-2	0.10		✓	✓	✓											✓
1	2-butanone(10xblk)	78-93-3	0.01		✓	✓	✓											✓
2	1,1,1-trichloroethane	71-55-6	0.10		✓	✓	✓											✓
2	carbon tetrachloride	56-23-5	0.10		✓	✓	22.0											✓
2	Bromodichloromethane	75-27-4	0.20		✓	✓	✓											✓
2	1,2-dichloropropane	78-87-5	0.01		✓	✓	✓											✓
2	cis-1,3-dichloropropene	10061-01-5	0.20		✓	✓	✓											✓
2	Trichloroethene	79-01-6	0.30		✓	✓	✓		✓	✓	✓							✓
2	Dibromochloromethane	124-48-1	0.10		✓	✓	✓											✓
2	1,1,2-trichloroethane	79-00-5	0.10		✓	✓	✓											✓
2	Benzene	71-43-2	0.50		✓	✓	✓		✓	✓	✓							✓
2	trans-1,3-dichloropropene	10061-02-6	0.10	✓	✓	✓	✓											✓
2	Bromoform	75-25-2	0.10	✓	✓	✓	35.8											✓
3	4-methyl-2-pentanone	108-10-1	0.10	NA	✓	✓	✓											✓
3	2-hexanone	591-78-6	0.01		✓	✓	✓											✓
3	Tetrachloroethene	127-18-4	0.20		✓	✓	✓											✓
3	1,1,2,2-tetrachloroethane	79-34-5	0.30		✓	✓	✓											✓
3	toluene(10xblk)	108-88-3	0.40		✓	✓	✓		✓	✓	✓							✓
3	Chlorobenzene	108-90-7	0.50		✓	✓	✓		✓	✓	✓							✓
3	Ethylbenzene	100-41-4	0.10		✓	✓	✓											✓
3	Styrene	100-42-5	0.30	✓	✓	✓	✓											✓
3	xylene(total)	1330-20-7	0.30	NA	✓	✓	✓											✓
	1,2-dichloroethylene(total)	540-59-0	0.01	✓	✓	✓	✓	NA										✓
	2-chloroethyl vinyl ether	110-75-8		NA	NA	NA	NA	NA										✓
	Vinyl Acetate	108-05-4		✓	✓	✓	✓	✓										✓

Comments:

REVIEWED BY: Ronald Buloy

DATE: 10/20/99

SITE/PROJECT: CCTA-09 ARCO# : 602163
 LABORATORY: GEL LABORATORY REPORT #: 9907542

Surrogate Recovery and Internal Standard Outliers

Sample	SMC 1	SMC 2	SMC 3	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3- area	IS 3- RT			
All Passed												

SMC 1: ~~4~~Bromofluorobenzene
 SMC 2: ~~1,2~~ Dichloroethane-d4
 SMC 3: Toluene-d8
 IS 1: ~~Bromochloromethane~~ Fluorobenzene
 IS 2: 1,4-Difluorobenzene-d4
 IS 3: Chlorobenzene-d5

Comments: Dibromofluoromethane
 10/15/99

10/22/99

of Samples: 15
Matrix: Soil

Sample IDs: 9907542-01, -03, -05, -07, -09, -11, -13, -15, -17, -19, -21, -23, -25, -27, -29

SEMI-VOLATILE ORGANICS: Page 1 of 3
SW-846 - Method 8270

SITE/PROJECT: CCTA-09 ARCO# : 602163
LABORATORY: GEL LABORATORY REPORT #: 9907542

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL	CCV %D	
1	A	108-95-2	Phenol	0.80	NA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	✓
1	BN	111-44-4	bis(2-Chloroethyl)ether	0.70		✓	✓														✓
1	A	95-57-8	2-Chlorophenol	0.80		✓	✓			✓	✓	✓	✓	✓	✓						✓
1	BN	541-73-1	1,3-Dichlorobenzene	0.60		✓	✓														✓
1	BN	106-46-7	1,4-Dichlorobenzene	0.50		✓	✓			✓	✓	✓	✓	✓	✓						✓
1	BN	95-50-1	1,2-Dichlorobenzene	0.40		✓	✓														
1	A	95-48-7	2-Methylphenol (o-cresol)	0.70		✓	✓														
1	BN	108-60-1	bis(2-chloroisopropyl)ether	0.01		✓	✓									✓		✓	✓	✓	
1	A	106-44-5	4-Methylphenol	0.60		NA	NA	NA	NA							NA	NA	NA			
1	BN	621-64-7	N-Nitroso-di-n-propylamine	0.50		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓	
1	BN	67-72-1	Hexachloroethane	0.30		✓	✓									✓	✓	NA	✓	✓	
2	BN	98-95-3	Nitrobenzene	0.20		✓	✓														
2	BN	78-59-1	Isophorone	0.40		✓	✓														
2	A	88-75-5	2-Nitrophenol	0.10		✓	✓														
2	A	105-67-9	2,4-Dimethylphenol	0.20		✓	✓														
2	BN	111-91-1	bis(2-Chloroethoxy)methane	0.30		✓	✓														
2	A	120-83-2	2,4-Dichlorophenol	0.20		✓	✓														
2	BN	120-82-1	1,2,4-Trichlorobenzene	0.20		✓	✓			✓	✓	✓	✓	✓	✓						
2	BN	91-20-3	Naphthalene	0.70		✓	✓														
2	BN	106-47-8	1-Chloroaniline	0.01		✓	✓														
2	BN	87-68-3	Hexachlorobutadiene	0.01		✓	✓														
2	A	59-50-7	4-Chloro-3-methylphenol	0.20		✓	✓			✓	✓	✓	✓	✓	✓						
2	BN	91-57-6	2-Methylnaphthalene	0.40		✓	✓														
3	BN	77-47-1	Hexachlorocyclopentadiene	0.01		✓	✓														
3	A	88-06-2	2,4,6-Trichlorophenol	0.20		✓	✓														
3	A	95-95-4	2,4,5-Trichlorophenol	0.20		✓	✓														

Comments: ① CCV %D applies to all samples other than -27 and -29.

② No FB submitted on the CCC.

③ CCV %D applies to samples -27 and -29 only.

NA = Not Applicable

REVIEWED BY:

[Signature]

DATE: 10/22/99

SITE/PROJECT: CCTA-09

ARCO# : 602163

LABORATORY: GEL

LABORATORY REPORT #: 9907542

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD/R ²	CCV %D	Method Blks	LCS	LCS D	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL	②		③	
																				CCV %D	CCV %D		
						>.05	<20% / 0.99	20%															
3	BN	91-58-7	2-Chloronaphthalene	0.80	NA	✓	✓	✓	✓							✓	✓	NA	✓	✓			
3	BN	88-74-4	2-Nitroaniline (o-)	0.01	↓	✓	✓	↓	↓							↓	↓	↓	↓	↓			
3	BN	131-11-3	Dimethylphthalate	0.01	↓	✓	✓	↓	↓							↓	↓	↓	↓	↓			
3	BN	208-96-8	Acenaphthylene	0.90	↓	✓	✓	↓	↓							↓	↓	↓	↓	↓			
3	BN	606-20-2	2,6-Dinitrotoluene	0.20	↓	✓	✓	↓	↓							↓	↓	↓	↓	↓			
3	BN	99-09-2	3-Nitroaniline (m-)	0.01	✓	✓	✓	↓	↓							↓	↓	↓	↓	↓	-21.2		
3	BN	83-32-9	Acenaphthene	0.90	NA	✓	✓	↓	↓	✓	✓	✓	✓	✓	✓	↓	↓	↓	↓	↓	✓		
3	A	51-28-5	2,4-Dinitrophenol	0.01	✓	✓	✓	↓	↓							↓	↓	↓	↓	↓	✓		
3	A	100-02-7	4-Nitrophenol	0.01	NA	✓	✓	↓	↓	✓	✓	✓	✓	✓	✓	↓	↓	↓	↓	↓	✓	-26.4	
3	BN	132-64-9	Dibenzofuran	0.80	↓	✓	✓	↓	↓							↓	↓	↓	↓	↓	✓		
3	BN	121-14-2	2,4-Dinitrotoluene	0.20	↓	✓	✓	↓	↓	✓	✓	✓	✓	✓	✓	↓	↓	↓	↓	↓	✓		
3	BN	84-66-2	Diethylphthalate	0.01	↓	✓	✓	↓	↓							↓	↓	↓	↓	↓	✓		
3	BN	7005-72-3	4-Chlorophenyl-phenylether	0.40	↓	✓	✓	↓	↓							↓	↓	↓	↓	↓	✓		
3	BN	86-73-7	Fluorene	0.90	↓	✓	✓	↓	↓							↓	↓	↓	↓	↓	✓		
3	BN	100-01-6	4-Nitroaniline (p-)	0.01	✓	✓	✓	↓	↓							↓	↓	↓	↓	↓	✓		
4	A	534-52-1	4,6-Dinitro-2-methylphenol	0.01	✓	✓	✓	↓	↓							↓	↓	↓	↓	↓	✓		
4	BN	86-30-6	N-Nitrosodiphenylamine (1)	0.01	NA	✓	✓	↓	↓							↓	↓	↓	↓	↓	✓		
4	BN	101-55-3	4-Bromophenyl-phenylether	0.10	↓	✓	✓	↓	↓							↓	↓	↓	↓	↓	✓		
4	BN	118-74-1	Hexachlorobenzene	0.10	↓	✓	✓	↓	↓							↓	↓	↓	↓	↓	✓		
4	A	87-86-5	Pentachlorophenol	0.05	✓	✓	✓	↓	↓	✓	✓	✓	✓	✓	✓	↓	↓	↓	↓	↓	✓		
4	BN	85-01-8	Phenanthrene	0.70	NA	✓	✓	↓	↓							↓	↓	↓	↓	↓	✓		
4	BN	120-12-7	Anthracene	0.70	↓	✓	✓	↓	↓							↓	↓	↓	↓	↓	✓		
4	BN	86-71-8	Carbazole	0.01	↓	NA	NA	NA	NA							NA	NA	↓	↓	↓	NA		
4	BN	84-71-2	Di-n-butylphthalate	0.01	↓	✓	✓	✓	✓							✓	✓	↓	↓	↓	✓		
4	BN	206-11-0	Fluoranthene	0.60	↓	✓	✓	↓	↓							↓	↓	↓	↓	↓	✓		
5	BN	129-00-0	Pyrene	0.60	↓	✓	✓	↓	↓	✓	✓	✓	✓	✓	✓	↓	↓	↓	↓	↓	✓		
5	BN	85-68-7	Dibutylphthalate	0.01	↓	✓	✓	↓	↓							↓	↓	↓	↓	↓	✓		
5	BN	91-94-1	3,3'-Dichlorobenzidine	0.01	↓	✓	✓	↓	↓							↓	↓	↓	↓	↓	✓		
5	BN	56-55-3	Benzo(a)anthracene	0.80	↓	✓	✓	↓	↓							↓	↓	↓	↓	↓	✓		

Comments: ① CCV %D applies to all samples except -27 and -29.
 ② No FB submitted on the COC.
 ③ CCV %D applies to samples -27 and -29 only.

NA = Not Applicable

[Handwritten signature] 10/20/11

Matrix: soil

SITE/PROJECT: CCTA-09 ARCO# : 602163
LABORATORY: GEL LABORATORY REPORT #: 9907542

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL	CCV %D	
						>.05	<20% / 0.99	20%													
5	BN	218-01-9	Chrysene	0.70	NA	✓	✓	✓	✓							✓	✓	NA	✓	✓	
5	BN	117-81-7	bis(2-Ethylhexyl)phthalate	0.01		✓	✓														
6	BN	117-84-0	Di-n-octylphthalate	0.01		✓	✓														
6	BN	205-99-2	Benzo(b)fluoranthene	0.70		✓	✓														
6	BN	207-08-9	Benzo(k)fluoranthene	0.70		✓	✓														
6	BN	50-32-8	Benzo(a)pyrene	0.70		✓	✓														
6	BN	193-39-5	Indeno(1,2,3-cd)pyrene	0.50		✓	✓													-24.8	
6	BN	53-70-3	Dibenz(a,h)anthracene	0.40		✓	✓														-23.6
6	BN	191-24-2	Benzo(g,h,i)perylene	0.50		✓	✓														-22.4
BV	122-66-7	1,2-diphenylhydrazole			✓	✓	✓														✓
A	65-85-0	Benzoic Acid			✓	✓	✓	-23.2													
BN	100-51-6	Benzyl Alcohol			NA	✓	✓	✓													
A	N22	m,p-cresol			NA	✓	✓	✓													

Surrogate Recovery Outliers

Sample	SMC 1	SMC 2	SMC 3	SMC 4	SMC 5	SMC 6	SMC 7	SMC 8
All Passed								

Comments:

- ① CCV %D applies to all samples except -27 and -29.
- ② No FB Submitted on to CC.
- ③ CCV %D applies to samples -27 and -29 only.

NA = Not Applicable

* Summary

CCV %D:

⇒ bis(2-chloroethyl)ether had a CCV %D < -60%
The assoc. results of samples -27 and -29 were ND and will be qualified "R."
⇒ Benzoic acid, 2-chlorophenol, 3-nitroaniline, 4-nitrophenol, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene, and Benzo(g,h,i)perylene had CCV %Ds < -20%. All assoc. sample results were ND. Thus, no data were qualified.

- SMC 1 Nitrobenzene-d5 (BN)
- SMC 2 2,4-Dichlorobiphenyl (BN)
- SMC 3 p-Terphenyl-d14 (BN)
- SMC 4 Phenol-d5 (A)
- SMC 5 2,4-Dichlorophenol (A)
- SMC 6 2,4,6-Tribromophenol (A)

01/19/99

Internal Standard Outliers

Sample	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3-area	IS 3-RT	IS 4-area	IS 4-RT	IS 5-area	IS 5-RT	IS 6-area	IS 6-RT
All Passed												

- IS 1 1,4-Dichlorobenzene-d4 (BN)
- IS 2 Naphthalene-d8 (BN)
- IS 3 Acenaphthene-d10 (BN)
- IS 4 Phenanthrene-d10 (BN)
- IS 5 Chrysene-d12 (BN)
- IS 6 Perylene-d12 (BN)

of Samples: 1
 Matrix: aqueous

Sample IDs: 9907542-35(8)

SEMI-VOLATILE ORGANICS: Page 1 of 3
 SW-846 - Method 8270

SITE/PROJECT: CCTA-09 ARCO# 602163
 LABORATORY: GEL LABORATORY REPORT #: 9907542

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL
						>.05	<20% / 0.99	20%											
1	A	108-95-2	Phenol	0.80	NA	✓	✓	✓	✓	✓	✓	✓	NA	NA	NA	NA	NA	NA	✓
1	BN	111-44-4	bis(2-Chloroethyl)ether	0.70		✓	✓	24.1											
1	A	95-57-8	2-Chlorophenol	0.80		✓	✓	✓		✓	✓	✓							
1	BN	541-73-1	1,3-Dichlorobenzene	0.60		✓	✓												
1	BN	106-46-7	1,4-Dichlorobenzene	0.50		✓	✓			✓	✓	✓							
1	BN	95-50-1	1,2-Dichlorobenzene	0.40		✓	✓												
1	A	95-48-7	2-Methylphenol (o-cresol)	0.70		✓	✓												
1	BN	108-60-1	bis(2-chloroisopropyl)ether	0.01		✓	✓	23.3	✓										↓
1	A	106-44-5	4-Methylphenol	0.60		NA	NA	NA	NA										
1	BN	621-64-7	N-Nitroso-di-n-propylamine	0.50		✓	✓	✓	✓	✓	✓	✓							✓
1	BN	67-72-1	Hexachloroethane	0.30		✓	✓												
2	BN	98-95-3	Nitrobenzene	0.20		✓	✓												
2	BN	78-59-1	Isophorone	0.40		✓	✓												
2	A	88-75-5	2-Nitrophenol	0.10		✓	✓												
2	A	105-67-9	2,4-Dimethylphenol	0.20		✓	✓												
2	BN	111-91-1	bis(2-Chloroethoxy)methane	0.30		✓	✓												
2	A	120-83-2	2,4-Dichlorophenol	0.20		✓	✓												
2	BN	120-82-1	1,2,4-Trichlorobenzene	0.20		✓	✓			✓	✓	✓							
2	BN	91-20-3	Naphthalene	0.70		✓	✓												
2	BN	106-47-8	4-Chloroaniline	0.01		✓	✓												
2	BN	87-68-3	Hexachlorobutadiene	0.01		✓	✓												
2	A	59-50-7	1-Chloro-3-methylphenol	0.20		✓	✓			✓	✓	✓							
2	BN	91-57-6	2-Methylnaphthalene	0.40		✓	✓												
3	BN	77-47-1	Hexachlorocyclopentadiene	0.01		✓	✓												
3	A	88-06-2	2,4,6-Trichlorophenol	0.20		✓	✓												
3	A	95-95-4	2,4,5-Trichlorophenol	0.20		✓	✓												

Comments: (MS/MSD) performed on a sample from another SOG.

NA = Not Applicable

(2) Sample is an EB. No field dup. or FB submitted on the COC.

REVIEWED BY: [Signature]

DATE: 10/22/99

SEMI-VOLATILE ORGANICS: Page 2 of 3
SW 846 - Method 8270

SITE/PROJECT: CCTA-09 ARCO# 602163
LABORATORY: GEL LABORATORY REPORT #: 9907542

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD/R ²	CCV %D	Method Blks	LCS	LCS D	LCS RPD	MS	MS D	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL		
						>.05	<20% / 0.99	20%													
3	BN	91-58-7	2-Chloronaphthalene	0.80	NA	✓	✓	✓	✓				NA	NA	NA	NA	NA	NA	✓		
3	BN	88-74-4	2-Nitroaniline (o-)	0.01	↓	✓	✓	↓	↓										✓		
3	BN	131-11-3	Dimethylphthalate	0.01	↓	✓	✓	↓	↓										✓		
3	BN	208-96-8	Acenaphthylene	0.90	↓	✓	✓	↓	↓										✓		
3	BN	606-20-2	2,6-Dinitrotoluene	0.20	↓	✓	✓	↓	↓										✓		
3	BN	99-09-2	3-Nitroaniline (m-)	0.01	↓	✓	✓	↓	↓										✓		
3	BN	83-32-9	Acenaphthene	0.90	↓	✓	✓	↓	↓	✓	✓	✓							✓		
3	A	51-28-5	2,4-Dinitrophenol	0.01	✓	✓	✓	21.2	↓										✓		
3	A	100-02-7	4-Nitrophenol	0.01	NA	✓	✓	✓	↓	✓	✓	✓							✓		
3	BN	132-64-9	Dibenzofuran	0.80	↓	✓	✓	↓	↓										✓		
3	BN	121-14-2	2,4-Dinitrotoluene	0.20	↓	✓	✓	↓	↓	✓	✓	✓							✓		
3	BN	84-66-2	Diethylphthalate	0.01	↓	✓	✓	↓	↓										✓		
3	BN	7005-72-3	4-Chlorophenyl-phenylether	0.40	↓	✓	✓	↓	↓										✓		
3	BN	86-73-7	Fluorene	0.90	↓	✓	✓	↓	↓										✓		
3	BN	100-01-6	4-Nitroaniline (p-)	0.01	↓	✓	✓	↓	↓										✓		
4	A	534-52-1	4,6-Dinitro-2-methylphenol	0.01	✓	✓	✓	↓	↓										✓		
4	BN	86-30-6	N-Nitrosodiphenylamine (I)	0.01	NA	✓	✓	↓	↓										✓		
4	BN	101-55-3	4-Bromophenyl-phenylether	0.10	↓	✓	✓	↓	↓										✓		
4	BN	118-74-1	Hexachlorobenzene	0.10	↓	✓	✓	↓	↓										✓		
4	A	87-86-5	Pentachlorophenol	0.05	↓	✓	✓	↓	↓	✓	✓	✓							✓		
4	BN	85-01-8	Phenanthrene	0.70	↓	✓	✓	↓	↓										✓		
4	BN	120-12-7	Anthracene	0.70	↓	✓	✓	↓	↓										✓		
4	BN	86-74-8	Carbazole	0.01	↓	NA	NA	NA	NA										✓		
4	BN	84-74-2	Di-n-butylphthalate	0.01	↓	✓	✓	✓	✓										✓		
4	BN	206-44-0	Fluoranthene	0.60	↓	✓	✓	↓	↓										✓		
5	BN	129-00-0	Pyrene	0.60	↓	✓	✓	↓	↓	✓	✓	✓							✓		
5	BN	85-68-7	Butylbenzylphthalate	0.01	↓	✓	✓	↓	↓										✓		
5	BN	91-94-1	3,3'-Dichlorobenzidine	0.01	↓	✓	✓	↓	↓										✓		
5	BN	56-55-3	Benzo(a)anthracene	0.80	↓	✓	✓	↓	↓										✓		

Comments: (MS/MSD performed on a sample from another SDG.
② Sample is an EB. No field dup. or FB submitted on the COC.

NA = Not Applicable

SITE/PROJECT: CCTA-09 ARCO# : 602163
 LABORATORY: GEL LABORATORY REPORT #: 9907542

IS	BNA	CAS #	NAME	Min RF	Intercept	Calib RF	Calib RSD / R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks	TAL
						>.05	<20% / 0.99	20%											
5	BN	218-01-9	Chrysene	0.70	NA	✓	✓	✓	✓				NA	NA	NA	NA	NA	NA	✓
5	BN	117-81-7	bis(2-Ethylhexyl)phthalate	0.01	↓	✓	✓	↓	↓				↓	↓	↓	↓	↓	↓	✓
6	BN	117-84-0	Di-n-octylphthalate	0.01	↓	✓	✓	↓	↓				↓	↓	↓	↓	↓	↓	✓
6	BN	205-99-2	Benzo(b)fluoranthene	0.70	↓	✓	✓	↓	↓				↓	↓	↓	↓	↓	↓	✓
6	BN	207-08-9	Benzo(k)fluoranthene	0.70	↓	✓	✓	↓	↓				↓	↓	↓	↓	↓	↓	✓
6	BN	50-32-8	Benzo(a)pyrene	0.70	↓	✓	✓	↓	↓				↓	↓	↓	↓	↓	↓	✓
6	BN	193-39-5	Indeno(1,2,3-cd)pyrene	0.50	↓	✓	✓	↓	↓				↓	↓	↓	↓	↓	↓	✓
6	BN	53-70-3	Dibenz(a,h)anthracene	0.40	✓	✓	✓	↓	↓				↓	↓	↓	↓	↓	↓	✓
6	BN	191-24-2	Benzo(g,h,i)perylene	0.50	NA	✓	✓	↓	↓				↓	↓	↓	↓	↓	↓	✓
	BU	122-66-7	1,2-diphenylhydrazine		↓	✓	✓	↓	↓				↓	↓	↓	↓	↓	↓	✓
	A	65-85-0	Benzoic Acid		✓	✓	✓	↓	↓				↓	↓	↓	↓	↓	↓	✓
	BM	100-51-6	Benzyl Alcohol		NA	✓	✓	↓	↓				↓	↓	↓	↓	↓	↓	✓
	A	N22	m,p-cresol		NA	✓	✓	↓	↓				↓	↓	↓	↓	↓	↓	✓

NA = Not Applicable

Surrogate Recovery Outliers

Sample	SMC 1	SMC 2	SMC 3	SMC 4	SMC 5	SMC 6	SMC 7	SMC 8
All Passed								

Comments:
 ① MS/MSD performed on a sample from another SDG.
 ② Sample is a EB. No field dup. or FB submitted on the COC.

* Summary:

CCV %D:
 → bis(2-chloroethyl)ether, bis(2-chloroisopropyl)ether, and 2,4-dinitrophenol had CCV %Ds > 20%. All assoc. results were ND. Thus, no data were qualified.

Internal Standard Outliers

Sample	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3-area	IS 3-RT	IS 4-area	IS 4-RT	IS 5-area	IS 5-RT	IS 6-area	IS 6-RT
All Passed												

IS 1: 1,1-Dichlorobenzene-d1 (BN) IS 2: Naphthalene-d8 (BN) IS 3: Acenaphthene-d10 (BN)
 IS 4: Phenanthrene-d10 (BN) IS 5: Chrysene-d12 (BN) IS 6: Perylene-d12 (BN)

Handwritten signature and date: 10/22/08

of Samples: 15
 Matrix: Soil

Sample IDs: 770 75 42 - 01, 03, 05, 07, 09, 11, 13, 15,
 " -17, 19, 21, 23, 25, 27, 29

HIGH EXPLOSIVES:
 SW846 Method 8330

SITE/PROJECT: CCTA-09 ARCO# : 602163
 LABORATORY: GEL LABORATORY REPORT #: 9907542

NAME	CAS #	Intercept	Curve R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks		
			.99	20%	U			20%			20%		U	U		
HMX	2691-41-0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	84.2	✓	NA		
RDX	121-82-4	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
1,3,5-Trinitrobenzene	99-35-4	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
1,3-dinitrobenzene	99-65-0	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
Nitrobenzene	98-95-3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
Tetryl	479-45-8	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
2,4,6-trinitrotoluene	118-96-7	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
2-amino-4,6-dinitrotoluene	35572-78-2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
4-amino-2,6-dinitrotoluene	19406-51-0	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
2,4-dinitrotoluene	121-14-2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
2,6-dinitrotoluene	606-20-2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
2-nitrotoluene	88-72-2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
4-nitrotoluene	99-99-0	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
3-nitrotoluene	99-08-1	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
PETN	78-11-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		

(%) (a)

NA = Not Applicable

Sample	SMC %REC	SMC RI	Sample	SMC %REC	SMC RI
All Passed					

Comments:
 (a) No FB submitted on the COC.
 (b) No confirmation data were provided. Thus, criteria could not be evaluated.

Confirmation

Sample	CAS #	RPD > 25%	Sample	CAS #	RPD > 25%
NA					

* Summary
 Field Dup:
 => HMX had an RPD > 35%. The assoc. results of samples 01, 03, 05, 07, 09, 13, and 15 were pos. and will be qualified "J." The assoc. result of 11, 17, 19, 21, 23, 25, 27, and 29 were NO and will be qualified "UJ."
 Eb:
 => 4-amino-2,6-DNT was detected. All assoc. results were either NO or > 5x the blank conc. Thus, no data were qual. for.

mg/kg ug/g (ug/g) x (sample mass [g]) / (sample vol. [ml]) x (1000ml / liter) / Dilution Factor ug/l

of Samples: 1
 Matrix: aqueous

Sample IDs: 4401542-54 (EB)

HIGH EXPLOSIVES:
 SW846 Method 8330

SITE/PROJECT: CCTA-09

ARCO# : 602163

LABORATORY: GEL

LABORATORY REPORT #: 9907542

NAME	CAS #	Intercept	Curve R ²	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup RPD	Eq. Blks	Field Blks
			.99	20%	U			20%			20%		U	U
HMX	2691-41-0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	NA	NA
RDX	121-82-4	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
1,3,5-Trinitrobenzene	99-35-4	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
1,3-dinitrobenzene	99-65-0	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Nitrobenzene	98-95-3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Tetryl	479-45-8	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
2,4,6-trinitrotoluene	118-96-7	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
2-amino-4,6-dinitrotoluene	35572-78-2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
4-amino-2,6-dinitrotoluene	19406-51-0	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
2,4-dinitrotoluene	121-14-2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
2,6-dinitrotoluene	606-20-2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
2-nitrotoluene	88-72-2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
4-nitrotoluene	99-99-0	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
3-nitrotoluene	99-08-1	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
PETN	78-11-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	↓	↓	↓

NA = Not Applicable

Sample	SMC %REC	SMC RT	Sample	SMC %REC	SMC RT
All Passed					

Comments:

① Sample B an EB. No field dup. or FB submitted on the CC.

* Summary

=> All QC criteria were met. No data were qualified.

Sample	CAS #	RPD > 25%	Sample	CAS #	RPD > 25%
-34	19406-51-0	✓			

ug/kg ug = [(ug/g) x (sample mass {g}) / sample vol {ml}] x (1000ml / liter) : Dilution Factor = ug/l

MEMORANDUM

DATE: October 22, 1999
TO: File
FROM: Kenneth Salaz *KS*
SUBJECT: Radiological Data Review and Validation
CCTA-09, ARCO #602163, Case No. 7215.2201

See the attached Data Assessment Summary Forms for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with accepted procedures and specified method: EPA900.0 (Gross Alpha/Beta). No problems were identified with the data package that result in the qualification of data.

Data are acceptable. QC measures appear to be adequate. The following sections discuss the data review and validation.

Holding Times

All samples were extracted and analyzed within the prescribed holding times.

Calibration

No calibration data were provided. However, the case narrative stated that the instrument was properly calibrated.

Blanks

No target analytes were detected in the method blanks above the required acceptance limits except gross alpha. However, all associated sample results were greater than (>) 5X the blank concentration. Thus, no data were qualified.

Matrix Spike (MS) Analysis

The MS met QC acceptance criteria.

Laboratory Control Sample (LCS)

The LCS met QC acceptance criteria.

Replicates

The replicate analyses met QC acceptance criteria.

Tracer Recoveries

No tracers were required for this method.

Negative Bias

All results met negative bias QC acceptance criteria.

Other QC

No target analytes were detected in the equipment blank (EB) above the required acceptance limits except gross alpha/beta. However, all associated sample results were > 5X the blank concentrations. Thus, no data were qualified. The field duplicate met QC acceptance criteria. No field blank (FB) were submitted on the ARCOC.

No other specific issues were identified which affect data quality.

Please contact me if you have any questions or comments regarding the review of this package.

SAMPLE FINDINGS SUMMARY

Site: CCTA - 09

AR/COC: 602163

Data Classification: Radiological (EPA 900.0)

Sample Fraction No.	Analysis	DV Qualifiers	Comments
	No Data were qualified.		
	Data are acceptable.		
	QC Measures appear to be adequate.		

Sample No./Fraction No. - This value is located on the Chain of Custody in the ER Sample Id field.

Analysis - Use valid test methods provided below or if the result applies to an individual analyte within a test method, use the CAS number from the analytical data sheet.

DV Qualifiers - The entry will be taken from the list of valid qualifiers and associated comments. If other qualifiers not on the list are needed, contact Tina Sanchez to coordinate adding them to the list.

Comments - This is only to be used if a comment associated with the qualifier is not appropriate, needs modification because of an unusual circumstance, or additional clarification is warranted.

Test Methods - Anions_CE, EPA6010, EPA6020, EPA7470-1, EPA8015B, EPA8081, EPA8260, EPA8260-M3, EPA8270, HACH_ALK, HACH_NO2, HACH_NO3, MEKC_HE, PCBRI5C

Reviewed by: [Signature] Date: 10/22/99

of Samples: 12
 Matrix: Soil

Sample IDs: 1101542 -01, -02, -03, -07, -08, -11, -13, -15,
 " " -17, -19, -21, -23, -25, -27, -29

RADIOCHEMISTRY:

SITE/PROJECT: CCTA-09 ARCO# : 602163
 LABORATORY: GEL LABORATORY REPORT #: 9907542
 METHODS: EPA 900.0

Batch # 154033(-01 → -15)
 " " 154034(-17 → -29)

QC Element/ Analyte	Method Blks	LCS	MS	Rep RER	Eq. Blks	Field Dup RER	Field Blks	Sample ID	Isotope	IS/Trace	Sample ID	Isotope	IS/Trace
CRITERIA	U	20%	25%	<1.0	U (M/L)	<1.0	U			50-105			50-105
U-238								NA					
U-234													
U-235/236													
Th-232													
Th-228													
Th-230													
Pu-239/240													
Gross Alpha	0.636/✓	✓	✓	✓	0.956	✓	NA						
Nonvolatile Beta	✓/✓	✓	✓	✓	1.85	✓	NA						
Ra226													
Ra228													
Ni-63													
Gamma Spec- Am241													
Gamma Spec- Cs137													
Gamma Spec- Co60													

NA = Not Applicable

Parameter	Method	Typical Tracer	Typical Carrier
Iso-U	Alpha spec	U-232	NA
Iso-Pu	Alpha spec	Pu-242	NA
Iso-Th	Alpha spec	Th-229	NA
Am-241	Alpha spec	Am-242	NA
Sr-90	Beta	Y ingrowth	NA
Ni-63	Beta	NA	Ni by ICP
Ra-226	Deamination	NA	NA
Ra-226	Alpha spec	Ba-133 or Ra-225	NA
Ra-228	Gamma spec	Ba-133	NA

Comments:
 0 No FB submitted on the COC.
 * Summary
 Method Blank:
 ⇒ Gross Alpha was detected. All assoc. sample results were
 > 5x the blank conc. Thus, no data were qual. f. rel.
 EB:
 ⇒ Gross Alpha/Beta were detected. All assoc. results were
 > 5x the blank conc. s. Thus, no data were qual. f. rel.

Gamma spec LCS contains: Am-241, Cs-137, and Co-60

of Samples: _____

Sample #s: 1907542 - 51201

Matrix: aqueous

RADIOCHEMISTRY:

SITE/PROJECT: CCTA-09 ARCO# : 602163

LABORATORY: GEL LABORATORY REPORT #: 9907542

METHODS: EPA 900.0

QC Element/ Analyte	Method Blks	LCS	MS	Rep RER	Eq. Blks	Field Dup RER	Field Blks	-	Sample ID	Isotope	IS/Trace	Sample ID	Isotope	IS/Trace
CRITERIA	U	20%	25%	<1.0	U	<1.0	U	-			50-105			50-105
H3														
U-238									NA					
U-234														
U-235/236														
Th-232														
Th-228														
Th-230														
Pu-239/240														
Gross Alpha	✓	✓	✓	✓	NA	NA	NA	-						
Nonvolatile Beta	✓	✓	✓	✓	NA	NA	NA	-						
Ra226								-						
Ra228								-						
Ni-63								-						
Gamma Spec- Am241								-						
Gamma Spec- Cs137								-						
Gamma Spec- Co60								-						

NA = Not Applicable

Parameter	Method	Typical Tracer	Typical Carrier
Iso-U	Alpha spec	U-232	NA
Iso-Pu	Alpha spec	Pu-242	NA
Iso-Th	Alpha spec	Th-229	NA
Am-241	Alpha spec	Am-242	NA
Sr-90	Beta	Y ingrowth	NA
Ni-63	Beta	NA	Ni by ICP
Ra-226	Deamination	NA	NA
Ra-226	Alpha spec	Ba-133 or Ra-225	NA
Ra-228	Gamma spec	Ba-133	NA

Comments:

① Sample is an EB. No field dup. or FB submitted on the COC.

② No tracer required for this method.

* Summary

⇒ All QC criteria were met. No data were qualified.

Gamma spec LCS contains Am-241, Cs-137, and Co-60

DATA VALIDATION SUMMARY:

SITE/PROJECT: CLTA-09 CASE #: 7215.2201
 ARCO#: 602163
 LABORATORY: GEL
 LABORATORY REPORT #: 9907542

OF SAMPLES: 36 MATRIX: 30 Soil / 6 aqueous
 LAB SAMPLE IDS: 9907542-01 thru -36

ANALYSIS/ QC ELEMENT	VOC	SVOC	PEST/ PCB	HPLC (HIE)	ICP/AES	GFAA/ AA	CVAA (Hg)	CN	RAD	OTHER → ICP/MS (u)
1. HOLDING TIMES/ PRESERVATION	✓	✓	NA	✓	✓	NA	✓	NA	✓	✓
2. CALIBRATIONS	R; UJ	R		✓	✓		✓		✓	✓
3. METHOD BLANKS	U1, B	✓		✓	J, B3		J, B3 ✓		✓	✓
4. MS/MSD	UJ, A2	✓		✓	R, A2 J, A2		✓		✓	✓
5. LABORATORY CONTROL SAMPLES	✓	✓		✓	✓		✓		✓	✓
6. REPLICATES					✓		✓		✓	J
7. SURROGATES	✓	✓		✓						NA
8. INTERNAL STDS	✓	✓								
9. TCL COMPOUND IDENTIFICATION	✓	✓								
10. ICP INTERFERENCE CHECK SAMPLE					✓					✓
11. ICP SERIAL DILUTION					✓					✓
12. CARRIER/CHEM TRACER RECOVERIES									NA	NA
13. OTHER QC	U, B2	✓		J; UJ	J, B2		✓		✓	✓

CHECK MARK (✓) - ACCEPTABLE
 J - ESTIMATED
 U - NOT DETECTED

SHADED CELLS - NOT APPLICABLE
 UJ - NOT DETECTED, ESTIMATED
 R - UNUSABLE

NA = Not Applicable

Contract Verification Review (CVR)

Project Leader BYRD Project Name CCTA-09 Case No. 7215.2201
 AR/COC No. 602163 Analytical Lab GEL SDG No. 9907542

In the tables below, mark any information that is missing or incorrect and give an explanation.

1.0 Analysis Request and Chain of Custody Record and Log-In Information

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
1.1	All items on COC complete - data entry clerk initialed and dated	X				
1.2	Container type(s) correct for analyses requested	X				
1.3	Sample volume adequate for # and types of analyses requested	X				
1.4	Preservative correct for analyses requested	X				
1.5	Custody records continuous and complete	X				
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	X				
1.7	Date samples received	X				
1.8	Condition upon receipt information provided	X				

2.0 Analytical Laboratory Report

Line No.	Item	Complete?		If no, explain	Resolved?	
		Yes	No		Yes	No
2.1	Data reviewed, signature	X				
2.2	Method reference number(s) complete and correct	X				
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X				
2.4	Matrix spike/matrix spike duplicate data provided(if requested)	X				
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and L _c	X				
2.6	QC batch numbers provided	X				
2.7	Dilution factors provided and all dilution levels reported	X				
2.8	Data reported in appropriate units and using correct significant figures	X				
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	X				
2.10	Narrative provided	X				
2.11	TAT met	X				
2.12	Hold times met	X				
2.13	Contractual qualifiers provided	X				
2.14	All requested result and TIC (if requested) data provided	X				

Contract Verification Review (Continued)

3.0 Data Quality Evaluation

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data		X	QC FOR EXPLOSIVES ANALYSES REPORTED IN INCORRECT UNITS FOR MATRIX (AQUEOUS)
3.2 Quantitation limit met for all samples	X		
3.3 Accuracy	X		
a) Laboratory control samples accuracy reported and met for all samples			
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique		X	RECOVERY FOR TOLUENE-d8 BELOW QC LIMITS FOR VOA SAMPLES #9907542-08 & 9907542-26
c) Matrix spike recovery data reported and met		X	RECOVERY FOR 1,1-DCE, BENZENE, TOLUENE & CHLOROBENZENE BELOW QC LIMITS FOR 9097542-02MS RECOVERY FOR 1,1-DCE BELOW QC LIMITS FOR 9907542-02MSD ANTIMONY BELOW RECOVERY LIMITS FOR 9907542-29MS
3.4 Precision		X	RPD FOR 9907542-15DUP & 9907542-29DUP ABOVE ACCEPTANCE LIMITS FOR GROSS ALPHA RPD FOR 9907542-31DUP ABOVE ACCEPTANCE LIMITS FOR BETA
a) Replicate sample precision reported and met for all inorganic and radiochemistry samples			
b) Matrix spike duplicate RPD data reported and met for all organic samples	X		
3.5 Blank data		X	CHLOROFORM DETECTED IN VOA METHOD BLANKS
a) Method or reagent blank data reported and met for all samples			
b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	SEVERAL ANALYTES DETECTED IN EQUIPMENT BLANKS
3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"-analyte found in method blank above the MDL for organic or above the PQL for inorganic; "U"- analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"-analysis done beyond the holding time	X		
3.7 Narrative addresses planchet flaming for gross alpha/beta	X		
3.8 Narrative included, correct, and complete		X	ANALYTICAL CASE NARRATIVE & QC SUMMARY REPORT FOR EXPLOSIVES (SOILS) NOT INCLUDED IN DATA PACKAGE
3.9 Second column confirmation data provided for methods 8330 (high explosives) and pesticides/PCBs	X		

Contract Verification Review (Continued)

4.0 Calibration and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.)			
a) 12-hour tune check provided	X		
b) Initial calibration provided	X		
c) Continuing calibration provided	X		
d) Internal standard performance data provided	X		
e) Instrument run logs provided	X		
4.2 GC/HPLC (8330 and 8010)			
a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) Instrument run logs provided	X		
4.3 Inorganics (metals)			
a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) ICP interference check sample data provided	X		
d) ICP serial dilution provided	X		
e) Instrument run logs provided	X		
4.4 Radiochemistry			
a) Instrument run logs provided	X		

Contract Verification Review (Concluded)

5.0 Problem Resolution

Summarize the findings in the table below. List only samples/fractions for which deficiencies have been noted.

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions
9907542-17	SVOC	FIRST PAGE OF REPORT MISSING (BETWEEN PG. 452 & 453)
ALL SOILS	HE	ANALYTICAL CASE NARRATIVE OMITTED
QC	METALS	BOTTOM OF PAGE 544 ILLEGIBLE
QC	HE	QC FOR AQUEOUS SAMPLES REPORTED IIN INCORRECT UNITS FOR MATRIX

Were deficiencies unresolved? Yes No

Based on the review, this data package is complete. Yes No

If no, provide: nonconformance report or correction request number 2163 and date correction request was submitted: 8-26-99

Reviewed by: W. Palencia Date: 8-26-99 Closed by: W. Palencia Date: 9-8-99

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab
Batch No. **901417**

SAR/WR No. _____

(Call 284-5514 for ARCOC and Sample Numbers.)

AR/COC- **602163**

Dept. No./Mail Stop: **6134 / 108B**
 Project/Task Manager: **BYRD / PAVLETICH**
 Project Name: **CCTA-09**
 Record Center Code: **EA/1334/09/PAT**
 Logbook Ref No: **ER 051**
 Service Order No.: **CF 0668**

Date Samples Shipped: **7-15-99** SMO USE
 Carrier/Waybill No.: **722699**
 Lab Contact: **ERIE KENT**
 Lab Destination: **GEL**
 SMO Contact/Phone: **DOUG SALMI (505) 894-3110**
 Send Report to SMO **SUEI JENSEN**

Contract No.: **AT-2480A**
 Case No.: **725, 220100**
 SMO Authorization: *[Signature]*
 Bill to: Sandia National Laboratories
 Supplier Services
 Department
 P.O. Box 5800 MS 0154

Parameter & Method Requested

Location		Tech Area	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)				Sample Collection Method	Sample Type	Gross Alpha/Beta	TAL MEMRS + U	SVCS	HE	VOCs	Lab Sample ID
						Soil Sample Matrix	Container Type	Volume (oz)	Preservative								
ER SITE 9					7/13/99												
47284-003		CCTA-09-AR-04-D-0.5-S	0-0.5	9	7-13-99 1310	S	AG	16	4°	G	SA	x	x	x	x		
77784-774		↓	↓	7	7	7	7	4	7	7	↓					x	
85-3		044-0.5-1.0-S	0.5-1		1312			16				x	x	x	x		
85-4		↓	↓		↓			4			↓					x	
86-3		045-0-0.5-S	0-0.5		1315			16				x	x	x	x		LAB USE
86-4		↓	↓		↓			4			↓					x	LAB USE
87-3		045-0-0.5-DU	0-0.5		1317			16			DU	x	x	x	x		
87-4		↓	↓		↓			4			↓					x	
88-3		045-0.5-1.0-S	0.5-1		1319			16			SA	x	x	x	x		
88-4		↓	↓		↓			4			↓					x	

RMMA Yes No Ref. No. _____

Sample Tracking SMO USE
 Date Entered (mm/dd/yy) **7/19/99**
 Entered by: *[Signature]*

Special Instructions/QC Requirements
 EDD Yes No
 Raw data package Yes No

Abnormal Conditions on Receipt

Turnaround Time Normal Rush Required Report Date _____

QC Inits: *[Signature]*

RELEASED BY ARCOC 602164 **

LAB USE

Sample Team Members	Name	Signature	Init	Company/Organization/Phone
	JOE PAVLETICH	<i>[Signature]</i>	JP	ARCOC/6134/SOS-284-2479

Please list as separate report.

1. Relinquished by <i>[Signature]</i> Org. 6134 Date 7-14-99 Time 1135	4. Relinquished by _____ Org. _____ Date _____ Time _____
1. Received by <i>[Signature]</i> Org. 7577 Date 7-14-99 Time 1135	4. Received by _____ Org. _____ Date _____ Time _____
2. Relinquished by <i>[Signature]</i> Org. 7577 Date 7-15-99 Time 1245	5. Relinquished by _____ Org. _____ Date _____ Time _____
2. Received by _____ Org. _____ Date _____ Time _____	5. Received by _____ Org. _____ Date _____ Time _____
3. Relinquished by _____ Org. _____ Date _____ Time _____	6. Relinquished by _____ Org. _____ Date _____ Time _____
3. Received by _____ Org. _____ Date _____ Time _____	6. Received by _____ Org. _____ Date _____ Time _____

ANALYSIS REQUEST AND CHAIN OF CUSTODY CONTINUATION FORM

001-COD (12-96)
revise (10-94) issue

AR/COC- 602163

Project Name: CCTA-09 Project/Task Manager: BYRD / PAULETICH Case No.: 7215.220100

Location Tech Area <u>ER SITE 9</u>		Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)				Parameter & Method Requested						Lab Sample ID	
					SOIL Sample Matrix	Container		40C Preservative	Sample Collection Method	Sample Type	GROSS ALPHA/BETA	TAL METALS + U	SVOCs	HE		VOCs
Type	Volume (oz)	Sample Matrix	Type	Volume		Preservative	Collection Method								Sample Type	
47289-003	CCTA-09-GR-046-0-0.5-S	0-0.5	9	7/13/99 1325	S	AG	16	40	G	SA	X	X	X	X		
77109-374	↓	↓	7	7 ↓	7	7	4	7	7	7						
290-3	046-0.5-1.0-S	0.5-1		1327			16				X	X	X	X		
790-4	↓	↓		↓			4									
91-3	047-0-0.5-S	0-0.5		1330			16				X	X	X	X		LAB USE
91-4	↓	↓		↓			4									
92-3	047-0.5-1.0-S	0.5-1		1332			16				X	X	X	X		
92-4	↓	↓		↓			4									
93-3	048-0-0.5-S	0-0.5		1335			16				X	X	X	X		
93-4	↓	↓		↓			4									
94-3	048-0.5-1.0-S	0.5-1		1337			16				X	X	X	X		
94-4	↓	↓		↓			4									
95-3	049-0-0.5-S	0-0.5		1345			16				X	X	X	X		
95-4	↓	↓		↓			4									
96-3	049-0-0.5-S	0-0.5		1347			16				DU	X	X	X		
96-4	↓	↓		↓			4				↓					
97-3	049-0.5-1.0-S	0.5-1		1347 1349 72099			16				SA	X	X	X		
97-4	↓	↓		↓			4				↓					

Abnormal Conditions on Receipt 1347 LAB USE

ANALYSIS REQUEST AND CHAIN OF CUSTODY CONTINUATION FORM

001 (01) (12 96)
Revised (10-94) issue

AR/COC- 602163

Project Name: CCTA-09 Project/Task Manager: BYRD/PAULETICH Case No.: 725.220100

Location
Tech Area _____
Building ER SITE 9 Room _____

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Reference LOV (available at SMO)					Parameter & Method Requested								Lab Sample ID				
					SOIL Sample Matrix	Container Type	Volume (oz)	Preservative	Sample Collection Method	Sample Type	GRADES ALPHA/BETA	TAL METALS + U	SVOCs	HE	VOCs							
47298-003	CCTA-09-62-050-0-0.5-5	0-0.5	9	7/13/99 1350	S	AG	16	40	G	SA	x	x	x	x								
	↓	↓		↓			4															
	050-0.5-1.0-5	0.5-1		1352			16				x	x	x	x								
	↓	↓		↓			4															
300-005	000-EB	NA		0925	DIW	P	500ml	HNO3	G	EB	x											
	↓	↓		↓			↓	↓				x										
	↓	↓		↓			2x 12	40					x									
	↓	↓		↓			4x 12	↓						x								
	↓	↓		↓			3x 40ml	HCl							x							
1301-012	000-TB			0915			↓	↓														
	↓	↓		↓																		
	↓	↓		↓																		
	↓	↓		↓																		
	↓	↓		↓																		
	↓	↓		↓																		
	↓	↓		↓																		

Abnormal Conditions on Receipt _____

LAB USE

Recipient Initials _____

ANNEX 10-E
Risk Screening Assessment

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SWMU 9: RISK SCREENING ASSESSMENT REPORT

I. Site Description and History

Solid Waste Management Unit (SWMU) 9, Burial Site/Open Dump at Sandia National Laboratories/New Mexico (SNL/NM), covers 1.86 acres of land that is owned by Kirtland Air Force Base (KAFB) and leased to the U.S. Department of Energy (DOE). The site is located about 1,800 feet east of the Schoolhouse Building (SWMU 61C), where an unnamed dirt road that branches off to the north from Demolition Range Road crosses an arroyo. SWMU 9 forms the southwestern corner of the adjacent SWMU 61A and encompasses features on the north and south arroyo banks. The elevation of the site is 5,845 feet above mean sea level.

Environmental concern about SWMU 9 is based upon the various debris types that were dumped, burned, and buried at the site between approximately 1967 and 1971. The debris is reported to have come from various undocumented activities in the local area. The initial Comprehensive Environmental Assessment and Response Program site survey in the mid-1980s, identified three mounds where debris was thought to have been buried. Subsequent investigation disclosed that debris was only actually buried in the largest mound (Mound 1.) Mound 2 was discovered to be an isolated pile of debris (i.e., no additional buried debris was found at the location), whereas Mound 3 consisted simply of debris scattered on a terrace deposit. Beginning in 1995 voluntary corrective measures (VCM) were conducted to survey and remove radioactive materials (depleted uranium [DU] fragments) from the surface of SWMU 9 and the adjacent SWMU 61A. Between 1996 and 1999 a second VCM was conducted to excavate, survey, and remove materials from the largest debris burial mound (Mound 1) at SWMU 9. Debris materials from Mounds 2 and 3 were also surveyed and removed during this VCM.

Debris excavated from Mound 1 included shrapnel-riddled and blasted galvanized sheet metal forms and sheets, steel plates, iron beams, shipping containers, empty 55-gallon drums, weapons transport racks, construction rubble (cinder blocks, concrete blocks, glazed tiles, plumbing pipes, approximately 0.5 gallon of Transite tile pieces), plastic wrappers for C-4 high explosive (HE) charges, burned wood and paper, wiring, unexploded ordnance (3 and 5-inch diameter artillery shells), spent fuze lines, paper, broken glass, and various beverage containers. Scattered pockets of radioactive materials (schoepite [DU], and DU-contaminated debris) were found in Mound 1 and in another shallow burial pit just east of Mound 1. Debris at Mound 2 consisted of a tangled mass of barbed wire, empty paint cans, ceramic electrical insulators, mortar shell storage cases, a military bomb rack, vehicle parts, a shrapnel-riddled iron plate, pieces of wood and metal, and building rubble (cinder blocks, glazed masonry tiles.) Debris at Mound 3 consisted of wooden crate remnants, empty paint cans, expended smoke grenades, an empty 55-gallon drum containing a grate that appeared to have been used as a grill, and other miscellaneous solid waste.

The annual precipitation for the area, as measured at the Albuquerque International Sunport, is 8.1 inches. The closest perennial water source, Coyote Springs, is located approximately 4,000 feet north of the site. Cattail and Homestead Springs, located about 2,000 feet north of the site are not perennial. During most rainfall events, rainfall quickly infiltrates the soil at SWMU 9. However, virtually all of the moisture subsequently undergoes evapotranspiration.

The estimates of evapotranspiration for the KAFB area range from 95 to 99 percent of the annual rainfall (NOAA 1990).

SWMU 9 is on an unnamed arroyo that is a tributary to Arroyo del Coyote. The unnamed arroyo drains a small watershed with headwaters in the western face of the Manzanita Mountains and joins Arroyo del Coyote about 3,800 feet west of the site. SWMU 9 lies on the Arroyo del Coyote alluvial fan that is composed of Pleistocene-age fine- to coarse-grained poorly to moderately sorted sediments ranging in size from small clay particles to boulders. These deposits contain relatively impermeable carbonate-rich soil horizons and impermeable carbonate-cemented horizons that inhibit vertical groundwater flow. Based upon the well record for the Schoolhouse Mesa Well, located approximately 1,800 feet west of SWMU 9, the alluvial fan deposits are less than 100 feet thick and unconformably overlie the Madera Formation. The Madera Formation consists of predominantly clastic limestone that contains fossiliferous, cherty limestone units with some interbedded shale, siltstone, sandstone, and pebble conglomerate. SWMU 9 is bounded on the west by the Coyote Fault that probably influences groundwater pathways from the Manzanita Mountains to the alluvium. The Schoolhouse Well is completed in the Madera Formation and the depth to groundwater is approximately 95 feet below ground surface (bgs). Groundwater recharge is likely from precipitation in the Manzanita Mountains infiltrating through fractured bedrock. There are no water supply wells in this area of KAFB.

Principal vegetation at SWMU 9 consists of desert grassland flora common to the area including grasses, juniper, yucca, and cacti. Soil at the site has been identified as Tesajo-Millet stony sandy loams. For purposes of defining the background levels of metals and radionuclides in soils, this soil has been included as part of the Coyote Test Field Supergroup. Slope angles vary from low (<10-percent) over most of the site to high (>30-percent) on the arroyo walls and as a result the runoff potential ranges from slow to rapid. A surface-water site assessment showed a high erosion potential in the area of Mound 1 excavation, as a result of the high slope angle. Following the completion of all investigation activities, the excavation area will be regraded and vegetated to minimize possible runoff and erosion impacts.

II. Data Quality Objectives

The original Data Quality Objectives (DQOs) presented in the Operable Unit (OU) 1334 Work Plan as modified by subsequent Notice of Deficiency and Request for Supplemental Information comments identify the site-specific confirmatory sampling locations, sample depths, sampling procedures, and analytical requirements. The DQOs outlined the quality assurance (QA)/quality control (QC) requirements necessary for producing definitive analytical data suitable for risk-assessment purposes. However, following the 1996 RFI sampling and the VCM at Mound 1, the confirmatory sampling conducted at SWMU 9 was modified to:

- Characterize site soils for background metal and radionuclide concentrations;
- Characterize the nature and extent of possible contaminants of concern (COCs) in the arroyo channel sediment;
- Determine the lateral and vertical extent of Mound 1 and characterize the nature and extent of possible COCs;

- Characterize the nature and extent of any residual COCs in the VCM excavations at Mound 1 and the newly discovered burial pit;
- Characterize the nature and extent of any residual COCs in the excavated soil (VCM soil piles) for later onsite redeposition;
- Characterize the nature and extent of possible COCs in soil underlying Mounds 2 and 3.
- Provide analytical data of sufficient quality to support risk screening assessments.

Table 1 summarizes the rationale for the sampling pattern design. The source for potential COCs at SWMU 9 was the debris buried in Mound 1, debris in the newly discovered burial pit, and materials dumped at Mound 2 in the arroyo channel. The VCM activities removed 14, 55-gallon drums of mixed waste, approximately 40 cubic yards of scrap metal, and 520 cubic yards of soil and debris.

Following the conclusion of the VCM excavation, a series of confirmatory soil samples were collected from under the southern end of Mound 1 (where the debris was buried), from the burial pit, from the soil mounds, from under Mound 3, and from the arroyo channel downstream of Mound 3 (Table 2.) The confirmatory soil samples were collected from 18 locations in the Mound 1 VCM excavation, from 3 locations in the burial pit, from 26 soil pile locations (2 per soil pile), from 1 location under Mound 3, and from 3 locations in the arroyo channel. The Mound 1 and burial pit samples were identified CCTA-09-GR-030 through CCTA-09-GR-050. The Mound 3 sample was identified CCTA-09-GR-029. The arroyo sediment samples were identified CCTA-09-GR-007 through CCTA-09-GR-009. Except for the Mound 3 sample, all of the samples were from the surface (0- to 0.5-foot depth) and near-surface (0.5- to 1.0-foot depth) and were collected using a hand trowel. The Mound 3 sample was from the depth of 3.0 to 3.5 feet bgs at the base of the exploratory trench excavated in 1996. The soil piles were sampled by collecting one sample from the north and south sides of the pile using a hand trowel. These samples were identified CCTA-09-VCM-Pile 1-N through CCTA-09-VCM-Pile 13-S. The soil samples were collected using the sampling procedures detailed in SNL/NM field operating procedures.

Table 2 summarizes the analytical methods and data quality requirements necessary to (1) adequately characterize hazardous waste or hazardous constituents associated with the materials buried on site and (2) to support risk screening assessments.

The SWMU 9 confirmatory soil samples were analyzed for all COCs: for radionuclides (using gamma spectroscopy, isotopic uranium and thorium, gross alpha and gross beta, and tritium), for Target Analyte List (TAL) metals plus total uranium, for volatile organic compounds (VOCs), for semivolatile organic compounds (SVOCs), and for HE compounds. The samples were analyzed by three analytical laboratories: Core Laboratories Inc., General Engineering Laboratories, Inc. (GEL/EPI), and the on-site SNL/NM Radiation Protection Sample Diagnostic (RPSD) Laboratory. Gamma spectroscopy analyses were performed on a majority of the samples. Isotopic uranium and thorium and tritium analyses were only performed on the soil pile samples. Gross alpha and gross beta were not performed on the soil pile samples.

Table 3 lists the analytical methods and some of the data quality requirements.

Table 1
Summary of Sampling Performed to Meet Data Quality Objectives

SWMU 9 Sampling Areas	Potential COC Source	Number of Sampling Locations	Sample Density	Sampling Location Rationale
Site-specific and arroyo sediment background	Not applicable	6	Surface and near-surface samples collected from each judgmental soil and arroyo sediment sample location	Sample locations selected in western portion of site and upstream of mounds in arroyo channel where activities are not believed to have had an impact
Arroyo sediment	Materials dumped in arroyo and mounds	3	Surface and near-surface samples collected from 3 arroyo channel locations at approximately 100-foot depth intervals	Sample locations selected downstream of Mound 3 to determine nature and extent of potential COCs released to arroyo channel sediment
Mound 1	Buried debris materials	9	Three trenches were excavated and 9 locations were sampled to characterize the mound materials and underlying soil.	Sample locations to determine the nature and extent of potential COCs in mound materials and possible release to underlying soil
Mound 1 VCM excavation	Buried debris materials	18	Surface and near-surface samples collected from within the excavation	Sample locations to confirm that no significant levels of COCs remain where the southern end of the mound was excavated
Burial Pit	Buried debris materials	3	Surface and near-surface samples collected from 3 judgmental locations across the excavation	Sample locations to confirm that no significant levels of COCs remain in the excavation
Soil piles from VCM excavation	Buried debris materials	26	Two locations on each of the 13 mounds	Sample locations to confirm that no significant levels of COCs remain in the excavated soil
Mound 2	Buried debris materials	1	Soil sample collected from beneath mound contact with native soil	Sample locations to determine nature and extent of potential COCs in underlying soil
Mound 3	Buried debris materials	1	Soil sample collected from beneath mound contact with native soil	Sample locations to determine nature and extent of potential COCs in underlying soil

COC = Contaminant of concern.

SWMU = Solid Waste Management Unit.

VCM = Voluntary Corrective Measure.

Table 2
Number of Confirmatory Soil Samples Collected During the SWMU 9 RFI, VCM, and Soil Pile Sampling

Sample Type ^a	Number of Samples	Radionuclides					TAL Metals plus Uranium	VOCs	SVOCs	HE
		Gamma Spectroscopy	Gamma Spectroscopy	Isotopic Uranium/Thorium	Gross Alpha Gross Beta	Tritium				
Confirmatory	75	27	49	26	54	32	75	69	69	82
Duplicates	7	–	5		5	2	5	5	4	7
Equipment Blanks	3	1	2		2	1	3	3	3	3
VOC Trip Blanks	4	–						4		
Total Samples	84	28	28	26	61	35	83	81	76	92
Analytical Laboratory	–	Core	RPSD	Core	GEL/EPI	Core, GEL/EPI	Core, GEL/EPI	Core, GEL/EPI	Core, GEL/EPI	Core, GEL/EPI

^aIncludes no site-specific background samples.

Core = Core Laboratories.

GEL/EPI = General Engineering Laboratories Inc.

HE = High explosive(s).

RFI = RCRA Facility Investigation.

RPSD = Radiation Protection Sample Diagnostic Laboratory.

SVOC = Semivolatile organic compound.

SWMU = Solid Waste Management Unit.

TAL = Target Analyte List.

VCM = Voluntary Corrective Measure.

VOC = Volatile organic compound.

– = Information not available.

Table 3
Summary of Data Quality Requirements

Analytical Requirement	Data Quality Level	Core Laboratories, Inc., and GEL/EPI	SNL/NM RPSD Laboratory
Gamma spectroscopy EPA Method 901.1 ^a	Definitive	27	Not analyzed
Gamma spectroscopy EPA Method 901.1 ^a	Definitive	Not applicable	49
Isotopic uranium and isotopic thorium HASL-300	Definitive	26	Not analyzed
Gross alpha/beta EPA Method 900.0 ^a	Definitive	54	Not analyzed
Tritium EPA Method 906.0 ^a	Definitive	32	Not analyzed
TAL metals plus uranium EPA Method 6010/7000 ^a	Definitive	75	Not analyzed
VOCs EPA Method 8260A ^a	Definitive	69	Not analyzed
SVOCs EPA Method 8270 ^a	Definitive	69	Not analyzed
HE Compounds EPA Method 8330 ^a	Definitive	75	Not analyzed

Note: The number of samples does not include QA/QC samples such as duplicates, trip blanks and equipment blanks.

^aEPA November 1986.

EPA = U.S. Environmental Protection Agency.

GEL/EPI = General Engineering Laboratories Inc.

HASL = Health and Safety Laboratory, NY.

HE = High explosive(s).

QA = Quality assurance.

QC = Quality control.

RPSD = Radiation Protection Sample Diagnostic Laboratory.

SNL/NM = Sandia National Laboratories/New Mexico.

SVOC = Semivolatile organic compound.

TAL = Target Analyte List.

VOC = Volatile organic compound.

Fourteen QA/QC sample were collected during the confirmatory sampling effort according to the Environmental Restoration (ER) Project QA Project Plan. The QA/QC samples consisted of seven duplicates, three equipment blanks, and four trip blanks. For sampling in the VCM and burial pit excavations, duplicate soil samples were collected at 10 percent of the sampling locations. Equipment wash (aqueous rinsate) blanks were prepared during the sampling day. Trip blanks accompanied the soil samples requiring VOC analyses. No significant QA/QC problems were identified in the QA/QC samples.

All of the sample results were verified/validated by SNL/NM. The off-site laboratory results from Core Laboratories and GEL/EPI were reviewed against "Data Validation Procedure for Chemical and Radiochemical Data" SNL/NM ER Project Administrative Operating Procedure 00-03, Rev. 0 (SNL/NM December 1999). The data validation reports are presented in Annex D. The gamma spectroscopy data from the SNL/NM RPSD laboratory were reviewed against "Laboratory Data Review Guidelines," Procedure No. RPSD-02-11, Issue No. 2. The RPSD verification/validation reports are presented along with the gamma spectroscopy results in Annex D. The reviews confirmed that the analytical data from the three analytical laboratories are acceptable for use in the NFA proposal. Therefore, the DQOs have been fulfilled.

III. Determination of Nature, Rate, and Extent of Contamination

III.1 Introduction

The determination of the nature, migration rate, and extent of contamination at SWMU 9 was based upon an initial conceptual model validated with confirmatory sampling at the site. The initial conceptual model was developed from archival research, soil sampling, aerial photographs, radiological surveys and VCM excavation. The DQOs contained in the OU 1334 Work Plan and modified by subsequent regulatory comments, identified the sample locations, sample density, sample depth and analytical requirements. The sample data were subsequently used to develop the final conceptual model for SWMU 9 which is presented in Section 10.5 of the associated NFA proposal. The quality of the data specifically used to determine the nature, migration rate, and extent of contamination are described below.

III.2 Nature of Contamination

Both the nature of contamination and the potential for the degradation of COCs at SWMU 9 was evaluated using laboratory analyses of the soil samples (Section V). The analytical requirements included analyses for radionuclides; TAL metals plus uranium, VOC, SVOCs, and HE compounds. The analyses characterized any potential contaminants remaining after the VCM excavation. The analytes and methods listed in Tables 2 and 3 are appropriate to characterize the COCs and any potential degradation products at SWMU 9.

III.3 Rate of Contaminant Migration

SWMU 9 is an inactive site that has recently been remediated, and therefore all primary sources of COCs have been eliminated. As a result, only secondary sources of COCs potentially remain in the soil in the form of adsorbed COCs (radionuclides, metals, VOCs, SVOCs, and HE compounds). The rate of COC migration from surficial soils is therefore dependent predominantly on precipitation and occasional surface-water flow as described in Section V. Data available from numerous SNL/NM monitoring programs for air, water, and radionuclides; various biological surveys; and meteorological monitoring are adequate to characterize the rate of COC migration at SWMU 9.

III.4 Extent of Contamination

Surface and near-surface confirmatory soil samples were collected from the excavation areas at Mound 1 and the burial pit, the soil piles, arroyo channel, and Mound 3 to assess the effectiveness of the VCM remediation. The confirmatory soil samples were collected using the sampling strategy in Table 1 after all visible debris was excavated from the Mound 1 and burial pit locations and surface radiation readings were less than 1.3 times background.

The confirmatory soil samples were collected from the upper one-foot of the excavated areas. Sampling at a more extensive variety of depths was not a significant concern at SWMU 9 because the VCM goals were satisfied. Furthermore, the vertical rate of contamination migration was expected to be low for SWMU 9 because the low precipitation, high evapotranspiration, impermeable layers in vadose zone soils, and the relative low solubility of the majority of COCs. Therefore, the confirmatory soil samples are considered to be representative of the soil potentially contaminated with the COCs and sufficient to determine the vertical extent, if any, of COCs.

In summary, the design of the confirmatory sampling was appropriate and adequate to determine the nature, migration rate, and extent of residual COCs in surface and subsurface soils at SWMU 9.

IV. Comparison of COCs to Background Screening Levels

Site history and characterization activities were used to identify potential COCs. The SWMU 9 NFA proposal describes the identification of COCs and the sampling that was conducted in order to determine the concentration levels of those COCs across the site. Generally, COCs evaluated in this risk assessment include all detected organics and all radiological and inorganic COCs for which samples were analyzed. If a detected concentration of an organic compound was too high (i.e., exceeded the detection level) it could possibly cause an adverse effect to human health or the environment, and therefore, the compound was retained. Nondetect organics not included in this assessment were determined to have sufficiently low detection limits to ensure protection of human health and the environment. In order to provide conservatism in this risk assessment, the calculation used only the maximum concentration value of each COC found for the entire site. The SNL/NM maximum background concentration for metals and radionuclides (Dinwiddie September 1997) was selected to provide the background screening listed in Tables 4 and 5.

Table 4
Nonradiological COCs for Human Health and Ecological Risk Assessment at SWMU 9 with Comparison to the Associated SNL/NM Background Screening Value, BCF, and Log K_{ow}

COC Name	Maximum Concentration (mg/kg)	SNL/NM Background Concentration (mg/kg) ^a	Is Maximum COC Concentration Less Than or Equal to the Applicable SNL/NM Background Screening Value?	BCF (maximum aquatic)	Log K _{ow} (for organic COCs)	Bioaccumulator? ^b (BCF >40, log K _{ow} >4)
Antimony	1.91 J	3.9	Yes	16,000 ^c	NA	Yes
Arsenic	4.89	5.6	Yes	44 ^d	NA	Yes
Barium	209 J	130	No	170 ^e	NA	Yes
Beryllium	0.653	0.65	No	19 ^d	NA	No
Cadmium	2.78	<1	No	64 ^d	NA	Yes
Chromium	28.4	12.8	No	16 ^d	NA	No
Cobalt	8.61	5.2	No	10,000 ^f	NA	Yes
Copper	536 J	15.4	No	6 ^d	NA	No
Lead	126	11.8	No	49 ^d	NA	Yes
Manganese	409	831	Yes	100,000 ^f	NA	Yes
Mercury	2.09	<0.1	No	5500 ^d	NA	Yes
Nickel	14.9	11.5	No	47 ^d	NA	Yes
Selenium	1.08	<1	No	800 ^c	NA	Yes
Silver	0.458 J	<1	Unknown	0.5 ^d	NA	No
Thallium	0.111 ^g	<1.1	Unknown	119 ^d	NA	Yes
Uranium	19.5 J	2.3	No	20 ^e	NA	No
Vanadium	24.6	20.4	No	3000 ^e	NA	Yes
Zinc	354	62	No	47 ^d	NA	Yes
Acetone	0.013 J	NA	NA	0.69 ^h	-0.24 ^h	No
2-amino-4,6-dinitrotoluene	3.68	NA	NA	3.76 ⁱ	1.94 ⁱ	No
4-amino-2,6-dinitrotoluene	2.29	NA	NA	3.76 ⁱ	1.94 ^{ij}	No
Anthracene	1.1	NA	NA	917 ^d	4.45 ^d	Yes
Benzo(a)pyrene	0.12 J	NA	NA	3000 ^d	6.04 ^d	Yes
Benzo(ghi)perylene	0.13 J	NA	NA	58,884 ^k	6.58 ^k	Yes
Chloroform	0.00097 J	NA	NA	10.35 ^h	1.92 ^k	No

Refer to footnotes at end of table.

Table 4 (Continued)
Nonradiological COCs for Human Health Risk Assessment at SWMU 9 with Comparison to the Associated SNL/NM Background Screening Value, BCF, and Log K_{ow}

COC Name	Maximum Concentration (mg/kg)	SNL/NM Background Concentration (mg/kg) ^a	Is Maximum COC Concentration Less Than or Equal to the Applicable SNL/NM Background Screening Value?	BCF (maximum aquatic)	Log K _{ow} (for organic COCs)	Bioaccumulator? ^b (BCF >40, log K _{ow} >4)
Chrysene	0.12 J	NA	NA	18,000 ^k	5.91 ^k	Yes
2,4-dinitrotoluene	0.44	NA	NA	204 ^k	1.98 ^k	Yes
2,6-dinitrotoluene	0.16	NA	NA	5,225 ^k	1.72 ^k	Yes
Ethylbenzene	0.00052 J	NA	NA	15.5 ^l	3.15 ^l	No
HMX	6.2 J	NA	NA	0.49 ^m	0.26 ⁿ	No
Methylene chloride	0.044	NA	NA	5 ^h	1.25 ^h	No
Pentachlorophenol	0.28 J	NA	NA	776 ^o	5.09 ^k	Yes
RDX	26 J	NA	NA	9 ^p	0.87 ^k	No
Toluene	0.0028	NA	NA	10.7 ^d	2.69 ^d	No
Trichloroethene	0.00058 J	NA	NA	10.6 ^d	2.29 ^d	No
1,3,5-trinitrobenzene	0.67	NA	NA	23 ^k	1.1 ^k	No
2,4,6-trinitrotoluene	18	NA	NA	453 ^q	1.6 ^k	Yes
Xylene	0.0061	NA	NA	23.4 ^h	1.5 ^k	No

Note: **Bold** indicates the COCs that failed the background screening procedure and/or are bioaccumulators.

^aFrom Dinwiddie (September 1997) CTF Soils.

^bNMED (March 1998).

^cCallahan et al. (1979).

^dYanicak (March 1997).

^eNeumann (1976).

^fVanderploeg et al. (1975).

^gParameter was nondetect. Concentration is 0.5 of detection limit.

^hHoward (1990).

ⁱTalmage (1996).

^jAssumed to be equivalent to the log K_{ow} for 2-amino-4,6-dinitrotoluene.

^kMicromedex, Inc (1998).

^lHoward (1989).

Table 4 (Concluded)
Nonradiological COCs for Human Health Risk Assessment at SWMU 9 with Comparison to the Associated SNL/NM Background Screening Value, BCF, and Log K_{ow}

^mFrom Rosenblatt et al. (1991).

ⁿMaxwell and Opresko (1996).

^oHoward (1991).

^pTalmage et al. (1996).

^qTalmage and Opresko (1995).

^rU.S. Geological Survey (USGS) 1984.

BCF = Bioconcentration factor.

COC = Constituent of concern.

CTF = Coyote Test Field.

HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.

J = Estimated concentration.

K_{ow} = Octanol-water partition coefficient.

Log = Logarithm (base 10).

mg/kg = Milligram(s) per kilogram.

NA = Not applicable.

NMED = New Mexico Environment Department.

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

SNL/NM = Sandia National Laboratories/New Mexico.

SWMU = Solid Waste Management Unit.

Table 5
Radiological COCs for Human Health and Ecological Risk Assessment at SWMU 9 with Comparison to the Associated SNL/NM Background Screening Value and BCF

COC Name	Maximum Concentration (pCi/g)	SNL/NM Background Concentration (pCi/g) ^a	Is Maximum COC Concentration Less Than or Equal to the Applicable SNL/NM Background Screening Value?	BCF (maximum aquatic)	Bioaccumulator? ^b (BCF >40)
H-3	721 (pCi/L)	None	No	NA	NA
Cs-137	0.8	0.079	No	3000 ^c	Yes
Co-60	1.1	None	No	1000 ^d	Yes
Th-232	1.95	1.01	No	3000 ^d	No ^e
U-234	2.51	1.6	No	900 ^d	Yes
U-235	0.36	0.18	No	900 ^d	Yes
U-238	5.84	1.4	No	900 ^d	Yes

Note: **Bold** indicates COCs that failed the background screening procedure and/or are bioaccumulators.

^aFrom Dinwiddie (September 1997), Canyons Background.

^bNMED (March 1998).

^cFrom Whicker and Schultz (1992).

^dFrom Baker and Soldat (1992).

^eYanicak (March 1997).

BCF = Bioconcentration factor.

COC = Constituent of concern.

NA = Not applicable.

NMED = New Mexico Environment Department.

pCi/g = Picocurie(s) per gram.

pCi/L = Picocurie(s) per liter.

SNL/NM = Sandia National Laboratories/New Mexico.

SWMU = Solid Waste Management Unit.

Human health nonradiological COCs were also compared to SNL/NM proposed Subpart S action levels, if applicable (IT July 1994).

Nonradiological inorganics that are essential nutrients such as iron, magnesium, calcium, potassium, and sodium were not included in this risk assessment (EPA 1989). Both radiological and nonradiological COCs were evaluated. The nonradiological COCs evaluated included both inorganic and organic compounds.

Table 4 lists nonradiological COCs for the human health and ecological risk assessment at SWMU 9. Table 5 lists radiological COCs for the human health and ecological risk assessment. All tables show the associated SNL/NM maximum background concentration values (Dinwiddie September 1997). Sections VI.4, VII.2 and VII.3 discuss Tables 4 and 5.

V. Fate and Transport

The primary release of COCs at SWMU 9 was to the surface and subsurface soil as a result of past dumping and burial of waste materials along a natural arroyo channel. Subsequent VCMs have removed the primary source materials (debris) leaving residual COCs in soil as a secondary source. Under the current conditions, wind, water, and biota are potential natural mechanisms of COC transport from the site. Because the site is located in an area of open grassland vegetation, wind erosion is a potentially significant transport mechanism from the site for COCs in surface soil; however, the effect of the wind may be moderated by the topographic relief of the arroyo channel.

Water at SWMU 9 is received as precipitation (approximately 8.1 inches of rain or snow annually), which will either evaporate at or near the point of contact, infiltrate into the soil, or form runoff. Runoff can carry surface soil particles with adsorbed COCs. The distance of transport will depend upon the size of the particle and the velocity of the water. Surface flow in the arroyo from upstream precipitation runoff is a more significant potential transport mechanism at SWMU 9 than on-site precipitation runoff. The arroyo at this site is a tributary of Arroyo del Coyote, approximately 3,800 feet to the north of SWMU 9.

Infiltration of precipitation is rapid due to the coarse nature of the soil. Water that infiltrates into the soil/sediment at this site can leach COCs into the subsurface soil. However, the depth of percolation is limited by the carbonate-rich, lower soil horizons. Approximately 95 to 99 percent of the annual precipitation is lost to evapotranspiration in this area (NOAA 1990). Because groundwater at this site is approximately 95 feet bgs, the potential for COCs to reach groundwater through the unsaturated zone above the water table is very small.

Plant roots can take up COCs that are in the soil. These COCs can then be transported to the above-ground tissues with the xylem stream. Above-ground tissues can also take up constituents from direct contact with dust particles. Volatilized COCs can be taken up by plants directly from the air; however, volatile COCs within the plant tissues can also be lost to the air. Organic COCs in plant tissues can be metabolized or can undergo other types of biotransformations. Those that remain in the tissue can be consumed by herbivores or eventually be returned to the soil as litter. Above-ground litter can be transported by wind and water until it is decomposed. Constituents in plant tissues that are consumed by herbivores can be absorbed or be returned to the soil in feces (at the site or possibly transported from the site

in the herbivore). COCs that are absorbed can be held in tissues, biotransformed, or later excreted. The herbivore can be eaten by a primary carnivore or scavenger and the constituents still held in the tissues will repeat the potential fates of excretion, transformation, or eventual consumption by higher predators, scavengers, and decomposers. The potential for transport of the constituents within the food chain depends upon the mobility of the species that comprise the food chain and the potential for the constituent to be transferred across the links in the food chain.

Degradation of COCs at SWMU 9 can result from biotic or abiotic processes. COCs that are inorganic and elemental in form are not considered to be degradable. Radiological COCs, however, undergo decay to stable isotopes or radioactive daughter elements. Other transformations of inorganics may include changes in valence (oxidation/reduction reactions) or incorporation into organic forms (e.g., the conversion of selenite or selenate from soil to seleno-amino acids in plants). Degradation processes for organic COCs can include photolysis, hydrolysis, and biotransformation. Photolysis requires light and, therefore, takes place in the air, at the ground surface, or in surface water. Hydrolysis includes chemical transformations in water, and can occur in the soil solution. Biotransformation (i.e., transformation due to plants, animals, and microorganisms) can occur; however, biological activity may be limited by the aridity of the environment at this site.

Table 6 summarizes the fate and transport processes that can occur at SWMU 9. COCs at this site include both inorganics (metals and radionuclides) and organics in soil. Because of the open vegetative cover at this site, the potential for transport of COCs by wind is moderate. Because the site is within an arroyo channel, the potential for transport by surface-water runoff is high. Significant leaching of COCs into the subsurface soil is unlikely and leaching to the groundwater at this site is highly unlikely. For inorganic COCs, the potential for degradation is low and the potential for uptake into the food chain is considered low because of the terrestrial nature of the habitat and the arid climate. Degradation and/or biotransformation of organics and their loss by volatilization may be significant. 2,4,6-trinitrotoluene (TNT) is degraded in the environment by photolysis and hydrolysis and is readily metabolized by animals and plants if absorbed (Talmage and Opresko 1995, Talmage et al. 1996). Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) and hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) can persist in soil and can leach into the subsurface soil with percolation (Maxwell and Opresko 1996; Talmage et al. 1996). RDX can be taken up by plant roots and sequestered in aboveground tissues (Talmage et al. 1996). Both HMX and RDX are readily metabolized and excreted by animals, making the potential for food chain uptake of these COCs low. The potential for degradation and/or biotransformation of the other organic COCs is low to moderate. Some organics may be lost through volatilization. The potential for uptake into the food chain by organic COCs at SWMU 9 is considered low to moderate because of the terrestrial nature of the habitat and the arid climate. Decay of radiological COCs is insignificant because of their long half lives.

Table 6
Summary of Fate and Transport at SWMU 9

Transport and Fate Mechanism	Existence at Site	Significance
Wind	Yes	Moderate
Surface runoff	Yes	High
Migration to groundwater	No	None
Food chain uptake	Yes	Low to moderate
Transformation/degradation	Yes	Low (inorganics and radionuclides) Low to moderate (organics)

SWMU = Solid Waste Management Unit.

VI. Human Health Risk Screening Assessment

VI.1 Introduction

Human health risk screening assessment of this site includes a number of steps that culminate in a quantitative evaluation of the potential adverse human health effects caused by constituents located at the site. The steps to be discussed include the following:

Step 1.	Site data are described that provide information on the potential COCs, as well as the relevant physical characteristics and properties of the site.
Step 2.	Potential pathways are identified by which a representative population might be exposed to the COCs.
Step 3.	The potential intake of these COCs by the representative population is calculated using a tiered approach. The first component of the tiered approach includes two screening procedures. One screening procedure compares the maximum concentration of the COC to an SNL/NM maximum background screening value. COCs that are not eliminated during the first screening procedure are subjected to a second screening procedure that compares the maximum concentration of the COC to the SNL/NM proposed Subpart S action level.
Step 4.	Toxicological parameters are identified and referenced for COCs that were not eliminated during the screening steps.
Step 5.	Potential toxicity effects (specified as a hazard index [HI]) and estimated excess cancer risks are calculated for nonradiological COCs and background. For radiological COCs, the incremental total effective dose equivalent (TEDE) and incremental estimated cancer risk are calculated by subtracting applicable background concentrations directly from maximum on-site contaminant values. This background subtraction only occurs when a radiological COC occurs as contamination and exists as a natural background radionuclide.
Step 6.	These values are compared with guidelines established by the U.S. Environmental Protection Agency (EPA) and the DOE to determine whether further evaluation, and potential site cleanup, is required. Nonradiological COC risk values are also compared to background risk so that an incremental risk can be calculated.
Step 7.	Uncertainties of the above steps are discussed.

VI.2 Step 1. Site Data

Section I provides the description and history for SWMU 9. Section II presents DQOs. Section III discusses the determination of the nature, rate, and extent of contamination.

VI.3 Step 2. Pathway Identification

SWMU 9 has been designated a future land use scenario of industrial (DOE and USAF March 1996) (see Appendix 1 for default exposure pathways and parameters). Because of the location and the characteristics of the potential contaminants, the primary pathway for human exposure is considered to be soil ingestion for the nonradiological COCs and direct gamma exposure for the radiological COCs. The inhalation pathway for both nonradiological and radiological COCs is included because of the potential to inhale dust and volatiles. Soil ingestion is included for the radiological COCs as well. No water pathways to the groundwater are considered. Depth to groundwater at SWMU 9 is approximately 95 feet bgs. Because of the lack of surface water or other significant mechanisms for dermal contact, the dermal exposure pathway is considered not to be significant. No intake routes through plant, meat, or milk ingestion are considered appropriate for the industrial land use scenario. However, plant uptake is considered for the residential land use scenario.

Pathway Identification

Nonradiological Constituents	Radiological Constituents
Soil ingestion	Soil ingestion
Inhalation (dust and volatiles)	Inhalation (dust and volatiles)
Plant uptake (residential only)	Plant uptake (residential only)
	Direct gamma

VI.4 Step 3. COC Screening Procedures

Step 3 is discussed in this section and includes two screening procedures. The first compares the maximum COC concentration to the background screening level. The second compares maximum COC concentrations to SNL/NM proposed Subpart S action levels. This second procedure was applied only to COCs that were not eliminated during the first screening procedure.

VI.4.1 Background Screening Procedure

VI.4.1.1 Methodology

Maximum concentrations of nonradiological COCs were compared to the approved SNL/NM maximum screening level for this area. The SNL/NM maximum background concentration was selected to provide the background screen in Table 4 and was used to calculate risk attributable to background in Table 10. Only the COCs that were detected above their respective SNL/NM

maximum background screening levels or did not have either a quantifiable or calculated background screening level were considered in further risk assessment analyses.

For radiological COCs that exceeded the SNL/NM background screening levels, background values were subtracted from the individual maximum radionuclide concentrations. Those that did not exceed these background levels were not carried any further in the risk assessment. This approach is consistent with DOE Order 5400.5, "Radiation Protection of the Public and the Environment" (DOE 1993). Radiological COCs that did not have a background value and were detected above the analytical minimum detectable activity were carried through the risk assessment at their maximum levels. The resultant radiological COCs remaining after this step are referred to as background-adjusted radiological COCs.

VI.4.1.2 Results

Tables 4 and 5 present SWMU 9 maximum COC concentrations that were compared to the SNL/NM maximum background values (Dinwiddie September 1997) for the human health risk assessment. For the nonradiological COCs, 13 constituents were measured at concentrations greater than their respective background. Two constituents did not have quantified background screening levels; therefore, it is unknown if these compounds exceed background. Twenty COCs were organic compounds and do not have background screening levels.

The maximum concentration value for lead is 126 milligrams (mg) per kilogram (/kg). The EPA intentionally does not provide any human health toxicological data on lead; therefore, no risk parameter values could be calculated. However, EPA Region 6 guidance for the screening value for lead for the industrial land use scenario is 2,000 mg/kg (EPA 1996a); for the residential land use scenario, the EPA screening guidance value is 400 mg/kg (EPA July 1994). The maximum concentration value for lead at this site is less than both screening values; therefore, lead is eliminated from further consideration in the human health risk assessment.

For the radiological COCs, seven constituents had maximum activity concentrations greater than their respective background (U-238, U-235, U-234, Th-232, Co-60, H-3, and Cs-137). They were evaluated in the risk assessment for screening purposes.

VI.4.2 Subpart S Screening Procedure

VI.4.2.1 Methodology

The maximum concentrations of nonradiological COCs not eliminated during the background screening process were compared with action levels (IT July 1994) calculated using methods and equations promulgated in the proposed RCRA Subpart S (EPA 1990) and Risk Assessment Guidance for Superfund (RAGS) (EPA 1989) documentation. Accordingly, all calculations were based upon the assumption that receptor doses from both toxic and potentially carcinogenic compounds result most significantly from ingestion of contaminated soil. Because the samples were all taken from the surface and near surface, this assumption is considered valid. If there were ten or fewer COCs and each had a maximum concentration of less than 1/10 the action level, then the site was judged to pose no significant health hazard to

humans. If there were more than ten COCs, then the Subpart S screening procedure was not performed.

VI.4.2.2 Results

Because the SWMU 9 sample set had more than ten COCs that continued beyond the first screening level (including COCs that did not have background screening values), the proposed Subpart S screening process was not performed. All nonradiological COCs that were not eliminated during the background screening process for SWMU 9 had a calculated hazard quotient (HQ) and excess cancer risk value.

Radiological COCs have no predetermined action levels analogous to proposed Subpart S levels and, therefore, this step in the screening process is not performed for radiological COCs.

VI.5 Step 4. Identification of Toxicological Parameters

Tables 7 (nonradiological) and 8 (radiological) list the COCs retained in the risk assessment and the values for the available toxicological information. The toxicological values used for nonradiological COCs in Table 7 were from the Integrated Risk Information System (IRIS) (EPA 2000), the Health Effects Assessment Summary Tables (HEAST) (EPA 1997a), and the Region 3 (EPA 1997c) and Region 9 (EPA 1996c) electronic databases. Dose conversion factors (DCF) used in determining the excess TEDE values for radiological COCs for the individual pathways were the default values provided in the RESRAD computer code (Yu et al. 1993a) as developed in the following documents:

- DCFs for ingestion and inhalation are taken from "Federal Guidance Report No. 11, Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion" (EPA 1988).
- DCFs for surface contamination (contamination on the surface of the site) were taken from DOE/EH-0070, "External Dose-Rate Conversion Factors for Calculation of Dose to the Public" (DOE 1988).
- DCFs for volume contamination (exposure to contamination deeper than the immediate surface of the site) were calculated using the methods discussed in "Dose-Rate Conversion Factors for External Exposure to Photon Emitters in Soil" (Kocher 1983) and in ANL/EAIS-8, *Data Collection Handbook to Support Modeling the Impacts of Radioactive Material in Soil* (Yu et al. 1993b).

VI.6 Step 5. Exposure Assessment and Risk Characterization

Section VI.6.1 describes the exposure assessment for this risk assessment. Section VI.6.2 provides the risk characterization, including the HI and the excess cancer risk for both the

Table 7
Toxicological Parameter Values for SWMU 9 Nonradiological COCs

COC Name	RfD _o (mg/kg-d)	Confidence ^a	RfD _{inh} (mg/kg-d)	Confidence ^a	SF _o (mg/kg-day) ⁻¹	SF _{inh} (mg/kg-day) ⁻¹	Cancer Class ^b
Barium	7E-2 ^c	M	1.4E-4 ^d	-	-	-	-
Beryllium	2E-3 ^c	L to M	5.7E-6 ^c	M	-	8.4E+0 ^c	B1
Cadmium	5E-4 ^c	H	5.7E-5 ^d	-	-	6.3E+0 ^c	B1
Chromium III	1E+0 ^c	L	5.7E-7 ^e	-	-	-	-
Chromium VI	5E-3 ^c	L	-	-	-	4.2E+1 ^c	A
Cobalt	6E-2 ^d	-	2.9E-4 ^d	-	-	-	-
Copper	3.7E-2 ^d	-	-	-	-	-	D
Mercury	3E-4 ^f	-	8.6E-5 ^c	M	-	-	D
Nickel	2E-2 ^c	M	-	-	-	-	-
Selenium	5E-3 ^c	H	-	-	-	-	D
Silver	5E-3 ^c	L	-	-	-	-	D
Thallium ^g	8E-5 ^c	L	-	-	-	-	D
Uranium	3E-3 ^c	M	-	-	-	-	-
Vanadium	7E-3 ⁱ	-	-	-	-	-	-
Zinc	3E-1 ^c	M	-	-	-	-	D
Acetone	1E-1 ^c	L	1E-1 ^d	-	-	-	D
2-amino-4,6-dinitrotoluene ^h	-	-	-	-	6.8E-1 ^c	6.8E-1 ^d	B2
4-amino-2,6-dinitrotoluene ^h	-	-	-	-	6.8E-1 ^c	6.8E-1 ^d	B2
Anthracene	3E-1 ^c	L	3E-1 ^d	-	-	-	D
Benzo(a)pyrene	-	-	-	-	7.3E+0 ^c	7.3E+0 ^d	B2
Benzo(ghi)perylene ⁱ	-	-	-	-	7.3E+0 ^d	7.3E+0 ^d	B2
Chloroform	1E-2 ^c	M	1E-2 ^d	-	6.1E-3 ^c	8.1E-2 ^c	B2
Chrysene	-	-	-	-	7.3E-3 ^d	7.3E-3 ^d	B2
2,4-dinitrotoluene	2E-3 ^c	H	2E-3 ^d	-	6.8E-1 ^{c,h}	6.8E-1 ^{d,h}	B2
2,6-dinitrotoluene	1E-3 ⁱ	-	1E-3 ^d	-	6.8E-1 ^{c,h}	6.8E-1 ^{d,h}	B2
Ethylbenzene	1E-1 ^c	L	2.9E-1 ^c	L	-	-	D
HMX	5E-2 ^c	L	5E-2 ^d	-	-	-	D
Methylene chloride	6E-2 ^c	M	8.6E-1 ⁱ	-	7.5E-3 ^c	1.7E-3 ^c	B2
Pentachlorophenol	3E-2 ^c	M	3E-2 ^d	-	1.2E-1 ^c	1.2E-1 ^d	B2
RDX	3E-3 ^c	H	3E-3 ^d	-	1.1E-1 ^c	1.1E-1 ^d	C
Toluene	2E-1 ^c	M	1.1E-1 ^c	M	-	-	D
Trichloroethene	6E-3 ^d	-	6E-3 ^d	-	1.1E-2 ^d	6E-3 ^d	-
1,3,5-trinitrobenzene	3E-2 ^c	M	5E-5 ^d	-	-	-	-

Refer to footnotes at end of table.

Table 7 (Concluded)
Toxicological Parameter Values for SWMU 9 Nonradiological COCs

COC Name	RfD _o (mg/kg-d)	Confidence ^a	RfD _{inh} (mg/kg-d)	Confidence ^a	SF _o (mg/kg-day) ⁻¹	SF _{inh} (mg/kg-day) ⁻¹	Cancer Class ^b
2,4,6-trinitrotoluene	5E-4 ^c	M	5E-4 ^d	–	3E-2 ^c	3E-2 ^d	C
Xylene ^j	2E+0 ^c	M	2E-1 ^d	–	–	–	D

^aConfidence associated with IRIS (EPA 2000) database values. Confidence: L = low, M = medium, H = high.

^bEPA weight-of-evidence classification system for carcinogenicity (EPA 1989) taken from IRIS (EPA 2000).

A = Human carcinogen.

B1 = Probable human carcinogen. Limited human data available.

B2 = Probable human carcinogen. Sufficient evidence in animals and inadequate or no evidence in humans.

C = Possible human carcinogen.

D = Not classifiable as to human carcinogenicity.

^cToxicological parameter values from IRIS electronic database (EPA 2000).

^dToxicological parameter values from EPA Region 9 electronic database (EPA 1996c).

^eToxicological parameter values from EPA Region 3 electronic database (EPA 1997c).

^fToxicological parameter values from HEAST database (EPA 1997a).

^gThallium does not have toxicological parameter values. Thallium sulfate was used as a surrogate.

^hToxicological parameter values are for dinitrotoluene, mixture.

ⁱBenzo(ghi) perylene does not have toxicological parameter values. Dibenz(a,h) anthracene was used as a surrogate.

^jToxicological parameter values are for xylene, mixture.

COC = Constituent of concern.

EPA = U.S. Environmental Protection Agency.

HEAST = Health Effects Assessment Summary Tables.

HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.

IRIS = Integrated Risk Information System.

mg/kg-d = Milligram(s) per kilogram day.

(mg/kg-day)⁻¹ = Per milligram per kilogram day.

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

RfD_{inh} = Inhalation chronic reference dose.

RfD_o = Oral chronic reference dose.

SF_{inh} = Inhalation slope factor.

SF_o = Oral slope factor.

SWMU = Solid Waste Management Unit.

– = Information not available.

Table 8
Radiological Toxicological Parameter Values for SWMU 9 COCs Obtained from RESRAD
Risk Coefficients^a

COC Name	SF _o (1/pCi)	SF _{inh} (1/pCi)	SF _{ev} (g/pCi-yr)	Cancer Class ^b
H-3	7.20E-14	9.60E-14	0	A
Cs-137	3.20E-11	1.90E-11	2.10E-6	A
Co-60	1.90E-11	6.90E-11	9.80E-6	A
Th-232	3.80E-11	1.90E-08	3.30E-11	A
U-234	4.40E-11	1.40E-08	2.10E-11	A
U-235	4.70E-11	1.30E-08	2.70E-07	A
U-238	6.20E-11	1.20E-08	6.60E-08	A

^aFrom Yu et al. (1993a).

^bEPA weight-of-evidence classification system for carcinogenicity (EPA 1989): A = Human carcinogen for high dose and high dose rate (i.e., greater than 50 rem per year). For low-level environmental exposures, the carcinogenic effect has not been observed and documented.

1/pCi = One per picocurie.

COC = Constituent of concern.

EPA = U.S. Environmental Protection Agency.

g/pCi-yr = Gram(s) per picocurie-year.

SF_{ev} = External volume exposure slope factor.

SF_{inh} = Inhalation slope factor.

SF_o = Oral (ingestion) slope factor.

SWMU = Solid Waste Management Unit.

potential nonradiological COCs and associated background for industrial and residential land uses. The incremental TEDE and incremental estimated cancer risk are provided for the background-adjusted radiological COCs for both industrial and residential land uses.

VI.6.1 Exposure Assessment

Appendix 1 shows the equations and parameter input values used in calculating intake values and subsequent HI and excess cancer risk values for the individual exposure pathways. The appendix shows parameters for both industrial and residential land use scenarios. The equations for nonradiological COCs are based upon the RAGS (EPA 1989). Parameters are based upon information from the RAGS (EPA 1989) and other EPA guidance documents and reflect the reasonable maximum exposure (RME) approach advocated by the RAGS (EPA 1989). For radiological COCs, the coded equations provided in RESRAD computer code are used to estimate the incremental TEDE and cancer risk for individual exposure pathways.

Further discussion of this process is provided in the *Manual for Implementing Residual Radioactive Material Guidelines Using RESRAD* (Yu et al. 1993a).

Although the designated land use scenario is industrial for this site, risk and TEDE values for a residential land use scenario are also presented. These residential risk and TEDE values are

presented only to provide perspective of potential risk to human health under the more restrictive land use scenario.

VI.6.2 Risk Characterization

Table 9 shows an HI of 0.1 for the SWMU 9 nonradiological COCs and an estimated excess cancer risk of $4E-6$ for the designated industrial land use scenario. The numbers presented included exposure from soil ingestion and dust and volatile inhalation for nonradiological COCs. Table 10 shows an HI of 0.00 and an excess cancer risk of $3E-10$ assuming the maximum background concentrations of the SWMU 9 associated background constituents for the designated industrial land use scenario.

For the radiological COCs, contribution from the direct gamma exposure pathway is included. For the industrial land use scenario, a TEDE was calculated for an industrial office worker who spends a majority of his time indoors and for an industrial worker who evenly splits his time indoors and outdoors at the site. After analyzing these two scenarios, the more conservative is the 50/50 time split. For the industrial land use scenario this resulted in an incremental TEDE of 3.5 millirem (mrem)/year (yr). In accordance with EPA guidance found in Office of Solid Waste and Emergency Response Directive No. 9200.4-18 (EPA 1997b), an incremental TEDE of 15 mrem/yr is used for the probable land use scenario (industrial in this case); the calculated dose value for SWMU 9 for the industrial land use is well below this guideline. The estimated excess cancer risk is $4.4E-5$.

For the residential land use scenario nonradioactive COCs, the HI is 158, and the excess cancer risk is $2E-2$ (Table 9). The numbers in the table included exposure from soil ingestion, dust and volatile inhalation, and plant uptake. Although the EPA (1991) generally recommends that inhalation not be included in a residential land use scenario, this pathway is included because of the potential for soil in Albuquerque, New Mexico, to be eroded and, subsequently, for dust to be present in predominantly residential areas. Because of the nature of the local soil, other exposure pathways are not considered (see Appendix 1). Table 10 shows that for the SWMU 9 associated background constituents, the HI is 0.3 and the excess cancer risk is $5E-10$.

For the residential land use scenario radiological COCs, the incremental TEDE is 8.6 mrem/yr. The guideline being used is an excess TEDE of 75 mrem/yr (SNL/NM February 1998) for a complete loss of institutional controls (residential land use in this case); the calculated dose value for SWMU 9 for the residential land use scenario is well below this guideline. Consequently, SWMU 9 is eligible for unrestricted radiological release because the residential land use scenario resulted in an incremental TEDE of less than 75 mrem/yr to the on-site receptor. The estimated excess cancer risk is $1.09E-4$. The excess cancer risk from the nonradiological COCs and the radiological COCs is not additive, as noted in the RAGS (EPA 1989).

Table 9
Risk Assessment Values for SWMU 9 Nonradiological COCs

COC Name	Maximum Concentration (mg/kg)	Industrial Land Use Scenario ^a		Residential Land Use Scenario ^a	
		Hazard Index	Cancer Risk	Hazard Index	Cancer Risk
Barium	209 J	0.00	-	0.03	-
Beryllium	0.653	0.00	3E-10	0.00	5E-10
Cadmium	2.78	0.01	9E-10	2.27	2E-9
Chromium, total ^b	28.4	0.01	6E-8	0.02	1E-7
Cobalt	8.61	0.00	-	0.00	-
Copper	536 J	0.01	-	2.6	-
Mercury	2.09	0.01	-	3.6	-
Nickel	14.9	0.00	-	0.02	-
Selenium	1.08	0.00	-	0.38	-
Silver	0.458 J	0.00	-	0.02	-
Thallium ^c	0.111 ^d	0.00	-	0.01	-
Uranium	19.5 J	0.01	-	0.05	-
Vanadium	24.6	0.00	-	0.02	-
Zinc	354	0.00	-	0.64	-
Acetone	0.013 J	0.00	-	0.00	-
2-amino-4,6-dinitrotoluene ^e	3.68	0.00	1E-6	0.00	5E-6
4-amino-2,6-dinitrotoluene ^e	2.29	0.00	8E-7	0.00	3E-6
Anthracene	1.1	0.00	-	0.00	-
Benzo(a) pyrene	0.12 J	0.00	3E-7	0.00	3E-6
Benzo(ghi) perylene ^f	0.13 J	0.00	3E-7	0.00	5E-6
Chloroform	0.00097 J	0.00	2E-9	0.00	6E-9
Chrysene	0.12 J	0.00	3E-10	0.00	4E-9
2,4-dinitrotoluene	0.44	0.00	1E-7	0.2	5E-7
2,6-dinitrotoluene	0.16	0.00	5E-8	0.00	2E-7
Ethylbenzene	0.00052 J	0.00	-	0.00	-
HMX	6.2 J	0.00	-	4.59	-
Methylene chloride	0.044	0.00	3E-9	0.00	3E-7
Pentachlorophenol	0.28 J	0.00	1E-8	0.00	3E-7
RDX	26 J	0.01	1E-6	142.8	2E-2
Toluene	0.0028	0.00	-	0.00	-
Trichloroethene	0.00058 J	0.00	7E-11	0.00	2E-9
1,3,5-trinitrobenzene	0.67	0.00	-	0.27	-
2,4,6-trinitrotoluene	18	0.04	2E-7	0.14	9E-7
Xylene ^g	0.0061	0.00	-	0.00	-
Total		0.1	4E-6	158	2E-2

Refer to footnotes at end of table.

Table 9 (Concluded)
Risk Assessment Values for SWMU 9 Nonradiological COCs

^aFrom EPA (1989).

^bChromium, total assumed to be chromium VI (most conservative).

^cToxicological parameter values are from thallium sulfate.

^dParameter was nondetect. Concentration assumed to be 0.5 of detection limit.

^eToxicological parameter values are for dinitrotoluene, mixture.

^fToxicological parameter values are from dibenz(a,h)anthracene.

^gToxicological parameter values are for xylene, mixture.

COC = Constituent of concern.

EPA = U.S. Environmental Protection Agency.

HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.

J = Estimated concentration.

mg/kg = Milligram(s) per kilogram.

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

SWMU = Solid Waste Management Unit.

– = Information not available.

Table 10
Risk Assessment Values for SWMU 9 Nonradiological Background Constituents

COC Name	Background Concentration ^a	Industrial Land Use		Residential Land Use	
		Hazard	Cancer	Hazard	Cancer
Barium	130	0.00	–	0.02	–
Beryllium	0.65	0.00	3E-10	0.00	5E-10
Cadmium	<1	–	–	–	–
Chromium, total ^c	12.8	0.00	–	0.00	–
Cobalt	5.2	0.00	–	0.00	–
Copper	15.4	0.00	–	0.07	–
Mercury	<0.1	–	–	–	–
Nickel	11.5	0.00	–	0.02	–
Selenium	<1	–	–	–	–
Silver	<1	–	–	–	–
Thallium ^d	<1.1	–	–	–	–
Uranium	2.3	0.00	–	0.01	–
Vanadium	20.4	0.00	–	0.02	–
Zinc	62	0.00	–	0.11	–
Total		0.00	3E-10	0.3	5E-10

^aFrom Dinwiddie (September 1997), CTF soils.

^bFrom EPA (1989).

^cChromium, total, assumed to be chromium VI (most conservative).

^dToxicological parameter values are from thallium sulfate.

COC = Constituent of concern.

CTF = Coyote Test Field.

EPA = U.S. Environmental Protection Agency.

mg/kg = Milligram(s) per kilogram.

SWMU = Solid Waste Management Unit.

– = Information not available.

VI.7 Step 6. Comparison of Risk Values to Numerical Guidelines.

The human health risk assessment analysis evaluated the potential for adverse health effects for both the industrial land use scenario (the designated land use scenario for this site) and the residential land use scenario.

For the industrial land use scenario nonradiological COCs, the HI is 0.1 (less than the numerical guideline of 1 suggested in the RAGS [EPA 1989]). Excess cancer risk is estimated at $4E-6$. Guidance from the New Mexico Environment Department (NMED) indicates that excess lifetime risk of developing cancer by an individual must be less than $1E-6$ for Class A and B carcinogens and less than $1E-5$ for Class C carcinogens (NMED March 1998). The excess cancer risk is driven by several explosives and semivolatile compounds. Most of the risk drivers are Class B2 carcinogens. Thus, the excess cancer risk for this site is above the suggested acceptable risk value ($1E-6$). This assessment also determined risks considering background concentrations of the potential nonradiological COCs for both the industrial and residential land use scenarios. Assuming the industrial land use scenario, for background nonradiological COCs the HI is 0.00 and the excess cancer risk is $3E-10$. Incremental risk is determined by subtracting risk associated with background from potential COC risk. These numbers are not rounded before the difference is determined and, therefore, may appear to be inconsistent with numbers presented in tables and within the text. For conservatism, the background constituents that do not have a quantified background concentrations are assumed to have an HQ of 0.00. Incremental HI is 0.1 and estimated incremental cancer risk is $3.83E-6$ for the industrial land use scenario. The incremental excess cancer risk to human health from the nonradiological COCs is above guidelines considering a industrial land use scenario.

For radiological COCs in the industrial land use scenario, incremental TEDE is 3.5 mrem/yr, which is significantly less than the EPA's numerical guideline of 15 mrem/yr. Incremental estimated excess cancer risk is $4.4E-5$.

The calculated HI for the residential land use scenario nonradiological COCs is 158, which is above the numerical guidance. Excess cancer risk is estimated at $2E-2$. The excess cancer risk is driven by semivolatile and HE compounds. Most of the compounds are Class B2 carcinogens. Therefore, the excess cancer risk for this site is above the suggested acceptable risk value ($1E-6$). The HI for associated background for the residential land use scenario is 0.3; the excess cancer risk is estimated at $5E-10$. The incremental HI is 157.41 and the estimated incremental cancer risk is $2E-2$ for the residential land use scenario. Both the incremental HI and estimated excess cancer risk indicates contribution to human health above proposed guidelines from the COCs considering the residential land use scenario.

The incremental TEDE for the residential land use scenario from the radiological components is 8.6 mrem/yr, which is significantly less than the numerical guideline of 75 mrem/yr suggested in the SNL/NM RESRAD Input Parameter Assumptions and Justification (SNL/NM February 1998). The estimated excess cancer risk is $1.09E-4$.

VI.8 Step 7. Uncertainty Discussion

The determination of the nature, rate, and extent of contamination at SWMU 9 was based upon an initial conceptual model that was validated with confirmatory sampling conducted around the

site. The confirmatory sampling was implemented as set forth by the OU 1334 RFI Work Plan (SNL/NM October 1994). The DQOs contained in the RFI Work Plan are appropriate for use in risk screening assessments. The data collected, based upon sample location, density, and depth are representative of the site. The analytical requirements and results satisfy the DQOs. The 1994 data quality was verified and the data quality was verified and validated against SNL/NM procedures (SNL/NM July 1994, July 1996, December 1999). Therefore, there is no uncertainty associated with the data quality used to perform the risk screening assessment at SWMU 9.

Because of the location, history of the site, and future land use (DOE and USAF March 1996), there is low uncertainty in the land use scenario and the potentially affected populations that were considered in performing the risk assessment analysis. Because the COCs are found in surface and near-surface soils and because of the location and physical characteristics of the site, there is little uncertainty in the exposure pathways relevant to the analysis.

An RME approach was used to calculate the risk assessment values. This means that the parameter values in the calculations are conservative and that calculated intakes are probably overestimates. Maximum measured values of COC concentrations are used to provide conservative results.

Table 7 shows the uncertainties (confidence) in nonradiological toxicological parameter values. There is a mixture of estimated values and values from the IRIS (EPA 2000), the HEAST (EPA 1997a), EPA Region 3 (EPA 1997c) and EPA Region 9 (EPA 1996c) electronic databases. Where values are not provided, information is not available from the HEAST (EPA 1997a), IRIS (EPA 2000), or the EPA regions (EPA 1996c, 1997c). Because of the conservative nature of the RME approach, uncertainties in toxicological values are not expected to change the conclusion from the risk assessment analysis.

Total and incremental HI values for the nonradiological COCs are below human health guidelines for the industrial land use scenario compared to established numerical guidance. Although the excess cancer risk was above proposed guidelines, the excess cancer risk was conservatively estimated through the use of maximum concentrations of the detected COCs. Because the site was adequately characterized, average concentrations would be more representative of actual site conditions. If the upper 95% confidence limit of the mean concentration (all in mg/kg) for 2-amino-4,6-dinitrotoluene (0.302), 4-amino-2,6-dinitrotoluene (0.217), benzo(a)pyrene (0.082), benzo(ghi) perylene (0.118), 2,4-dinitrotoluene (0.158), RDX (3.7), and 2,4,6-TNT (1.4) is used in place of the maximum concentration the total excess cancer risk is reduced to $9.67E-7$ and the incremental excess cancer risk is calculated to be $9.66E-7$, both of which are within proposed guidelines considering an industrial land use scenario.

For radiological COCs, the conclusion of the risk assessment is that potential effects on human health for both industrial and residential land use scenarios are within guidelines and are a small fraction of the estimated 360 mrem/yr received by the average U.S. population (NCRP 1987).

The overall uncertainty in all of the steps in the risk assessment process is considered not significant with respect to the conclusion reached.

VI.9 Summary

SWMU 9 has identified COCs consisting of some inorganic, organic, and radiological compounds. Because of the location of the site, the designated industrial land use scenario, and the nature of contamination, potential exposure pathways identified for this site included soil ingestion and dust and volatile inhalation for chemical constituents and soil ingestion, dust and volatile inhalation, and direct gamma exposure for radionuclides. Plant uptake was included as an exposure pathway for the residential land use scenario.

Using conservative assumptions and an RME approach to risk assessment, calculations for nonradiological COCs show that for the industrial land use scenario the HI (0.1) is significantly less than the accepted numerical guidance from the EPA. Excess cancer risk (4E-6) is above the acceptable risk value provided by the NMED for an industrial land use scenario (NMED March 1998). The incremental HI is 0.1, and the incremental cancer risk is 3.83E-6 for the industrial land use scenario. If the upper 95% confidence limit of the mean concentration (all in mg/kg) for 2-amino-4,6-dinitrotoluene (0.302), 4-amino-2,6-dinitrotoluene (0.217), benzo(a)pyrene (0.082), benzo(ghi) perylene (0.118), 2,4-dinitrotoluene (0.158), RDX (3.7), and 2,4,6-TNT (1.4) is used in place of the maximum concentration the total excess cancer risk is reduced to 9.67E-7 and the incremental excess cancer risk is calculated to be 9.66E-7, both of which are within proposed guidelines considering an industrial land use scenario.

Incremental TEDE and corresponding estimated cancer risk from radiological COCs are much less than EPA guidance values; the estimated TEDE is 3.5 mrem/yr for the industrial land use scenario. This value is much less than the numerical guidance of 15 mrem/yr in EPA guidance (EPA 1997b). The corresponding incremental estimated cancer risk value is 4.4E-5 for the industrial land use scenario. Furthermore, the incremental TEDE for the residential land use scenario that results from a complete loss of institutional control is only 8.6 mrem/yr with an associated risk of 1.09E-4. The guideline for this scenario is 75 mrem/yr (SNL/NM February 1998). Therefore, SWMU 9 is eligible for unrestricted radiological release.

Uncertainties associated with the calculations are considered small relative to the conservativeness of risk assessment analysis. It is, therefore, concluded that this site poses insignificant risk to human health under the industrial land use scenario.

VII. Ecological Risk Screening Assessment

VII.1 Introduction

This section addresses the ecological risks associated with exposure to constituents of potential ecological concern (COPEC) in soils at SWMU 9. A component of the NMED Risk-Based Decision Tree (March 1998) is to conduct an ecological screening assessment that corresponds with that presented in the EPA's Ecological Risk Assessment Guidance for Superfund (EPA 1997d). The current methodology is tiered and contains an initial scoping assessment followed by a more detailed screening assessment. Initial components of NMED's decision tree (a discussion of DQOs, a data assessment, and evaluations of bioaccumulation and fate and transport potential) are addressed in previous sections of this report. Following the completion

of the scoping assessment, a determination is made as to whether a more detailed examination of potential ecological risk is necessary. If deemed necessary, the scoping assessment proceeds to a screening assessment whereby a more quantitative estimate of ecological risk is conducted. Although this assessment incorporates conservatism in the estimation of ecological risks, ecological relevance and professional judgment are also used as recommended by the EPA (1998) to ensure that predicted exposures of selected ecological receptors reflect those reasonably expected to occur at the site.

VII.2 Scoping Assessment

The scoping assessment focuses primarily on the likelihood of exposure of biota at or adjacent to the site to be exposed to constituents associated with site activities. Included in this section are an evaluation of existing data and a comparison of maximum detected concentrations to background concentrations, examination of bioaccumulation potential, and fate and transport potential. A scoping risk management decision (Section VII.2.4) involves summarizing the scoping results and determining whether further examination of potential ecological impacts is necessary.

VII.2.1 Data Assessment

As indicated in Section IV (Tables 4 and 5), inorganic constituents in soil within the 0- to 5-foot depth interval that exceeded background concentrations were as follows:

- Barium
- Beryllium
- Cadmium
- Chromium
- Cobalt
- Copper
- Lead
- Mercury
- Nickel
- Selenium
- Uranium
- Vanadium
- Zinc
- H-3
- Co-60
- Cs-137
- Th-232
- U-234
- U-235
- U-238.

Two constituents do not have quantified background screening concentrations. Thus, it is unknown if these constituents exceed background. These constituents are:

- Silver
- Thallium.

Organic analytes detected in soil were as follows:

- Acetone
- 2-amino-4,6-dinitrotoluene
- 4-amino-2,6-dinitrotoluene
- Anthracene
- Benzo(a)pyrene
- Benzo(g,h,i)perylene
- Chloroform
- Chrysene
- 2,4-dinitrotoluene
- 2,6-dinitrotoluene
- Ethylbenzene
- HMX
- Methylene chloride
- Pentachlorophenol
- RDX
- Toluene
- Trichloroethene
- 1,3,5-trinitrobenzene
- 2,4,6-TNT
- Xylenes.

VII.2.2 Bioaccumulation

Among the COPECs listed in Section VII.2.1, the following were considered to have bioaccumulation potential in aquatic environments (Section IV, Tables 4 and 5):

- Barium
- Cadmium
- Cobalt
- Lead
- Mercury
- Nickel
- Selenium
- Thallium
- Vanadium
- Zinc

- Co-60
- Cs-137
- U-234
- U-235
- U-238
- Anthracene
- Benzo(a)pyrene
- Benzo(g,h,i)perylene
- Chrysene
- 2,4-dinitrotoluene
- 2,6-dinitrotoluene
- Pentachlorophenol
- 2,4,6-TNT.

It should be noted, however, that as directed by the NMED (March 1998), bioaccumulation for inorganics is assessed exclusively based upon maximum reported bioconcentration factors (BCF) for aquatic species. Because only aquatic BCFs are used to evaluate the bioaccumulation potential for metals, bioaccumulation in terrestrial species is likely to be overpredicted.

VII.2.3 Fate and Transport Potential

The potential for the COPECs to move from the source of contamination to other media or biota is discussed in Section V. As noted in Table 6 (Section V), wind is expected to be of moderate significance as a transport mechanism for COPECs at this site, and surface-water runoff is of potentially high significance. Migration to groundwater is not anticipated. Food chain uptake is expected to be of low to moderate significance. Degradation (decay) and transformation for the inorganic COPECs and radionuclides is expected to be of low significance but may be of moderate significance for the organic COPECs. Volatilization may be a mechanism of loss for some organic COPECs (e.g., VOCs).

VII.2.4 Scoping Risk Management Decision

Based upon information gathered through the scoping assessment, it was concluded that complete ecological pathways may be associated with this SWMU and that COPECs also exist at the site. As a consequence, a screening assessment was deemed necessary to predict the potential level of ecological risk associated with the site.

VII.3 Screening Assessment

As concluded in Section VII.2.4, complete ecological pathways and COPECs are associated with this SWMU. The screening assessment performed for the site involves a quantitative estimate of current ecological risks using exposure models in association with exposure

parameters and toxicity information obtained from the literature. The estimation of potential ecological risks is conservative to ensure that ecological risks are not underpredicted.

Components within the screening assessment include the following:

- Problem Formulation—sets the stage for the evaluation of potential exposure and risk.
- Exposure Estimation—provides a quantitative estimate of potential exposure.
- Ecological Effects Evaluation—presents benchmarks used to gauge the toxicity of COPECs to specific receptors.
- Risk Characterization—characterizes the ecological risk associated with exposure of the receptors to environmental media at the site.
- Uncertainty Assessment—discusses uncertainties associated with the estimation of exposure and risk.
- Risk Interpretation—evaluates ecological risk in terms of HQs and ecological significance.
- Screening Assessment Scientific/Management Decision Point—presents the decision to risk managers based upon the results of the screening assessment.

VII.3.1 Problem Formulation

Problem formulation is the initial stage of the screening assessment that provides the introduction to the risk evaluation process. Components that are addressed in this section include a discussion of ecological pathways and the ecological setting, identification of COPECs, and selection of ecological receptors. The conceptual model, ecological food webs, and ecological endpoints (other components commonly addressed in a screening assessment) are presented in the "Predictive Ecological Risk Assessment Methodology for SNL/NM ER Program" (IT July 1998) and are not duplicated here.

VII.3.1.1 Ecological Pathways and Setting

SWMU 9 is approximately 1.86 acres in size. The site is located in an area dominated by grassland habitat, but the habitat of the site is dominated by an arroyo with riparian scrubland vegetation. The habitat at this site has been moderately disturbed by past use. The site is open to use by wildlife. Larger animals such as coyotes and deer may use the arroyo as a travel corridor. A sensitive species survey of the site was conducted on June 16, 1994 (IT February 1995). No threatened, endangered, or other sensitive species were found within this SWMU.

is the major route of exposure for plants and that exposure of plants to wind-blown soil is minor. Exposure modeling for the wildlife receptors was limited to the food and soil ingestion pathways and external radiation. Because of the lack of surface water at this site, exposure to COPECs through the ingestion of surface water was considered insignificant. Inhalation and dermal contact were also considered insignificant pathways with respect to ingestion (Sample and Suter 1994). Groundwater is not expected to be affected by COCs at this site.

VII.3.1.2 COPECs

Waste materials dumped in the arroyo channel at SWMU 9 were the source of the COPECs associated with the soils at this site. Inorganic and organic COPECs identified for SWMU 9 are listed in Section VII.2.1. The inorganic COPECs include both radiological and nonradiological analytes. The inorganic analytes were screened against background concentrations and those that exceeded the approved SNL/NM background screening levels (Dinwiddie September 1997) for the area were considered to be COPECs. Nonradiological inorganics that are essential nutrients such as iron, magnesium, calcium, potassium, and sodium were not included in this risk assessment as set forth by the EPA (1989). All organic analytes detected were considered to be COPECs for the site. In order to provide conservatism, this ecological risk assessment was based upon the maximum soil concentrations of the COPECs measured in the surface soil at this site. Tables 4 and 5 present maximum concentrations for the COPECs.

VII.3.1.3 Ecological Receptors

As described in detail in an IT Corporation report (July 1998), a nonspecific perennial plant was selected as the receptor to represent plant species at the site. Vascular plants are the principal primary producers at the site and are key to the diversity and productivity of the wildlife community associated with the site. The deer mouse (*Peromyscus maniculatus*) and the burrowing owl (*Speotyto cunicularia*) were used to represent wildlife use. Because of its opportunistic food habits, the deer mouse was used to represent a mammalian herbivore, omnivore, and insectivore. The burrowing owl was selected to represent a top predator at this site. The burrowing owl is present at SNL/NM and is designated a species of management concern by the U.S. Fish and Wildlife Service in Region 2, which includes the state of New Mexico (USFWS September 1995).

VII.3.2 Exposure Estimation

For nonradiological COPECs, direct uptake from the soil was considered the only significant route of exposure for terrestrial plants. Exposure modeling for the wildlife receptors was limited to food and soil ingestion pathways and external radiation. Inhalation and dermal contact were considered insignificant pathways with respect to ingestion (Sample and Suter 1994). Drinking water was also considered an insignificant pathway because of the lack of surface water at this site. The deer mouse was modeled under three dietary regimes: as an herbivore (100 percent of its diet as plant material), as an omnivore (50 percent of its diet as plants and 50 percent as soil invertebrates), and as an insectivore (100 percent of its diet as soil invertebrates). The burrowing owl was modeled as a strict predator on small mammals (100 percent of its diet as deer mice). Because the exposure in the burrowing owl from a diet consisting of equal parts of

herbivorous, omnivorous, and insectivorous mice would be equivalent to the exposure consisting of only omnivorous mice, the diet of the burrowing owl was modeled with intake of omnivorous mice only. Both species were modeled with soil ingestion comprising 2 percent of the total dietary intake. Table 11 presents the species-specific factors used in modeling exposures in the wildlife receptors. Justification for use of the factors presented in this table is described in the ecological risk assessment methodology document (IT July 1998).

Although home range is also included in this table, exposures for this risk assessment were modeled using an area use factor of 1, implying that all food items and soil ingested are from the site being investigated. The maximum measured COPEC concentrations from surface soil samples were used to conservatively estimate potential exposures and risks to plants and wildlife at this site.

For the radiological dose rate calculations, the deer mouse was modeled as an herbivore (100 percent of its diet as plants), and the burrowing owl was modeled as a strict predator on small mammals (100 percent of its diet as deer mice). Both were modeled with soil ingestion comprising 2 percent of the total dietary intake. Receptors are exposed to radiation both internally and externally from tritium (H-3), Cs-137, Co-60, Th-232, U-234, U-235, and U-238. Internal and external dose rates to the deer mouse and the burrowing owl are approximated using modified dose rate models from DOE (1995) as presented in the ecological risk assessment methodology document for the SNL/NM ER Project (IT July 1998). Radionuclide-dependent data for the dose rate calculations were obtained from Baker and Soldat (1992). The external dose rate model examines the total-body dose rate to a receptor residing in soil exposed to radionuclides. The soil surrounding the receptor is assumed to be an infinite medium uniformly contaminated with gamma-emitting radionuclides. The external dose rate model is the same for both the deer mouse and the burrowing owl. The internal total-body dose rate model assumes that a fraction of the radionuclide concentration ingested by a receptor is absorbed by the body and concentrated at the center of a spherical body shape. This provides for a conservative estimate for absorbed dose. This concentrated radiation source at the center of the body of the receptor is assumed to be a "point" source. Radiation emitted from this point source is absorbed by the body tissues to contribute to the absorbed dose. Alpha and beta emitters are assumed to transfer 100 percent of their energy to the receptor as they pass through tissues. Gamma-emitting radionuclides only transfer a fraction of their energy to the tissues because gamma rays interact less with matter than do beta or alpha emitters. The external and internal dose rate results are summed to calculate a total dose rate from exposure to tritium, Cs-137, Co-60, Th-232, U-234, U-235, and U-238 in soil.

Table 12 presents the transfer factors used in modeling the concentrations of COPECs through the food chain. Table 13 presents maximum concentrations in soil and derived concentrations in tissues of the various food chain elements that are used to model dietary exposures for each of the wildlife receptors.

VII.3.3 Ecological Effects Evaluation

Table 14 shows benchmark toxicity values for the plant and wildlife receptors. For plants, the benchmark soil concentrations are based upon the lowest-observed-adverse-effect level

Table 11
Exposure Factors for Ecological Receptors at SWMU 9

Receptor Species	Class/Order	Trophic Level	Body Weight (kg) ^a	Food Intake Rate (kg/day) ^b	Dietary Composition ^c	Home Range (acres)
Deer mouse (<i>Peromyscus maniculatus</i>)	Mammalia/ Rodentia	Herbivore	2.39E-2 ^d	3.72E-3	Plants: 100% (+ soil at 2% of intake)	2.7E-1 ^e
Deer mouse (<i>Peromyscus maniculatus</i>)	Mammalia/ Rodentia	Omnivore	2.39E-2 ^d	3.72E-3	Plants: 50% Invertebrates: 50% (+ soil at 2% of intake)	2.7E-1 ^e
Deer mouse (<i>Peromyscus maniculatus</i>)	Mammalia/ Rodentia	Insectivore	2.39E-2 ^d	3.72E-3	Invertebrates: 100% (+ soil at 2% of intake)	2.7E-1 ^e
Burrowing owl (<i>Speotyto cunicularia</i>)	Aves/ Strigiformes	Carnivore	1.55E-1 ^f	1.73E-2	Rodents: 100% (+ soil at 2% of intake)	3.5E+1 ^g

^aBody weights are in kg wet weight.

^bFood intake rates are estimated from the allometric equations presented in Nagy (1987). Units are kg dry weight per day.

^cDietary compositions are generalized for modeling purposes. Default soil intake value of 2% of food intake.

^dFrom Silva and Downing (1995).

^eEPA (1993), based upon the average home range measured in semiarid shrubland in Idaho.

^fFrom Dunning (1993).

^gFrom Haug et al. (1993).

EPA = U.S. Environmental Protection Agency.

kg = Kilogram(s).

kg/day = Kilogram(s) per day.

SWMU = Solid Waste Management Unit.

Table 12
Transfer Factors Used in Exposure Models for
Constituents of Potential Ecological Concern at SWMU 9

Constituent of Potential Ecological Concern	Soil-to-Plant Transfer Factor	Soil-to-Invertebrate Transfer Factor	Food-to-Muscle Transfer Factor
Inorganic			
Barium	1.5E-1 ^a	1.0E+0 ^b	2.0E-4 ^c
Beryllium	1.0E-2 ^a	1.0E+0 ^b	1.0E-3 ^a
Cadmium	5.5E-1 ^a	6.0E-1 ^d	5.5E-4 ^a
Chromium (total)	4.0E-2 ^c	1.3E-1 ^e	3.0E-2 ^c
Cobalt	4.0E-1 ^c	1.0E+0 ^b	3.0E-2 ^c
Copper	8.0E-1 ^f	2.5E-1 ^d	1.0E-2 ^a
Lead	9.0E-2 ^c	4.0E-2 ^d	8.0E-4 ^c
Mercury (organic)	1.0E+0 ^c	1.0E+0 ^b	2.5E-1 ^a
Mercury (inorganic)	1.0E+0 ^c	1.0E+0 ^b	2.5E-1 ^a
Nickel	2.0E-1 ^c	3.8E-1 ^e	6.0E-3 ^a
Selenium	5.0E-1 ^c	1.0E+0 ^b	1.0E-1 ^c
Silver	1.0E+0 ^c	2.5E-1 ^d	5.0E-3 ^c
Thallium	4.0E-3 ^a	1.0E+0 ^b	4.0E-2 ^a
Uranium	2.3E-2 ^f	1.0E+0 ^b	1.0E-2 ^c
Vanadium	5.5E-3 ^a	1.0E+0 ^b	2.5E-3 ^a
Zinc	1.5E+0 ^a	3.0E-1 ^d	1.0E-1 ^a
Organic ^g			
Acetone	5.3E+1	1.3E+1	1.0E-8
2-amino-4,6-dinitrotoluene	2.9E+0	1.6E+1	1.9E-6
4-amino-2,6-dinitrotoluene	2.9E+0	1.6E+1	1.9E-6
Anthracene	1.0E-1	2.2E+1	7.3E-4
Benzo(a)pyrene	1.1E-2	2.7E+1	3.8E-2
Benzo(g,h,i)perylene	6.1E-3	2.8E+1	1.2E-1
Chloroform	3.0E+0	1.6E+1	1.8E-6
Chrysene	1.5E-2	2.6E+1	2.3E-2
2,4-dinitrotoluene	2.8E+0	1.7E+1	2.0E-6
2,6-dinitrotoluene	3.9E+0	1.6E+1	1.1E-6
Ethylbenzene	5.9E-1	1.9E+1	3.3E-5
HMX	2.7E+1	1.4E+1	3.4E-8
Methylene chloride	7.3E+0	1.5E+1	3.6E-7
Pentachlorophenol	4.4E-2	2.4E+1	3.3E-3
RDX	1.2E+1	1.5E+1	1.5E-7
Toluene	10.0E-1	1.8E+1	1.3E-5
Trichloroethene	1.1E+0	1.8E+1	1.2E-5
1,3,5-Trinitrobenzene	9.0E+0	1.5E+1	2.5E-7
2,4,6-Trinitrotoluene	4.6E+0	1.6E+1	8.3E-7
Xylenes	5.5E-1	1.9E+1	3.7E-5

Refer to footnotes at end of table.

Table 12 (Concluded)
Transfer Factors Used in Exposure Models for
Constituents of Potential Ecological Concern at SWMU 9

^aFrom Baes et al. (1984).

^bDefault value.

^cFrom NCRP (January 1989).

^dFrom Stafford et al. (1991).

^eFrom Ma (1982).

^fFrom IAEA (1994).

^gSoil-to-plant and food-to-muscle transfer factors from equations developed in Travis and Arms (1988). Soil-to-invertebrate transfer factors from equations developed in Connell and Markwell (1990). All three equations based upon relationship of the transfer factor to the log K_{ow} value of compound.

HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.

IAEA = International Atomic Energy Agency.

K_{ow} = Octanol-water partition coefficient.

Log = Logarithm (base 10).

NCRP = National Council on Radiation Protection and Measurements.

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

SWMU = Solid Waste Management Unit.

Table 13
Media Concentrations^a for Constituents of
Potential Ecological Concern at SWMU 9

Constituent of Potential Ecological Concern	Soil (maximum) ^a	Plant Foliage ^b	Soil Invertebrate ^b	Deer Mouse Tissues ^c
Inorganic				
Barium	2.1E+2 ^d	3.1E+1	2.1E+2	7.8E-2
Beryllium	6.5E-1	6.5E-3	6.5E-1	1.1E-3
Cadmium	2.8E+0	1.5E+0	1.7E+0	2.8E-3
Chromium (total)	2.8E+1	1.1E+0	3.7E+0	2.8E-1
Cobalt	8.6E+0	3.4E+0	8.6E+0	5.8E-1
Copper	5.4E+2 ^d	4.3E+2	1.3E+2	9.1E+0
Lead	1.3E+2	1.1E+1	5.0E+0	2.7E-2
Mercury (organic)	2.1E+0	2.1E+0	2.1E+0	1.7E+0
Mercury (inorganic)	2.1E+0	2.1E+0	2.1E+0	1.7E+0
Nickel	1.5E+1	3.0E+0	5.7E+0	8.7E-2
Selenium	1.1E+0	5.4E-1	1.1E+0	2.6E-1
Silver	4.6E-1 ^d	4.6E-1	1.2E-1	4.6E-3
Thallium	1.1E-1	4.4E-4	1.1E-1	7.2E-3
Uranium	2.0E+1 ^d	4.5E-1	2.0E+1	3.2E-1
Vanadium	2.5E+1	1.4E-1	2.5E+1	1.0E-1
Zinc	3.5E+2	5.3E+2	1.1E+2	1.0E+2
Organic				
Acetone	1.3E-2 ^d	6.9E-1	1.7E-1	1.4E-8
2-amino-4,6-dinitrotoluene	3.7E+0	1.1E+1	6.1E+1	2.1E-4
4-amino-2,6-dinitrotoluene	2.3E+0	6.7E+0	3.8E+1	1.3E-4
Anthracene	1.1E+0	1.1E-1	2.4E+1	2.8E-2
Benzo(a)pyrene	1.2E-1 ^d	1.4E-3	3.2E+0	1.9E-1
Benzo(g,h,i)perylene	1.3E-1 ^d	7.9E-4	3.7E+0	6.6E-1
Chloroform	9.7E-4 ^d	2.9E-3	1.6E-2	5.2E-8
Chrysene	1.2E-1 ^d	1.8E-3	3.1E+0	1.1E-1
2,4-dinitrotoluene	4.4E-1	1.2E+0	7.3E+0	2.7E-5
2,6-dinitrotoluene	1.6E-1	6.3E-1	2.6E+0	5.5E-6
Ethylbenzene	5.2E-4 ^d	3.0E-4	9.8E-3	5.2E-7
HMX	6.2E+0 ^d	1.7E+2	8.4E+1	1.4E-5
Methylene chloride	4.4E-2	3.2E-1	6.7E-1	5.6E-7
Pentachlorophenol	2.8E-1 ^d	1.2E-2	6.6E+0	3.5E-2
RDX	2.6E+1 ^d	3.2E+2	3.8E+2	1.6E-4
Toluene	2.8E-3	2.8E-3	5.1E-2	1.1E-6
Trichloroethene	5.8E-4 ^d	6.1E-4	1.0E-2	2.0E-7
1,3,5-trinitrobenzene	6.7E-1	6.0E+0	1.0E+1	6.3E-6
2,4,6-trinitrotoluene	1.8E+1	8.3E+1	2.9E+2	4.8E-4
Xylenes	6.1E-3	3.3E-3	1.2E-1	7.0E-6

Refer to footnotes at end of table.

Table 13 (Concluded)
Media Concentrations^a for Constituents of
Potential Ecological Concern at SWMU 9

^aIn milligram(s) per kilogram. All biotic media are based upon dry weight of the media. Soil concentration measurements are assumed to have been based upon dry weight. Values have been rounded to two significant digits after calculation.

^bProduct of the soil concentration and the corresponding transfer factor.

^cBased upon the deer mouse with an omnivorous diet. Product of the average concentration ingested in food and soil times the food-to-muscle transfer factor times a wet weight-dry weight conversion factor of 3.125 (EPA 1993).

^dBased upon an estimated concentration.

EPA = U.S. Environmental Protection Agency.

HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

SWMU = Solid Waste Management Unit.

Table 14
Toxicity Benchmarks for Ecological Receptors at SWMU 9

Constituent of Potential Ecological Concern	Plant Benchmark ^{a,b}	Mammalian NOAELs			Avian NOAELs		
		Mammalian Test Species ^{c,d}	Test Species NOAEL ^{d,e}	Deer Mouse NOAEL ^{e,f}	Avian Test Species ^d	Test Species NOAEL ^{d,e}	Burrowing Owl NOAEL ^{e,g}
Inorganic							
Barium	500	Rat ^h	5.1	10.5	Chicken	20.8	20.8
Beryllium	10	Rat	0.66	1.29	–	–	–
Cadmium	3	Rat ⁱ	1.0	1.9	Mallard	1.45	1.45
Chromium (total)	1	Rat	2,737	5,354	Black duck	1.0	1.0
Cobalt	20	–	–	–	–	–	–
Copper	100	Mink	11.7	29.8	Chicken	47	47
Lead	50	Rat	8.0	15.7	American kestrel	3.85	3.85
Mercury (organic)	0.3	Rat	0.032	0.063	Mallard	0.0064	0.0064
Mercury (inorganic)	0.3	Mouse	13.2	14.0	Japanese quail	0.45	0.45
Nickel	30	Rat	40	78	Mallard	77.4	77.4
Selenium	1	Rat	0.20	0.39	Screech owl	0.44	0.44
Silver	2	Rat	17.8 ^l	34.8	–	–	–
Thallium	1	Rat ^k	0.0074	0.015	–	–	–
Uranium	5	Mouse	3.07	3.19	Black duck	16	16
Vanadium	2	Rat	0.21	0.38	Mallard	11.4	11.4
Zinc	50	Rat	160	313	Chicken	14.5	14.5
Organic ^l							
Acetone	–	Rat	10	20	–	–	–
2-amino-4,6-dinitrotoluene	80 ⁱ	Rat	2.81 ^m	5.5	–	–	–
4-amino-2,6-dinitrotoluene	–	Rat	1.93 ⁿ	3.78	–	–	–
Anthracene	18 ^o	Mouse	100 ^p	106	–	–	–
Benzo(a)pyrene	18 ^o	Mouse	1.0	1.1	–	–	–
Benzo(g,h,i)perylene	18 ^o	Mouse	1.0 ^q	1.1	–	–	–

Refer to footnotes at end of table.

**Table 14 (Continued)
Toxicity Benchmarks for Ecological Receptors at SWMU 9**

Constituent of Potential Ecological Concern	Plant Benchmark ^{a,b}	Mammalian NOAELs			Avian NOAELs		
		Mammalian Test Species ^{c,d}	Test Species NOAEL ^{d,e}	Deer Mouse NOAEL ^{e,f}	Avian Test Species ^d	Test Species NOAEL ^{d,e}	Burrowing Owl NOAEL ^{e,g}
Chloroform	-	Rat	15	29	-	-	-
Chrysene	18 ^o	Mouse	1.0 ^q	1.1	-	-	-
2,4-dinitrotoluene	-	Rat	3.8 ^r	7.4	-	-	-
2,6-dinitrotoluene	-	Rat	7.2 ^s	14.1	-	-	-
Ethylbenzene	-	Rat	291 ^t	569	-	-	-
HMX	-	Mouse ^u	3.0 ^l	3.0	-	-	-
Methylene chloride	-	Rat	5.85	11.4	-	-	-
Pentachlorophenol	-	Rat	0.24	0.47	-	-	-
RDX	100	Mouse ^v	7.0 ^l	7.8	-	-	-
Toluene	200	Mouse	26	28	-	-	-
Trichloroethene	-	Mouse	0.70	0.74	-	-	-
1,3,5-Trinitrobenzene	-	White-footed mouse ^w	6.74 ^l	6.32	-	-	-
2,4,6-Trinitrotoluene	30	Rat ^x	1.6 ^y	3.1	-	-	-
Xylenes	-	Mouse	2.1	2.2	-	-	-

^aIn milligram(s) per kilogram soil dry weight.

^bFrom Efroymsen et al. (1997).

^cBody weights (in kilogram[s]) for the NOAEL conversion are as follows: lab mouse, 0.030; lab rat, 0.350; mink, 1.0 (except where noted).

^dFrom Sample et al. (1996), except where noted.

^eIn milligram(s) per kilogram body weight per day.

^fBased upon NOAEL conversion methodology presented in Sample et al. (1996), using a deer mouse body weight of 0.0239 kilogram and a mammalian scaling factor of 0.25.

^gBased upon NOAEL conversion methodology presented in Sample et al. (1996). The avian scaling factor of 0.0 was used, making the NOAEL independent of body weight.

^hBody weight: 0.435 kilogram.

ⁱBody weight: 0.303 kilogram.

^lBased upon a rat LOAEL of 89 mg/kg/d (EPA 2000) and an uncertainty factor of 0.2.

^kBody weight: 0.365 kilogram.

Table 14 (Concluded)
Toxicity Benchmarks for Ecological Receptors at SWMU 9

ⁱFrom Talmage et al. (1999).

^mBased upon the rat NOAEL for 2,4,6-trinitrotoluene and the ratio of LD₅₀ values for 2-amino-4,6-dinitrotoluene and 2,4,6-trinitrotoluene (Micromedex 1998).

ⁿBased upon the rat NOAEL for 2,4,6-trinitrotoluene and the ratio of LD₅₀ values for 2-amino-4,6-dinitrotoluene and 2,4,6-trinitrotoluene (Micromedex 1998).

^oFrom Sims and Overcash (1983).

^pBased upon a subchronic NOAEL of 1000 mg/kg/d (EPA 2000) and an uncertainty factor of 0.1.

^qNo data available. Toxicity value based upon NOAEL for benzo(a)pyrene.

^rBased upon a rat NOAEL for 2,4,6-trinitrotoluene and the ratio of LD₅₀ values for 2,4-dinitrotoluene and 2,4,6-trinitrotoluene (Micromedex 1998).

^sBased upon a rat NOAEL for 2,4,6-trinitrotoluene and the ratio of LD₅₀ values for 2,6-dinitrotoluene and 2,4,6-trinitrotoluene (Micromedex 1998).

^tFrom EPA (2000).

^uBody weight: 0.023 kilogram.

^vBody weight: 0.036 kilogram.

^wWhite-footed mouse body weight: 0.0185 kilogram.

^xRat body weight: 0.318 kilogram.

^yBased upon data summarized in Talmage et al. (1999).

EPA = U.S. Environmental Protection Agency.

HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.

LD₅₀ = Acute lethal dose to 50 percent of the test population.

LOAEL = Lowest-observed-adverse-effect level.

mg/kg/d = Milligrams per kilogram per day.

NOAEL = No-observed-adverse-effect level.

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

SWMU = Solid waste management unit.

- = insufficient toxicity data.

(LOAEL). For wildlife, the toxicity benchmarks are based upon the no-observed-adverse-effect level (NOAEL) for chronic oral exposure in a taxonomically similar test species. Insufficient toxicity information was found to estimate the LOAELs or NOAELs for some COPECs.

The benchmark used for exposure of terrestrial receptors to radiation was 0.1 rad/day. This value has been recommended by the International Atomic Energy Agency (IAEA 1992) for the protection of terrestrial populations. Because plants and insects are less sensitive to radiation than vertebrates (Whicker and Schultz 1982), the dose of 0.1 rad/day should also offer sufficient protection to other components within the terrestrial habitat of SWMU 9.

VII.3.4 Risk Characterization

Maximum concentrations in soil and estimated dietary exposures were compared to plant and wildlife benchmark values, respectively. Table 15 presents results of these comparisons. HQs are used to quantify the comparison with benchmarks for plants and wildlife exposure.

HQs for plants exceeded unity for total chromium, copper, lead, mercury, selenium, uranium, vanadium, and zinc. Because of a lack of sufficient toxicity information, HQs could not be determined for 12 of the organic COPECs. HQs exceeded unity for all three dietary regimes in the deer mouse for HMX; RDX; 2,4,6-TNT; and mercury when the mercury was assumed to be entirely in organic form. HQs for the herbivorous and omnivorous deer mice exceeded unity for copper, and HQs for the omnivorous and insectivorous deer mice exceeded unity for barium, vanadium, and pentachlorophenol. The insectivorous deer mouse also showed an HQ greater than unity from exposure to thallium, 2-amino-4,6-dinitrotoluene, and 4-amino-2,6-dinitrotoluene. HQs for the deer mouse could not be determined for cobalt because of a lack of sufficient toxicity information. For the burrowing owl, the only HQ that exceeded unity was that from exposures to mercury when the mercury was assumed to be entirely in organic form. HQs for beryllium, silver, thallium, and all organic COPECs could not be determined for the burrowing owl because of a lack of sufficient toxicity information. As directed by the NMED, HIs were calculated for each of the receptors (the HI is the sum of chemical-specific HQs for all pathways for a given receptor). All receptors had total HIs greater than unity, with a maximum HI of 78 for plants.

Tables 16 and 17 summarize the internal and external dose rate model results for tritium, Cs-137, Co-60, Th-232, U-234, U-235, and U-238. The total radiation dose rate to both the deer mouse and the burrowing owl was predicted to be 1.6E-3 rad/day. The dose rates for the deer mouse and the burrowing owl are considerably less than the benchmark of 0.1 rad/day.

VII.3.5 Uncertainty Assessment

Many uncertainties are associated with the characterization of ecological risks at SWMU 9. These uncertainties result from assumptions used in calculating risk that could overestimate or underestimate true risk presented at a site. For this risk assessment, assumptions are made that are more likely to overestimate exposures and risk rather than to underestimate them. These conservative assumptions are used to be more protective of the ecological resources potentially affected by the site. Conservatism incorporated into this risk assessment include the use of maximum measured analyte concentrations in soil to evaluate risk, the use of wildlife

Table 15
HQs for Ecological Receptors at SWMU 9

Constituent of Potential Ecological Concern	Plant HQ	Deer Mouse HQ (Herbivorous)	Deer Mouse HQ (Omnivorous)	Deer Mouse HQ (Insectivorous)	Burrowing Owl HQ
Inorganic					
Barium	4.2E-1	5.3E-1	1.8E+0	3.2E+0	2.3E-2
Beryllium	6.5E-2	2.4E-3	4.1E-2	8.0E-2	–
Cadmium	9.3E-1	1.3E-1	1.4E-1	1.4E-1	4.5E-3
Chromium (total)	2.8E+1	5.0E-5	8.7E-5	1.2E-4	9.5E-2
Cobalt	4.3E-1	–	–	–	–
Copper	5.4E+0	2.3E+0	1.5E+0	7.6E-1	4.7E-2
Lead	2.5E+0	1.4E-1	1.1E-1	7.5E-2	7.4E-2
Mercury (organic)	7.0E+0	5.3E+0	5.3E+0	5.3E+0	3.0E+1
Mercury (inorganic)	7.0E+0	2.4E-2	2.4E-2	2.4E-2	4.2E-1
Nickel	5.0E-1	6.5E-3	9.2E-3	1.2E-2	5.5E-4
Selenium	1.1E+0	2.2E-1	3.3E-1	4.4E-1	7.1E-2
Silver	2.3E-1	2.1E-3	1.3E-3	5.5E-4	–
Thallium	1.1E-1	2.8E-2	6.2E-1	1.2E+0	–
Uranium	3.9E+0	4.1E-2	5.1E-1	9.7E-1	5.0E-3
Vanadium	1.2E+1	2.6E-1	5.3E+0	1.0E+1	5.8E-3
Zinc	7.1E+0	2.7E-1	1.6E-1	5.6E-2	8.4E-1
Organic					
Acetone	–	5.5E-3	3.4E-3	1.3E-3	–
2-amino-4,6-dinitrotoluene	4.6E-2	3.1E-1	1.0E+0	1.7E+0	–
4-amino-2,6-dinitrotoluene	–	2.8E-1	9.2E-1	1.6E+0	–
Anthracene	6.1E-2	2.0E-4	1.8E-2	3.6E-2	–
Benzo(a)pyrene	6.7E-3	5.5E-4	2.4E-1	4.7E-1	–
Benzo(g,h,i)perylene	7.2E-3	5.0E-4	2.7E-1	5.4E-1	–
Chloroform	–	1.6E-5	5.0E-5	8.5E-5	–
Chrysene	6.7E-3	6.2E-4	2.3E-1	4.6E-1	–

Refer to footnotes at end of table.

Table 15 (Concluded)
Hazard Quotients for Ecological Receptors at SWMU 9

Constituent of Potential Ecological Concern	Plant HQ	Deer Mouse HQ (Herbivorous)	Deer Mouse HQ (Omnivorous)	Deer Mouse HQ (Insectivorous)	Burrowing Owl HQ
2,4-dinitrotoluene	-	2.6E-2	8.9E-2	1.5E-1	-
2,6-dinitrotoluene	-	7.0E-3	1.8E-2	2.8E-2	-
Ethylbenzene	-	8.6E-8	1.4E-6	2.7E-6	-
HMX	-	8.9E+0	6.7E+0	4.4E+0	-
Methylene chloride	-	4.4E-3	6.8E-3	9.1E-3	-
Pentachlorophenol	-	6.0E-3	1.1E+0	2.2E+0	-
RDX	2.6E-1	6.4E+0	7.0E+0	7.6E+0	-
Toluene	1.4E-5	1.6E-5	1.5E-4	2.9E-4	-
Trichloroethene	-	1.3E-4	1.2E-3	2.2E-3	-
1,3,5-trinitrobenzene	-	1.5E-1	2.0E-1	2.5E-1	-
2,4,6-trinitrotoluene	6.0E-1	4.2E+0	9.4E+0	1.5E+1	-
Xylenes	-	2.4E-4	4.2E-3	8.1E-3	-
HI ^a	7.8E+1	2.9E+1	4.2E+1	5.4E+1	3.1E+1

Note: **Bold** text indicates HQ or HI exceeds unity.

^aThe HI is the sum of individual HQs using the value for organic mercury as a conservative estimate of the HI.

HI = Hazard index.

HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.

HQ = Hazard quotient.

RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.

SWMU = Solid Waste Management Unit.

- = Insufficient toxicity data available for risk estimation purposes.

Table 16
Internal and External Dose Rates for
Deer Mice Exposed to Radionuclides at SWMU 9

Radionuclide	Maximum Concentration (pCi/g)	Internal Dose (rad/day)	External Dose (rad/day)	Total Dose (rad/day)
H-3	3.6E-2	1.2E-7	–	1.2E-7
Cs-137	8.0E-1	2.5E-5	3.7E-5	6.1E-5
Co-60	1.1E+0	3.6E-6	2.1E-4	2.1E-4
Th-232	2.0E+0	7.8E-7	3.7E-4	3.7E-4
U-234	2.5E+0	2.9E-5	2.8E-7	2.9E-5
U-235	3.6E-1	3.9E-6	5.9E-6	9.8E-6
U-238	5.8E+0	5.9E-5	8.9E-4	9.5E-4
Total		1.2E-4	1.5E-3	1.6E-3

pCi/g = Picocurie(s) per gram.

SWMU = Solid Waste Management Unit.

– = Insufficient toxicity data available for risk estimation purposes.

Table 17
Internal and External Dose Rates for
Burrowing Owls Exposed to Radionuclides at SWMU 9

Radionuclide	Maximum Concentration (pCi/g)	Internal Dose (rad/day)	External Dose (rad/day)	Total Dose (rad/day)
H-3	3.6E-2	4.7E-8	–	4.7E-8
Cs-137	8.0E-1	1.6E-5	3.7E-5	5.3E-5
Co-60	1.1E+0	9.2E-7	2.1E-4	2.1E-4
Th-232	2.0E+0	1.1E-6	3.7E-4	3.7E-4
U-234	2.5E+0	1.2E-5	2.8E-7	1.2E-5
U-235	3.6E-1	1.6E-6	5.9E-6	7.4E-6
U-238	5.8E+0	2.4E-5	8.9E-4	9.1E-4
Total		5.6E-5	1.5E-3	1.6E-3

pCi/g = Picocurie(s) per gram.

SWMU = Solid Waste Management Unit.

– = Insufficient toxicity data available for risk estimation purposes.

toxicity benchmarks based upon NOAEL values, the incorporation of strict herbivorous and strict insectivorous diets for predicting the extreme HQ values for the deer mouse, and the use of 1.0 as the area use factor for wildlife receptors regardless of seasonal use or home range size. Each of these uncertainties, which are consistent among each of the SWMU-specific ecological risk assessments, is discussed in greater detail in the uncertainty section of the ecological risk assessment methodology document for the SNL/NM ER Project (IT July 1998).

Uncertainties associated with the estimation of risk to ecological receptors following exposure to tritium, Cs-137, Co-60, Th-232, U-234, U-235, and U-238 are primarily related to those inherent in the radionuclide-specific data. Radionuclide-dependent data are measured values that have their associated errors. The dose rate models used for these calculations are based upon conservative estimates on receptor shape, radiation absorption by body tissues, and intake parameters. The goal is to provide a realistic but conservative estimate of a receptor's internal and external exposure to radionuclides in soil.

The assumption of an area use factor of 1.0 is a source of uncertainty for the burrowing owl. Because SWMU 9 is approximately 1.86 acres in size, an area use factor of approximately 0.054 would be justified for this receptor. This is sufficient to reduce the HQs for organic mercury from 30 to 1.6. It is unlikely that a significant proportion of the mercury at this site is in organic form because of the arid nature of the site; therefore, the assumption that all of the mercury is in organic form is highly conservative. The risk to the burrowing owl from exposure to mercury at this site is probably insignificant.

In the estimation of ecological risk, background concentrations are included as a component of maximum on-site concentrations. Conservatism in the modeling of exposure and risk can result in the prediction of risk to ecological receptors when exposed at background concentrations. As shown in Table 18, HQs associated with exposures to background are greater than 1.0 for barium, chromium, thallium, vanadium, and zinc. In the case of vanadium, background may account for approximately 83 percent of the HQ values. For barium, background may account for 62 percent of the HQs for barium). It is, therefore, likely that the actual risks from vanadium and barium at SWMU 9 are overestimated by the HQs calculated in this screening assessment because of conservatism incorporated into the exposure assessment and in the toxicity benchmarks for these COPECs (e.g., the use of NOAELs for wildlife receptors).

The background value for thallium can only be specified as being less than 1.1 mg/kg. As shown in Table 18, one-half of this value (0.55 mg/kg), used as an approximation of the background concentration for thallium, results in HQs greater than unity for the omnivorous and insectivorous deer mice. Thallium was not detected in soil samples from SWMU 9 at a detection limit of 0.22 mg/kg. Because one-half of this detection limit (0.11 mg/kg) also shows potential risk to the insectivorous deer mouse (HQ = 1.2), thallium was retained as a COPEC. Based upon this low HQ and uncertainty associated with the estimation of thallium exposure point concentrations, potential risks from exposures to thallium are probably insignificant at this site.

A significant source of uncertainty associated with the prediction of ecological risks at this site is the use of the maximum measured concentrations to evaluate risk. This results in a conservative exposure scenario that does not necessarily reflect actual site conditions. In order to determine whether the predicted risks can be accounted for by the magnitude of the extreme

Table 18
HQs for Ecological Receptors Exposed to Background Concentrations at SWMU 9

Constituent of Potential Ecological Concern	Plant HQ	Deer Mouse HQ (Herbivorous)	Deer Mouse HQ (Omnivorous)	Deer Mouse HQ (Insectivorous)	Burrowing Owl HQ
Inorganic					
Barium	2.6E-1	3.3E-1	1.1E+0	2.0E+0	1.4E-2
Beryllium	6.5E-2	2.4E-3	4.1E-2	8.0E-2	-
Cadmium	1.7E-1	2.4E-2	2.5E-2	2.6E-2	8.1E-4
Chromium (total)	1.3E+1	2.2E-5	3.9E-5	5.6E-5	4.3E-2
Cobalt	2.6E-1	-	-	-	-
Copper	1.5E-1	6.6E-2	4.4E-2	2.2E-2	1.4E-3
Lead	2.4E-1	1.3E-2	10.0E-3	7.0E-3	6.9E-3
Mercury (organic)	1.7E-1	1.3E-1	1.3E-1	1.3E-1	7.1E-1
Mercury (inorganic)	1.7E-1	5.7E-4	5.7E-4	5.7E-4	1.0E-2
Nickel	3.8E-1	5.0E-3	7.1E-3	9.2E-3	4.3E-4
Selenium	5.0E-1	1.0E-1	1.5E-1	2.0E-1	3.3E-2
Silver	2.5E-1	2.3E-3	1.4E-3	6.0E-4	-
Thallium	5.5E-1	1.4E-1	3.1E+0	6.0E+0	-
Uranium	4.6E-1	4.8E-3	6.0E-2	1.1E-1	5.9E-4
Vanadium	1.0E+1	2.1E-1	4.4E+0	8.5E+0	4.8E-3
Zinc	1.2E+0	4.7E-2	2.8E-2	9.9E-3	1.5E-1
HI ^a	2.8E+1	1.1E+0	9.0E+0	1.7E+1	9.7E-1

Note: **Bold** text indicates HQ or HI exceeds unity.

^aThe HI is the sum of individual HQs using the value for organic mercury as a conservative estimate of the HI.

HI = Hazard index.

HQ = Hazard quotient.

SWMU = Solid Waste Management Unit.

- = Insufficient toxicity data available for risk estimation purposes.

measurement, potential risks based upon average soil concentrations were evaluated for the COPECs with HQs greater than unity. The mean concentrations of barium, chromium, and vanadium are 111, 11.4, and 17.0 mg/kg, respectively. These means are all less than the corresponding background screening values for these COPECs, and therefore, the actual site risks are likely to be within background levels. For copper, lead, mercury, selenium, 2-amino-4,6-dinitrotoluene, 4-amino-2,6-dinitrotoluene, pentachlorophenol, RDX, and 2,4,6-TNT, the means are 33.7, 22.6, 0.0542, 0.553, 0.199, 0.148, 0.095, 2.73, and 0.836, respectively. In all of these cases, the mean soil concentration is sufficiently less than the maximum to reduce all HQs to values less than unity.

For uranium and zinc, the mean soil concentrations (6.17 and 90.0 mg/kg, respectively) have residual HQs of 1.2 and 1.8, respectively. In both of these cases, HQs greater than unity are limited to exposures to plant receptors. Because the plant toxicity benchmarks for metals are typically based upon laboratory/greenhouse studies in which the metal being tested is applied freshly to the soil in a form that is highly available to the plant (e.g., a soluble salt), the bioavailability associated with these benchmarks can significantly overestimate the bioavailability of the metals in field situations where the COPECs are typically in less soluble forms and have been allowed to "age" in the soil, reducing their availability to plants. For this reason, the risk to plants indicated by the low residual HQs for uranium and zinc are probably insignificant.

The mean soil concentration for HMX resulted in a residual HQ of 1.2 for the herbivorous deer mouse (HQs for all other receptors being less than 1). As with uranium and zinc, this low HQ is probably insignificant due to the conservative estimation of the toxicity benchmark. For the deer mice, the benchmark for HMX was based upon a chronic NOAEL of 3.0 milligrams per kilogram per day (mg/kg/d). The chronic LOAEL for HMX in the deer mouse is 7.5 mg/kg/d (based upon information in Talmage et al., 1999), indicating a possible range of HQs between 0.5 and 1.2 representing the range between the NOAEL and LOAEL-based benchmarks. It is, therefore, likely that potential exposures in this receptor to HMX are less than the threshold of toxicity.

Based upon this uncertainty analysis, ecological risks at SWMU 9 are expected to be low. HQs greater than unity were initially predicted; however, closer examination of the exposure assumptions revealed an overestimation of risk primarily attributed to exposure concentration and the contribution of background risk.

VII.3.6 Risk Interpretation

Ecological risks associated with SWMU 9 were estimated through a screening assessment that incorporated site-specific information when available. Overall, risks to ecological receptors are expected to be low because predicted risks associated with exposure to COPECs are based upon calculations using maximum detected values. The average concentrations of barium, chromium, and vanadium at the site were within the range of background concentrations. Predicted risks from exposures to copper, lead, mercury, selenium, 2-amino-4,6-dinitrotoluene, 4-amino-2,6-dinitrotoluene, pentachlorophenol, RDX, and 2,4,6-TNT were attributed to using maximum detected values. Risks to ecological receptors from exposures to uranium, zinc, and HMX were attributed to conservative assumptions of COPEC bioavailability and toxicity in

addition to the use of maximum measured concentration values. Based upon this final analysis, ecological risks associated with SWMU 9 are expected to be low.

VII.3.7 Screening Assessment Scientific/Management Decision Point

After potential ecological risks associated with the site have been assessed, a decision is made regarding whether the site should be recommended for NFA or whether additional data should be collected to assess actual ecological risk at the site more thoroughly. With respect to this site, ecological risks are predicted to be low. The scientific/management decision is to recommend this site for NFA.

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APPENDIX 1 EXPOSURE PATHWAY DISCUSSION FOR CHEMICAL AND RADIONUCLIDE CONTAMINATION

Introduction

Sandia National Laboratories/New Mexico (SNL/NM) proposes that a default set of exposure routes and associated default parameter values be developed for each future land use designation being considered for SNL/NM Environmental Restoration (ER) project sites. This default set of exposure scenarios and parameter values would be invoked for risk assessments unless site-specific information suggested other parameter values. Because many SNL/NM solid waste management units (SWMU) have similar types of contamination and physical settings, SNL/NM believes that the risk assessment analyses at these sites can be similar. A default set of exposure scenarios and parameter values will facilitate the risk assessments and subsequent review.

The default exposure routes and parameter values suggested are those that SNL/NM views as resulting in a Reasonable Maximum Exposure (RME) value. Subject to comments and recommendations by the U.S. Environmental Protection Agency (EPA) Region VI and New Mexico Environment Department (NMED), SNL/NM proposes that these default exposure routes and parameter values be used in future risk assessments.

At SNL/NM, all SWMUs exist within the boundaries of the Kirtland Air Force Base (KAFB). Approximately 157 potential waste and release sites have been identified where hazardous, radiological, or mixed materials may have been released to the environment. Evaluation and characterization activities have occurred at all of these sites to varying degrees. Among other documents, the SNL/NM ER draft Environmental Assessment (DOE 1996) presents a summary of the hydrogeology of the sites, the biological resources present and proposed land use scenarios for the SNL/NM SWMUs. At this time, all SNL/NM SWMUs have been tentatively designated for either industrial or recreational future land use. The NMED has also requested that risk calculations be performed based upon a residential land use scenario. All three land use scenarios will be addressed in this document.

The SNL/NM ER project has screened the potential exposure routes and identified default parameter values to be used for calculating potential intake and subsequent Hazard index (HI), excess cancer risk and dose values. The EPA (EPA 1989a) provides a summary of exposure routes that could potentially be of significance at a specific waste site. These potential exposure routes consist of:

- Ingestion of contaminated drinking water
- Ingestion of contaminated soil
- Ingestion of contaminated fish and shell fish
- Ingestion of contaminated fruits and vegetables

- Ingestion of contaminated meat, eggs, and dairy products
- Ingestion of contaminated surface water while swimming
- Dermal contact with chemicals in water
- Dermal contact with chemicals in soil
- Inhalation of airborne compounds (vapor phase or particulate)
- External exposure to penetrating radiation (immersion in contaminated air; immersion in contaminated water and exposure from ground surfaces with photon-emitting radionuclides).

Based upon the location of the SNL/NM SWMUs and the characteristics of the surface and subsurface at the sites, we have evaluated these potential exposure routes for different land use scenarios to determine which should be considered in risk assessment analyses (the last exposure route is pertinent to radionuclides only). At SNL/NM SWMUs, there does not currently occur any consumption of fish, shell fish, fruits, vegetables, meat, eggs, or dairy products that originate on site. Additionally, no potential for swimming in surface water is present due to the high-desert environmental conditions. As documented in the RESRAD computer code manual (ANL 1993), risks resulting from immersion in contaminated air or water are not significant compared to risks from other radiation exposure routes.

For the industrial and recreational land use scenarios, SNL/NM ER has, therefore, excluded the following four potential exposure routes from further risk assessment evaluations at any SNL/NM SWMU:

- Ingestion of contaminated fish and shell fish.
- Ingestion of contaminated fruits and vegetables
- Ingestion of contaminated meat, eggs, and dairy products
- Ingestion of contaminated surface water while swimming.

That part of the exposure pathway for radionuclides related to immersion in contaminated air or water is also eliminated.

For the residential land use scenario, we will include ingestion of contaminated fruits and vegetables because of the potential for residential gardening.

Based upon this evaluation, for future risk assessments, the exposure routes that will be considered are shown in Table 1. Dermal contact is included as a potential exposure pathway in all land use scenarios. However, the potential for dermal exposure to inorganics is not considered significant and will not be included. In general, the dermal exposure pathway is generally considered to not be significant relative to water ingestion and soil ingestion pathways but will be considered for organic components. Because of the lack of toxicological parameter values for this pathway, the inclusion of this exposure pathway into risk assessment calculations may not be possible and may be part of the uncertainty analysis for a site where dermal contact is potentially applicable.

Table 1
Exposure Pathways Considered for Various Land Use Scenarios

Industrial	Recreational	Residential
Ingestion of contaminated drinking water	Ingestion of contaminated drinking water	Ingestion of contaminated drinking water
Ingestion of contaminated soil	Ingestion of contaminated soil	Ingestion of contaminated soil
Inhalation of airborne compounds (vapor phase or particulate)	Inhalation of airborne compounds (vapor phase or particulate)	Inhalation of airborne compounds (vapor phase or particulate)
Dermal contact	Dermal contact	Dermal contact
External exposure to penetrating radiation from ground surfaces	External exposure to penetrating radiation from ground surfaces	Ingestion of fruits and vegetables
		External exposure to penetrating radiation from ground surfaces

Equations and Default Parameter Values for Identified Exposure Routes

In general, SNL/NM expects that ingestion of compounds in drinking water and soil will be the more significant exposure routes for chemicals; external exposure to radiation may also be significant for radionuclides. All of the above routes will, however, be considered for their appropriate land use scenarios. The general equations for calculating potential intakes via these routes are shown below. The equations are from the Risk Assessment Guidance for Superfund (RAGS): Volume 1 (EPA 1989a, 1991). These general equations also apply to calculating potential intakes for radionuclides. A more in-depth discussion of the equations used in performing radiological pathway analyses with the RESRAD code may be found in the RESRAD Manual (ANL 1993). Also shown are the default values SNL/NM ER suggests for use in RME risk assessment calculations for industrial, recreational, and residential scenarios, based upon EPA and other governmental agency guidance. The pathways and values for chemical contaminants are discussed first, followed by those for radionuclide contaminants. RESRAD input parameters that are left as the default values provided with the code are not discussed. Further information relating to these parameters may be found in the RESRAD Manual (ANL 1993).

Generic Equation for Calculation of Risk Parameter Values

The equation used to calculate the risk parameter values (i.e., hazard quotients/hazard index [HI], excess cancer risk, or radiation total effective dose equivalent [dose]) is similar for all exposure pathways and is given by:

Risk (or Dose) = Intake x Toxicity Effect (either carcinogenic, noncarcinogenic, or radiological)

$$= C \times (CR \times EFD/BW/AT) \times \text{Toxicity Effect} \quad (1)$$

where

- C = contaminant concentration (site specific)
- CR = contact rate for the exposure pathway
- EFD = exposure frequency and duration
- BW = body weight of average exposure individual
- AT = time over which exposure is averaged.

The total risk/dose (either cancer risk or HI) is the sum of the risks/doses for all of the site-specific exposure pathways and contaminants.

The evaluation of the carcinogenic health hazard produces a quantitative estimate for excess cancer risk resulting from the constituents of concern (COC) present at the site. This estimate is evaluated for determination of further action by comparison of the quantitative estimate with the potentially acceptable risk range of $1E-6$ for Class A and B carcinogens and $1E-5$ for Class C carcinogens. The evaluation of the noncarcinogenic health hazard produces a quantitative estimate (i.e., the HI) for the toxicity resulting from the COCs present at the site. This estimate is evaluated for determination of further action by comparison of this quantitative estimate with the EPA standard HI of unity (1). The evaluation of the health hazard due to radioactive compounds produces a quantitative estimate of doses resulting from the COCs present at the site.

The specific equations used for the individual exposure pathways can be found in RAGS (EPA 1989a) and the RESRAD Manual (ANL 1993). Table 2 shows the default parameter values suggested for use by SNL/NM at SWMUs, based upon the selected land use scenario. References are given at the end of the table indicating the source for the chosen parameter values. The intention of SNL/NM is to use default values that are consistent with regulatory guidance and consistent with the RME approach. Therefore, the values chosen will, in general, provide a conservative estimate of the actual risk parameter. These parameter values are suggested for use for the various exposure pathways based upon the assumption that a particular site has no unusual characteristics that contradict the default assumptions. For sites for which the assumptions are not valid, the parameter values will be modified and documented.

Summary

SNL/NM proposes the described default exposure routes and parameter values for use in risk assessments at sites that have an industrial, recreational or residential future land use scenario. There are no current residential land use designations at SNL/NM ER sites, but this scenario has been requested to be considered by the NMED. For sites designated as industrial or recreational land use, SNL/NM will provide risk parameter values based upon a residential land use scenario to indicate the effects of data uncertainty on risk value calculations or in order to potentially mitigate the need for institutional controls or restrictions on SNL/NM ER sites. The parameter values are based upon EPA guidance and supplemented by information from other government sources. The values are generally consistent with those proposed by Los Alamos National Laboratory, with a few minor variations. If these exposure routes and parameters are acceptable, SNL/NM will use them in risk assessments for all sites where the assumptions are consistent with site-specific conditions. All deviations will be documented.

Table 2
Default Parameter Values for Various Land Use Scenarios

Parameter	Industrial	Recreational	Residential
General Exposure Parameters			
Exposure frequency	8 hr/day for 250 day	4 hr/wk for 52 wk/yr	350 day/yr
Exposure duration (yr)	25 ^{a,b}	30 ^{a,b}	30 ^{a,b}
Body weight (kg)	70 ^{a,b}	70 adult ^{a,b} 15 child	70 adult ^{a,b} 15 child
Averaging Time (days) for carcinogenic compounds (= 70 y x 365 day/yr)	25,550 ^a	25,550 ^a	25,550 ^a
for noncarcinogenic compounds (= ED x 365 day/yr)	9,125	10,950	10,950
Soil Ingestion Pathway			
Ingestion rate	100 mg/day ^c	200 mg/day child 100 mg/day adult	200 mg/day child 100 mg/day adult
Inhalation Pathway			
Inhalation rate (m ³ /yr)	5,000 ^{a,b}	260 ^d	7,000 ^{a,b,d}
Volatilization factor (m ³ /kg)	chemical specific	chemical specific	chemical specific
Particulate emission factor (m ³ /kg)	1.32E9 ^a	1.32E9 ^a	1.32E9 ^a
Water Ingestion Pathway			
Ingestion rate (liter/day)	2 ^{a,b}	2 ^{a,b}	2 ^{a,b}
Food Ingestion Pathway			
Ingestion rate (kg/yr)	NA	NA	138 ^{b,d}
Fraction ingested	NA	NA	0.25 ^{b,d}
Dermal Pathway			
Surface area in water (m ²)	2 ^{b,e}	2 ^{b,e}	2 ^{b,e}
Surface area in soil (m ²)	0.53 ^{b,e}	0.53 ^{b,e}	0.53 ^{b,e}
Permeability coefficient	chemical specific	chemical specific	chemical specific

^aRisk Assessment Guidance for Superfund, Vol. 1, Part B (EPA 1991).

^bExposure Factors Handbook (EPA 1989b).

^cEPA Region VI guidance.

^dFor radionuclides, RESRAD (Argonne National Laboratory, 1993. *Manual for Implementing Residual Radioactive Material Guidelines Using RESRAD*, Version 5.0, ANL/EAD/LD-2, Argonne National Laboratory, Argonne, IL. 1993) is used for human health risk calculations; default parameters are consistent with RESRAD guidance.

^eDermal Exposure Assessment (EPA 1992).

ED = Exposure duration.

EPA = U.S. Environmental Protection Agency.

hr = Hour.

kg = Kilogram(s).

m = Meter(s).

mg = Milligram(s).

NA = Not available.

wk = Week.

yr = Year.

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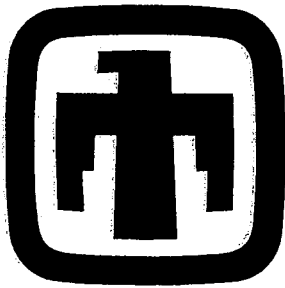
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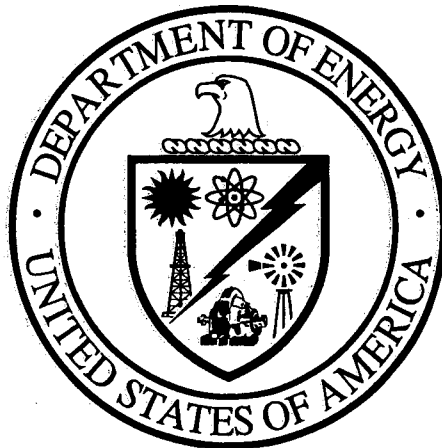
**Supplemental
Risk**



Sandia National Laboratories/New Mexico Environmental Restoration Project

Supplemental Risk Document Supporting Class 3 Permit Modification Process

October 2003



United States Department of Energy
Sandia Site Office

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- 2 Calculation of the Upper 95% Confidence Limits of Mean Concentrations

ACRONYMS AND ABBREVIATIONS

amsl	above mean sea level
AOC	Area of Concern
COC	constituent of concern
DOE	U.S. Department of Energy
EBP	Explosive Burn Pit
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
gal	gallon
HE	high explosives
HI	hazard index
JP-4	jet propulsion fuel grade 4
JP-8	jet propulsion fuel grade 8
KAFB	Kirtland Air Force Base
kg	kilogram(s)
LAARC	Light Airtransport Accident Resistant Container
LCBS	Lurance Canyon Burn Site
mg	milligram(s)
NFA	no further action
NMED	New Mexico Environment Department
OU	Operable Unit
PCB	polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
RDX	cyclotrimethylenetrinitramine
SNL/NM	Sandia National Laboratories/New Mexico
SOBP	Small Open Burn Pool
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TA	Technical Area
TNT	2,4,6-trinitrotoluene
UCL	upper confidence limit
USAF	U.S. Air Force
USFS	U.S. Forest Service
VCM	voluntary corrective measure
VOC	volatile organic compound

1.0 INTRODUCTION

This supplemental risk document was prepared to support no further action (NFA) determination and subsequent removal of 16 Solid Waste Management Units (SWMUs) and 2 Areas of Concern (AOCs) from the Hazardous and Solid Waste Amendments Module of the Resource Conservation and Recovery Act (RCRA) Permit for Sandia National Laboratories/New Mexico (SNL/NM) (U.S. Environmental Protection Agency [EPA] ID No. 5890110518). See Figure 1-1 for the locations of these SWMUs and AOCs.

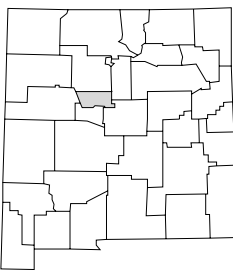
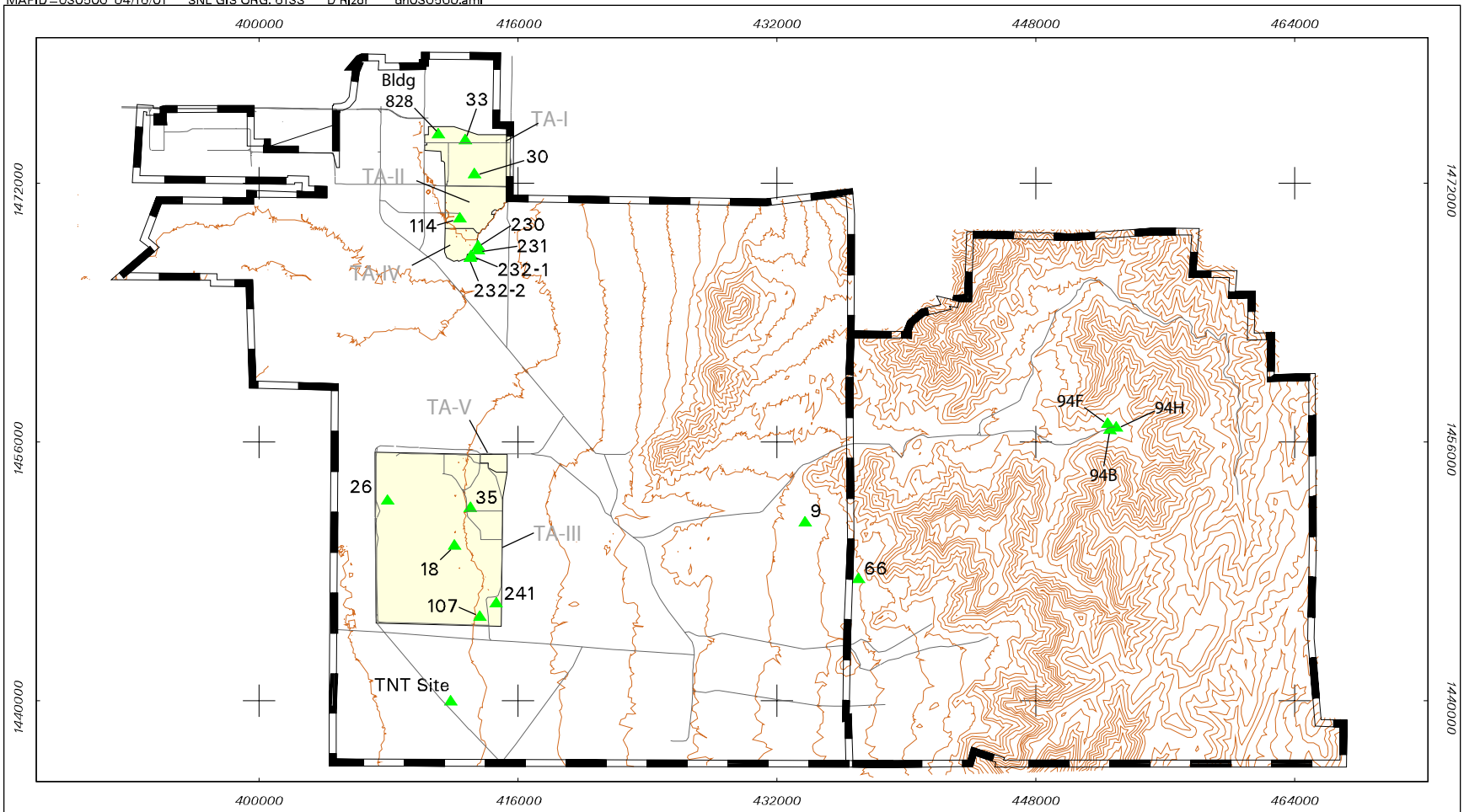
Initially, risk assessments were performed for these sites considering the designated land use provided in the land use workbooks (DOE et al. September 1995, DOE et al. October 1995, DOE and USAF January 1996, and DOE and USAF March 1996). However, in January 2001, the New Mexico Environment Department (NMED) promulgated risk-based screening levels for RCRA Corrective Action Sites in New Mexico (Bearzi January 2001). The letter stated that "until statutory authority exists allowing restriction of future land use, corrective action sites applying for NFA determination (an NFA) under a risk-based approach cannot use industrial risk-based screening levels for soils." SNL/NM has determined from the letter that no more SWMUs or AOCs will be approved for NFA, under either industrial or recreational land use, unless the site also poses an insignificant risk to human health under the residential land use scenario.

In addition, in April 2003, the NMED requested that SNL/NM change its risk approach to include the dermal pathway for all land use scenarios and to eliminate the food ingestion pathway for the residential land use scenario.

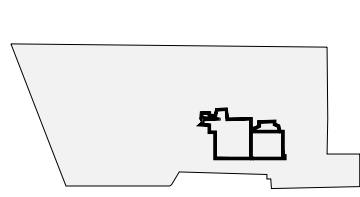
This report presents a short site history and additional risk assessment analysis of 16 SWMUs and 2 AOCs. Each of these sites has been proposed for NFA based upon industrial or recreational land use scenarios. This supplemental analysis evaluates each site using a residential scenario and is based upon guidance provided in NMED's "Technical Background Document for Development of Soil Screening Levels" (NMED December 2000). Appendix 1 contains the SNL/NM default exposure pathways and input parameters. For SWMUs and AOCs that exceeded NMED guidance risk levels, summary statistics (95% upper confidence level [UCL] of the mean) were calculated following standard EPA guidance (EPA 1992) for the chemicals that contributed the most to the overall risk.






Additional information containing more detailed descriptions of site location, site history, site characterization, Voluntary Corrective Measures (VCMs)/Voluntary Corrective Actions (VCAs) (if applicable), verification sampling events, and other related data are contained in the respective SWMU's NFA proposal, Request for Supplemental Information (RSI), or Notice of Deficiency (NOD) documents. Supplemental information for each SWMU is identified in Table 1-1.

This report is organized by Operable Unit (OU) in ascending order with SWMUs in ascending order within each OU.



Legend



-  SWMU
-  Major Road
-  KAFB Boundary
-  100 Foot Contour
-  SNL Technical Area

Sandia National Laboratories, New Mexico
Environmental Geographic Information System

Figure 1-1
Location of SNL/NM SWMUs
for Residential Risk Analysis
Albuquerque, NM

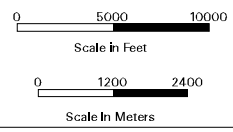


Table 1-1
Location of Supplemental Information for Each SNL/NM SWMU or AOC Proposed for NFA

OU Name	OU	SWMU/ AOC	NFA Date Submitted/ Batch No.	NOD or RSI Submittal Date	Comments
TA-I	1302	30	September 30, 2001/16	NA	
TA-I	1302	33	October 3, 1996/5	June 2001 September 10, 2001	The June 2001 response was not complete; the September 2001 response included results of additional sampling and risk assessment.
TA-I	1302	828	December 1996	June 2001 July 16, 2001 (SWMU Assessment Report)	PCB immunoassay data in letter of December 1996 indicated that SNL/NM did not consider this site a SWMU.
TA-II	1303	114	July 19, 1996/4	January 31, 2003	
TA-III/V	1306	18	Aug 11, 1997/8	October 1997 July 1998 June 2002	
TA-III/V	1306	26	June 1996	October 1997 July 1998 August 14, 2001	NFA originally proposed in the RFI report in June 1996.
TA-III/V	1306	35	June 1996	October 1997 July 1998 July 31, 2001	NFA originally proposed in the RFI report in June 1996.
TA-III/V	1306	107	June 1996	October 1997 July 1998 August 9, 2001	NFA originally proposed in the RFI report in June 1996.
TA-III/V	1306	241	June 1996	October 1997 July 1998 August 24, 2001	NFA originally proposed in the RFI report in June 1996.
Tijeras Arroyo	1309	230	August 28, 1995/2	December 2002	
Tijeras Arroyo	1309	231	August 28, 1995/2	December 2002	
Tijeras Arroyo	1309	232-1	August 11, 1997/8	December 2002	

Refer to footnotes at end of table.

Table 1-1 (Concluded)
Location of Supplemental Information for Each SNL/NM SWMU or AOC Proposed for NFA

OU Name	OU	SWMU/ AOC	NFA Date Submitted/ Batch No.	NOD or RSI Submittal Date	Comments
Tijeras Arroyo	1309	232-2	August 11, 1997/8	December 2002	
Foothills Test Area	1332	66	October 3, 1996/5	May 11, 1998	
Canyons Test Area	1333	94B	September 30, 2001/16	NA	
Canyons Test Area	1333	94F	September 30, 2001/16	NA	
Canyons Test Area	1333	94H	September 24, 2002/17	NA	
Central Coyote Test Area	1334	9	August 31, 1999/14	July 6, 1998	
Southwest Test Area	1335	TNT Site	September 24, 2002/17	NA	

AOC = Area of Concern.

NA = Not applicable.

NFA = No Further Action.

NOD = Notice of Deficiency.

OU = Operable Unit.

PCB = Polychlorinated biphenyl.

RCRA = Resource Conservation and Recovery Act.

RFI = RCRA Facility Investigation.

RSI = Request for Supplemental Information.

SNL/NM = Sandia National Laboratories/New Mexico.

SWMU = Solid Waste Management Unit.

TA = Technical Area.

TNT = 2,4,6-trinitrotoluene.

8.0 OU 1334

8.1 SWMU 9: Burial Site/Open Dump

8.1.1 Site Location and Operational History

SWMU 9, the Burial Site/Open Dump, is located in OU 1334, which is known as the Central Coyote Test Area (Figure 8.1.1-1). It occupies 1.86 acres of land permitted to the DOE and SNL/NM that is controlled by the USAF. SWMU 9 is an inactive site located on the north side of the KAFB Explosive Ordnance Disposal Range, approximately 1,800 feet east of the Schoolhouse Building (SWMU 61C) where an unnamed dirt road branches off to the north from Demolition Range Road and crosses an arroyo (Figure 8.1.1-1). SWMU 9 forms the southwest corner of adjacent SWMU 61A and encompasses features on the north and south arroyo banks as well as in the arroyo channel. The site is at an elevation of 5,845 feet amsl.

The original description of ER SWMU 9 included three "debris mounds" of which only the largest, Mound 1, was later determined to be a true soil-covered debris burial mound. Mound 1 was approximately 175 feet long and up to 8 feet high above the surrounding grade. The other two "mounds" were simply debris, dumped as either a discrete pile in the arroyo channel (Mound 2) or as debris scattered along the south bank of the arroyo channel (Mound 3). Mound 2 debris consisted of a tangled mass of barbed wire, empty paint cans, ceramic electrical insulators, mortar shell storage cases, a military bomb rack, vehicle parts, a shrapnel-riddled iron plate, pieces of wood and metal, and building rubble (cinder blocks and glazed masonry tiles). Mound 3 debris consisted of wooden crate remnants, empty paint cans, expended smoke grenades, an empty 55-gallon drum containing a grate that appears to have been used as a grill, and other miscellaneous solid waste.

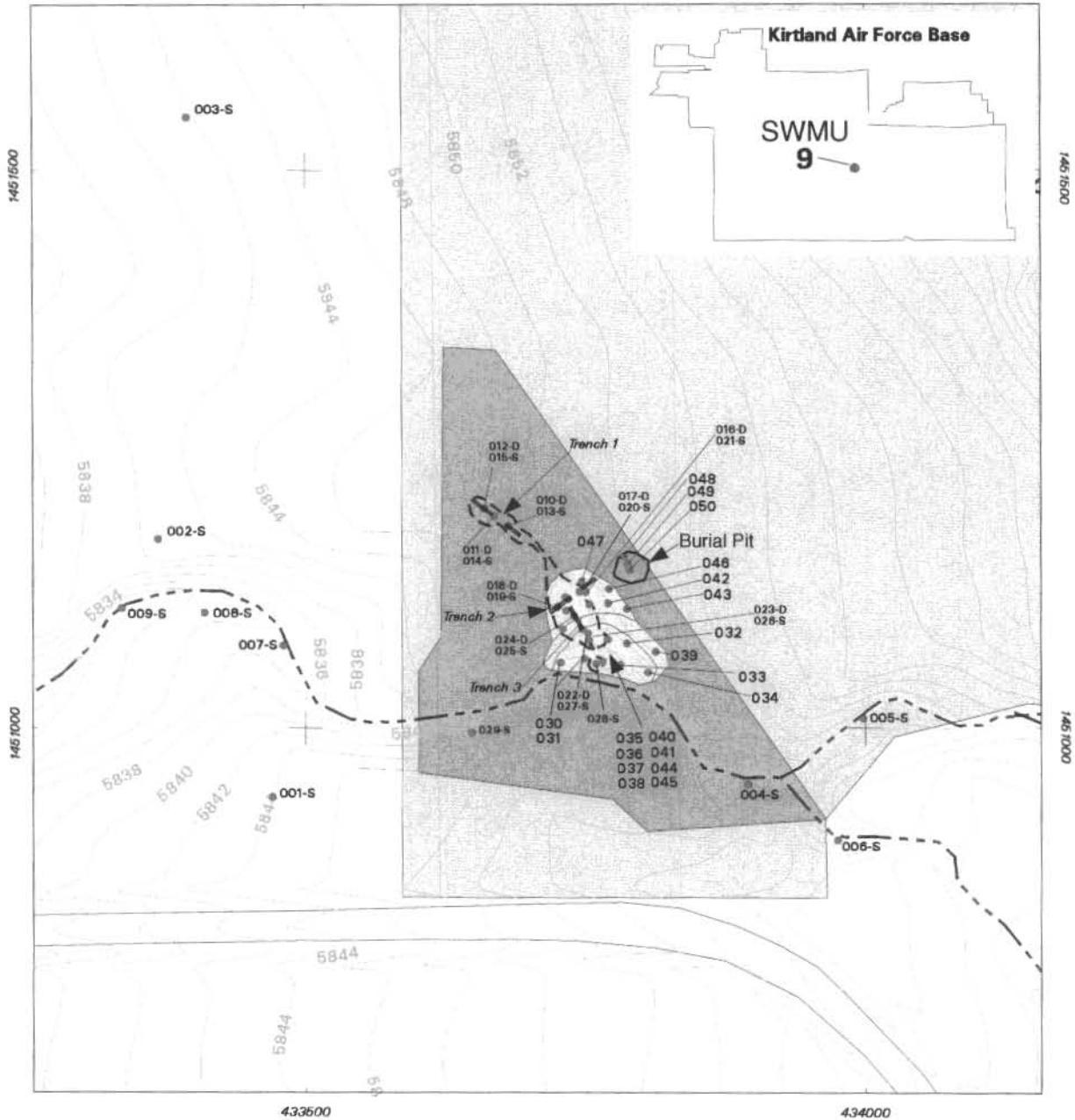
A burial pit containing radioactively contaminated materials was discovered during a VCM conducted at SWMU 9 between 1996 and 1998. The burial pit was located approximately 30 feet northeast of the south end of Mound 1 and measured 30 feet in diameter with debris buried to a depth of approximately 4 feet.

COCs included VOCs, SVOCs, HE compounds, and radionuclides.

8.1.2 Results of Risk Analysis

The initial risk assessment calculation was performed using maximum COC concentrations and the methods specified in NMED's "Technical Background Document for Development of Soil Screening Levels" (NMED December 2000). As shown in Table 8.1.2-1, the total human health HI (1.44) is higher than the NMED guidance value of 1 for the residential land use scenario. The total estimated excess cancer risk is $2E-5$ for the residential land use scenario. NMED guidance states that cumulative excess lifetime cancer risk must be less than $1E-5$ (Bearzi January 2001), thus the excess cancer risk for this site is slightly higher than the suggested acceptable risk value.

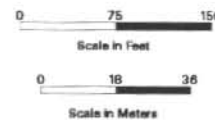
Although the HI and estimated excess cancer risk are both slightly higher than the NMED guidelines for the residential land use scenario, maximum COC concentrations were used in the



Legend

- Sample Location & Identification
- Trench
- Unpaved Road
- - - Surface Drainage
- - - Mound / Pit Outline
- - - 2-foot Contour
- SWMU 9
- Excavation
- SWMU 61A

Figure 8.1.1-1
RFI & VCM Soil Sampling
Locations at SWMU 9,
Burial Site / Open Dump



Sandia National Laboratories, New Mexico
Environmental Geographic Information System

Table 8.1.2-1
Human Health Risk Assessment Values for SWMU 9 Nonradiological COCs

COC	Maximum Concentration/ UCL (mg/kg)	Residential Land Use Scenario ^a (Maximum Concentrations)		Residential Land Use Scenario ^a (UCL Concentrations)	
		Hazard Index	Cancer Risk	Hazard Index	Cancer Risk
Inorganic					
Barium	209 J	0.04	--	0.04	--
Beryllium	0.653	0.00	6E-10	0.00	6E-10
Cadmium	2.78	0.07	2E-9	0.07	2E-9
Chromium, total ^b	28.4	0.13	1E-7	0.13	1E-7
Cobalt	8.61	0.01	9E-9	0.01	9E-9
Copper	536 J	0.19	--	0.19	--
Mercury	2.09	0.09	--	0.09	--
Nickel	14.9	0.01	--	0.01	--
Selenium	1.08	0.00	--	0.00	--
Silver	0.458 J	0.00	--	0.00	--
Thallium	0.111 ^c	0.02	--	0.02	--
Uranium	19.5 J	0.08	--	0.08	--
Vanadium	24.6	0.05	--	0.05	--
Zinc	354	0.02	--	0.02	--
Organic					
Acetone	0.013 J	0.00	--	0.00	--
Anthracene	1.1	0.00	--	0.00	--
Benzo(a)pyrene	0.12 J/0.04	0.00	2E-6	0.00	6E-7
Benzo(g,h,i)perylene ^e	0.13 J/0.05	0.00	2E-6	0.00	8E-7
Chloroform	0.00097 J	0.00	4E-9	0.00	4E-9
Chrysene	0.12 J	0.00	2E-9	0.00	2E-9
Ethylbenzene	0.00052 J	0.00	8E-11	0.00	8E-11
Methylene chloride	0.044	0.00	6E-7	0.00	6E-7
Pentachlorophenol	0.28 J	0.00	5E-8	0.00	5E-8
Toluene	0.0028	0.00	--	0.00	--
Trichloroethene	0.00058 J	0.00	1E-8	0.00	1E-8
Xylene ^f	0.0061	0.00	--	0.00	--
HE Compounds					
2-amino-4,6-Dinitrotoluene ^d	3.68/0.50	0.00	4E-6	0.00	5E-7
4-amino-2,6-Dinitrotoluene ^d	2.29/0.35	0.00	3E-6	0.00	4E-7
2,4-Dinitrotoluene	0.44	0.00	5E-7	0.00	5E-7
2,6-Dinitrotoluene	0.16	0.00	2E-7	0.00	2E-7
HMX	6.2 J	0.00	--	0.00	--
RDX	26 J/9.0	0.14	6E-6	0.05	2E-6
1,3,5-Trinitrobenzene	0.67	0.00	--	0.00	--
TNT	18/4.7	0.59	1E-6	0.15	3E-7
Total		1.44	2E-5	0.91	6E-6

Refer to footnotes at end of table.

Table 8.1.2-1 (Concluded)
Human Health Risk Assessment Values for SWMU 9 Nonradiological COCs

Note: UCLs are calculated only for risk drivers. UCL concentrations are in **bold**.

^aEPA 1989.

^bChromium, total assumed to be chromium VI (most conservative).

^cParameter was not detected. Concentration assumed to be one-half the detection limit.

^dToxicological parameter values are for dinitrotoluene, mixture.

^eToxicological parameter values are from dibenzo(a,h)anthracene.

^fToxicological parameter values are for xylene, mixture.

COC = Constituent of concern.

EPA = U.S. Environmental Protection Agency.

HMX = 1,3,5,7-tetranitro-1,3,5,7-tetrazacyclooctane.

J = Estimated concentration.

mg/kg = Milligram(s) per kilogram.

RDX = Cyclotrimethylenetrinitramine.

SWMU = Solid Waste Management Unit.

TNT = 2,4,6-trinitrotoluene.

UCL = Upper confidence limit.

-- = Information not available.

risk calculation. However, average concentrations are more representative of actual site conditions. When the 95% UCL of the average concentrations for the main contributors to the HI and excess cancer risk are used in the risk calculation (Appendix 2), the total HI and estimated excess cancer risk are reduced to 0.91 and 6E-6, respectively. The 95% UCL of the average concentrations used for the main risk drivers at this site are as follows:

- 2-amino-4,6-dinitrotoluene (0.50 mg/kg)
- 4-amino-2,6-dinitrotoluene (0.35 mg/kg)
- Benzo(a)pyrene (0.04 mg/kg)
- Benzo(g,h,i)perylene (0.05 mg/kg)
- RDX (9.0 mg/kg)
- TNT (4.7 mg/kg)

Thus, using realistic concentrations in the risk calculations that more accurately depict actual site conditions, both the total HI and estimated excess cancer risk are lower than NMED guidelines.

In conclusion, human health risk is within the acceptable range according to NMED guidance for the residential land use scenario.

10.0 REFERENCES

Bearzi, J.P. (New Mexico Environment Department), January 2001. Memorandum to RCRA-Regulated Facilities, "Risk-Based Screening Levels for RCRA Corrective Action Sites in New Mexico," Hazardous Waste Bureau, New Mexico Environment Department, Santa Fe, New Mexico. January 23, 2001.

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APPENDIX 1
Exposure Pathway Discussion for Chemical and Radionuclide Contamination
Sandia National Laboratories/New Mexico

APPENDIX 1

EXPOSURE PATHWAY DISCUSSION FOR CHEMICAL AND RADIONUCLIDE CONTAMINATION

Introduction

Sandia National Laboratories/New Mexico (SNL/NM) uses a default set of exposure routes and associated default parameter values developed for each future land-use designation being considered for SNL/NM Environmental Restoration (ER) Project sites. This default set of exposure scenarios and parameter values are invoked for risk assessments unless site-specific information suggests other parameter values. Because many SNL/NM solid waste management units (SWMUs) have similar types of contamination and physical settings, SNL/NM believes that the risk assessment analyses at these sites can be similar. A default set of exposure scenarios and parameter values facilitates the risk assessments and subsequent review.

The default exposure routes and parameter values used are those that SNL/NM views as resulting in a Reasonable Maximum Exposure (RME) value. Subject to comments and recommendations by the U.S. Environmental Protection Agency (EPA) Region VI and New Mexico Environment Department (NMED), SNL/NM will use these default exposure routes and parameter values in future risk assessments.

At SNL/NM, all SWMUs exist within the boundaries of the Kirtland Air Force Base. Approximately 240 potential waste and release sites have been identified where hazardous, radiological, or mixed materials may have been released to the environment. Evaluation and characterization activities have occurred at all of these sites to varying degrees. Among other documents, the SNL/NM ER draft Environmental Assessment (DOE 1996) presents a summary of the hydrogeology of the sites and the biological resources present. When evaluating potential human health risk the current or reasonably foreseeable land use negotiated and approved for the specific SWMU/AOC, aggregate, or watershed will be used. The following references generally document these land uses: Workbook: Future Use Management Area 2 (DOE et al. September 1995); Workbook: Future Use Management Area 1 (DOE et al. October 1995); Workbook: Future Use Management Areas 3, 4, 5, and 6 (DOE and USAF January 1996); Workbook: Future Use Management Area 7 (DOE and USAF March 1996). At this time, all SNL/NM SWMUs have been tentatively designated for either industrial or recreational future land use. The NMED has also requested that risk calculations be performed based upon a residential land-use scenario. Therefore, all three land-use scenarios will be addressed in this document.

The SNL/NM ER Project has screened the potential exposure routes and identified default parameter values to be used for calculating potential intake and subsequent hazard index (HI), excess cancer risk and dose values. The EPA (EPA 1989) provides a summary of exposure routes that could potentially be of significance at a specific waste site. These potential exposure routes consist of:

- Ingestion of contaminated drinking water
- Ingestion of contaminated soil

- Ingestion of contaminated fish and shellfish
- Ingestion of contaminated fruits and vegetables
- Ingestion of contaminated meat, eggs, and dairy products
- Ingestion of contaminated surface water while swimming
- Dermal contact with chemicals in water
- Dermal contact with chemicals in soil
- Inhalation of airborne compounds (vapor phase or particulate)
- External exposure to penetrating radiation (immersion in contaminated air; immersion in contaminated water; and exposure from ground surfaces with photon-emitting radionuclides)

Based upon the location of the SNL/NM SWMUs and the characteristics of the surface and subsurface at the sites, we have evaluated these potential exposure routes for different land-use scenarios to determine which should be considered in risk assessment analyses (the last exposure route is pertinent to radionuclides only). At SNL/NM SWMUs, there is currently no consumption of fish, shellfish, fruits, vegetables, meat, eggs, or dairy products that originate on site. Additionally, no potential for swimming in surface water is present due to the high-desert environmental conditions. As documented in the RESRAD computer code manual (ANL 1993), risks resulting from immersion in contaminated air or water are not significant compared to risks from other radiation exposure routes.

For the industrial and recreational land-use scenarios, SNL/NM ER has, therefore, excluded the following four potential exposure routes from further risk assessment evaluations at any SNL/NM SWMU:

- Ingestion of contaminated fish and shellfish
- Ingestion of contaminated fruits and vegetables
- Ingestion of contaminated meat, eggs, and dairy products
- Ingestion of contaminated surface water while swimming
- Dermal contact with chemicals in water

That part of the exposure pathway for radionuclides related to immersion in contaminated air or water is also eliminated.

Based upon this evaluation, for future risk assessments the exposure routes that will be considered are shown in Table 1.

Table 1
Exposure Pathways Considered for Various Land-Use Scenarios

Industrial	Recreational	Residential
Ingestion of contaminated drinking water	Ingestion of contaminated drinking water	Ingestion of contaminated drinking water
Ingestion of contaminated soil	Ingestion of contaminated soil	Ingestion of contaminated soil
Inhalation of airborne compounds (vapor phase or particulate)	Inhalation of airborne compounds (vapor phase or particulate)	Inhalation of airborne compounds (vapor phase or particulate)
Dermal contact (nonradiological constituents only) soil only	Dermal contact (nonradiological constituents only) soil only	Dermal contact (nonradiological constituents only) soil only
External exposure to penetrating radiation from ground surfaces	External exposure to penetrating radiation from ground surfaces	External exposure to penetrating radiation from ground surfaces

Equations and Default Parameter Values for Identified Exposure Routes

In general, SNL/NM expects that ingestion of compounds in drinking water and soil will be the more significant exposure routes for chemicals; external exposure to radiation may also be significant for radionuclides. All of the above routes will, however, be considered for their appropriate land-use scenarios. The general equation for calculating potential intakes via these routes is shown below. The equations are taken from "Assessing Human Health Risks Posed by Chemicals: Screening-Level Risk Assessment" (NMED March 2000) and "Technical Background Document for Development of Soil Screening Levels" (NMED December 2000). Equations from both documents are based upon the "Risk Assessment Guidance for Superfund" (RAGS): Volume 1 (EPA 1989, 1991). These general equations also apply to calculating potential intakes for radionuclides. A more in-depth discussion of the equations used in performing radiological pathway analyses with the RESRAD code may be found in the RESRAD Manual (ANL 1993). RESRAD is the only code designated by the U.S. Department of Energy (DOE) in DOE Order 5400.5 for the evaluation of radioactively contaminated sites (DOE 1993). The Nuclear Regulatory Commission (NRC) has approved the use of RESRAD for dose evaluation by licensees involved in decommissioning, NRC staff evaluation of waste disposal requests, and dose evaluation of sites being reviewed by NRC staff. EPA Science Advisory Board reviewed the RESRAD model. EPA used RESRAD in their rulemaking on radiation site cleanup regulations. RESRAD code has been verified, undergone several benchmarking analyses, and been included in the International Atomic Energy Agency's VAMP and BIOMOV5 II projects to compare environmental transport models.

Also shown are the default values SNL/NM ER will use in RME risk assessment calculations for industrial, recreational, and residential land-use scenarios, based upon EPA and other governmental agency guidance. The pathways and values for chemical contaminants are discussed first, followed by those for radionuclide contaminants. RESRAD input parameters that are left as the default values provided with the code are not discussed. Further information relating to these parameters may be found in the RESRAD Manual (ANL 1993) or by directly accessing the RESRAD websites at: <http://web.ead.anl.gov/resrad/home2/> or <http://web.ead.anl.gov/resrad/documents/>.

Generic Equation for Calculation of Risk Parameter Values

The equation used to calculate the risk parameter values (i.e., hazard quotients/HI, excess cancer risk, or radiation total effective dose equivalent [TEDE] [dose]) is similar for all exposure pathways and is given by:

Risk (or Dose) = Intake x Toxicity Effect (either carcinogenic, noncarcinogenic, or radiological)

where;

C = contaminant concentration (site specific)
CR = contact rate for the exposure pathway
EFD = exposure frequency and duration
BW = body weight of average exposure individual
AT = time over which exposure is averaged.

For nonradiological constituents of concern (COCs), the total risk/dose (either cancer risk or HI) is the sum of the risks/doses for all of the site-specific exposure pathways and contaminants. For radionuclides, the calculated radiation exposure, expressed as TEDE is compared directly to the exposure guidelines of 15 millirem per year (mrem/year) for industrial and recreational future use and 75 mrem/year for the unlikely event that institutional control of the site is lost and the site is used for residential purposes (EPA 1997).

The evaluation of the carcinogenic health hazard produces a quantitative estimate for excess cancer risk resulting from the COCs present at the site. This estimate is evaluated for determination of further action by comparison of the quantitative estimate with the potentially acceptable risk of 1E-5 for nonradiological carcinogens. The evaluation of the noncarcinogenic health hazard produces a quantitative estimate (i.e., the HI) for the toxicity resulting from the COCs present at the site. This estimate is evaluated for determination of further action by comparison of this quantitative estimate with the EPA standard HI of unity (1). The evaluation of the health hazard from radioactive compounds produces a quantitative estimate of doses resulting from the COCs present at the site. This estimated dose is used to calculate an assumed risk. However, this calculated risk is presented for illustration purposes only, not to determine compliance with regulations.

The specific equations used for the individual exposure pathways can be found in RAGS (EPA 1989) and are outlined below. The RESRAD Manual (ANL 1993) describes similar equations for the calculation of radiological exposures.

Soil Ingestion

A receptor can ingest soil or dust directly by working in the contaminated soil. Indirect ingestion can occur from sources such as unwashed hands introducing contaminated soil to food that is then eaten. An estimate of intake from ingesting soil will be calculated as follows:

$$I_s = \frac{C_s * IR * CF * EF * ED}{BW * AT}$$

where:

- I_s = Intake of contaminant from soil ingestion (milligrams [mg]/kilogram [kg]-day)
- C_s = Chemical concentration in soil (mg/kg)
- IR = Ingestion rate (mg soil/day)
- CF = Conversion factor (1E-6 kg/mg)
- EF = Exposure frequency (days/year)
- ED = Exposure duration (years)
- BW = Body weight (kg)
- AT = Averaging time (period over which exposure is averaged) (days)

It should be noted that it is conservatively assumed that the receptor only ingests soil from the contaminated source.

Soil Inhalation

A receptor can inhale soil or dust directly by working in the contaminated soil. An estimate of intake from inhaling soil will be calculated as follows (EPA August 1997):

$$I_s = \frac{C_s * IR * EF * ED * \left(\frac{1}{VF} \text{ or } \frac{1}{PEF} \right)}{BW * AT}$$

where:

- I_s = Intake of contaminant from soil inhalation (mg/kg-day)
- C_s = Chemical concentration in soil (mg/kg)
- IR = Inhalation rate (cubic meters [m³]/day)
- EF = Exposure frequency (days/year)
- ED = Exposure duration (years)
- VF = soil-to-air volatilization factor (m³/kg)
- PEF = particulate emission factor (m³/kg)
- BW = Body weight (kg)
- AT = Averaging time (period over which exposure is averaged) (days)

Soil Dermal Contact

$$D_a = \frac{C_s * CF * SA * AF * ABS * EF * ED}{BW * AT}$$

where:

- D_a = Absorbed dose (mg/kg-day)
- C_s = Chemical concentration in soil (mg/kg)
- CF = Conversion factor (1E-6 kg/mg)
- SA = Skin surface area available for contact (cm²/event)
- AF = Soil to skin adherence factor (mg/cm²)
- ABS = Absorption factor (unitless)
- EF = Exposure frequency (events/year)

- ED = Exposure duration (years)
 BW = Body weight (kg)
 AT = Averaging time (period over which exposure is averaged) (days)

Groundwater Ingestion

A receptor can ingest water by drinking it or through using household water for cooking. An estimate of intake from ingesting water will be calculated as follows (EPA August 1997):

$$I_w = \frac{C_w * IR * EF * ED}{BW * AT}$$

where:

- I_w = Intake of contaminant from water ingestion (mg/kg/day)
 C_w = Chemical concentration in water (mg/liter [L])
 IR = Ingestion rate (L/day)
 EF = Exposure frequency (days/year)
 ED = Exposure duration (years)
 BW = Body weight (kg)
 AT = Averaging time (period over which exposure is averaged) (days)

Groundwater Inhalation

The amount of a constituent taken into the body via exposure to volatilization from showering or other household water uses will be evaluated using the concentration of the constituent in the water source (EPA 1991 and 1992). An estimate of intake from volatile inhalation from groundwater will be calculated as follows (EPA 1991):

$$I_w = \frac{C_w * K * IR_i * EF * ED}{BW * AT}$$

where:

- I_w = Intake of volatile in water from inhalation (mg/kg/day)
 C_w = Chemical concentration in water (mg/L)
 K = volatilization factor (0.5 L/m³)
 IR_i = Inhalation rate (m³/day)
 EF = Exposure frequency (days/year)
 ED = Exposure duration (years)
 BW = Body weight (kg)
 AT = Averaging time (period over which exposure is averaged—days)

For volatile compounds, volatilization from groundwater can be an important exposure pathway from showering and other household uses of groundwater. This exposure pathway will only be evaluated for organic chemicals with a Henry's Law constant greater than 1x10⁻⁵ and with a molecular weight of 200 grams/mole or less (EPA 1991).

Tables 2 and 3 show the default parameter values suggested for use by SNL/NM at SWMUs, based upon the selected land-use scenarios for nonradiological and radiological COCs,

respectively. References are given at the end of the table indicating the source for the chosen parameter values. SNL/NM uses default values that are consistent with both regulatory guidance and the RME approach. Therefore, the values chosen will, in general, provide a conservative estimate of the actual risk parameter. These parameter values are suggested for use for the various exposure pathways, based upon the assumption that a particular site has no unusual characteristics that contradict the default assumptions. For sites for which the assumptions are not valid, the parameter values will be modified and documented.

Summary

SNL/NM will use the described default exposure routes and parameter values in risk assessments at sites that have an industrial, recreational, or residential future land-use scenario. There are no current residential land-use designations at SNL/NM ER sites, but NMED has requested this scenario to be considered to provide perspective of the risk under the more restrictive land-use scenario. For sites designated as industrial or recreational land use, SNL/NM will provide risk parameter values based upon a residential land-use scenario to indicate the effects of data uncertainty on risk value calculations or in order to potentially mitigate the need for institutional controls or restrictions on SNL/NM ER sites. The parameter values are based upon EPA guidance and supplemented by information from other government sources. If these exposure routes and parameters are acceptable, SNL/NM will use them in risk assessments for all sites where the assumptions are consistent with site-specific conditions. All deviations will be documented.

Table 2

Default Nonradiological Exposure Parameter Values for Various Land-Use Scenarios

Parameter	Industrial	Recreational	Residential
General Exposure Parameters			
Exposure Frequency (day/yr)	250 ^{a,b}	8.7 (4 hr/wk for 52 wk/yr) ^{a,b}	350 ^{a,b}
Exposure Duration (yr)	25 ^{a,b,c}	30 ^{a,b,c}	30 ^{a,b,c}
Body Weight (kg)	70 ^{a,b,c}	70 Adult ^{a,b,c} 15 Child ^{a,b,c}	70 Adult ^{a,b,c} 15 Child ^{a,b,c}
Averaging Time (days) for Carcinogenic Compounds (= 70 yr x 365 day/yr)	25,550 ^{a,b}	25,550 ^{a,b}	25,550 ^{a,b}
for Noncarcinogenic Compounds (= ED x 365 day/yr)	9,125 ^{a,b}	10,950 ^{a,b}	10,950 ^{a,b}
Soil Ingestion Pathway			
Ingestion Rate (mg/day)	100 ^{a,b}	200 Child ^{a,b} 100 Adult ^{a,b}	200 Child ^{a,b} 100 Adult ^{a,b}
Inhalation Pathway			
Inhalation Rate (m ³ /day)	20 ^{a,b}	15 Child ^a 30 Adult ^a	10 Child ^a 20 Adult ^a
Volatilization Factor (m ³ /kg)	Chemical Specific	Chemical Specific	Chemical Specific
Particulate Emission Factor (m ³ /kg)	1.36E9 ^a	1.36E9 ^a	1.36E9 ^a
Water Ingestion Pathway			
Ingestion Rate (liter/day)	2.4 ^a	2.4 ^a	2.4 ^a
Dermal Pathway			
Skin Adherence Factor (mg/cm ²)	0.2 ^a	0.2 Child ^a 0.07 Adult ^a	0.2 Child ^a 0.07 Adult ^a
Exposed Surface Area for Soil/Dust (cm ² /day)	3,300 ^a	2,800 Child ^a 5,700 Adult ^a	2,800 Child ^a 5,700 Adult ^a
Skin Adsorption Factor	Chemical Specific	Chemical Specific	Chemical Specific

^aTechnical Background Document for Development of Soil Screening Levels (NMED December 2000).

^bRisk Assessment Guidance for Superfund, Vol. 1, Part B (EPA 1991).

^cExposure Factors Handbook (EPA August 1997).

ED = Exposure duration.

EPA = U.S. Environmental Protection Agency.

hr = Hour(s).

kg = Kilogram(s).

m = Meter(s).

mg = Milligram(s).

NA = Not available.

wk = Week(s).

yr = Year(s).

Table 3
Default Radiological Exposure Parameter Values for Various Land-Use Scenarios

Parameter	Industrial	Recreational	Residential
General Exposure Parameters			
Exposure Frequency	8 hr/day for 250 day/yr	4 hr/wk for 52 wk/yr	365 day/yr
Exposure Duration (yr)	25 ^{a,b}	30 ^{a,b}	30 ^{a,b}
Body Weight (kg)	70 Adult ^{a,b}	70 Adult ^{a,b}	70 Adult ^{a,b}
Soil Ingestion Pathway			
Ingestion Rate	100 mg/day ^c	100 mg/day ^c	100 mg/day ^c
Averaging Time (days) (= 30 yr x 365 day/yr)	10,950 ^d	10,950 ^d	10,950 ^d
Inhalation Pathway			
Inhalation Rate (m ³ /yr)	7,300 ^{d,e}	10,950 ^e	7,300 ^{d,e}
Mass Loading for Inhalation g/m ³	1.36 E-5 ^d	1.36 E-5 ^d	1.36 E-5 ^d
Food Ingestion Pathway			
Ingestion Rate, Leafy Vegetables (kg/yr)	NA	NA	16.5 ^c
Ingestion Rate, Fruits, Non-Leafy Vegetables & Grain (kg/yr)	NA	NA	101.8 ^b
Fraction Ingested	NA	NA	0.25 ^{b,d}

^aRisk Assessment Guidance for Superfund, Vol. 1, Part B (EPA 1991).

^bExposure Factors Handbook (EPA August 1997).

^cEPA Region VI guidance (EPA 1996).

^dFor radionuclides, RESRAD (ANL 1993).

^eSNL/NM (February 1998).

EPA = U.S. Environmental Protection Agency.

g = Gram(s)

hr = Hour(s).

kg = Kilogram(s).

m = Meter(s).

mg = Milligram(s).

NA = Not applicable.

wk = Week(s).

yr = Year(s).

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APPENDIX 2
Calculation of the Upper 95% Confidence Limits of
Mean Concentrations

APPENDIX 2 CALCULATION OF THE UPPER 95% CONFIDENCE LIMITS OF MEAN CONCENTRATIONS

For conservatism, Sandia National Laboratories/New Mexico uses the maximum concentration of the constituents of concern (COCs) for initial risk calculation. If the maximum concentrations produce risk above New Mexico Environment Department (NMED) guidelines, conservatism with this approach is evaluated and, if appropriate, a more realistic approach is applied. When the site has been adequately characterized, an estimate of the mean concentration of the COCs is more representative of actual site conditions. The NMED has proposed the use of the 95% upper confidence limit (UCL) of the mean to represent average concentrations at a site (NMED December 2000). The 95% UCL is calculated according to NMED guidance (Tharp June 2002) using the U.S. Environmental Protection Agency ProUCL program (EPA April 2002). Attached are the outputs from that program and the calculated UCLs used in the risk analysis.

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SWMU 30

SWMU 30:	
Summary Statistics for Antimony	
Number of Samples	204
Minimum	0.592
Maximum	5.8
Mean	1.19702
Median	1.05
Standard Deviation	0.674566
Variance	0.455039
Coefficient of Variation	0.563538
Skewness	5.207189
Lilliefors Test Statistic 0.522539	
Lilliefors 5% Critical Value 0.062032	
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95% UCL (Assuming Normal Data)	
Student's-t	1.275061
95% UCL (Adjusted for Skewness)	
Adjusted-CLT	1.293103
Modified-t	1.27793
95% Non-parametric UCL	
CLT	1.274704
Jackknife	1.275061
Standard Bootstrap	1.274023
Bootstrap-t	1.301275
Chebyshev (Mean, Std)	1.402886

General Statistics

SWMU 30	
Summary Statistics for Arsenic	
Number of Samples	217
Minimum	1.3
Maximum	8.4
Mean	4.002535
Median	3.9
Standard Deviation	1.22699
Variance	1.505505
Coefficient of Variation	0.306553
Skewness	0.907574
Lilliefors Test Statistic 0.108883	
Lilliefors 5% Critical Value 0.060146	
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
97.5% UCL (Assuming Normal Data)	
Student's-t	4.166707
97.5% UCL (Adjusted for Skewness)	
Adjusted-CLT	4.173213
Modified-t	4.167562
97.5% Non-parametric UCL	
CLT	4.165787
Jackknife	4.166707
Standard Bootstrap	4.160514
Bootstrap-t	4.16847
Chebyshev (Mean, Std)	4.522702

General Statistics

SWMU 30				
Summary Statistics for		Barium	Summary Statistics for	ln(Barium)
Number of Samples		217	Minimum	4.356709
Minimum		78	Maximum	6.927558
Maximum		1020	Mean	5.199119
Mean		199.659	Standard Deviation	0.421616
Median		179	Variance	0.17776
Standard Deviation		105.0009	Lilliefors Test Statistic	0.050666
Variance		11025.2	Lilliefors 5% Critical Value	0.060146
Coefficient of Variation		0.525901	Data are Lognormal at 5% Significance Level	
Skewness		3.144076		
95% UCL (Assuming Normal Data)			Estimates Assuming Lognormal Distribution	
Student's-t		211.4339	MLE Mean	197.947
95% UCL (Adjusted for Skewness)			MLE Standard Deviation	87.30759
Adjusted-CLT		213.009	MLE Coefficient of Variation	0.441065
Modified-t		211.6874	MLE Skewness	1.409001
95% Non-parametric UCL			MLE Median	181.1127
CLT		211.3834	MLE 80% Quantile	258.6265
Jackknife		211.4339	MLE 90% Quantile	311.3433
Standard Bootstrap		211.2211	MLE 95% Quantile	362.3743
Bootstrap-t		213.794	MLE 99% Quantile	482.8946
Chebyshev (Mean, Std)		230.7289	MVU Estimate of Median	181.0385
			MVU Estimate of Mean	197.8589
			MVU Estimate of Std. Dev.	87.11469
			MVU Estimate of SE of Mean	5.899481
			UCL Assuming Lognormal Distribution	
			95% H-UCL	208.2126
			95% Chebyshev (MVUE) UCL	223.5741
			99% Chebyshev (MVUE) UCL	256.558
			Recommended UCL to use:	
			Student's-t or H-UCL	

General Statistics

SWMU 30	
Summary Statistics for Cadmium	
Number of Samples	216
Minimum	0.038
Maximum	26
Mean	0.577157
Median	0.05
Standard Deviation	2.125555
Variance	4.517985
Coefficient of Variation	3.6828
Skewness	9.07822
Lilliefors Test Statistic	0.399881
Lilliefors 5% Critical Value	0.060285
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
99% UCL (Assuming Normal Data)	
Student's-t	0.916134
99% UCL (Adjusted for Skewness)	
Adjusted-CLT	1.089653
Modified-t	0.931023
99% Non-parametric UCL	
CLT	0.913607
Jackknife	0.916134
Standard Bootstrap	0.920487
Bootstrap-t	1.443623
Chebyshev (Mean, Std)	2.016165

General Statistics

SWMU 30	
Summary Statistics for Chromium	
Number of Samples	217
Minimum	1.9
Maximum	35.3
Mean	6.657604
Median	6.3
Standard Deviation	3.184934
Variance	10.1438
Coefficient of Variation	0.47839
Skewness	4.020673
Lilliefors Test Statistic	0.16202
Lilliefors 5% Critical Value	0.060146
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
99% UCL (Assuming Normal Data)	
Student's-t	7.164337
99% UCL (Adjusted for Skewness)	
Adjusted-CLT	7.276868
Modified-t	7.174172
99% Non-parametric UCL	
CLT	7.160577
Jackknife	7.164337
Standard Bootstrap	7.147358
Bootstrap-t	7.305035
Chebyshev (Mean, Std)	8.80884

General Statistics

SWMU 30:	
Summary Statistics for Copper	
Number of Samples	217
Minimum	2.7
Maximum	1080
Mean	27.84719
Median	8
Standard Deviation	106.352
Variance	11310.75
Coefficient of Variation	3.819129
Skewness	7.75972
Lilliefors Test Statistic 0.407154	
Lilliefors 5% Critical Value 0.060146	
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
99:% UCL (Assuming Normal Data)	
Student's-t	44.76812
99:% UCL (Adjusted for Skewness)	
Adjusted-CLT	52.13701
Modified-t	45.40197
99:% Non-parametric UCL	
CLT	44.6426
Jackknife	44.76812
Standard Bootstrap	45.00691
Bootstrap-t	107.3865
Chebyshev (Mean, Std)	99.68175

General Statistics

SWMU 30	
Summary Statistics for Thallium	
Number of Samples	217
Minimum	0.1025
Maximum	1.8
Mean	0.63735
Median	0.5
Standard Deviation	0.299855
Variance	0.089913
Coefficient of Variation	0.470472
Skewness	0.990108
Lilliefors Test Statistic 0.340138	
Lilliefors 5% Critical Value 0.060146	
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95% UCL (Assuming Normal Data)	
Student's-t	0.670976
95% UCL (Adjusted for Skewness)	
Adjusted-CLT	0.672294
Modified-t	0.671204
95% Non-parametric UCL	
CLT	0.670832
Jackknife	0.670976
Standard Bootstrap	0.670844
Bootstrap-t	0.672638
Chebyshev (Mean, Std)	0.726078

General Statistics

SWMU 30:	
Summary Statistics for Benzo(a)anthracene	
Number of Samples	203
Minimum	0.0105
Maximum	1.8
Mean	0.03954433498
Median	0.0105
Standard Deviation	0.1691337364
Variance	0.0286062208
Coefficient of Variation	4.277066147
Skewness	9.600429941
Lilliefors Test Statistic	0.4318272266
Lilliefors 5% Critical Value	0.0621850092
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95% UCL (Assuming Normal Data)	
Student's-t	0.0591601219
95% UCL (Adjusted for Skewness)	
Adjusted-CLT	0.06761699862
Modified-t	0.06049325538
95% Non-parametric UCL	
CLT	0.05907016396
Jackknife	0.0591601219
Standard Bootstrap	0.05903257542
Bootstrap-t	0.1467307946
Chebyshev (Mean, Std)	0.09128821899

General Statistics

SWMU 30	
Summary Statistics for Benzo(a)pyrene	
Number of Samples	203
Minimum	0.0105
Maximum	1.4
Mean	0.03557881773
Median	0.0105
Standard Deviation	0.1393922228
Variance	0.01943019178
Coefficient of Variation	3.917843022
Skewness	9.421068241
Lilliefors Test Statistic	0.4286094696
Lilliefors 5% Critical Value	0.0621850092
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95% UCL (Assuming Normal Data)	
Student's-t	0.05174524437
95% UCL (Adjusted for Skewness)	
Adjusted-CLT	0.058583413
Modified-t	0.0528234247
95% Non-parametric UCL	
CLT	0.05167110519
Jackknife	0.05174524437
Standard Bootstrap	0.05196916335
Bootstrap-t	0.1148218532
Chebyshev (Mean, Std)	0.0782237398

General Statistics

SWMU 30:	
Summary Statistics for Benzo(b)fluoranthene	
Number of Samples	203
Minimum	0.023
Maximum	2.2
Mean	0.06532019704
Median	0.048
Standard Deviation	0.1651837589
Variance	0.02728567419
Coefficient of Variation	2.528831301
Skewness	11.16394414
Lilliefors Test Statistic	
	0.4235276709
Lilliefors 5% Critical Value	
	0.0621850092
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95% UCL (Assuming Normal Data)	
Student's-t	0.0844778736
95% UCL (Adjusted for Skewness)	
Adjusted-CLT	0.09409666668
Modified-t	0.08599191486
95% Non-parametric UCL	
CLT	0.08439001656
Jackknife	0.0844778736
Standard Bootstrap	0.08404098284
Bootstrap-t	0.1178602954
Chebyshev (Mean, Std)	0.1158556457

General Statistics

SWMU 30:	
Summary Statistics for	Benzo(ghi)perylene
Number of Samples	203
Minimum	0.038
Maximum	1.125
Mean	0.1176403941
Median	0.1125
Standard Deviation	0.1628316608
Variance	0.02651414975
Coefficient of Variation	1.384147529
Skewness	5.347718539
Lilliefors Test Statistic	0.4633309945
Lilliefors 5% Critical Value	0.0621850092
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95% UCL (Assuming Normal Data)	
Student's-t	0.1365252791
95% UCL (Adjusted for Skewness)	
Adjusted-CLT	0.1410221154
Modified-t	0.1372402035
95% Non-parametric UCL	
CLT	0.1364386731
Jackknife	0.1365252791
Standard Bootstrap	0.136196107
Bootstrap-t	0.1466069039
Chebyshev (Mean, Std)	0.1674562543

General Statistics

SMMU 30	
Summary Statistics for Dibenz[a,h]anthracene	
Number of Samples	203
Minimum	0.012
Maximum	0.31
Mean	0.01787684729
Median	0.012
Standard Deviation	0.02480437533
Variance	0.0006152570356
Coefficient of Variation	1.387513969
Skewness	9.236559483
Lilliefors Test Statistic	0.4407174179
Lilliefors 5% Critical Value	0.0621850092
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95% UCL (Assuming Normal Data)	
Student's-t	0.02075360832
95% UCL (Adjusted for Skewness)	
Adjusted-CLT	0.02194634773
Modified-t	0.02094170937
95% Non-parametric UCL	
CLT	0.0207404155
Jackknife	0.02075360832
Standard Bootstrap	0.02076194131
Bootstrap-t	0.02450798073
Chebyshev (Mean, Std)	0.02546536716

General Statistics

SWMU 30	
Summary Statistics for	Indeno(1,2,3-c,d)pyrene
Number of Samples	203
Minimum	0.011
Maximum	0.77
Mean	0.02982512315
Median	0.011
Standard Deviation	0.07208069398
Variance	0.005195626445
Coefficient of Variation	2.416777749
Skewness	8.831107245
Lilliefors Test Statistic	0.396981787
Lilliefors 5% Critical Value	0.0621850092
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95% UCL (Assuming Normal Data)	
Student's-t	0.03818489551
95% UCL (Adjusted for Skewness)	
Adjusted-CLT	0.04149712607
Modified-t	0.03870751648
95% Non-parametric UCL	
CLT	0.03814655762
Jackknife	0.03818489551
Standard Bootstrap	0.03804524108
Bootstrap-t	0.05624577682
Chebyshev (Mean, Std)	0.05187711082

SWMU 30	
Summary Statistics for Phenanthrene	
Number of Samples	203
Minimum	0.0115
Maximum	2.6
Mean	0.04084482759
Median	0.0115
Standard Deviation	0.2026506146
Variance	0.04106727159
Coefficient of Variation	4.961475579
Skewness	11.05978798
Lilliefors Test Statistic	0.4424323824
Lilliefors 5% Critical Value	0.0621850092
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95% UCL (Assuming Normal Data)	
Student's-t	0.0643478339
95% UCL (Adjusted for Skewness)	
Adjusted-CLT	0.07603725356
Modified-t	0.06618795938
95% Non-parametric UCL	
CLT	0.06424004919
Jackknife	0.0643478339
Standard Bootstrap	0.06453160258
Bootstrap-t	0.1529764859
Chebyshev (Mean, Std)	0.1028426887

SWMU 33

General Statistics

SWMU 33	
Summary Statistics for	Arsenic
Number of Samples	44
Minimum	0.84
Maximum	4.8
Mean	2.489545
Median	2.4
Standard Deviation	0.955654
Variance	0.913274
Coefficient of Variation	0.383867
Skewness	0.56107
Shapiro-Wilk Test Statistic	0.958688
Shapiro-Wilk 5% Critical Value	0.944
Data are Normal at 5% Significance Level	
Recommended UCL to use	Student's-t
95% UCL (Assuming Normal Data)	
Student's-t	2.731738
95% UCL (Adjusted for Skewness)	
Adjusted-CLT	2.739541
Modified-t	2.733769
95% Non-parametric UCL	
CLT	2.72652
Jackknife	2.731738
Standard Bootstrap	2.722356
Bootstrap-t	2.741929
Chebyshev (Mean, Std)	3.117533

SWMU 114

SWMU 114		
Summary Statistics for		arsenic
Number of Samples		415
Minimum		0.05
Maximum		4.8
Mean		2.044892
Median		1.9
Standard Deviation		0.879985
Variance		0.774373
Coefficient of Variation		0.430333
Skewness		0.558008
Lilliefors Test Statistic		0.089123
Lilliefors 5% Critical Value		0.043492
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
95 % UCL (Assuming Normal Data)		
Student's-t		2.116103
95 % UCL (Adjusted for Skewness)		
Adjusted-CLT		2.117208
Modified-t		2.1163
95 % Non-parametric UCL		
CLT		2.115944
Jackknife		2.116103
Standard Bootstrap		2.115682
Bootstrap-t		2.116594
Chebyshev (Mean, Std)		2.233182

SWMU 18

General Statistics

SWMU 18:			
Summary Statistics for		cadmium	Summary Statistics for
Number of Samples		34	In(cadmiur
Minimum		0.007	Minimum
Maximum		18.9	Maximum
Mean		2.276644	Mean
Median		0.25	Standard Deviation
Standard Deviation		5.031886	Variance
Variance		25.31988	Shapiro-Wilk Test Statistic
Coefficient of Variation		2.210221	Shapiro-Wilk 5% Critical Value
Skewness		2.637362	Data are Lognormal at 5% Significance Leve
95% UCL (Assuming Normal Data)			Estimates Assuming Lognormal Distribution
Student's-t		3.737085	MLE Mean
95% UCL (Adjusted for Skewness)			MLE Standard Deviation
Adjusted-CLT		4.113153	MLE Coefficient of Variation
Modified-t		3.802139	MLE Skewness
95% Non-parametric UCL			MLE Median
CLT		3.696089	MLE 80% Quantile
Jackknife		3.737085	MLE 90% Quantile
Standard Bootstrap		3.646522	MLE 95% Quantile
Bootstrap-t		4.531744	MLE 99% Quantile
Chebyshev (Mean, Std)		6.038205	MVU Estimate of Median
			MVU Estimate of Mean
			MVU Estimate of Std. Dev.
			MVU Estimate of SE of Mean
			UCL Assuming Lognormal Distribution
			95% H-UCL
			95% Chebyshev (MVUE) UCL
			99% Chebyshev (MVUE) UCL
			Recommended UCL to use:
			95 % Chebyshev (MVUE) UCL

General Statistics

SWMU 18	
Summary Statistics for	benzo(a)pyrene
Number of Samples	22
Minimum	0.001
Maximum	0.289
Mean	0.01409090909
Median	0.001
Standard Deviation	0.06140180631
Variance	0.003770181818
Coefficient of Variation	4.357547545
Skewness	4.69041576
Shapiro-Wilk Test Statistic	0.2207134286
Shapiro-Wilk 5% Critical Value	0.911
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95 % UCL (Assuming Normal Data)	
Student's-t	0.03661699432
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	0.0496113644
Modified-t	0.0387988125
95 % Non-parametric UCL	
CLT	0.0356235384
Jackknife	0.03661699432
Standard Bootstrap	0.03470468779
Bootstrap-t	-1.#QNAN
Chebyshev (Mean, Std)	0.0711528589

SWMU 241

General Statistics

SWMU 241					
Summary Statistics for		Antimony		Summary Statistics for	
Number of Samples		8		Minimum	
Minimum		2.32		Maximum	
Maximum		29.6		Mean	
Mean		8.2525		Standard Deviation	
Median		5		Variance	
Standard Deviation		9.083127		Shapiro-Wilk Test Statistic	
Variance		82.50319		Shapiro-Wilk 5% Critical Value	
Coefficient of Variation		1.100652		Data are Lognormal at 5% Significance Level	
Skewness		2.345822			
95% UCL (Assuming Normal Data)				Estimates Assuming Lognormal Distribution	
Student's-t		14.33669		MLE Mean	
				MLE Standard Deviation	
95% UCL (Adjusted for Skewness)				MLE Coefficient of Variation	
Adjusted-CLT		16.38064		MLE Skewness	
Modified-t		14.7806		MLE Median	
				MLE 80% Quantile	
95% Non-parametric UCL				MLE 90% Quantile	
CLT		13.53473		MLE 95% Quantile	
Jackknife		14.33669		MLE 99% Quantile	
Standard Bootstrap		13.21739			
Bootstrap-t		38.05266		MVU Estimate of Median	
Chebyshev (Mean, Std)		22.25054		MVU Estimate of Mean	
				MVU Estimate of Std. Dev.	
				MVU Estimate of SE of Mean	
				UCL Assuming Lognormal Distribution	
				95% H-UCL	
				95% Chebyshev (MVUE) UCL	
				99% Chebyshev (MVUE) UCL	
				Recommended UCL to use:	
				H-UCL	

SWMU 230

General Statistics

SWMU 230			
Summary Statistics for		arsenic	Summary Statistics for
Number of Samples		14	ln(arsenic)
Minimum		1.3	Minimum
Maximum		6.6	Maximum
Mean		2.504286	Mean
Median		2.15	Standard Deviation
Standard Deviation		1.307197	Variance
Variance		1.708765	Shapiro-Wilk Test Statistic
Coefficient of Variation		0.521984	Shapiro-Wilk 5% Critical Value
Skewness		2.651345	Data are Lognormal at 5% Significance Level
95 % UCL (Assuming Normal Data)			Estimates Assuming Lognormal Distribution
Student's-t		3.122985	MLE Mean
95 % UCL (Adjusted for Skewness)			MLE Standard Deviation
Adjusted-CLT		3.343458	MLE Coefficient of Variation
Modified-t		3.164244	MLE Skewness
95 % Non-parametric UCL			MLE Median
CLT		3.078937	MLE 80% Quantile
Jackknife		3.122985	MLE 90% Quantile
Standard Bootstrap		3.051074	MLE 95% Quantile
Bootstrap-t		3.865287	MLE 99% Quantile
Chebyshev (Mean, Std)		4.027125	MVU Estimate of Median
			MVU Estimate of Mean
			MVU Estimate of Std. Dev.
			MVU Estimate of SE of Mean
			UCL Assuming Lognormal Distribution
			95% H-UCL
			95% Chebyshev (MVUE) UCL
			99% Chebyshev (MVUE) UCL
			Recommended UCL to use:
			Student's-t or H-UCL

SWMU 231

General Statistics

SWMU 231					
Summary Statistics for		arsenic	Summary Statistics for		ln(arsenic)
Number of Samples		12	Minimum		0.182322
Minimum		1.2	Maximum		1.740466
Maximum		5.7	Mean		0.766958
Mean		2.374167	Standard Deviation		0.44689
Median		2.25	Variance		0.199711
Standard Deviation		1.217378			
Variance		1.482008	Shapiro-Wilk Test Statistic		0.930821
Coefficient of Variation		0.51276	Shapiro-Wilk 5% Critical Value		0.859
Skewness		1.953615	Data are Lognormal at 5% Significance Level		
95 % UCL (Assuming Normal Data)			Estimates Assuming Lognormal Distribution		
Student's-t		3.005288	MLE Mean		2.379317
95 % UCL (Adjusted for Skewness)			MLE Standard Deviation		1.118658
Adjusted-CLT		3.163982	MLE Coefficient of Variation		0.470159
Modified-t		3.03832	MLE Skewness		1.514406
95 % Non-parametric UCL			MLE Median		2.153206
CLT		2.952212	MLE 80% Quantile		3.141122
Jackknife		3.005288	MLE 90% Quantile		3.823675
Standard Bootstrap		2.921609	MLE 95% Quantile		4.491076
Bootstrap-t		3.377078	MLE 99% Quantile		6.088639
Chebyshev (Mean, Std)		3.906	MVU Estimate of Median		2.135352
			MVU Estimate of Mean		2.358104
			MVU Estimate of Std. Dev.		1.07576
			MVU Estimate of SE of Mean		0.310095
			UCL Assuming Lognormal Distribution		
			95% H-UCL		3.1481
			95% Chebyshev (MVUE) UCL		3.709775
			99% Chebyshev (MVUE) UCL		5.443506
			Recommended UCL to use:		
			Student's-t or H-UCL		

SWMU 232-1

General Statistics

SWMU 232-1			
Summary Statistics for		arsenic	Summary Statistics for
Number of Samples		12	ln(arsenic)
Minimum		0.98	Minimum
Maximum		5.1	Maximum
Mean		2.093333	Mean
Median		1.7	Standard Deviation
Standard Deviation		1.205354	Variance
Variance		1.452879	Shapiro-Wilk Test Statistic
Coefficient of Variation		0.575806	Shapiro-Wilk 5% Critical Value
Skewness		1.531818	Data are Lognormal at 5% Significance Level
95 % UCL (Assuming Normal Data)			Estimates Assuming Lognormal Distribution
Student's-t		2.718222	MLE Mean
95 % UCL (Adjusted for Skewness)			MLE Standard Deviation
Adjusted-CLT		2.830077	MLE Coefficient of Variation
Modified-t		2.743866	MLE Skewness
95 % Non-parametric UCL			MLE Median
CLT		2.66567	MLE 80% Quantile
Jackknife		2.718222	MLE 90% Quantile
Standard Bootstrap		2.64416	MLE 95% Quantile
Bootstrap-t		3.04951	MLE 99% Quantile
Chebyshev (Mean, Std)		3.610037	MVU Estimate of Median
			MVU Estimate of Mean
			MVU Estimate of Std. Dev.
			MVU Estimate of SE of Mean
			UCL Assuming Lognormal Distribution
			95% H-UCL
			95% Chebyshev (MVUE) UCL
			99% Chebyshev (MVUE) UCL
			Recommended UCL to use:
			H-UCL

SWMU 66

General Statistics

SWMU 66					
Summary Statistics for		Arsenic		Summary Statistics for	
Number of Samples		44		ln(Arsenic)	
Minimum		2.1		Minimum	
Maximum		15.4		Maximum	
Mean		6.1025		Mean	
Median		5.635		Standard Deviation	
Standard Deviation		2.891816		Variance	
Variance		8.362601		Shapiro-Wilk Test Statistic	
Coefficient of Variation		0.473874		Shapiro-Wilk 5% Critical Value	
Skewness		1.121094		Data are Lognormal at 5% Significance Level	
95 % UCL (Assuming Normal Data)				Estimates Assuming Lognormal Distribution	
Student's-t		6.835376		MLE Mean	
95 % UCL (Adjusted for Skewness)				MLE Standard Deviation	
Adjusted-CLT		6.898317		MLE Coefficient of Variation	
Modified-t		6.847656		MLE Skewness	
95 % Non-parametric UCL				MLE Median	
CLT		6.819587		MLE 80% Quantile	
Jackknife		6.835376		MLE 90% Quantile	
Standard Bootstrap		6.810294		MLE 95% Quantile	
Bootstrap-t		6.954678		MLE 99% Quantile	
Chebyshev (Mean, Std)		8.002795		MVU Estimate of Median	
				MVU Estimate of Mean	
				MVU Estimate of Std. Dev.	
				MVU Estimate of SE of Mean	
				UCL Assuming Lognormal Distribution	
				95% H-UCL	
				95% Chebyshev (MVUE) UCL	
				99% Chebyshev (MVUE) UCL	
				Recommended UCL to use:	
				Student's-t or H-UCL	

SWMU 9

General Statistics

SWMU 9	
Summary Statistics for 2-Amino-4,6-dinitrotoluene	
Number of Samples	76
Minimum	0.0033
Maximum	3.68
Mean	0.2118302632
Median	0.0067
Standard Deviation	0.5817663116
Variance	0.3384520413
Coefficient of Variation	2.746379592
Skewness	4.69054563
Lilliefors Test Statistic	0.3600058379
Lilliefors 5% Critical Value	0.1016311701
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95% UCL (Assuming Normal Data)	
Student's-t	0.3229693582
95% UCL (Adjusted for Skewness)	
Adjusted-CLT	0.3599618782
Modified-t	0.3289535719
95% Non-parametric UCL	
CLT	0.3215965643
Jackknife	0.3229693582
Standard Bootstrap	0.3234650063
Bootstrap-t	0.4583355893
Chebyshev (Mean, Std)	0.502713419

General Statistics

SWMU 9	
Summary Statistics for	4-Amino-2,6-dinitrotoluene
Number of Samples	76
Minimum	0.00275
Maximum	2.29
Mean	0.1574065789
Median	0.00505
Standard Deviation	0.3890942839
Variance	0.1513943618
Coefficient of Variation	2.471906108
Skewness	3.830155045
Lilliefors Test Statistic	0.362837273
Lilliefors 5% Critical Value	0.1016311701
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95% UCL (Assuming Normal Data)	
Student's-t	0.2317381202
95% UCL (Adjusted for Skewness)	
Adjusted-CLT	0.2517725796
Modified-t	0.2350063032
95% Non-parametric UCL	
CLT	0.2308199745
Jackknife	0.2317381202
Standard Bootstrap	0.2310650059
Bootstrap-t	0.2743577913
Chebyshev (Mean, Std)	0.3519537209

General Statistics

SWMU 9	
Summary Statistics for	Benzo(a)pyrene
Number of Samples	73
Minimum	0.036
Maximum	0.12
Mean	0.03715068493
Median	0.036
Standard Deviation	0.009831456364
Variance	9.665753425E-005
Coefficient of Variation	0.2646372841
Skewness	8.544003745
Lilliefors Test Statistic	0.5328876937
Lilliefors 5% Critical Value	0.1036984564
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95% UCL (Assuming Normal Data)	
Student's-t	0.03906806366
95% UCL (Adjusted for Skewness)	
Adjusted-CLT	0.04027291673
Modified-t	0.03925984448
95% Non-parametric UCL	
CLT	0.03904339322
Jackknife	0.03906806366
Standard Bootstrap	0.03906780011
Bootstrap-t	-1.#QNAN
Chebyshev (Mean, Std)	0.04216640426

General Statistics

SWMU 9	
Summary Statistics for Benzo(g,h,i)perylene	
Number of Samples	73
Minimum	0.0405
Maximum	0.13
Mean	0.04267808219
Median	0.0405
Standard Deviation	0.01317309175
Variance	0.0001735303463
Coefficient of Variation	0.308661755
Skewness	6.060960979
Lilliefors Test Statistic	0.5382658485
Lilliefors 5% Critical Value	0.1036984564
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
95% UCL (Assuming Normal Data)	
Student's-t	0.045247163
95% UCL (Adjusted for Skewness)	
Adjusted-CLT	0.04638276345
Modified-t	0.04542944975
95% Non-parametric UCL	
CLT	0.04521410727
Jackknife	0.045247163
Standard Bootstrap	0.04516633511
Bootstrap-t	-1.#QNAN
Chebyshev (Mean, Std)	0.04939860543

General Statistics

From File	
Summary Statistics for	RDX
Number of Samples	76
Minimum	0.00485
Maximum	26
Mean	2.863429
Median	0.874
Standard Deviation	5.348326
Variance	28.60459
Coefficient of Variation	1.867805
Skewness	2.954668
Lilliefors Test Statistic	0.296504
Lilliefors 5% Critical Value	0.101631
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
99% UCL (Assuming Normal Data)	
Student's-t	4.321769
99% UCL (Adjusted for Skewness)	
Adjusted-CLT	4.700381
Modified-t	4.356424
99% Non-parametric UCL	
CLT	4.290632
Jackknife	4.321769
Standard Bootstrap	4.30461
Bootstrap-t	5.294516
Chebyshev (Mean, Std)	8.967627

General Statistics

SWMU 9	
Summary Statistics for	2,4,6-Trinitrotoluene
Number of Samples	76
Minimum	0.00285
Maximum	18
Mean	0.8988052632
Median	0.00705
Standard Deviation	3.304352648
Variance	10.91874642
Coefficient of Variation	3.676383287
Skewness	4.555488479
Lilliefors Test Statistic	0.4199366114
Lilliefors 5% Critical Value	0.1016311701
Data not Normal at 5% Significance Level	
Data not Lognormal: Try Non-parametric UCL	
99% UCL (Assuming Normal Data)	
Student's-t	1.799810502
99% UCL (Adjusted for Skewness)	
Adjusted-CLT	2.170886233
Modified-t	1.832821336
99% Non-parametric UCL	
CLT	1.780573098
Jackknife	1.799810502
Standard Bootstrap	1.771129398
Bootstrap-t	6.030904486
Chebyshev (Mean, Std)	4.670158322